APPENDIX - Land Administration "Best Practice" - providing the infrastructure for land policy implementation

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ABSTRACT

Land administration systems, and particularly their central cadastral components, are an important infrastructure which facilitates the implementation of land use policies. While most land administration systems traditionally have a primary objective of supporting the operation of land markets, they are increasingly evolving into a broader land information infrastructure which supports economic development, environmental management and social stability in both developed and developing countries.

While a great deal of attention is given to land use policies world wide concerned with such areas as forest management, coastal zone management, environmental sustainability and managing the urban environment, less attention is given to the infrastructures which facilitate the implementation of the associated policies and programs. Importantly all these activities rely on some form of land administration infrastructure which permits the complex range of rights, restrictions and responsibilities in land to be identified, mapped and managed as a basis for policy formulation and implementation. As a result there is an increasing interest in the concept of land administration infrastructures, in the principles and policies concerned with establishing such infrastructures and in "best practices".

In addressing this need, this paper attempts to explain the evolving concept of land administration infrastructures, the concept of "best practice" and the concept of a land administration "tool box" of principles, policies, laws and technologies which are useful in reforming or re-engineering land administration systems in support of a broader land policy agenda.

Keywords: Land administration systems, cadastre, infrastructure, land information, "best practice"

Introduction

Land administration systems, and particularly their central cadastral components, are an important infrastructure which facilitates the implementation of land use policies in both developed and developing countries (UN-FIG, 1999). These systems are concerned with the administration of land as a natural resource to ensure its sustainable development. Land administration systems are concerned with the social, legal, economic and technical framework within which land managers and administrators must operate (UNECE, 1996). In developing countries, the introduction or improvement of appropriate land administration systems is a key component of land policy for countries:

- moving from command economies to market economies, such as in Eastern and Central Europe,
- addressing injustices from apartheid, such as in Southern Africa,
- re-building shattered social and governmental institutions after war, such as Kosovo, East Timor, El Salvador and Nicaragua,
- trying to raise themselves from poverty, such as Ghana, Bangladesh, Nepal and Peru, and
- struggling to accommodate major financial crises, such as Indonesia.

All these countries and many more across all continents are endeavoring to build appropriate land administration infrastructures for a wide range of reasons.

The role of a land administration infrastructure is even more evident in developed countries. In these countries the infrastructure supports the operation of land markets, the use and creation of capital, land use planning, land taxation systems, urban infrastructure and to a large extent most of the natural resource management through the provision of spatial frameworks providing topography, land tenure, value and land use.

Within this paper, land administration is defined as the processes of determining, recording and disseminating information about the tenure, value and use of land when implementing land management policies (UNECE, 1996). It is considered to include land registration, cadastral surveying and mapping, fiscal, legal and multi-purpose cadastres and parcel based land information systems, and in many systems is closely related to or facilitates land use planning and valuation/land taxation systems (although land administration does not include the actual land use planning or land valuation processes). A cadastre is defined as a parcel based and up-to-date land information system containing a record of interests in land (e.g. rights, restrictions and responsibilities). It usually includes a geometric description of land parcels linked to other records describing the nature of the interests, and ownership or control of those interests, and often the value of the parcel and its improvements (FIG, 1995).

For economic reasons, most land administration systems have historically had a primary objective of supporting the operation of land markets. However they are increasingly evolving into a broader land information infrastructure which supports economic development, environmental management and social stability in both developed and developing countries. The trend for the key components of land administration systems, the cadastral and land registration activities, to evolve into land information systems within an information technology environment, has also

seen the evolution of the Spatial Data Infrastructure (SDI) concept as a key component of land administration infrastructures (Williamson and Ting, 2000). This has resulted in the increasing integration of traditional land administration and national mapping activities into one governmental institution (Mooney and Grant, 1997; Williamson et al, 1998). In this paper an SDI is defined as "the policies, technologies, standards and human resources necessary for the effective collection, management, access, delivery and utilisation of geospatial data" (Coleman and McLaughlin, 1998). An SDI typically comprises core data sets such as the topography, hydrology, cadastre, administrative boundaries, geographic names and geodetic framework. Within a country there is a hierarchy of SDIs from the local to state to national levels. The key to the success of SDIs are an understanding of the role of partnerships between all the components and the relationship between the SDI as an infrastructure and the business systems it supports (Chan and Williamson, 1999; Rajabifard et al, 2000).

While a great deal of attention is given to land use policies world wide concerned with such areas as forest management, coastal zone management, environmental sustainability and managing the urban environment, less attention is given to the infrastructures which facilitate the implementation of the associated policies and programs. Importantly all these activities rely on some form of land administration infrastructure which permits the complex range of rights, restrictions and responsibilities in land to be identified, mapped and managed as a basis for policy formulation and implementation. As a result there is an increasing interest in the concept of land administration infrastructures, in the principles and policies concerned with establishing such infrastructures and in "best practices".

The reality is that in most countries the land administration infrastructure provided by the cadastral and land registration activities, and surveying and mapping activities, is the only available infrastructure which enables the implementation of integrated national, state or provincial land policies. Unfortunately these land administration infrastructures are often out of date and inadequate to serve a more integrated role, even though they are usually the only option if an integrated national approach is needed. This results in purpose-built infrastructures being created which in turn results in isolated land information "silos" which are jealously guarded, cannot be integrated or combined, and are usually not shared (Mooney and Grant, 1997).

These separate purpose-built spatial or map based infrastructures have been created in virtually all countries and particularly in developing countries. Examples in forestry, planning, agriculture, land reform, environmental management, city administration, valuation and land tax departments or ministries are common world wide. While difficult to achieve, the need for a common land administration infrastructure and particularly SDI, is generally accepted in both rural (UN-FIG, 1999; Williamson et al, 2000) and urban areas (Suwanarat et al, 2000) to implement broad or integrated land policies (Mooney and Grant, 1997).

This increased interest in improving land administration systems has been partly due to the dramatic changes that have occurred in Central and Eastern Europe and Southern Africa. However the reality is that there has been major land administration reform world-wide during this period, with no indication of a slowing down of the reform process. As a result there has been considerable attention in recent times given

to land administration principles and what constitutes "best practice". For example over the last 20 years there has been about a large increase in land administration type projects supported by the World Bank (Deininger and Binswanger, 1999; Razzaz and Galal, 2000).

This paper proposes that land administration "best practice" evolves over time and varies from place to place and country to country in response to national and global drivers. To introduce the concept of "best practice" in land administration systems, the paper briefly reviews the development of "best practice" in land administration over the last 50 years. While the paper focuses on world's best practice, it emphasises developing and emerging industrial countries and their wide range of land tenure relationships. These relationships range from areas in cities with active land markets approaching modern land markets, to whole provinces which are almost completely under traditional or customary tenures.

In recognising the principle that what is "best practice" for one country is not necessarily "best practice" for another, the paper considers the dimensions of land administration reform that influence "best practice" for a specific country or set of circumstances within a country. This leads to the concept of a land administration "tool box" of options for reforming or re-engineering land administration systems based on "best practice" components.

The focus of the paper is on land administration best practice from a perspective centred on the development of land administration systems based on cadastral principles, spatial data infrastructures, institutions, legal frameworks, systems and associated technologies. The paper acknowledges a great deal of experience in land management and land administration related areas, concerned with common property regimes, sociology and anthropology, land use planning, valuation and land taxation systems, and does not attempt to summarise these areas or disciplines. While all these areas can be critically important to land administration reform, the focus of the paper takes the more technical perspective of land administration which has grown out of cadastral, land registration and national mapping systems and experiences and which facilitates or underpins many of these activities.

The paper also recognises that many "best practices" are often influenced from either an English Common Law or a Civil Code (European) perspective (and increasingly from a traditional or customary perspective), although an attempt has been made in the paper to ensure that the concept of "best practice" is considered from a generic perspective.

The paper focusses on two aspects of "best practice". In recognising that best practice is dynamic, the evolution of best practice is firstly summarised and analysed. Included in this review is a summary of the major publications, institutions and persons that have contributed to "best practice", particularly over the last 50 years or so. In this context, the paper secondly discusses the dimensions of best practice in the context of different humankind to land relationships in a country, the dynamic nature of the humankind to land relationship and the consequent evolving land administration response, and the different stages of development of different countries. It then concludes with a discussion of the land administration "tool box" concept of best practices.

The Evolution of "Best Practice" in Land Administration

Land administration "best practice" has evolved as a result of the changing relationship of humankind to land and the global drivers of sustainable development, urbanisation, globalisation, economic reform and technology (Ting et al, 1999; Ting and Williamson, 1999a and 1999b). In recent years globalization is being balanced by localization as a competing and often complimentary phenomena as discussed in the 1999/2000 World Development Report (World Bank, 2000) as follows:

> Globalization, which reflects the progressive integration of the world's economies, requires national governments to reach out to international partners as the best way to manage changes affecting trade, financial flows, and the global environment. Localization, which reflects the growing desire of people for a greater say in their government, manifests itself in the assertion of regional identities. It pushes national governments to reach down to regions and cities as the best way to manage changes affecting domestic politics and patterns of growth.

Historically modern land administration systems and resulting "best practices" realistically became established in the late 18th Century or early 19th Century with the development of the Napoleonic cadastre and the establishment of "modern" land administration systems by colonising powers such as England, France, The Netherlands, Germany, Portugal and Spain. Today the challenge in most developing countries is to integrate these so called "modern" land administration systems with indigenous cultures and tenure systems, and rapidly expanding informal sectors and institutions (see for example Hernando de Soto, 1989 and 1999; Kalabamu, 2000).

An example of a "modern" system is the Torrens System of title registration which was developed in Australia in the mid 19th Century (Simpson, 1976). As a result of the Torrens system being seen as "best practice", it was introduced into many British colonies in the late 19th Century or early 20th Century as well as into such countries as Thailand, Brazil and Hawaii (before it became a state of the USA). These systems however were generally introduced to support the property interests of the colonising power, the expatriate population and a wealthy elite. These systems had a clear economic focus. They were usually not designed for general application across the entire population of a country.

Both colonisation and de-colonisation have been a driving force for land administration reform (and "best practice") over the last 200 years. Examples of the tensions resulting from attempts to accommodate western land tenure and title systems with indigenous or customary land tenure systems are common in both developed countries (for example Australia, New Zealand, USA, Canada, Norway, Finland) and developing countries (for example Indonesia, Malaysia, most African and Latin American countries, most Pacific island states) are regularly found in the daily press.

The later half of the 20th Century saw a great deal more attention given to land registration, cadastral surveying and land administration in general. Without doubt land administration "best practice" evolved during this period, and continues to

evolve to this day. During this period there have been two major forces promoting land administration reform. The first is the desire of countries to promote economic development by improving their land administration institutions and infrastructure. Current land administration projects in Thailand, Philippines, Laos, Greece and Vietnam are examples, although there are parallel examples occurring in most developed and developing countries. The second driving force is political and is more concerned with justice and the restitution of land rights. Examples are the changes in southern Africa as a result of the fall of apartheid and the changes in Eastern and Central Europe as a result of the change from command economies to market economies, with the establishment of private land ownership and land markets. However in many countries there has been a combination of these forces (such as in China) and the need to often address security of tenure issues (such as in Indonesia).

As described by Williamson and Ting (2000), for much of the 1950s to 1970s or so, the focus was either on the technical aspects of cadastral surveying and mapping or land reform issues. Much of the literature focussed on individual cadastral or land registration activities. It was not until the mid 1980s that the role of cadastral systems and land information was starting to be widely understood in the broader context of land administration. However while there continues to be an active interest in cadastral systems due to their central role in land administration infrastructures, there has been an increasing focus in the 1990s on the broader role of land administration with strong links to land valuation, land use planning and a focus on land markets. The latter part of the 1990s then saw a growing recognition of the need for land administration systems to better address sustainable development priorities, consider common property institutions, informal systems and indigenous cultures and tenures.

This trend from a technical focus in land administration and particularly cadastres to one more concerned with economic, social and environmental issues can be clearly seen from the work and focus of the United Nations (UN) and such non government organisations such as the International Federation of Surveyors (FIG) over the last 30 or so years. In the 1970s and 1980s the focus on the UN was more concerned with cadastral surveying and mapping (UN, 1973 and 1985). The FIG spent several years developing a Statement on the Cadastre in 1995 and then together with the UN developed the joint UN-FIG Bogor Declaration on Cadastral Reform (UN-FIG, 1996). This then lead to the development in 1999 of the joint UN-FIG Bathurst Declaration on Land Administration for Sustainable Development. These trends are also clearly evident from a review of the World Bank's Land Policy Network at www.worldbank.org/landpolicy. All of these documents contribute to the evolving concept of land administration "best practice".

The UN Economic Commission for Europe (UNECE) was a key catalyst in broadening the focus from cadastral systems to land administration during the 1990s through the work of the Meeting of Officials on Land Administration (MOLA) and the resulting Land Administration Guidelines (UNECE, 1996). The MOLA initiative was sensitive to there being too many strongly held views of what constituted a cadastre in Europe and needed another term to describe these land related activities. MOLA also recognised that any initiatives that were primarily focussed on improving the operation of land markets had to take a broader perspective to include planning or land use considerations and land tax or valuation. As a result MOLA adopted the term "land administration" instead of "cadastre". Interesting today most of the work of

MOLA is still concerned with the traditional cadastral areas of land registration, cadastral surveying and mapping, and associated computerised land information systems which are the focus of this paper.

One result of these trends is that land administration systems are having to administer a greater variety and complexity of rights, restrictions and responsibilities and are having to take a more integrated, holistic and national view of land administration. Also as a result of the impact of information and communication technologies on land administration systems, a clear vision of what the future land administration systems and particularly the future cadastral systems will look like in a decade or so is becoming more urgent.

The Sources of Land Administration Best Practice

As mentioned one of the most recent examples in the evolution of "best practice" is the joint UN-FIG Bathurst Declaration on Land Administration for Sustainable Development (UN-FIG, 1999 and Williamson et al, 2000) which resulted from a Workshop and International Conference on Land tenure and Cadastral Infrastructures for Sustainable Development. The Declaration established a strong link between land administration and sustainable development. Importantly this Declaration sets out evolving concepts and principles which add to and build on the rich body of knowledge in land administration and particularly cadastral systems developed over more than half a century. This body of knowledge includes a wide range of journal articles, books, reports, statements, policies and declarations from international organisations such as the UN and the World Bank, from individual country governments, as well as from many individuals.

A summary of some of the key institutions active in developing land adminsitration "best practice" and some important "best practice" publications is useful in understanding the evolution of the concept of land administration "best practice". The following summary is expanded from Williamson and Ting (2000):

1. Reports from the Land Tenure Service of the UN Food and Agriculture Organisation (UNFAO) from as early as 1953 with the publication of the classic document titled "Cadastral surveys and records of rights in land" by Sir Bernard O. Binns (Binns, 1953) which was revised by P.F.Dale in 1995. Also the UN Centre for Human Settlements has been particularly active in land issues over the last decade or so, and particularly in the area of security of tenure, the formalisation of informal settlements and access to land. See www.unchs.org/unchs/land/land.htm.
2. The World Bank has been active in land policy, land reform, land titling and land administration for almost 30 years. A review of the World Bank's land policy for the last 25 years can be seen in Deininger and Binswanger (1999). Numerous other publications have been produced by individuals such as Dunkerley and Whitehead (1983), Feder *et al* (1988), Feder and Feeney (1991), Holstein (1996) and Byamugisha (1999). See the World Bank's Land Policy Network at www.worldbank.org/landpolicy for an extensive list of activities and publications. Noting that the Land Policy Network has a primarily rural focus, the World Bank also supports a complimentary Land and Real Estate Network which has an urban focus (for example see Razzaz and Galal, 2000).

3. The International Federation of Surveyors (FIG) has been active in promoting discussion on cadastral and land management issues for almost 100 years. In recent times Commission 7 (Cadastre and Land Management) of the FIG has produced such publications as the 1995 Statement on the Cadastre (FIG, 1995), the 1996 UN-FIG Bogor Declaration on Cadastral Reform (UN-FIG, 1996), the 1997 report on benchmarking cadastral systems (Steudler *et al*, 1997), the 1998 CADASTRE 2014 (Kaufmann, 1998 and Kaufmann and Steudler, 1998) and the 1999 UN-FIG Bathurst Declaration (UN-FIG, 1999 and Williamson *et al*, 2000). The four yearly FIG congresses are also a rich source of cadastral and land administration papers (see the proceedings of the 1998 Congress for example at the Commission 7's www site accessed through http://www.fig.net/). The FIG has sponsored the International Office of Cadastre and Land Records (OICRF) which is supported by The Netherlands Government since 1958 as one of its Permanent Institutions. It has an extensive list of references which can be accessed at www.oicrf.org.
4. Publications sponsored by the former British Colonial Office (renamed the Ministry of Overseas Development, then the Department of Overseas Development and now the Department for International Development) such as "Land Registration" by Dowson and Sheppard in 1956, "Land Law and Registration" by Simpson in 1976 and "Cadastral surveys within the Commonwealth" by Peter Dale in 1976.
5. The proceedings of the United Nations Regional Cartographic Conferences (UNRCC) which led to meetings on cadastral surveying and mapping in 1973 and 1985, a meeting on surveying and mapping legislation in 1997 and in particular led to the development of the UN-FIG Bogor Declaration on Cadastral Reform in 1996 and the UN-FIG Bathurst Declaration on Land administration for Sustainable Development in 1999 discussed above. The UNRCC is currently administered through the UN Department of Economic and Social Affairs (DESA) in New York.
6. Many developed countries have made a major commitment to development assistance in land administration and particularly the establishment and reform of cadastral systems in developing countries. These countries include The Netherlands (and particularly the International Institute for Aerospace Survey and Earth Sciences (ITC)), the United Kingdom, Sweden, Australia, Germany, France, Canada, the USA and Spain. While these countries have contributed a great deal to the development of land administration systems, there are few generic "best practice" publications resulting from them. Germany (GTZ) is a good example of a country which has encouraged the documentation of "best practice" with the most notable publication being *Land Tenure in Development Cooperation – Guiding Principles* (GTZ 1998). See http://www.gtz.de/.
7. As a result of the changes that occurred in Eastern and Central Europe in the early 1990s, with a change from command economies to market economies, the UN Economic Commission for Europe (UNECE) saw the need to establish the Meeting on Officials on Land Administration (MOLA) (noting MOLA has now be upgraded in the UNECE to the Working Party on Land Administration (WPLA). See http://www.unece.org/env/hs/wpla/welcome.html). In 1996 MOLA produced the Land Administration Guidelines (UNECE, 1996) as one of its many initiatives.
8. Various books such as the two by Dale and McLaughlin on "Land Information Management" in 1988 and on "Land Administration" in 1999, by Larsson on

"Land registration and cadastral systems" in 1991 and in 2000 Groot and McLaughlin on "Geospatial Data Infrastructure: concepts, cases and good practice".

9. Numerous articles in technical journals such as *The Survey Review* (UK), *The Australian Surveyor* (Australia) such as Williamson (1990) and *GEOMATICA* (Canada), in land policy journals such as *Land Use Policy* (see Rattanabirabongse et al, 1998), in more general planning journals such as *CITIES* (see Suwarnarat, 2000) and in international surveying, land administration and cadastral conferences such as Holstein (1996), Burns *et al* (1996) and McGrath *et al* (1996). Also numerous conferences, workshops and meetings such as the International Land Policy Conference in Florida in 1996 (http://www.surv.ufl.edu/publications/land_conf96/Barnstoc.htm), the international cadastral reform conferences at the University of Melbourne in the early 1990s, the International Conference on Land Policy Reform, Jakarta, 2000 (see www.landpolicy.org), many conferences in Western and Central Europe and numerous events sponsored by organisations such as the UN and the FIG.
10. The extensive research by the Land Tenure Center at the University of Wisconsin-Madison which was established in 1962 with a particular focus on the land tenure issues in Latin America and increasingly Eastern and Central Europe (see http://www.wisc.edu/ltc/).
11. Various research groups, typically in universities, investigating land administration issues and particularly cadastral topics in developing countries, often located in surveying, geomatics, geography or law departments. Examples include the University of New Brunswick, Canada; the Technical University of Delft, The Netherlands; Aalborg University, Denmark; several German universities; the University of Florida, USA and the University of Melbourne, Australia (see for example http://www.geom.unimelb.edu.au/research/SDI_research/). The ITC in the Netherlands is of particular importance due to the significant resources provided and attracted by it for both education, training and research. Over the last decade it has placed increasing emphasis on education and research for land administration in developing countries (see http://www.itc.nl/).

The Dimensions of Land Administration Reform

In undertaking land administration reform by drawing on "best practices" in land administration, it is important to consider the factors that drive or affect the reform and the choice of the specific strategies adopted. These factors are many and varied which re-enforces the statement that the land administration system for each country requires its own individual strategy. On the other hand strategies can be developed using the "tool box" approach. That is each specific strategy and resulting system can be made up of many separate, well understood, proven and generally accepted principles and concepts.

In designing a strategy it is first important to recognise that almost every country will require ***a range of different strategies depending on the relationship of humankind to land*** in each individual region in the specific country. In simple terms these arrangements include:

- Cities and urban areas, where active land markets operate on titled land,
- Cities and urban areas, occupied by informal settlements (squatter, illegal or low cost systems outside the formal or regulatory structures),

- High value agricultural lands which are titled and are part of the formal land market,
- Private untitled lands in rural areas and villages,
- Informal or illegal settlements in rural areas, especially in government forests,
- Lands which are subject to indigenous rights,
- Lands in all categories which are the subject of claims from previously dispossessed persons, and
- Government or state lands, reserves and forests and usually many other forms of common property

To some degree these categories are common to all developing (and many developed) countries.

The second consideration is that the relationship of humankind to land is dynamic with the result that there is ***an evolution in the each of these categories***. None of these relationships stay the same in the long term. They are affected by the impact of the global drivers on the relationship of humankind to land such as sustainable development, urbanisation, globalisation, localisation, economic reform and environmental management, as discussed above. As a result a different land administration response is required for each area or situation, within an overall national vision or strategy. The categories of land tenure can be considered a continuum of land tenure relationships in a country where to some degree tenures evolve from undocumented customary or informal tenures to documented or formal individual private rights.

Third, the stage of development of the specific country has a major impact on the appropriate form of land administration response, and what is considered "best practice" for the individual country. As an example, in simple terms in the Asian-Pacific area there are four general categories of countries:

- Developed countries, such as Japan, Korea, Australia, New Zealand and Singapore,
- Newly industrialised countries or countries in transition, such as PRC, Indonesia, Thailand, Malaysia and the Philippines,
- Countries at an early stage of development such as Vietnam and Laos, and
- Island states such as Fiji, Tonga and Vanuatu.

While each country has different development priorities, those in each group do share some similar priorities. A complication is that many countries do not fit easily into these categories with some countries having aspects of all categories. But in general the stage of development overall of an individual country does significantly influence the choice of which land administration strategies are adopted.

The combination of all these factors determine or at least strongly influence, the specific strategy or strategies adopted in reforming or establishing the land administration system. These strategies draw on the land administration "tool box" for their institutional, legal, technical and administrative solutions.

For example there is a whole range of surveying and mapping technologies and approaches depending on what is the stage of development of the country and what is

the major relationship of humankind to land which is being surveyed or mapped. These options include sporadic and systematic approaches, graphical and mathematical surveys, different positioning technologies such as satellite positioning or scaling off photomaps, different mapping technologies such as photomaps, topographic mapping and simple cadastral maps.

In addition there is a range of options for the recording land tenure relationships. There are government guaranteed land titles, deeds registration systems, title insurance systems, qualified titles (both to boundaries and title), individual ownership and communal or customary ownership.

For all these arrangements there are a range of technologies which are again strongly influenced by the wealth and development of the country. For example whether titles or deeds and cadastral maps will be computerised or held as paper records or whether the Internet can be utilised to access land records.

Institutional arrangements are influenced by the same factors. Whether the system is decentralised, deconcentrated or centralised. The level of education and training in a country. For example if a country such as Indonesia wished to have a land administration system supported by a land title and cadastral surveying system similar to Australia, this could possibly require 40,000 professional land surveyors and 30 or more university programs educating professional surveyors (based on Steudler *et al,*1997). Clearly this is not realistic in the short to medium term and as a result this re-enforces the need to develop appropriate solutions matched to the stage of development and specific requirements of the individual country.

Components of Land Administration "Best Practice"

Recognising all the above constraints, this paper proposes that there are a range of "best practices" that are useful in undertaking the establishment or re-engineering of land administration systems (also see Williamson, 2000). These can be considered the theories and principles supporting land administration and the major components of the land administration "tool box". These could be considered under the following headings:

Land policy principles

Land policy principles which are relevant to land administration could include a statement on the roles and responsibilities of the various land related activities such as land management, land reform, land registration, cadastre and particularly the role of land administration as an infrastructure. These principles could be included in a state or national land policy. Such a policy could recognise the range of humankind to land relationships in a jurisdiction and the need for appropriate land administration responses and could describe the land administration infrastructure which facilitates the development and implementation of land policies. The principles could include the components in an integrated or holistic state or national land administration vision as part of a land policy. The land policy framework could clarify the role that an integrated land administration infrastructure plays in supporting land markets, the management of cities and urban areas, and many natural resource and environmental management policies. The land policy framework could recognise the growing

complexity of rights, restrictions and responsibilities relating to land and the consequent demands on land administration infrastructures. Other land policies such as decentralisation (or deconcentration) and cost recovery of government services have a significant impact on the performance of land administration strategies could be considered. However the overall principle is that land policy drives legislative reform which in turn results in institutional reform and finally implementation with all its technical requirements.

Land tenure principles

The key land tenure principle is the recognition that most countries, and particularly developing countries, exhibit a range of land tenures, each requiring a different land administration strategy if it is to be recognised formally. This is particularly relevant where indigenous or informal tenure relationships are being addressed. There needs to be a recognition that there is a range of responses from the land administration "tool box" that can be applied to such circumstances. This includes an understanding of such concepts as adverse possession, qualifies or limited titles and flexible cadastral boundaries.

Land administration and cadastral principles

The land administration and particularly the cadastral principles comprise the majority of the principles in the land administration "tool box". A great deal has been written on the subject as highlighted in the sources identified earlier in the paper. One of the key principles is an understanding of the cadastral concept and the components of a cadastre (FIG, 1995). Another important principle is accepting that while the cadastral concept is simple, implementation is difficult. This leads to the need for a land administration and/or cadastral vision for a country. Other principles include recognition that land administration reform is long term, the need for performance indicators, that land administration is not just about supporting land markets but also national land information systems, the need to focus on land administration processes not institutions and recognition that there is a wide range of options in the land administration "tool box" for a country to draw upon. Arguably the most important principle is that the success of a land administration system, and particularly the land registration or cadastral components, is not dependent on its legal or technical sophistication, but whether it protects land rights adequately and permits those rights to be traded (where appropriate) efficiently, simply, quickly, securely and at low cost (UN-FIG 1996).

Institutional principles

While institutional principles should be dependent on policy principles and legal developments, it is generally recognised that inappropriate institutional arrangements are often the biggest limitation in undertaking land administration reform. Institutional principles should be concerned with government structures including ministerial responsibilities, departmental structures and decentralisation/deconcentration principles, as well as government-private sector relationships and partnerships, and the operation of professional organisations. Arguably the most important principle is the recognition that some of the most successful land administration or cadastral systems have been established as a result

of all land administration activities being combined into one government agency. A particularly important trend has been the bringing together of mapping, land information, cadastral, valuation and land registration agencies.

Spatial data infrastructure principles

Spatial data infrastructures (SDI) are a key component of any land administration infrastructure (Mooney and Grant, 1997; Groot and McLaughlin, 2000). A understanding of the role and potential of SDIs in supporting land administration systems greatly assists any land administration reform process. In particular the generic principles concerned with the development of an "infrastructure", as distinct from "business systems" which rely on the infrastructure, are very useful (Chan and Williamson, 1999). Also an understanding of the role and maintenance of the cadastral or land parcel layer in an SDI is important (Williamson et al, 1998). At the same time an understanding of key SDI principles, such as the hierarchy of SDIs in a jurisdiction and the dynamic nature of SDIs, are useful (Rajabifard et al, 2000).

Technical principles

The technical principles concerned with building, upgrading or re-engineering a land administration systems are critically important and often constitute a great number of the principles in the land administrtaion "tool box", but they are only one category. Unfortunately some projects concerned with land administration reform (and particularly building cadastral systems) only concentrate on technical issues and neglect other components. On the other hand the technical component of a project, and particularly the surveying and mapping component, often consumes the greatest amount of money and resources. As a result it is essential that a good understanding of the available technical options in the land administration "tool box". These options include developing technical solutions which are user driven, which can integrate both formal and informal systems and which utilise appropriate levels of computerisation in sympathy with the development of the country. Computerisation, while an integral component of almost all land administration reforms, can be a high risk strategy if not introduced carefully (Suwarnarat et al, 2000). Importantly, land administration reform is not simply about introducing a geographic information system for example. In summary, while the introduction of appropriate technical solutions will be critical to the success of any land administration project, technology is not an end in itself and must serve the overall objectives of the reform such as improving the operation of the land market or providing security of tenure (UN-FIG, 1996).

Human resource development and capacity building principles

There are two key outcomes required from building or re-engineering land administration systems; first the establishment of an appropriate land administration system and secondly ensuring that there is sustainable long term capacity of educated and trained personnel to operate the system in both the public and private sectors. All human resource development (HRD) and capacity building principles are central to these objectives. For example it is critical that capacity building is a mainstream component of a project, not an "add-on". Also that capacity building is equally applicable to the private sector and the establishment of professions, as it is to the

public sector. In this context, there are a whole range of capacity building and HRD principles and options within the land administration "tool box".

Conclusion

While many land related activities and policies appropriately receive a great deal of attention world wide, there is much less attention given to the land administration systems or infrastructures which facilitate the implementation of those policies and programs. Consideration of the importance of land administration systems has increased over the last decade or so, with considerable attention being paid to what constitutes "best practice". As a result this paper has attempted to describe the concept of land administration "best practice" from the perspective of a "tool box" of policies, laws, institutions, principles and technologies.

The evolution of "best practice" has been discussed and the major sources of "best practice" summarised. The paper concludes that what is "best practice" for one country is not necessarily "best practice" for another. Also since the humankind to land relationship varies across a country resulting in different land administration responses, what is "best practice" for one part of a country is not necessarily "best practice" in another. The paper explores these concepts by examining the dimensions of land administration reform.

In summary there are two key principles which underpin all land administration "best practice". First the documentation and wide acceptance of why the reform is being undertaken. For example is it to promote an active land market or is it to support sustainable development or is it to promote social stability? It is important to remember that land administration and their central cadastral systems:

> "… are not ends in themselves. They support effective land markets, increased agricultural productivity, sustainable economic development, environmental management, political stability and social justice." (UN-FIG, 1996)

As a result land administration systems and their technical components must be driven by the needs of the users as shown in Figure 1.

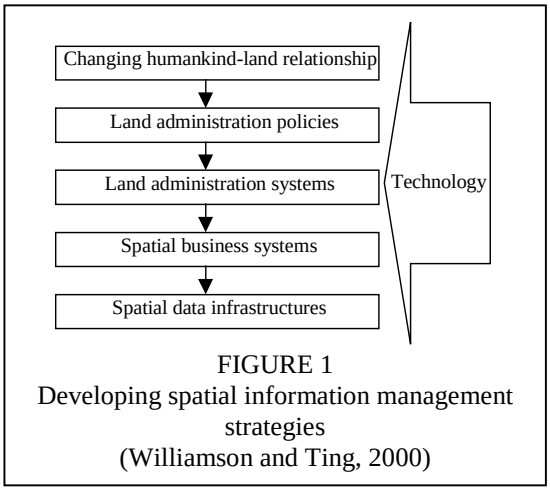

FIGURE 1
Developing spatial information management strategies
(Williamson and Ting, 2000)

Second is the development of a vision for a future land administration system for the country. Land administration reform by its very nature is long term and as such there is a need for a clear road map to ensure that all developments and changes contribute to the overall vision for the land administration system for the country. Due to the complexity of land administration systems there is a strong argument for such projects to comprise "bite size" sub-projects which have a clear focus, however it is essential that these sub-projects are undertaken as part of an agreed vision and integrated land administration strategy for the country.

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References

Binns, Sir Bernard O. and Dale P.F. 1995. Cadastral surveys and records of rights in land. Based on the 1953 study by Sir Bernard O. Binns, revised by Peter F. Dale. FAO Land Tenure Studies 1, UNFAO Rome. http://www.fao.org/icatalog/book_review/giii/land1-e.htm (accessed 7 August, 2000).

Burns, A., Eddington, R., Grant, C. and Lloyd, I. 1996. Land Titling Experience in Asia. *Proceedings of the International Conference on Land tenure and Administration in Developing Countries,* Orlando, Florida, November 23-26, 1996. http://www.surv.ufl.edu/publications/land_conf96/Barnstoc.htm Accessed 15 August, 2000.

Byamugisha, F.K. 1999. The Effects of Land Registration on Financial Development and Economic Growth: A Theoretical and Conceptual Framework. *Policy Research Working Paper No. 2240*. The World Bank, Washington, D.C. (November 1999).

Chan, T. O. and Williamson, I. P., (1999) The different identities of GIS and GIS diffusion. *International Journal of Geographical Information Science*, **13**(3), 267-281.

Coleman, D. J. and McLaughlin J., 1998. Defining global geospatial data infrastructure (GGDI): components, stakeholders and interfaces, *Geomatica*, **52**(2), 129-144.

Dale, P.F. 1976. *Cadastral Surveys within the Commonwealth*. HMSO

Dale, P.F.and Baldwin, R. 1999. Emerging land markets in Central and Eastern Europe. Proceedings of the Second World Bank/FAO Workshop on Lessons for EU Accession, Warsaw, Poland, June 27-29, 1999. Edited by C.Csaki and Z.Lerman. World Bank Technical Paper No. 465, 81-109.

Dale, P.F. and McLaughlin, J.D., 1986. *Land Information Management.*

Dale, P.F. and McLaughlin, J.D., 1999. *Land Administration.* Oxford University Press, 169p.

De Soto, Hernando de, 1989. *The Other Path: the invisible revolution in the Third World.* Harper and Row, New York.

De Soto, Hernando de, 1999. *The Mystery of Capital.* Basic Books, New York.

Deininger, K. and H. Binswanger, 1999. The evolution of the World Bank's Land Policy: Principles, Experience, and Future Challenges. *The World Bank Research Observer* **14**(2) (August, 1999), 247-76.

Dowson, E. and V.L.O. Sheppard 1956. *Land Registration*. HMSO, London.

Dunkeley, H.B. and Whitehead, C.M.E. 1983. *Urban land policy, issues and opportunities.* Published for the World Bank by Oxford University Press, 214p.

Feder, G. Onchan, T. and Hongladarom, C. 1988. *Land policies and farm productivity in Thailand.* Published for the World Bank by John Hopkins University Press, 165p.

Feder,G. and D.Feeney. 1991. Land tenure and property rights: Theory and Implications for Development Policy. *The World Bank Economic Review*. **5**(1).

FIG, 1995. *Statement on the Cadastre.* Report prepared for the International Federation of Surveyors by Commission 7 (Cadastre and Land Management). http://www.fig7.org.uk/ Accessed 15 August, 2000.

Groot, R. and McLaughlin, J.D. 2000. Geospatial Data Infrastructure: concepts, cases and good practice, Oxford University Press, New York, USA.

GTZ, 1998. *Land Tenure in Development Cooperation – Guiding Principles.* Gesellschaft fur Technische Zusammenarbeit (GTZ) GmbH, Eschborn. Published by Universum Verlagsanstalt, GmbH, KG, Wiesbaden, Germany. Also see http://www.gtz.de/.

Holstein, L. 1996. Towards best practice from World Bank Experience in Land Titling and Registration. *International Conference on Land Tenure and Administration*, Orlando Florida, November, 1996, 22p.

Kalabamu, F.T. 2000. Land tenure and management reforms in East and Southern Africa – the case of Botswana. *Land Use Policy* **17**(4), 305-319.

Kaufmann, J. (1998) 'Cadastre 2014' – Report of Commission 7 Working Group 7.1, Modern Cadastres. *Congress Proceedings, Commission 7, FIG XXI FIG Congress,* Brighton 1998. WWW accessed 5th September, 1999 http://www.fig7.org.uk/Brighton98/proceedings.html

Kaufmann, J. and Steudler, D. (1998) *Cadastre 2014: A Vision for a Future Cadastral System* (Rheinfall, Switzerland: FIG). http://www.swisstopo.ch/fig-wg71/ Accessed 5th September, 1999.

Larsson, G. 1991. *Land Registration and Cadastral Systems*. New York: Longman Scientific and Technical.

McGrath, G., MacNeill, T. and I. Ford. 1996. Issues and key principles related to the implementation of cadastral and land registration systems: a perspective from Eastern Europe and the former Soviet Union. *Proceedings of the International Conference on Land tenure and Administration in Developing Countries,* Orlando, Florida, November 23-26, 1996. http://www.surv.ufl.edu/publications/land_conf96/Barnstoc.htm Accessed 15 August, 2000.

McKean, M.A. 2000. Siting and designing successful institutions for community rights in natural resources. International Conference on Land Policy Reform, Jakarta 25-27 July, 2000 http://www.landpolicy.org/conference/index.htm Accessed 8 August, 2000.

Mooney, J. D. and Grant, D. M. (1997) The Australian Spatial Data Infrastructure. In *Framework of the World*, edited by D. Rhind. (Cambridge: GeoInformation International), pp. 187-201.

Rajabifard, A, Williamson, I P, Holland, P, and Johnstone, G, 2000, From Local to Global SDI initiatives: a pyramid building blocks, Proceedings of the 4th GSDI Conference, Cape Town, South Africa, <http://www.gsdi.gov. docs.html>.

Rattanabirabongse,V., Eddington, R.A., Burns,A.F., Nettle, K.G. 1998. The Thailand Land Tilting Project - thirteen years experience. Land Use Policy **15**(1) January.

Razzaz, O. and Galal, A. 2000. *Reforming land and real estate markets.* Draft Research Paper, The World Bank, Washington, DC.

Simpson, R.W. 1976. *Land Registration* Cambridge University Press.

Steudler, D., Williamson, I.P., Kaufmann, J. and Grant, D.M. 1997. Benchmarking Cadastral Systems. *The Australian Surveyor*. **42**(3) 87-106. Accessed 17 August, 2000 http://www.sli.unimelb.edu.au/research/publications/IPW_publ.html

Suwarnarat, K., Karuppannan, S., Haider, W., Yaqub, H.W., Escobar, F.E., Bishop, I., Yates, P.M. and Williamson, I.P., 2000. Spatial Data Infrastructures For Cities In Developing Countries: Lessons From The Bangkok Experience, *Cities*. **17**(2) 85-96.

Ting, L., Williamson, I.P., Grant, D. and Parker, J.R. 1999. Understanding the Evolution of Land Administration Systems in Some Common Law Countries. *The Survey Review*, **35**(272) 83-102.

Ting, L. and Williamson, I.P. 1999a. Cadastral Trends: A Synthesis. *The Australian Surveyor*, **4**(1) 46-54.

Ting, L. and Williamson, I.P. 1999b. Land Administration and Cadastral Trends: The Impact of the Changing Humankind-Land Relationship and Major Global Drivers. *Technical Papers of UN-FIG International Conference on Land Tenure and Cadastral Infrastructures for Sustainable Development*, Melbourne, Australia, 24-27 October, 252-275. http://www.sli.unimelb.edu.au/UNConf99/

United Nations 1973. Report of the Ad Hoc Group of Experts on Cadastral Surveying and Mapping. New York.

United Nations 1985. *Conventional and Digital Cadastral Mapping*. Report of the Meeting of the Ad Hoc Group of experts on Cadastral Surveying and Land Information Systems. Economic and Social Council E/CONF.77/L.1.

UN, 1992. *Agenda 21*. United Nations Division for Sustainable Development. http://www.un.org/esa/sustdev/agenda21text.htm

UN, 1997. Proceedings of Meeting of the Ad Hoc Group of Experts on legislation for Surveying and Mapping, 6th United Nations Regional Cartographic Conference for the Americas, New York, 6 June, 1997.

UNECE,1996. *Land Administration Guidelines. Meeting of Officials on Land Administration*, UN Economic Commission for Europe. ECE/HBP/96 Sales No. E.96.II.E.7, ISBN 92-1-116644-6. WWW accessed 5th September, 1999 http://www.sigov.si/mola/Preview/html/projects.html#nas1. MOLA has been upgraded to Working Party status as the UNECE Working Party on Land Administration (WPLA) at http://www.unece.org/env/hs/wpla/welcome.html

UN-FIG, 1996. *Bogor Declaration on Cadastral Reform*. Report from United Nations Interregional Meeting of Experts on the Cadastre, Bogor, Indonesia, 18-22 March, 1996. A joint initiative of the International Federation of Surveyors (FIG) and the United Nations. http://www.sli.unimelb.edu.au/research/publications/IPW_publ.html

UN-FIG, 1999. *The Bathurst Declaration on Land Administration for Sustainable Development*. Report from the UN-FIG Workshop on Land Tenure and Cadastral Infrastructures for Sustainable Development, Bathurst, NSW, Australia, 18-22 October, 1999. A joint initiative of the United Nations and the International Federation of Surveyors. http://www.sli.unimelb.edu.au/UNConf99/ Also see at this WWW address the Findings of the Workshop and the background papers prepared for the Workshop and presented at the subsequent International Conference on Land Tenure and Cadastral Infrastructures for Sustainable Development, 25-27 October, 1999 Melbourne.

Williamson, I. P., Chan, T. O., and Effenberg, W. W. (1998) Development of spatial data infrastructures - lessons learned from the Australian digital cadastral databases. *Geomatica*, **52**(2), 177-187.

Williamson, I.P. and Ting, L. 2000. Land administration and cadastral trends – a framework for re-engineering. *Computers, Environment and Urban Systems* (In Press).

Williamson, I.P., Ting, L. and Grant, D.M. 2000. The Evolving Role of Land Administration in Support of Sustainable Development - A review of the United Nations - International Federation of Surveyors Bathurst Declaration for Sustainable Development. *The Australian Surveyor* **44**(2) 126-135.

Williamson, I.P. 1990. Considerations in Assessing the Potential Success of a Cadastral Project in a Developing Country - A Case Study - Thailand Land Titling Project. *The Australian Surveyor*, **35**(4) 313-325.

Williamson, I.P. 2000. Institutional Framework Reforms for Land administration. Topic Cycle 10, World Bank Land Administration Project – Part C. National Development Planning Agency (BAPPENAS) and National Land Agency, Government of the Republic of Indonesia. www.landpolicy.org Accessed 9 August, 2000.

World Bank, 2000. *Entering the 21st Century – World Development Report 1999/2000.* The World Bank, Washington DC. Oxford University Press, New York.