Fit-for-Purpose

Building Spatial Frameworks for Sustainable and Transparent Land Governance

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FIT FOR PURPOSE:
Building Spatial Frameworks for Sustainable and Transparent Land Governance

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ABSTRACT

Spatial frameworks identify the spatial units such as land parcels, as a basis for dealing with land administration functions. However, building such spatial frameworks is not primarily about accuracy. It is about adequate identification and representation of the spatial/legal objects and parcels; completeness to cover the total jurisdiction; and credibility in terms of reliable data being trusted by the users. Accuracy can then be incrementally improved over time when relevant and justified by serving the needs of citizen, business and society in general.

Such a fit-for-purpose approach is fundamental for building adequate land administration systems in developing regions in support of sustainable and transparent land governance. The paper addresses some of the key technological, economic, legal, and social issues related to building such fit-for purpose spatial frameworks as a means of paving the way towards sustainable and transparent land governance in developing countries.

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. The operational component of land governance is the country specific land administration systems dealing with the four key functions of land tenure, land value, land, and land development. From a global perspective, land administration systems act within adopted land policies that define the legal regulatory pattern for dealing with land issues.

Land administration systems - whether highly advanced or very basic – require a spatial framework to operate. This framework provides the fundamental information for dealing with land issues such as adjudication and recordation of legal and social tenure; assessment of land value and taxation; identification of the current use of land and planning for future land use and development; delivery of utility services; and administration and protection of natural resources.

This paper argues that the spatial framework should be developed using a flexible and fit-for-purpose approach rather than being guided by costly field survey procedures or over-engineered technology solutions. 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.

KEY WORDS: Land Governance, Land Administration, Land Registration, Spatial Framework.

1. INTRODUCTION

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.

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.

Land administration systems - whether highly advanced or very basic – require a large scale spatial framework to operate. In most 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. Technology development now provides opportunities for 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. These 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 recognize the range of more informal, social, 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 with an increasing population of slum dwellers and also in rural areas with regard to food security and rural land management issues.

Building the spatial frameworks in developing countries is a major challenge – and fundamental for building systems in support of sustainable and transparent land governance.

2. LAND GOVERNANCE

All countries have to deal with land management and its four functions of land tenure, land value, land use and land development. Different countries will also put varying emphasis on each of the four functions, depending on their cultural basis and level of economic development.

Land governance is about the policies, processes and institutions by which land, property and natural resources are managed. Sound land governance requires operational processes to implement policies in sustainable ways. Many countries 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. Investment in new technology will only go a small way towards solving a deeper problem: the failure to treat land and its resources as a whole.

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.

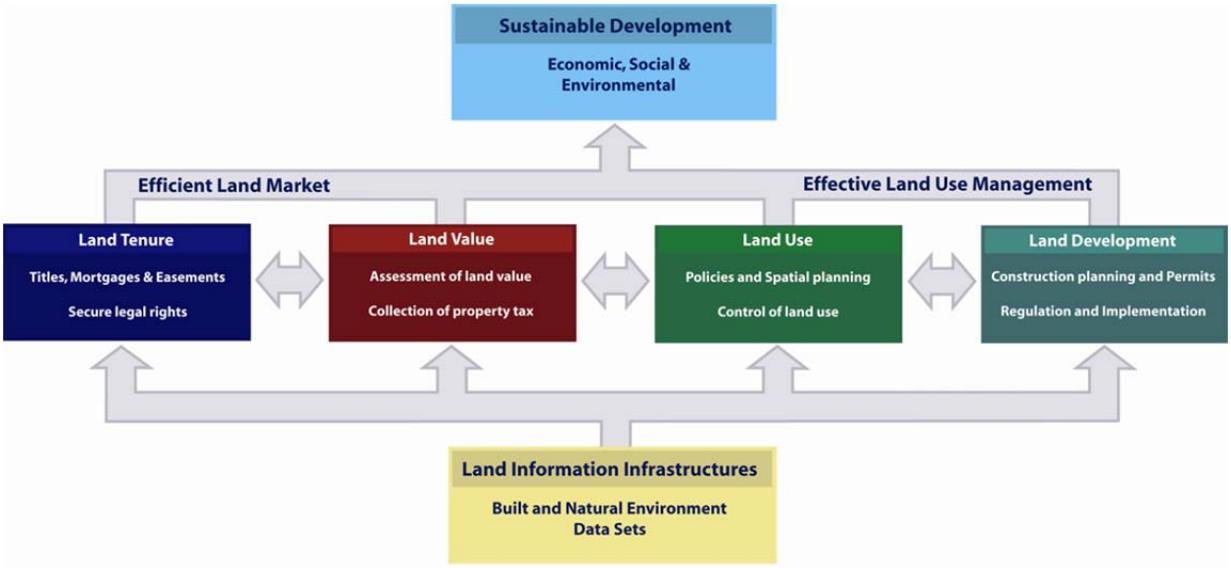

Figure 1: A global land administration perspective (Enemark, 2004).

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 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; and 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.

3. 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 (MDGs) were adopted as the overarching agenda; and in the 2010s there is increasingly focus on climate change and related challenges such as natural disasters, food shortage and environmental degradation. Finally rapid urbanisation has appeared as 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 (FIG/WB, 2010).

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).

The MDGs are a good example of the need for on-going data collection and documentation to drive global change. The concept of 8 goals divided into 18 targets and 48 indicators simply creates a demand for measurement and data collection for documenting the progress.

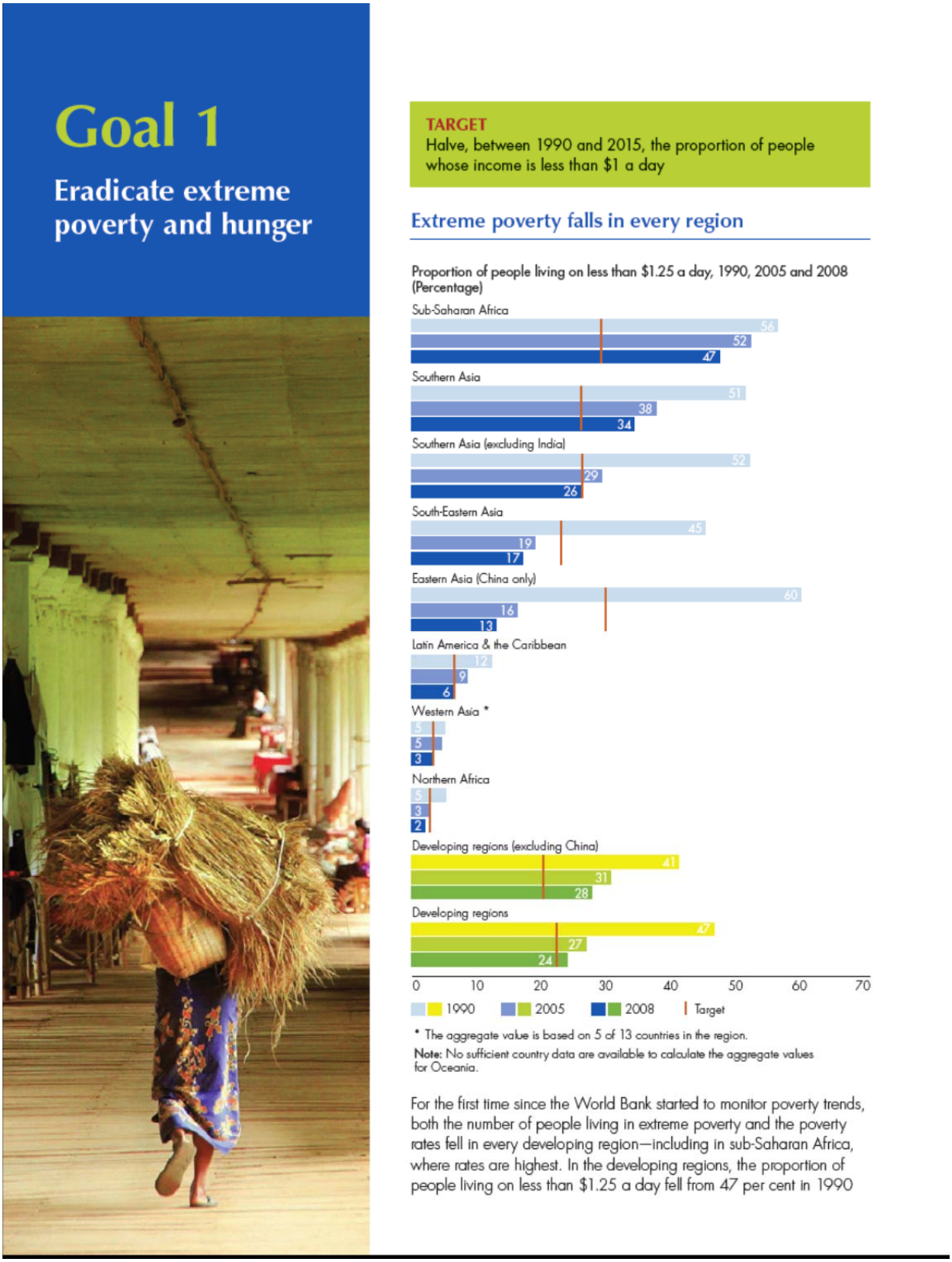

Figure 2. Documenting the progress of achieving MDGs Goal 1. (UN, MDGs Report 2012, page 6).

Looking at the MDGs Goal 1, the target is to halve between 1990 and 2015 the proportion of people whose income is less than $1 per day. At a global scale this target will actually be met – but with big deviations for the various regions throughout the world. As shown in Figure 2 the big contribution to meeting the target comes from China and South eastern Asia while poverty alleviation in regions such as Sub-Sahara Africa is progressing at a much slower pace or hardly moving at all.

The MDGs are also a good example of the phrase: *"If we can measure it – we can better it"*. This phrase (Bill Gates, 2013) relates to the fact, that without a road map for measuring the progress most UN or government pronouncements will have little impact and are easily forgotten – no matter how well-meaning they may be. But by monitoring and documenting the on-going progress governments can justify activities and costs and also attract donor money toward meeting the country specific targets.

The MDGs represent a wider concept or a vision for the future that is clearly stated and backed by a broad consensus. Talking about measurement, land professionals, such as surveyors, have a key role to play in 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 functions underpin development and innovation and form a kind of "backbone" in society that supports social justice, economic growth, and environmental sustainability. These aspects are all key components within the MDGs.

Another good example of measuring and monitoring is the Land Governance Assessment framework (LGAF) developed by the World Bank in conjunction with UN and other partners. The LGAF provides a holistic diagnostic review at the country level that can inform policy dialogue in a clear and targeted manner. This quick and innovative tool to monitor land governance is built around five main areas for policy intervention: rights recognition and enforcement; land use planning, land management, and taxation; management of public land; public provision of land information; and dispute resolution and conflict management. The LGAF helps policymakers and other stakeholders to make sense of the technical levels of the land sector, benchmark governance, prioritize reforms in the land sector and identify areas that require further attention (World Bank, 2011). Further examples are the World Bank´s "Doing Business" reports (World Bank, 2012), and the Corruption Perception Index of Transparency International (Transparency International, 2012).

In summary, there is a general consensus that governing the people to land relationship is in the heart of the global agenda. In this regard, it must be recognised that land governance and the operational component of land administration systems need a spatial framework to establish the link between people and land, and thereby enable monitoring of improvements in relation to meeting aims and objectives of adopted land policies.

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.

4. THE SPATIAL FRAMEWORK

The spatial framework is the basic large scale mapping showing the way land is divided into parcels and plots for specific use and possession. This framework provides the basis for dealing with the land administration functions such as recordation and management of legal and social tenure; assessment of land and property value and taxation; identification and management of current land use; planning for future land use and land development; delivery of utility services; and administration and protection of natural resources.

These functions are presented in Figure 1 as land tenure, land value, land use, and land development. The operation of these four functions is supported by a land information infrastructure organising the datasets of the natural and built environment. The spatial framework is then the basic layer of this infrastructure by showing the way land is divided into parcels for specific use and possession.

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. 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.

In the developed world such as Western Europe the spatial frameworks were established about two hundred years ago – in the early 1800s. The framework originally served the purpose of valuation and taxation based on the yielding capacity of the soil or based on the use of land for different purposes. By numbering the various spatial units (land parcels) the framework was then connected to a register containing the area and value of the individual spatial units. The register and the connected spatial framework form a “cadastral system” while the actual design of this system varies considerably throughout the world. In Denmark, for example, the spatial framework (cadastral mapping) was produced by plane table and covered a village and surrounding cultivated areas. The maps were not

connected to a national grid but were updated through local cadastral surveys. These maps served as an analogue base for land administration over two centuries.

The human kind to land relationship is dynamic and is changing over time as a response to general trends in societal development. In the same way, the role of the cadastral systems is changing over time, in response to supporting these societal trends. In the Western world this dynamic interaction may be described in four phases as shown in Figure 3 below.

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

Figure 3: Evolution of Western Cadastral System (Enemark, 2004)

Over the last few decades land is increasingly seen as a community scarce resource. The role of the cadastral systems has then evolved to be serving the need for comprehensive information regarding the combination of land-use and property issues. New information technology provides the basis for this evolution. This forms the new role of cadastral systems: the multi-purpose cadastre.

Over recent decades the 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. It is important to recognise, though, that Western land registration systems generally do not require high accuracy boundary surveys. The real demand for accuracy stems from building modern web base land information systems.

In other regions of the world the Torrens/English style cadastral systems are based on boundary surveys or topographic boundary identification (UK). Analogue cadastral maps mainly served as index maps for identifying land ownership. The development of digital cadastral maps was based on the boundary surveys for the individual land parcels and put together to form a best possible seamless cadastral map linked to the national grid. This Digital Cadastral Data Base (DCDB) is then improved over time.

In summary, it looks that no matter the origin of the analogue cadastral maps the end result of the digitizing process seems to serve to same purpose. This does not relate to the cadastral process or accuracy of boundary surveys, but to the ability of combining the spatial unit graphics with other relevant topographic or property information to form an integrated source of land information – a spatial information infrastructure – serving as a basis for holistic and sustainable land management.

A website has been established http://www.cadastraltemplate.org to compare cadastral systems on a worldwide basis. About 47 countries are currently included (February 2013) and the number is still increasing. The cadastral template is basically a standard form to be completed by cadastral organizations presenting their national cadastral system. It includes samples of spatial frameworks (cadastral maps) with the aim is to understand the role that a cadastre plays in a state or a National Spatial Data Infrastructure (NSDI), and to compare best practice as a basis for improving cadastres as a key component of NSDIs. (Steudler, et.al. 2004).

It is generally accepted, however, that a good property system is a system where people can readily participate in the land market having a widespread ownership where everybody can make transactions and have access to registration. The infrastructure supporting transactions must be simple, fast, cheap, reliable, sustainable, and free of corruption. It is estimated that only about 40 countries in the world apply to these criteria (mainly ECE region + North America, Japan, South Korea, AUS and NZ).

5. FIT FOR PURPOSE

The term fit-for-purpose indicates that the spatial framework in the developing world should be developed using a flexible approach to accuracy and identification rather than copying the western style of cadastral mapping based on boundary surveys.

Fit-for-purpose means that the framework should be designed for the purpose of managing current land issues within a specific country or region - rather than following more advanced technical standards. The land administration functions as mentioned above and as shown in Figure 1 may put different requirements on accuracy and this again may vary depending on the geography and density of the use of land. E.g. security of tenure does not in itself require accurate surveys of the boundaries while the important aspect is identification of the land object in relation to the connected legal or social right. Also, the accuracy required for the purpose of planning and management of the use of land varies considerably for different kinds of rural land uses and again for the higher density of built up urban areas.

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. Accuracy is then a relative term that relates to the purpose of creating the spatial framework However, 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 or available.

When considering the resources and capacities required for building such spatial frameworks in developing countries, the western concepts may well be seen as the end target but not as the point of entry. Using advanced (Western) technical standards of adjudication, boundary marking, field surveys etc. are far too costly, too time consuming and capacity demanding, and in most cases simply not relevant for providing a suitable spatial framework. Considering that more than 70% of the land in most Sub-Saharan countries is currently outside the formal land administration systems, the focus should be on providing the spatial framework through methods that are fast, cheap, complete, and reliable. The framework can then be upgraded and updated whenever necessary or relevant in relation to land development and management activities.

Furthermore, it is recognized that the legal or formal Western systems do not serve the millions of people whose tenures are predominantly social rather than legal. This relates to the STDM model that recognises land rights as a continuum ranging from informal to more formalised stages as shown in figure 4, even though this process does not mean that the all societies will or should necessarily develop into freehold tenure systems. Figure 4 shows a continuum of land rights where each step in the process can be formalised, with registered freeholds offering a stronger protection, than at earlier stages.

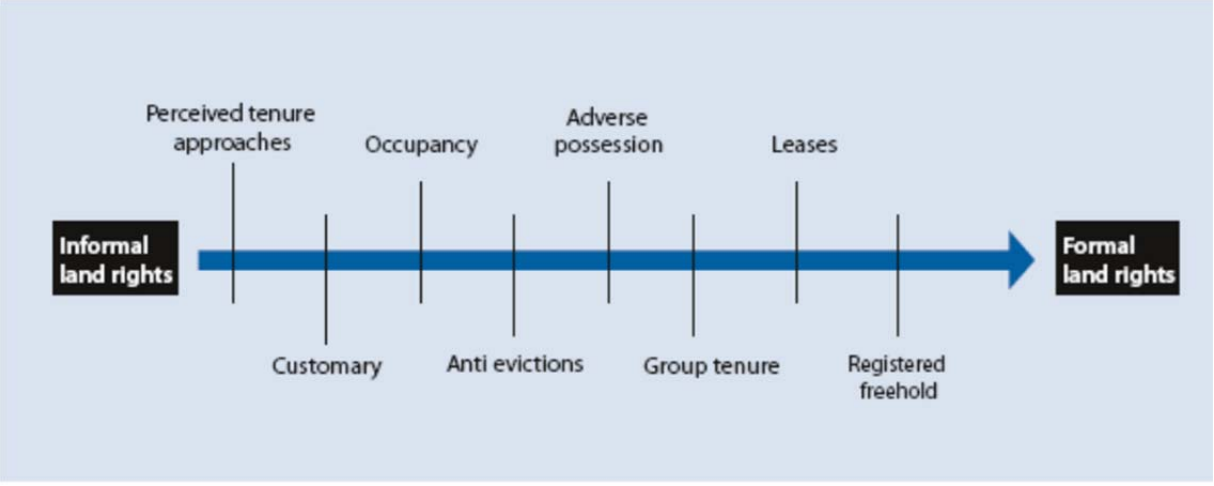

Figure 4. Continuum of land rights (UN-Habitat, 2008).

The STDM is a concept rather than a software package. The concept is focusing on the relationship between the parties (tribes, people, villages, co-operations, organisations, governments), social tenure relations ('people – land' relationships, which can be formal, informal, customary or even conflict), and spatial units (representations from reality where the social tenure occurs can be represented as sketch based, point based, line based, polygon based). (FIG/GLTN, 2010).

FAO has recently launched the voluntary guidelines on "Responsible Governance of Tenure" (FAO, 2012). The guidelines are an international "soft law instrument" that represents a global consensus on internationally accepted principles and standards for responsible practices. They provide a framework that States can use when developing their own policies, legislation and programmes. The Guidelines place tenure rights in the context of human rights such as the rights to adequate food and to adequate housing. With the help of the Guidelines a variety of actors can determine whether their proposed actions and the actions of others constitute acceptable practices. (FAO, 2012).

5.1 Key principles for building a fit-for-purpose approach.

The key principles of a fit-for-purpose approach for developing the spatial framework can be described in four points:

- **General boundaries rather than fixed boundaries.**
  Using general boundaries (the physical object in the field) will be sufficient for most land administration purposes especially in rural and semi-urban areas, while fixed boundaries (monuments and surveyed) will contribute to interoperability between legal and physical objects in advanced land information systems and also to reducing boundary disputes to some extent.
  In the context of Sub-Sahara Africa – where only 30% of the land is included in the formal land administration systems – it is argued that use of a general boundary concept will be adequate and sufficient for incorporating the remaining 70% under more formalised land administration procedures. Fixed boundaries can then be used where relevant or necessary for any specific purposes or when required and paid for by the landowner/stakeholders.

- **Satellite images/orthophoto rather than field surveys.**
  Using large scale satellite images (e.g.50 cm resolution) or orthophotos (e.g. in the scale of 1:2000) will be sufficient for most land administration purposes. Boundaries can easily be identified on the images/orthophotos in most cases, depending on the visibility of the physical boundaries. Experience (e.g. Ethiopia) shows that people in general can read the images easily so that a participatory approach to boundary determination can easily be applied. Non-visual boundaries can easily be added using hand held GPS or field survey field survey measurements.

Using satellite images/orthophotos are by far cheaper than field survey (about three times more costly in rural areas and about five times in urban areas) and does not require the capacity of trained professionals to undertake the field work. Furthermore, the mapping methodology using satellite images/orthophotos provides not only the framework of land parcels but also the general topography of land use and buildings and infrastructure, that is fundamental for the planning and land development functions of the land administration systems.

- **Accuracy relates to the purpose rather than technical standards**

  Accuracy of the information such as the parcel boundaries should be understood as a relative issue related to the use of this information, while technical standards are often inflexible and over the top for the purpose. In general, the need for accuracy is clearly lower in rural areas than in densely built up urban regions. But, more importantly, the need for accuracy of the various features should be determined by the purpose of using this information for dealing with the various land administration functions. In this regard, the registration of legal and social tenure rights requires identification of object, but the process does not call for a high accuracy in itself. Also, planning and land development processes mainly require sufficient mapping for identifying physical and spatial objects rather than high accuracy per se. Any demand for accuracy may stem from issues such as high land value in dense urban areas or implementation of costly construction works. High accuracy should therefore only be provided when needed and be paid for by the beneficiaries.

- **Opportunities for updating, upgrading and improvement**

  Building the spatial framework is not a one-stop process – it should be seen in a perspective of opportunities for on-going updating, sporadic upgrading, and incremental improvement whenever relevant or necessary for fulfilling land policy aims and objectives. This of course requires that the mapping and surveys are linked a national grid system.

  The requirement for on-going updating procedures is a must in order to ensure that all data are complete and reliable. Without such procedures the investments are easily wasted over a relatively short period. The opportunity for upgrading is essential and allows for providing an improved map-base whenever needed for specific purposes such as land development activities, major construction works and implantation of major infrastructure. This allows for incremental improvement that, in turn, will establish a spatial framework in line with modern and fully integrated land information systems.

The principles outlined above can be further qualified and justified using a wide range of experiences and analysis e.g. as provided through the recent WB report (2013) on "Improving Land Governance in Sub-Saharan Africa - A Ten Point Program to Scale Up Land Policy Reforms and Investments".

6. DISCUSSION

The discussion on building the spatial framework includes a range of issue where some of these are clearly political while others relate to social equity, economic constraints, or professional standings. While most of these issues are touched upon above it might be useful to address some of the key questions that are often raised in this regard.

- **Why should developing countries not have the same high level spatial framework as is known in developed countries?**

  This question is of course relevant. The response mainly relates to the fact that the framework in most developed countries is developed over a period of about two centuries and in response to societal, institutional and technological developments. Developing regions of course can´t wait for that, but, on the other hand, building this spatial framework should be in response to current societal needs and available economic resources. These needs will be best addressed by adopting a fit-for-purpose approach as argued above, and the framework can then be incrementally improved over time in response to societal development.

- **What are the main barriers for adopting a fit-for purpose approach?**

  The easy response to this question would be political economy constraints, colonial legacy, lack of basic financial resources, and even lack of political will. However, this may not be entirely true. Politicians will often rely on professional bodies to advise on specific professional issues. These groups of professionals, such as lawyers, surveyors, planners, etc., are highly educated and act as custodians of existing land administration systems mainly developed by colonial powers and serving mainly the elite. It is no surprise that their professional codes support the existing systems, and there are many examples of resistance towards change that will challenge their position. On the other hand, by including all land in the formal land administration systems the land professionals will contribute to social development and, at the same time, also enlarge their functions and clientele.

- **What are the main opportunities for providing a fit-for-purpose framework?**

  Experience shows that a fit-for-purpose approach is adopted mainly when there is a strong political leadership for change in support of secure land rights for all. This kind of leadership so to say bypasses the professional arguments by setting a deadline for completing the project of identification and registration of land rights. By setting a firm deadline – say five years as was the case in Rwanda – there is no way this can be accomplished using the traditional field surveys. Instead, new approaches have to be developed while still meeting the overall land reform aim and objectives. In this situation, the fit-for-purpose approach is the obvious choice.

- **What are the benefits of adopting a fit-for-purpose approach?**

  The benefits are certainly many. The key benefit would be that by taking this approach it will be possible to include all land in the formal land administration system within a reasonable short time and for a relatively low cost. A fit-for purpose approach also means that the solution can be shaped to fit the size of the economy – the budgetary capacity – that the system is intended to serve. Furthermore, such a framework will be more flexible and suitable for meeting the current demands in the land sector – and the framework can easily be incrementally improved over time. This will enable a developing country to leap frog many of the steps and lessons that developed countries have been through when the time is right, resources are available, and the need for improvement present itself. It looks that the benefits will easily outweigh the disadvantages (if any).

The discussion may include a wide range of further questions. However, by raising this fundamental question of building the spatial framework for developing countries – and especially in Sub-Sahara Africa – the scene is set for decision making and implementation.

7. FINAL REMARKS

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.

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 be referred to as a “continuum of accuracy”.

The key focus should be on providing secure land rights for all, and managing the use of land and natural resources for the benefit of local communities and the society as a whole. The spatial framework provides the foundation for making land administration systems operational in support of sustainable and transparent land governance.

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BIOGRAPHICAL NOTES

Stig Enemark is Honorary President of the International Federation of Surveyors, FIG (President 2007-2010). He is Professor of Land Management at Aalborg University, Denmark, where he was Head of School of Surveying and Planning for 15 years. He holds a M.Sc. in Surveying, Planning, and Land Management and before joining the University in 1980 he was a consultant surveyor in private practice for 12 years. He is Past President and Honorary Member of the Danish Association of Chartered Surveyors. 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, Asia and Sub-Saharan Africa. For a full list of about 350 publications see: http://vbn.aau.dk/en/publications/searchall.html?searchall=Stig%20Enemark.