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Spatially Enabled Land Administration – Bridging the Gap

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Abstract

Good governance is a qualitative term or an ideal which may be difficult to achieve. Different people, organisations, and government authorities will define "good governance" according to their own experience and interests. In any case, almost all kind of government includes a spatial component. In other words: Good governance and sustainable development is not attainable without sound land administration or - more broadly – sound land management.

The paper presents a land management vision that incorporates the benefits of ICT enabled land administration functions. The idea is that spatial enabling of land administration systems managing tenure, valuation, planning, and development will allow the information generated by these activities to be much more useful. Also, the services available to private and public sectors and to community organisations should commensurably improve.

Knowledge management is about organising and sharing of knowledge just like spatial information management is about organising and sharing of spatial data. In relation to e-Government knowledge management is basically about designing and implementing suitable spatial data infrastructures that can improve the communication between administrative systems and also establish more reliable data due to the use the original data instead of copies. In Denmark, such governmental guidelines for a service-oriented IT-architecture in support of e-government are recently adopted.

Finally, the paper presents the role of FIG in terms of developing relevant land information policies in the Latin American and Caribbean region. The focus is on establishing an awareness of the value of integrating the land administration/cadastre/land registration function with the topographic mapping function. In other words: the value of bridging the gap.

Introduction

Modern ICT offers a whole range of opportunities and, at the same, imposes all kind of challenges to be faced by professional communities within the spatial sciences. This relates especially to areas such e-Governance, Knowledge Management, and Land Management.

These areas interact and respond mutually. This papers agues that spatial enabled land administration is the key component for bridging the gabs.

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 e.g. as identified in the UN-Habitat Global Campaign on Urban Governance. The characteristics or norms are as follows (adapted from UN-Habitat, 2002):

- *Sustainability:* balancing social, economic and environmental needs while being responsive to the present and future needs of society.
- *Subsidiarity:* allocation of authority at the closest appropriate level consistent with efficient and cost-effective services
- *Equity of access:* Women and men must participate as equals in all decision making, priority setting, and resource allocation processes
- *Efficiency:* Public services and local economic development must be financially sound and cost-effective.
- *Transparency and Accountability:* Decisions taken and their enforcement follow rules and regulations. Information must be freely available and directly accessible.
- *Civic Engagement and Citizenship:* Citizens must be empowered to participate effectively in decision-making processes.
- *Security:* All stakeholders must strive for prevention of crime and disasters. Security also implies freedom from persecution, forced evictions and provision of land tenure security.

Once the adjective "good" is added, a normative debate begins. Different people, organisations, and government authorities will define "good governance" according to their own experience and interests. E.g. it may be argued that issues such as rule of law, responsiveness, and consensus orientation should be added to list above. The term good governance can also be viewed in several contexts such as corporate, institutional, national, and local governance. In any case, almost all kind of government includes a spatial component. In other words: Good governance and sustainable development is not attainable without sound land administration or - more broadly – sound land management.

The Land Management Paradigm

Land management is the process by which the resources of land are put into good effect (UN-ECE 1996). Land management encompasses all activities associated with the management of land and natural resources that are required to achieve sustainable development. The concept of land includes properties and natural resources and thereby encompasses the total natural and build environment. Land administration is an area dealing with rights, restrictions and responsibilities in land. This relates to the interaction of the three areas of land tenure, land value and land use. By including land development these four areas are called the Land Administration Functions. These functions are based on policies determining the overall objectives and they are managed on the basis of appropriate land information infrastructures providing complete and up to date in formation on the natural and built environment. This all sits within a country/state context of institutional arrangements that may change over time.
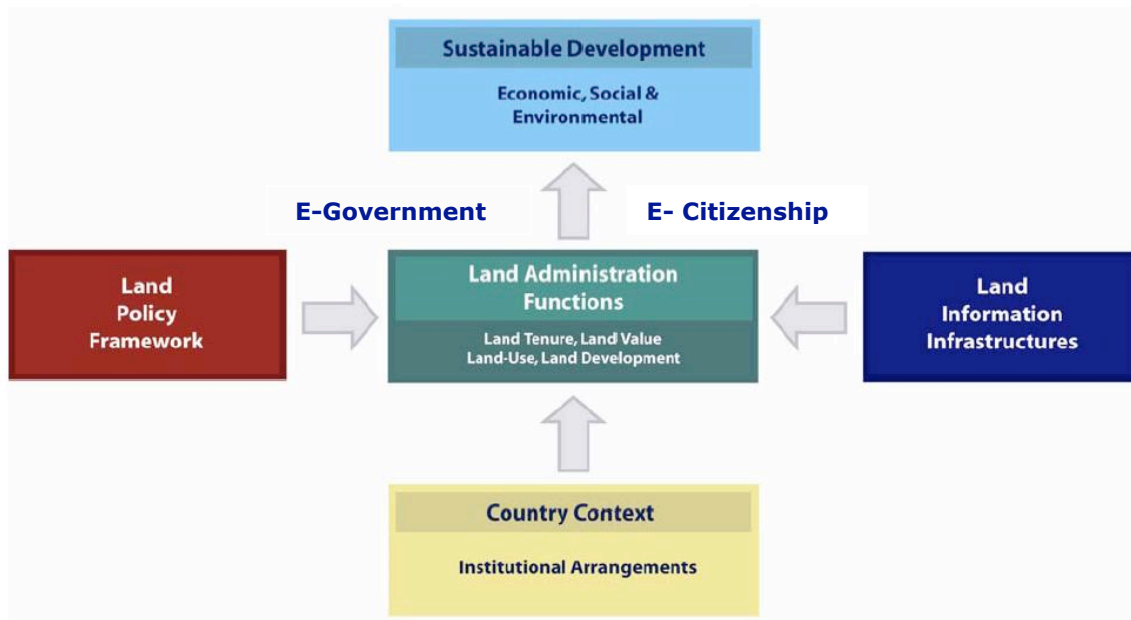

Fig. 1. The Land Management Paradigm (Enemark et.al. 2005).

Land management in developed economies should facilitate sustainable development - the triple bottom line of economic, social and environmental sustainability - through public participation and informed and accountable government decision-making in relation to the built and natural environments. The interface between the land administration infrastructure and professions and the public will increasingly be serviced by information communication technologies designed to implement e-government and e-citizenship. These processes will be used to link systems and information to people who would then be involved in delivering sustainable development at the local level. E-citizenship is mobilisation of

society to engage in planning, use and allocation of resources, using technology to facilitate participatory democracy. E-government involves a government putting government information and processes on-line, and using digital systems to assist public access. E-governance is e-democracy – helping to govern society through the use of the Web.

Spatial Enablement

Since 1990, land administration in modern democracies emerged from a technical focus aiming at serving professionals, institutions, and governments to a wider scope of serving citizens and businesses. This requires an understanding of how spatial enabling works.

On one standard, spatial enabling is just one form of interoperability (capacity for a computer to identify "where" something is). It is, however, far more energetic and offers opportunities for visualisation, scalability, and user functionality. The capacity of computers to place information in on-screen maps and to allow users to make their own enquires has raised the profile of spatial enablement. Thousands of new applications of this technology (mobile phones, vehicle tracking, digital cameras, and intelligent systems in asset management) are developing annually. These rely on the underpinning of spatial information in the cadastre, land administration, and large scale topographic maps. The benefits of spatial enablement of the core cadastral layer are (Wallace et. al. 2006):

- Maintenance and sharing of the core information layer – once created it is used many times – already used in thousands of applications
- Attachment of information to images of parcel and property configurations
- Accurate identification about the place or location of one activity in relation to other places in ways that are understandable by ordinary and non-technical people
- Capacity of businesses and citizens to understand, interrogate and manipulate information in the computer
- Inclusion of layers of geo-referenced information in the computer systems, despite their distinct sources, systems and owners, and achieve interoperability between the layers
- Integration of government information systems and provision of seamless information to institutions and government
- Incorporation of a spatial and relative information into maps permitting the location of that information to be realised and visualised
- Ultimately managing information through spatially enabled systems, rather than databases.

Spatial enablement offers land administration a revolution equivalent to the conversion of paper files to digital systems of twenty years ago. However this is not the end of the story – researchers, practitioners, big business and government are now seeing the huge potential from linking "location" or the "where" to most activities, polices and strategies, just over the horizon. Companies like Google and Microsoft are actively negotiating to gain access to the world's large scale built and natural environmental data bases.

A Land Management Vision

While the paradigm conceptually defines the land management discipline a vision for the role of this discipline in society – or a vision for the role of LAS within the paradigm - is needed as a facilitator for dynamic response to contemporary developments.

The Land administration function of land registration and tenure, valuation and taxation, planning and regulation, and development, are the institutional core of modern economies. These functions will, however, undergo changes as they adapt to the new policies of sustainable development, demand driven processes, acceleration in take-up of spatially enabled systems, and the historical and cultural realities. How a particular jurisdiction responds will depend on the understanding of the vision be its leaders.
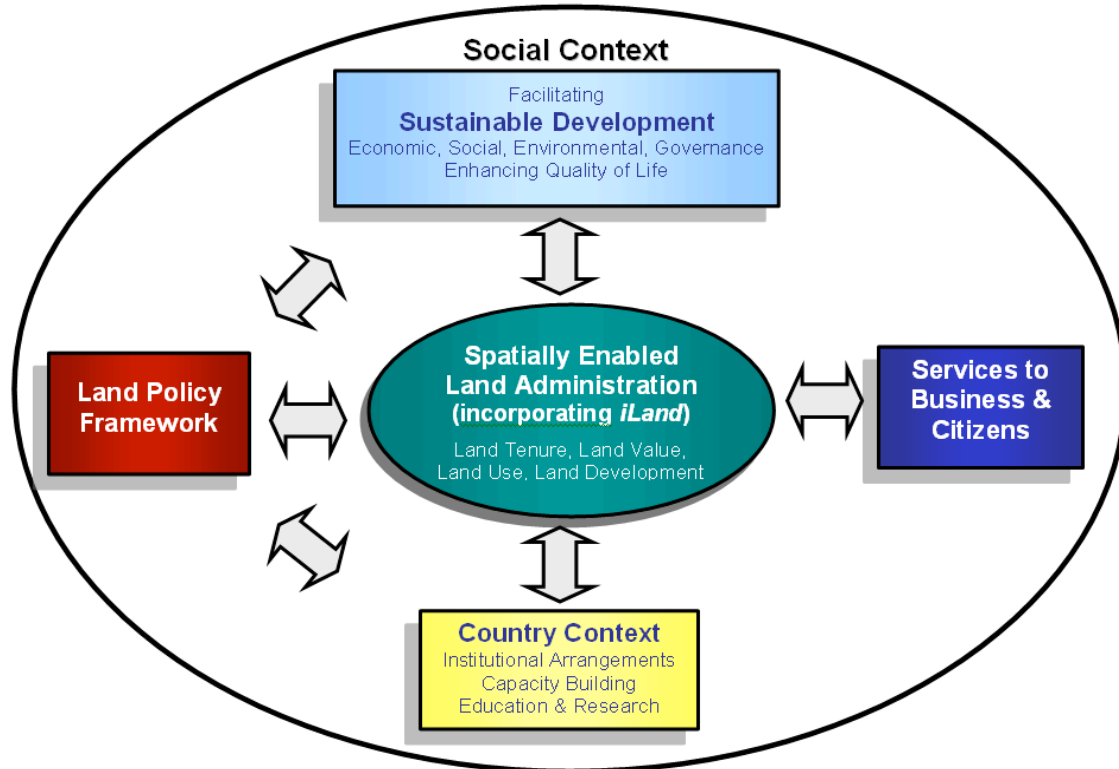
Fig. 2. A Land Management Vision (Expert Group Meeting, Melbourne, November 2005)

Compared to the paradigm the vision recognizes that land management activities must include a strong focus on benefit for the people and also ensure that feed back will take place as a basis for ongoing adaptation and innovation. The vision also aims at integrating the land information infrastructures with the land administration functions and thereby forming what is called Spatial Enabled Land Administration.

The idea is that spatial enabling of land administration systems managing tenure, valuation, planning, and development will allow the information generated by these activities to be much more useful. *Firstly,* the achievement of sustainable development goals will be easier to evaluate since adaptability and usability of modern spatial systems will encourage much more information to be collected and made available. For governments, building a suitable land policy framework will be assisted by better information chains. *Secondly,* the services available to private and public sectors and to community organisations should commensurably improve.

Ideally these processes are dual: with modern information and communication technology, the engagement of users in design of suitable services, and the adaptability of new applications should increase and mutually influence. The global initiatives are the starting point, but in a national case, modifications to suit the particular context will be built. The new land administration systems of the future will be local, regional and global in their capacity.

Knowledge Management

The concept of Knowledge Management is about optimising the use of the basic asset of any organisation namely knowledge. Knowledge Management is basically an integrated approach to managing the information assets of an organisation/enterprise. These information assets may include databases, documents, policies, procedures, or just knowledge stored in the individual's heads. (Markus, 2005). Knowledge Management, this way, is just common sense. However, in reality, the state of knowing or having access to the right knowledge at the right time is a real and important business advantage.

Knowledge management in e-Government

Knowledge management is about organising and sharing of knowledge just like spatial information management is about organising and sharing of spatial data. This is of course a simplification since knowledge management is a broader concept. However, in relation to e-Government knowledge management is then basically about designing and implementing suitable spatial data infrastructures or, more particularly, it is about designing and implementing a suitable IT-architecture for organising spatial information that can improve the communication between administrative systems and also establish more reliable data due to the use the original data instead of copies. In Denmark, such governmental guidelines for service-oriented architecture e-government are recently adopted (Enemark, 2006).

The diagram contains the following labels:

Left vertical axis (top to bottom): Users, User services, Common services, Dataservices, Data

Right vertical bar: Standards for data, services and security

Internet (cloud layers)

Self service | Case system

Information services | Administrative services

DATAMODELS, METADATA

COMMON REFERENCE DATA

Sector data (repeated columns)

♀ = Web-service

Right-side text box:

Users: All kind

User services:
Self services collect and organise data from different sources for specific purposes.
Case systems design and support the processes in government administration

Common services:
Information services support the distribution of data
Administrative services secure the process of access to and updating of the data

Data services: Provide functionality
For distribution and administration

Data: Official (authentic) governmental registers and map databases
- Quality, authenticity, and actuality
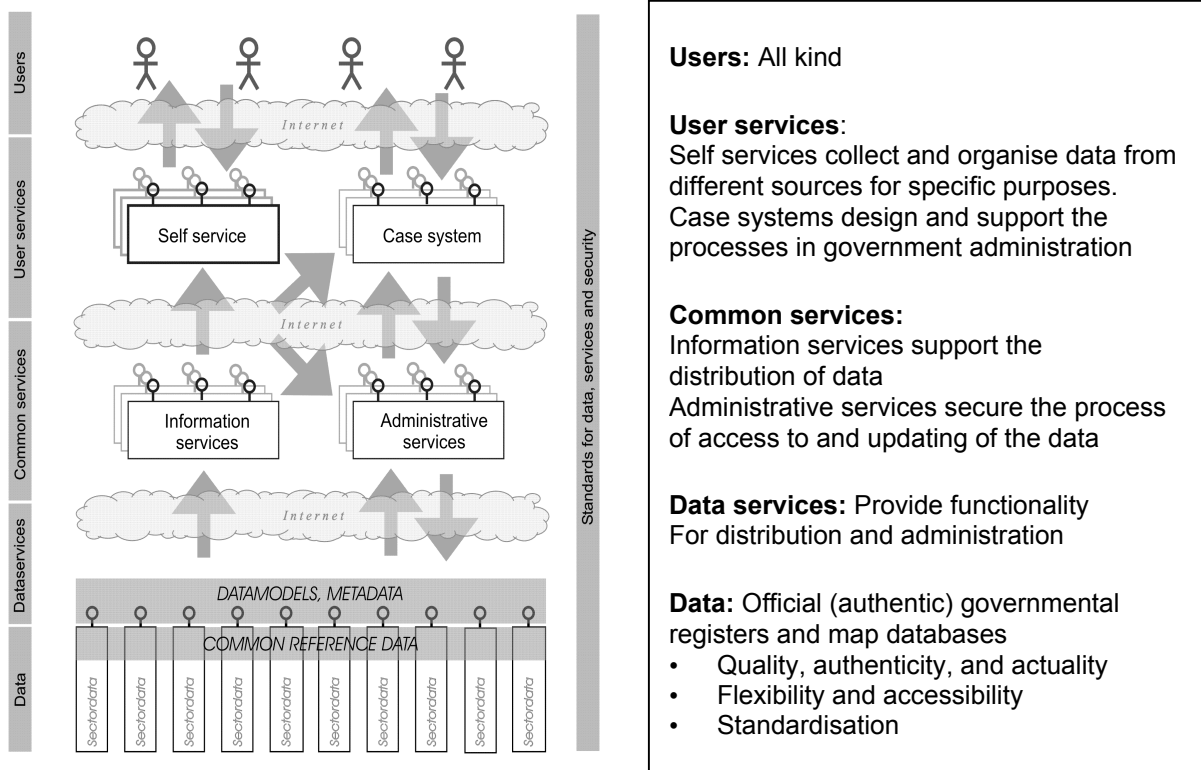- Flexibility and accessibility
- Standardisation

Fig. 3. The Danish concept for service-oriented IT-architecture.

The key elements are: (i) *Flexibility* and *accessibility* which facilitates decision-making at all levels, (ii) *Quality*, *authenticity* and *actuality* due to direct access for reading and updating in the basic databases, and (iii) *Standardisation* through homogeneously selection of communications and exchange standards such as XML etc. This is currently being applied in the area of land administration through close cooperation between the agencies and stakeholders involved.

The role of FIG

FIG can support the process of building capacity for sustainable land management in three ways:

- **Professional development**
  FIG provides a global forum for discussion and exchange of experiences and new developments between member countries and between individual professionals in the broad areas of surveying and mapping, spatial information management, and land management. This relates to the FIG annual conferences, the FIG regional conferences, and the work of the ten technical commissions within their working groups and commission seminars. This global forum offers opportunities to take part

in the development of many aspects of surveying practice and the various disciplines including ethics, standards, education and training, and a whole range of professional areas.

- **Institutional development**
  FIG provides institutional support to individual member countries or regions with regard to developing the basic capacity in terms of educational programs and professional organizations. The educational basis must include programs at minimum Bachelor level that include the combination of surveying and mapping, Spatial Information management, and Land Management. Such programs combine the land administration/cadastre/land registration function with the topographic mapping function within a holistic land management perspective. The professional organizations must include the basic mechanisms for professional development including standards, ethics and professional code of conduct for serving the clients.

- **Global development**
  FIG provides a global forum for institutional development through cooperation with international NGO´s such as the United Nations Agencies (UNEP, FAO, HABITAT), the World Bank, and sister organizations (IAG, ICA, IHO, and ISPRS). The cooperation includes a whole range of activities such as joint projects (e.g. Bathurst, Aguascalientes), and joint policy making e.g. through round tables. This should lead to joint efforts of addressing topical issues on the international political agenda, such as reduction of poverty and enforcement of sustainable development.

The three means of development are of course interrelated and interdependent. Professional development requires that both a professional organization and an educational basis are in place. Institutional development in terms of mature public agencies and policies requires a solid professional and educational base in order to establish a holistic and sustainable approach to land management based on principles of good governance and an adequate balance between the activities of the public and private sector. And global development of course requires mature NGO´s with a strong professional base.

FIG, this way, plays a strong role in improving the capacity to design, build, and manage land administration systems which incorporate spatial data infrastructures.

Throughout the last 10-15 years FIG has taken a lead role in explaining the importance of sound land administration systems as a basis for achieving "the triple bottom line" in terms of economic, social and environmental sustainability. International organizations such as UN, FAO, HABITAT and especially the World Bank have been key actors in this process. A number of these key publications are shown below.
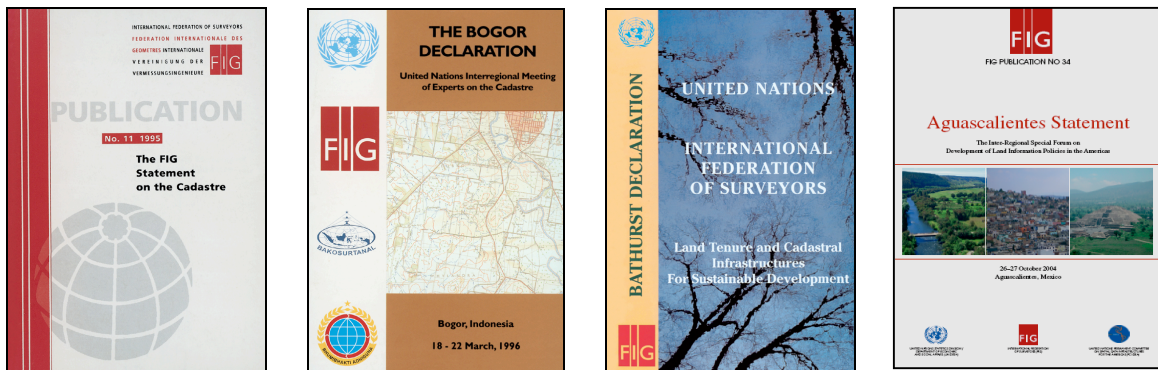
Samples of FIG publication available on the FIG website.

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

A regional case study of Latin America

The UN, FIG, PC IDEA Inter-Regional Special Forum on "Development of Land Information Policies in the Americas" was based on a resolution adopted at the Seventh United Nations Regional Cartographic Conference for the Americas held New York January 2001. The International Federation of Surveyors (FIG) was tasked with taking the lead role in organizing the special forum with support from the United Nations Statistics Division, Department of Economic and Social Affairs, and the Permanent Committee on Spatial Data Infrastructures for the Americas (PC IDEA) and was hosted by the National Institute of Statistics, Geography and Informatics (INEGI) in Aguascalientes, Mexico.

Invitations were issued by the United Nations to Ministers of Government who have responsibility for the above functions, or their senior managers who have a policy responsibility, to attend. There were about 60 delegates from 18 countries together with representatives from the United Nations, PC IDEA, World Bank, and the Pan American Institute of Geography and History (PAIGH).

The initial issue was funding, which took some time to resolve. It is therefore gratefully acknowledged the support and funding provided by the Canadian Government through Natural Resources Canada, the United States of America Government through USGS/FGDC and USAID, the World Bank through the Danish Trust Fund, and PAIGH.

The program of the special forum consisted of four key-note presentations followed by some case studies from various regions of the world, and a number of case studies from the

Latin American countries. The case studies followed a common format in order to ensure consistency and contextual focus. All papers were prepared by personal invitation in order to ensure consistency with the special forum profile. Sessions were allocated to discussions of the case studies and for short presentations and discussions on the challenges facing the Americas with respect to the theme of this forum. These provided the opportunity for those attending to either comment on a presentation or provide some insight into the situation within their own country. The full papers and the ppt-presentations are available in English and Spanish at the FIG website on http://www.FIG.net/pub/mexico.

A final report of the Special Forum was tabled at the Eighth United Nations Regional Cartographic Conference for the Americas to be held in June 2005 in New York. The report is entitled the "Aguascalientes Statement" (UN-FIG-PC IDEA, 2005). The report should assist member States to develop appropriate institutional, legal and technical processes to integrate land administration and topographic mapping programs within the context of a wider national strategy for spatial data infrastructure. The Aguascalientes Statement states the following:

> The Special Forum strongly endorses the need for Latin American and Caribbean countries to:
>
> - Foster modern land policies and associated spatial data infrastructures so as to better support social, economic and environmental sustainability.
> - Determine policies and programs for educational, professional, and institutional capacity building that will ensure the development of appropriate land administration systems and associated spatial data infrastructure.
> - Develop appropriate institutional, legal and technical processes to integrate land administration, cadastre and land registration functions with topographic mapping programs within the context of a wider national strategy for spatial data infrastructure (SDI).

Background

There are difficulties being faced by many United Nations member States in designing appropriate spatial data infrastructures to support effective land administration, and in integrating cadastral and topographic spatial data, especially in digital form. Therefore, there is a need to improve capacity to design, build and manage land administration systems, which incorporate appropriate spatial data infrastructures.

In many cases there is a lack of understanding of the important role spatial information (i.e. information that provides location on the earth, e.g. to allow accurately plotting on maps) plays in land administration projects, particularly in developing countries.

In many countries the land ownership and registration function is located in one department e.g. the justice or legal department of government, while the geodetic survey and mapping function is located in another department, and often has very little if anything to do with the ownership and registration function. When a land administration project is initiated and funded, say by the World Bank, the government's institutional arrangements of departments can make it very difficult to access information and involve the skills and knowledge between different departments, e.g. between the survey and mapping functional area and justice and legal functional area.

With this background the objective of the special forum was:

- To establish an awareness of the economic and social value for decision makers, of the importance of developing land policies that effectively and efficiently incorporate appropriate spatial data infrastructures (SDI´s).
- To develop an overall understanding of the economic and social benefits that results from integrating the land administration/cadastre/land registration functions with the topographic mapping function.

Facing the challenges

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

With few University programs in Land Management, the Latin American and Caribbean region is lacking experts to support systems of sustainable land administration infrastructures. There is a need to develop comprehensive University programs with a broader profile than a technical focus. And there is need to share efforts and information between educational institutions in order to serve the basic land administration needs in the region. Donors such as the World Bank and other aid agencies where they are building land administration systems should include the educational component to ensure long term sustainability.

In many Latin American and Caribbean countries there is a need to establish professional associations that can set standards, enforce professional development, and interact with sister associations within the region and world wide through international NGO´s such as FIG. This will increase awareness about regional and global opportunities for technological development and transfer, institutional strengthening, and the exchange of managerial and SDI experiences.

With regard to institutional arrangements it is understood that one model will not fit all countries. In spite of sharing much the same geography and history, the Latin American and Caribbean region shows diverse approaches to land information and land registration systems, as well as to the building of spatial data infrastructures. Such systems are embedded in the institutional development of the country or jurisdiction and the institutional arrangements may change over time to better support the implementation of land policies and good governance.

In terms of capacity building attention should be given to sustaining existing educational facilities in terms of institutional development, quality management, and financial support. Attention should also be given to the development of one or more Regional Centers in the Latin American and Caribbean region for Education and Research in Land Administration. Such centers should act as ongoing bodies of knowledge and experience in land administration and using actual projects as long-term case studies and operational laboratories. The centers should provide educational programs and supervise establishment of educational programs at other institutions. The centers should develop guidelines for capacity assessment in land administration and interact with national institutions, international academics and professional bodies to assist regional and local development serving regional and local needs.

Findings and recommendations

The Special Forum discussed and took note of the major challenges faced by the Latin American and Caribbean region for the creation and maintenance of land administration infrastructures for poverty reduction, economic growth, and sustainable development. The presentations from various Latin American countries were very different, as experiences depend on social and cultural factors. However, most countries in the region seem to share the same needs in terms of capacity building for educational and institutional development in land administration. Key findings and conclusions are highlighted below:

- It is important that the countries in the region develop a wider vision for the creation of knowledge, reduction of poverty, and sustainability. In this regard, it is time to handle change and to convince politicians and decision-makers.
- The need to formulate national policies, legal frameworks, and standards for land administration, land information and spatial data infrastructure is widely acknowledged.
- It is important to demonstrate the economic value of land administration systems and SDI´s to high-level decision-makers, considering the large number of priorities they are facing. This should be based on further case studies from the Latin American and Caribbean region
- Visionary leadership and also short term initiatives such as shared data collection projects are recognized as important to establish inter-organizational and inter-regional cooperation. It is necessary to ensure coordination between the key players, and to break down human, technical and political barriers.

- It is important to have a focus on the users needs in order to build trust amongst the beneficiaries of the systems. Credibility and transparency must be built into the processes, including institutional continuity and continuous modernization.
- The need for capacity development of human resources through the building of programs for education and training in land administration must be reinforced. This also applies to the establishment of national professional bodies to interact at regional and global level.
- There is a need to integrate land administration, cadastre and land registration functions with topographic mapping programs within the context of a wider national strategy for spatial data infrastructures.

Final remarks

Information and communication technologies are essential but the developments in this area are difficult to cope with in government and businesses. Modern ICT offers a whole range of opportunities and, at the same, imposes all kind of challenges to be faced by professional communities within the spatial sciences. This relates especially to areas such e-Governance, Knowledge Management, and Land Management. These areas interact and respond mutually. This papers agues that spatial enabled land administration is the key component for bridging the gabs.

The objective of this paper is to build a general understanding of the Land Management Paradigm and the need for capacity building and institutional development to establish sustainable national concepts in this area. This debate should be aware of the global trends in this area while still recognizing that the design of such systems will always be unique due to the different geographic and cultural preconditions and needs of each respective country. This calls for increased international co-operation. FIG is prepared to invest in such corporative efforts.

The conclusions can be summarized in the "Aguascalientes Statement" as also presented in this paper. Most countries in the Latin American and Caribbean region seem to share the same needs in terms of capacity building for educational and institutional development in land administration. The Statement recommends establishing an awareness of the economic and social value for decision makers, of the importance of developing land policies that effectively and efficiently incorporate appropriate spatial data infrastructures (SDI´s). It further recommends that an overall understanding of the economic and social benefits that results from integrating the land administration/cadastre/land registration functions with the topographic mapping function.

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Biographical notes

Stig Enemark is Professor in Land Management and Problem Based Learning at Aalborg University, Denmark, where he was Head of the School of Surveying and Planning 1991-2005. He is currently Vice-President of FIG 2005-2008 as well as President of the Danish Association of Chartered Surveyors. He holds a masters of science in surveying, planning and land management and he obtained his license for cadastral surveying in 1970, working for ten years as a consultant surveyor in private practice. He was chairman of FIG Commission 2 (Professional Education) 1994-98, and he is an Honorary Member of FIG.
His teaching and research are concerned with land administration systems, land management and spatial planning, and related educational and capacity building activities. Another research area is within Problem Based Learning and the interaction between education, research and professional practice. He has undertaken consultancies for the World Bank and the European Union especially in Eastern Europe and Sub Saharan Africa. He has about 250 publications to his credit, and he has presented invited papers to more than 60 international conferences.