INTERNATIONAL CONFERENCE ON

# Enhancing Land Registration and Cadastre for Economic Growth in India

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# Abstracts

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# Foreword



It is not always easy to relate investments in land administration systems to effects on economic growth and poverty alleviation. For India, McKinsey Global Institute calculated in its report 'The Growth Imperative' (2001) that removing barriers in the performance of the real estate market would propel the annual economic growth with 1.3%. Apart from inflexible zoning, rent controls, protected tenancies, also the lack of good land registration and cadastre limits growth rates, the relation between land policy and poverty reduction was explored in the research report of the World Bank, 'Land Policy for Growth and Poverty Reduction' (2003). Both reports justify investment in improving land records and land access. During a conference held by the World Bank and the Ministry of Rural Development, Government of India on 6th January 2006 in New Delhi, the participants even agreed that improving land administration is a top-priority for India.

With all this in view, GIS Development, the Centre for Science, Development and Media Studies (CSDMS) and Commission 7 (Cadastre and Land Management) of the International Federation of Surveyors (FIG) took the initiative to dedicate a two day international conference on enhancing land registration and cadastre in India, as part of the bigger event MapIndia 2006.

The participants aim at covering the wide spectrum of land administration, from economic and social benefits of good land administration on one hand, to the application of low cost technology on the other hand.

I am convinced that the authors will reach their goal to contribute to better land administration in India.

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# The Importance of Enhancing Land Registration and Cadastre: Some General Considerations

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Land and the way governments deal with the land, are issues of major importance in the development of society. These do not go unnoticed at global level. In the Global Plan of Action for Sustainable Development, as adopted by the Rio Conference 1992 (Agenda 21), global objectives of combating poverty, sustainable settlement, sustainable agriculture and forestry, are directly related to the land issue. According to the Plan of Action, strengthening legal frameworks for land management and land ownership is strongly recommended to facilitate access to land for the urban and rural poor, to create efficient and accessible land markets, to establish appropriate forms of land tenure that provide security for all land users especially for indigenous people. Another Plan of Action, as adopted by the HABITAT II Conference in Istanbul 1996, considered sustainable housing not only as a roof above one's head, but also as having enough room, access to land and security of tenure. This Plan advocated providing sufficient legal security of land ownership and land use, an equal distribution of land to all people and protection against illegitimate expulsion. Governments should furthermore, as it says, aim to provide legal frameworks facilitating the land market, by clarifying the definition of land tenure and property rights, by creating clear procedures for transfer of rights, by establishing a transparent and reviewable market, by encouraging access to land especially for women, and by creating fiscal systems providing opportunities for adequate housing. One new initiative is the Global Campaign for Secure Tenure launched by the UN Commission on Human Settlements (Habitat) as a follow-up to the Istanbul Conference. The Campaign states that insecure tenure inhibits investment in housing, hinders good governance, promotes social exclusion, undermines long-term planning, distorts prices of land and services, reinforces poverty, and adversely affects women and children. Action point number 1 is the struggle against forced eviction, as the UN feels that forced eviction constitutes a gross violation of human rights, in particular the right to adequate housing (see the Universal Declaration of Human Rights, 1948).

In a world where 1.3 billion people live on less than 1$ a day (with the worst decline in living standards in eastern Europe and the former Soviet Union), 1 billion people live without adequate housing, 100 million people are homeless, 600 million people suffer from chronic under-nourishment, reviewing the way how governments deal with land and land administration seems to be a matter of urgency.
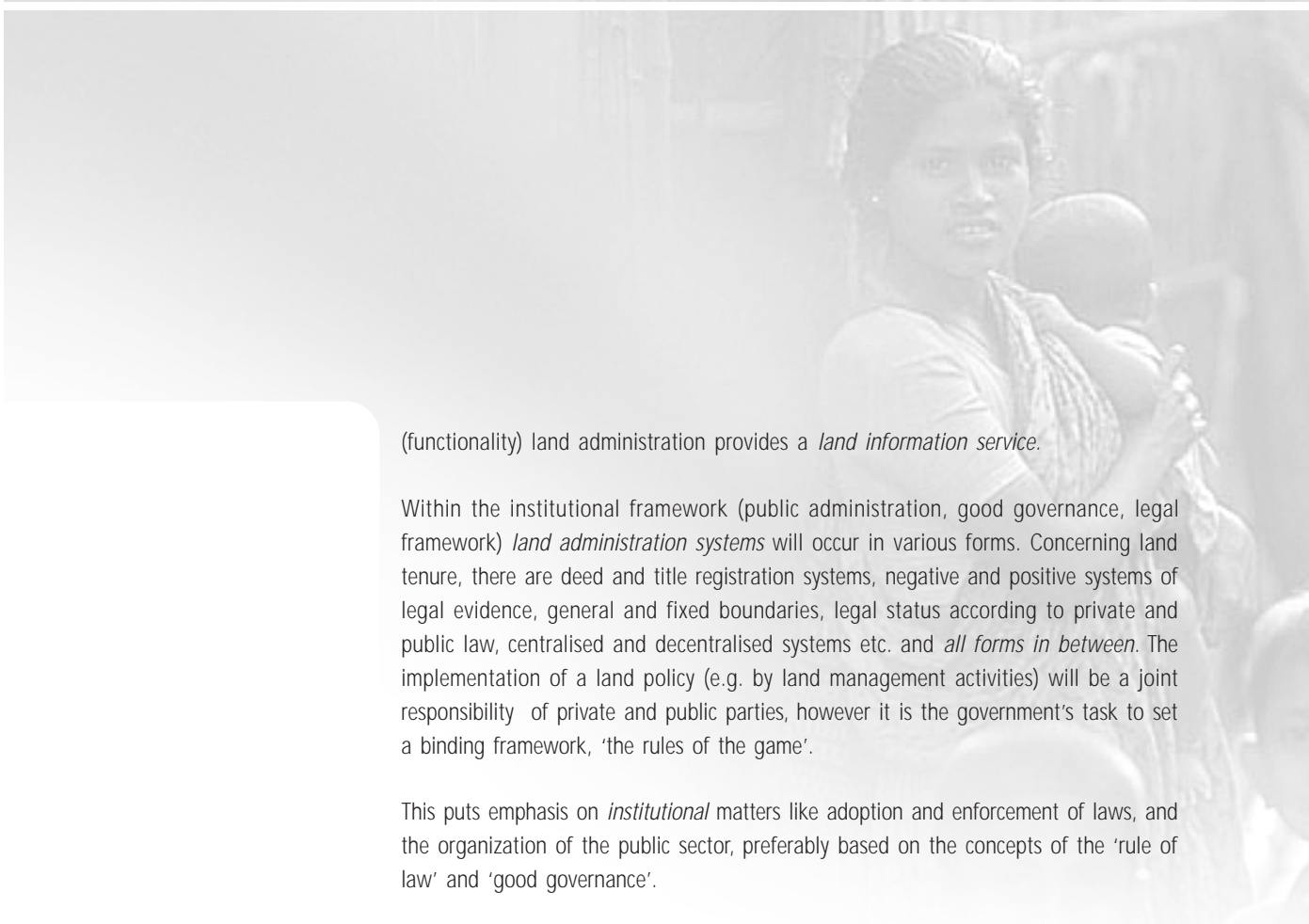
## LAND ADMINISTRATION

First of all it is needed to clarify how we understand the land administration activity. In this background-paper we consider land administration as the process of determining, recording and disseminating information on ownership, value and use of land, when implementing land management policies (UN, 1996). 'Ownership' is to be seen in a broad sense: land tenure, as the mode in which rights to land are held, based on *statutory law, common law, and customary traditions*. 'Value' is to be understood as all kinds of values which land might have, dependent from purpose of the value, use of land and method of valuation. 'Land use' is to be understood as all kinds of use land might have, dependent from purpose and use, classification and methodology. 'Land' is to be considered as the surface of the earth, the materials beneath, the air above, and all things fixed to the soil, so more then 'land' alone.

Regarding the content of the concept of land administration, the following is important: land administration is *not a purpose in itself*. It aims at serving society, when implementing land policy through land management activities. 'How to deal with land', is in all countries (whatever stage of development they are) a topic of government policy (might even be expanded to 'civil society'). Such a land policy explicits the governments decisions on the whole complex of socio-economic and legal prescriptions how the land and the benefits from the land are to be allocated and therefore relates to economic development, equality and social justice, and environmental preservation and sustainable land use (UN, 1996).

Here we enter a very sensitive field, as land policy will be very much determined by *ideology*. It makes a world of difference whether capitalists or communists, whether socialists or liberals are in power: will the land and the benefits of the land be allocated to the rich or the poor, to large-holders or small-holders, to individuals or to the state? There is a growing notion that ideology, history and attitude of people are important parameters to understanding the role and the organisation of land administration in a certain country.

From an ICT-architectural point of view, such a tool will be materialized in the form of a *geospatial data infrastructure*, ultimately in a digital environment (Groot & MacLaughlin 1999) as a network of distributed data sources. From a user's perspective

(functionality) land administration provides a *land information service.*

Within the institutional framework (public administration, good governance, legal framework) *land administration systems* will occur in various forms. Concerning land tenure, there are deed and title registration systems, negative and positive systems of legal evidence, general and fixed boundaries, legal status according to private and public law, centralised and decentralised systems etc. and *all forms in between.* The implementation of a land policy (e.g. by land management activities) will be a joint responsibility of private and public parties, however it is the government's task to set a binding framework, 'the rules of the game'.

This puts emphasis on *institutional* matters like adoption and enforcement of laws, and the organization of the public sector, preferably based on the concepts of the 'rule of law' and 'good governance'.
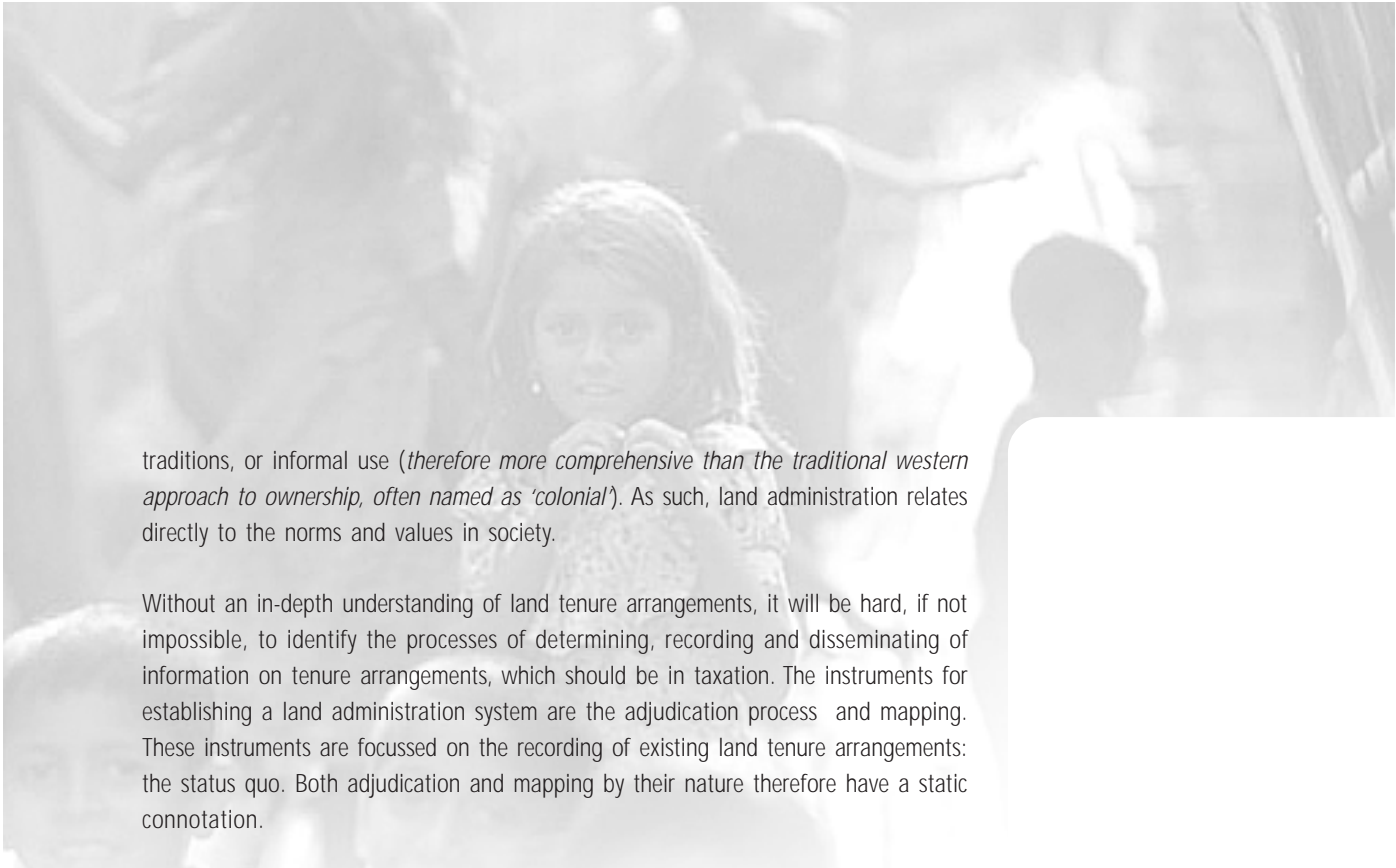
A government normally has quite a few instruments to implement land policy from which the most important ones, *inter alia,* are (GTZ, 1998):

- providing security of land tenure and security of credit
- regulating the land market
- urban and rural planning development and maintenance
- land taxation

By consequence, talking about the contribution of land administration to society, this contribution can be identified in the way they facilitate these land-policy instruments.

## IMPROVING LAND TENURE SECURITY

A land administration system differs from other geo-information systems in a sense that it represents more than physical attributes to spatial objects only, namely the relationship humankind to land in the form of rights, interests and responsibilities to land. These relationships might be based on statutory and common law, customary

traditions, or informal use (*therefore more comprehensive than the traditional western approach to ownership, often named as 'colonial'*). As such, land administration relates directly to the norms and values in society.
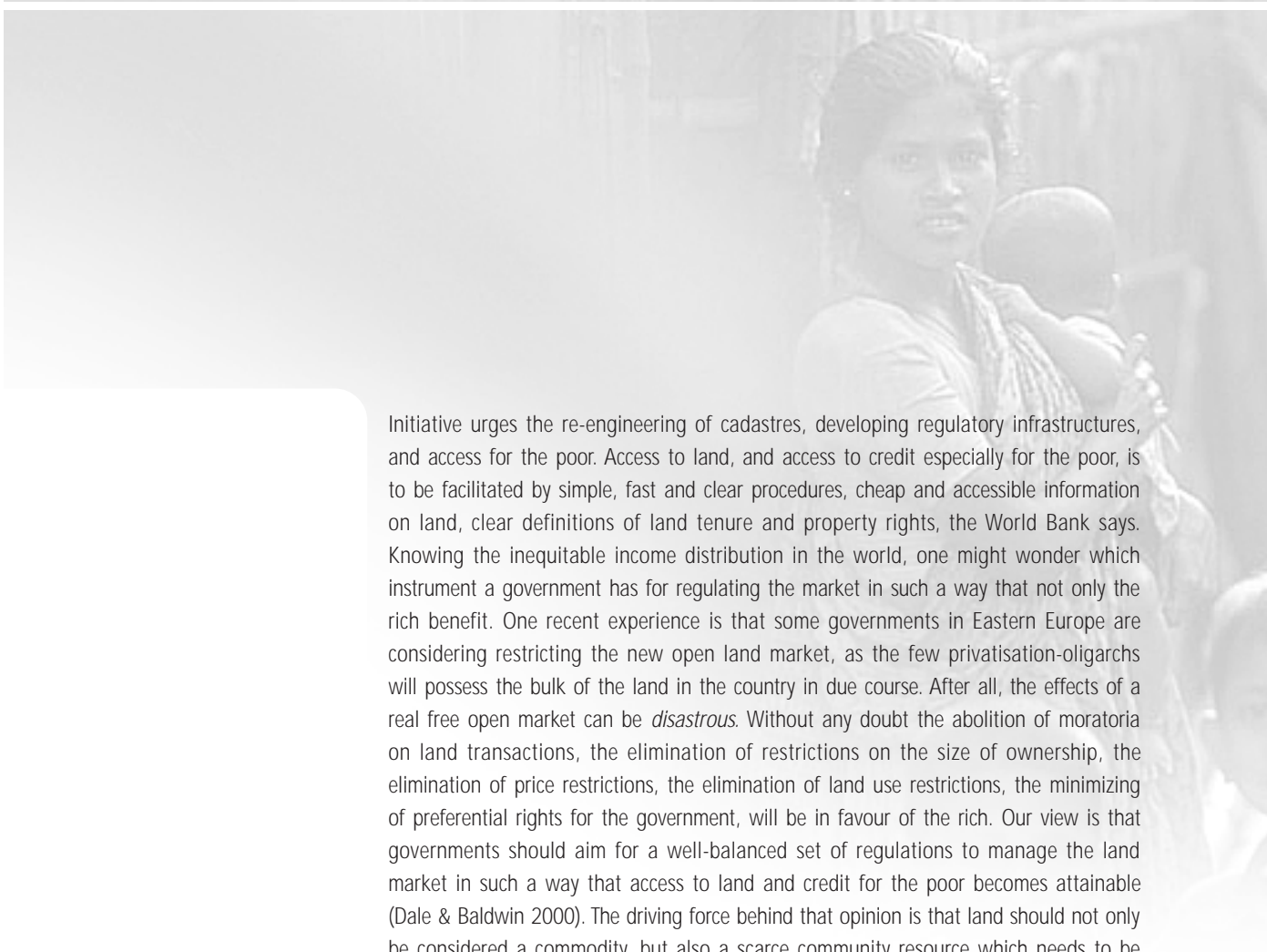
Without an in-depth understanding of land tenure arrangements, it will be hard, if not impossible, to identify the processes of determining, recording and disseminating of information on tenure arrangements, which should be in taxation. The instruments for establishing a land administration system are the adjudication process and mapping. These instruments are focussed on the recording of existing land tenure arrangements: the status quo. Both adjudication and mapping by their nature therefore have a static connotation.

Adjudication after all is the process whereby all existing rights in a particular parcel of land are finally and authoritatively ascertained (Lawrance, 1985). Land adjudication does not create rights, only establishes existing rights.

Mapping, in the sense of fixing some kind of geo-reference to the object where rights to land are being exerted, also reflects by its nature the status quo. The mapping part of land administration has to provide sufficient specification on the location of the object. *It is a misunderstanding that this could only be done by defining a cadastral parcel and by a precise boundary survey*. Any sort of geo-reference which is recognised by a community will meet the demands of specifying an object. At the contrary, it is a misunderstanding that object-definitions without any reference to the earth's surface can meet demands of providing evidence of the location of legally recognised land-objects.

## REGULATING LAND MARKETS

The previously mentioned global summits expect that a free land market will move the key economic resource of land towards the highest and economically most efficient use. Governments are therefore challenged to encourage the creation of efficient and accessible land markets that meet the community needs by improving cadastres and streamlining procedures in land transactions. The World Bank Land and Real Estate

Initiative urges the re-engineering of cadastres, developing regulatory infrastructures, and access for the poor. Access to land, and access to credit especially for the poor, is to be facilitated by simple, fast and clear procedures, cheap and accessible information on land, clear definitions of land tenure and property rights, the World Bank says. Knowing the inequitable income distribution in the world, one might wonder which instrument a government has for regulating the market in such a way that not only the rich benefit. One recent experience is that some governments in Eastern Europe are considering restricting the new open land market, as the few privatisation-oligarchs will possess the bulk of the land in the country in due course. After all, the effects of a real free open market can be *disastrous*. Without any doubt the abolition of moratoria on land transactions, the elimination of restrictions on the size of ownership, the elimination of price restrictions, the elimination of land use restrictions, the minimizing of preferential rights for the government, will be in favour of the rich. Our view is that governments should aim for a well-balanced set of regulations to manage the land market in such a way that access to land and credit for the poor becomes attainable (Dale & Baldwin 2000). The driving force behind that opinion is that land should not only be considered a commodity, but also a scarce community resource which needs to be handled with care. We would like governments to considering regulations on the maximum size of land holdings in order to break up large holdings, on the minimum size to prevent farmers from being too small, on pre-emptive rights to acquire public land, on the approval of land-transfers for preventing undesirable changes in land use, on anti-speculation orders to avoid speculation, on moratoria on land transfer to avoid undesirable land transfers, on price restrictions to facilitate access to land by the poor, on ceilings to credit with land as a collateral to avoid a boost in foreclosures. This should be done, as we said, in a well-balanced manner, as too many restrictions and unnecessary regulations immediately will result in an informal market.

## PLANNING AND DEVELOPMENT OF URBAN AND RURAL LAND USE

Regarding the third sector to be facilitated by land administration, urban and rural land use planning, our view is that planning and development should be seen as an intervention by the government in existing proprietary structures. The FAO Guidelines
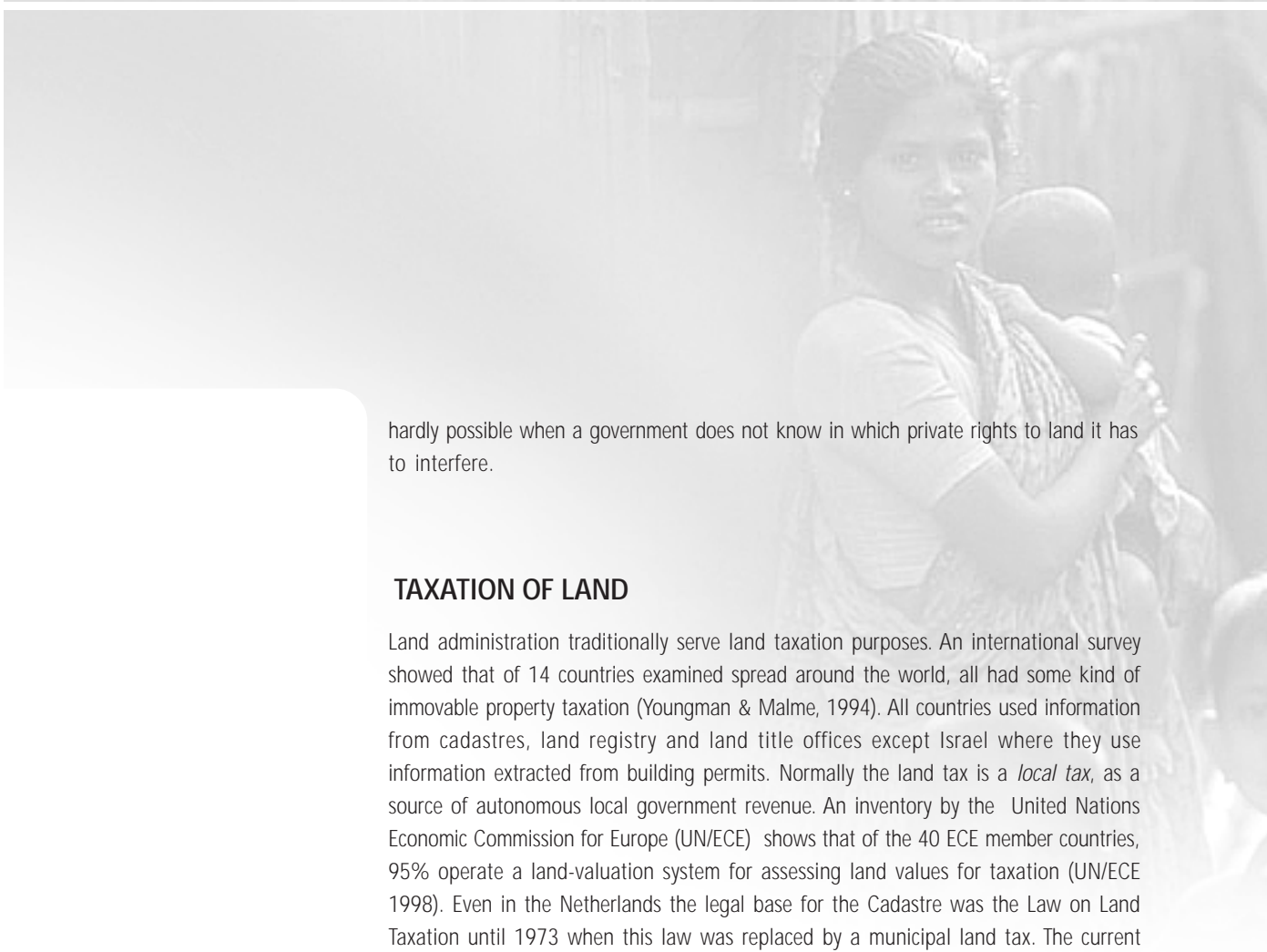
for Land Use Planning 1983 recognise legal and traditional ownership and usage rights for land, trees, and grazing as one of the important basic elements of information about an area when developing land-use plans. The FAO in its study on the role of legislation in land-use planning 1985 emphasizes the influence of existing land tenure patterns in the decision-making process by formulating questions like who owns the land in a legal sense, who controls the land in fact, and how are customary rights integrated into statutory law.

Although the attention of international organisations is attracted more and more by urbanisation they should not forget the *rural areas*. They,  as the complex of food, water and land area major prerequisite to solving the problem of 600 million people suffering from hunger.

Talking about *urbanisation*, we should however admit that the growth of urban and peri-urban areas constitute a big problem. The world's urban population continues to boom. While in 1950 30% of people lived in urban areas, the United Nations estimate that in the year 2030 60% will do so. At the same time experience shows that governments in the 'non-western' countries can by no means cope with the migration of rural people to the cities, resulting in a growing number of informal settlements. It is estimated that up to 80% of urban growth is in informal settlements. Problems accumulate dramatically, resulting in lack of services, no infrastructure, bad housing, and above all insecurity of land tenure. The World Bank estimates that 25% of all urban dwellers live in poverty. The HABITAT Global Plan of Action 1996 (mentioned earlier), considers insecure tenure as one of the most essential elements of a successful shelter strategy and no wonder that the Global Campaign for Secure Tenure has as its first priority opposition against forced eviction, because forced eviction always exists where the worst housing conditions are, always touches the poor, often is violent, and results in evictees who end up even worse off than before. *Anti-eviction laws* become more and more common which, seen from the cadastral point of view, constitutes a sort of innovative right to land, namely the right not to be kicked off the land you actually live on, a new right, which is eligible for registration in a land administration system! Providing governments with information on who has certain rights to land, where that land is located, what size the land plot has, is a major task of cadastres. This is especially valid when a land-use plan is to be implemented. Such implementation is

hardly possible when a government does not know in which private rights to land it has to interfere.

## TAXATION OF LAND

Land administration traditionally serve land taxation purposes. An international survey showed that of 14 countries examined spread around the world, all had some kind of immovable property taxation (Youngman & Malme, 1994). All countries used information from cadastres, land registry and land title offices except Israel where they use information extracted from building permits. Normally the land tax is a *local tax*, as a source of autonomous local government revenue. An inventory by the United Nations Economic Commission for Europe (UN/ECE) shows that of the 40 ECE member countries, 95% operate a land-valuation system for assessing land values for taxation (UN/ECE 1998). Even in the Netherlands the legal base for the Cadastre was the Law on Land Taxation until 1973 when this law was replaced by a municipal land tax. The current multi-purpose character of the Dutch cadastre was legitimised in the new Cadastre Act 1992 along with the new Civil Code.

In 1999 the Association of Netherlands Municipalities calculated that taxes based on land value generate 4.4 billion Dfl for the municipalities, 3.7 billion Dfl for the State government, and 0.4 billion Dfl for the waterboards, while monitoring costs are no more then 200 million Dfl. For the municipalities this is 47% of their income from revenues.

Countries in transition also introduce land taxation, which constitutes a joint challenge to the efforts towards privatisation, decentralisation of state power, and market development. For example, in the Republic of Estonia the revenue from local land tax already is 3% of the local budget, in the Czech Republic 3%, in the Slovak Republic 11% and in Poland even 13%. In Columbia, as in many other countries in Latin America a political debate is going on highlighting the difficulty of measurement of the land tax base due to the obsolete current cadastres, reports the Lincoln Institute of Land Policy, USA. El Salvador, recovering from civil war, is discussing the introduction of a municipal

land tax for the city of San Salvador starting from a simple tax rate and growing into a more sophisticated system.
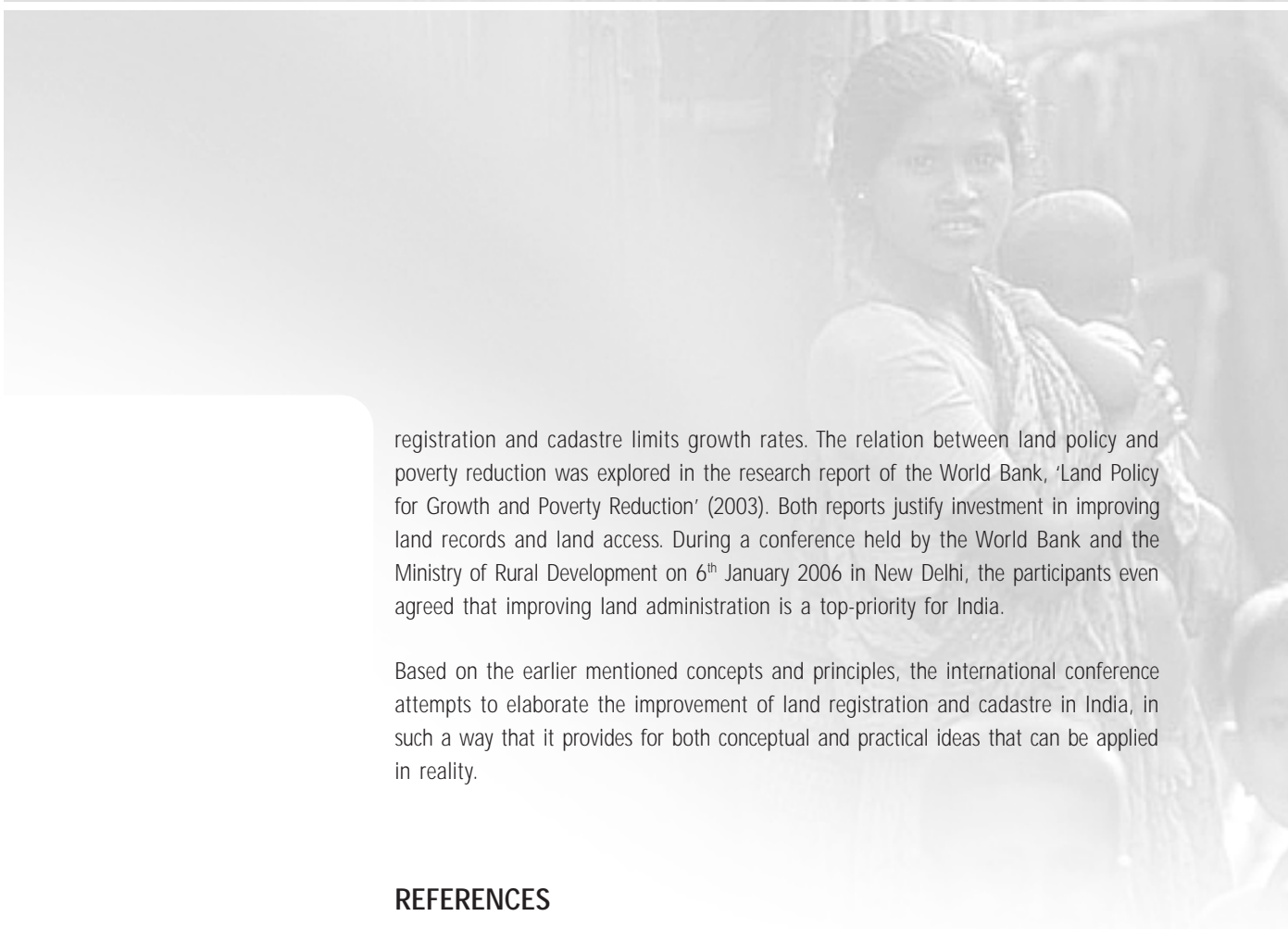
An up-to-date land administration system is an essential information source for levying land taxes. Without knowledge about taxable persons, taxable objects and market values it will hardly be possible for tax authorities to enforce land taxation. The Federation of Bosnia Herzegovina, for example, after the signing of the Dayton peace treaty is currently tying to develop local land tax based on the existing cadastral records, combined with local public housing records and information from utilities. The city of Mexicali invested large amounts in a municipal cadastre, and then succeeded in raising the land tax revenue from 5 million pesos in 1990 to 70 million nowadays.

The demands for urban services normally exceed the financial capacity of local governments, which makes land taxation a very popular means of generating revenue.

At the same time a government can regulate the land market by *fiscal measures*. Well-known examples are the tax on potential value (which encourages optimal land use), penalty tax on fallow land (which stimulates the use of vacant land), progressive tax (to avoid speculation) and tax-deduction measures for mortgage rents to advance private house ownership, where the Netherlands by the way is on top of the list of favourable tax-relief policy, at least in Europe and probably in the whole world by allowing 100% tax relief of mortgage rents for a maximum of 30 years on the principal residential home. As a sideline consequence real estate prices are very high: where there is a demand, supply adapts.


## THE CONFERENCE

It is not always easy to relate investments in land administration systems to effects on economic growth and poverty alleviation. For India, McKinsey Global Institute calculated in its report 'The Growth Imperative' (2001) that removing barriers in the performance of the real estate market would propel the economic growth with 1.3%. Apart from inflexible zoning, rent controls, protected tenancies, also the lack of good land

registration and cadastre limits growth rates. The relation between land policy and poverty reduction was explored in the research report of the World Bank, 'Land Policy for Growth and Poverty Reduction' (2003). Both reports justify investment in improving land records and land access. During a conference held by the World Bank and the Ministry of Rural Development on 6th January 2006 in New Delhi, the participants even agreed that improving land administration is a top-priority for India.

Based on the earlier mentioned concepts and principles, the international conference attempts to elaborate the improvement of land registration and cadastre in India, in such a way that it provides for both conceptual and practical ideas that can be applied in reality.

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# Advantages of unified multipurpose land registry system

According to statistics, in developed countries, the value of land and real estates together with mortgages on properties is about 60-65 % of the national asset. The land and property related activities, including property developments, generating about the 30-35 % of the GDP. The value of mortgages on properties in developed countries is 30-35 % of the GDP (in CEE transition countries this figure is 3-5%).
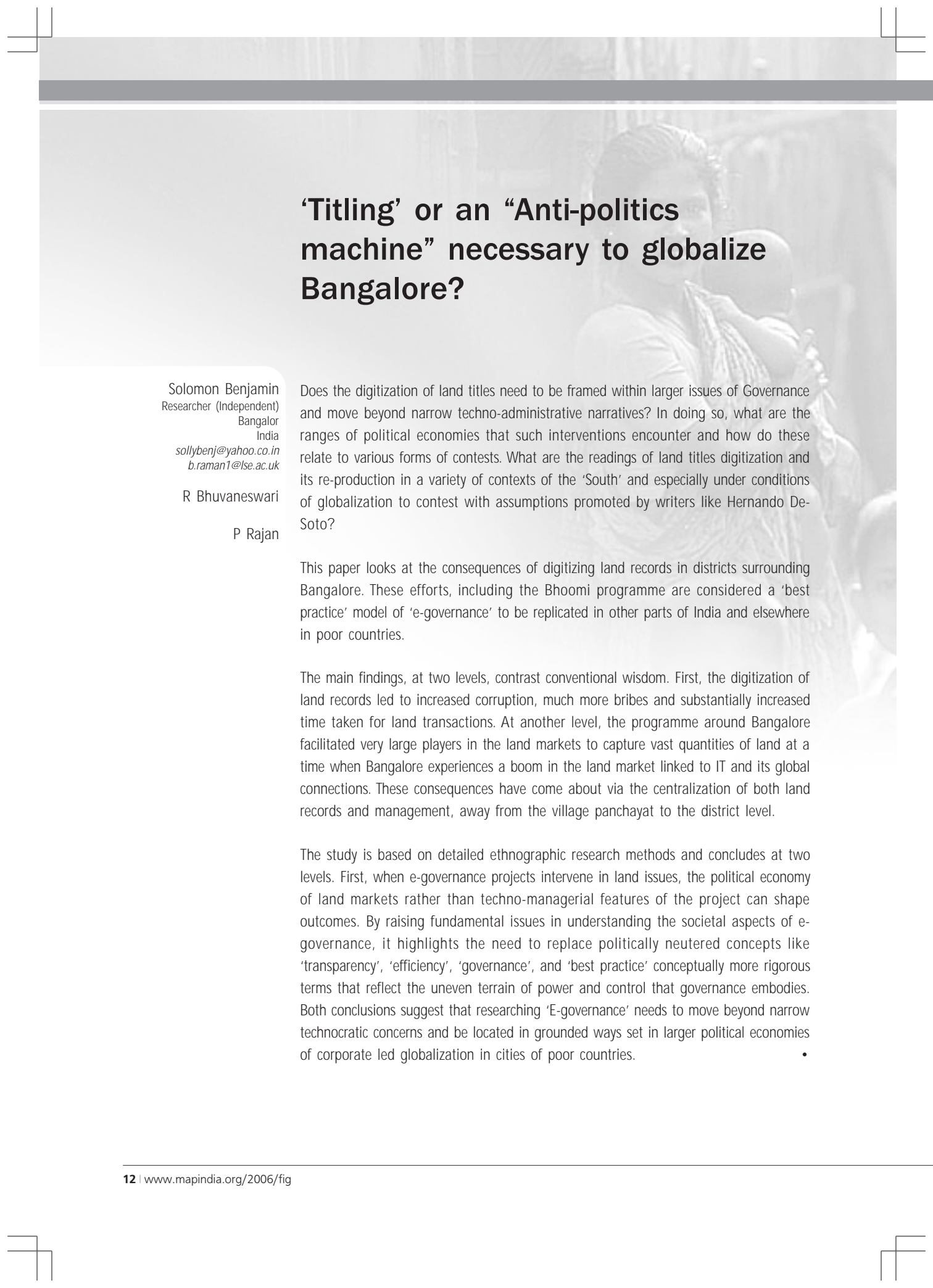
The implementation of sustainable development (economy, society, environment) is also one of the main topics worldwide in developed and developing countries as well. There have been many changes related to land and properties during the last decade, resulted new challenges to be solved. These changes very much effected the developed, transition and developing countries.

In respect of the above it is obvious that every country needs such a legal and institutional framework, fully operational nation wide infrastructure supporting the land and property related activities. There is general consensus among professionals and world organisations, like UN, World Bank, etc., that Land Administration and especially land registry, cadastre institutions should be the proper infrastructure for sustainable development and land and property related activities.

Land administration is the "process of determining, recording and disseminating information about the ownership, value and use of land when implementing land management policies" (ref. UNECE Land Administration Guidelines). "Ownership" should be seen as a broad concept of land tenure within various jurisdictions (statutory, customary, informal, etc.). "Land" includes constructions at subsurface level, ground level and above land level (e.g. buildings). Land management is the implementation of land policy by a wide range of land policy instruments (e.g. land reform, land consolidation, land markets, land taxation, marine resource management, etc.) (Ref. FIG Commission 7 Work Plans 2002-2006 Prof. Paul van der Molen).

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# 'Titling' or an "Anti-politics machine" necessary to globalize Bangalore?

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Does the digitization of land titles need to be framed within larger issues of Governance and move beyond narrow techno-administrative narratives? In doing so, what are the ranges of political economies that such interventions encounter and how do these relate to various forms of contests. What are the readings of land titles digitization and its re-production in a variety of contexts of the 'South' and especially under conditions of globalization to contest with assumptions promoted by writers like Hernando De-Soto?

This paper looks at the consequences of digitizing land records in districts surrounding Bangalore. These efforts, including the Bhoomi programme are considered a 'best practice' model of 'e-governance' to be replicated in other parts of India and elsewhere in poor countries.

The main findings, at two levels, contrast conventional wisdom. First, the digitization of land records led to increased corruption, much more bribes and substantially increased time taken for land transactions. At another level, the programme around Bangalore facilitated very large players in the land markets to capture vast quantities of land at a time when Bangalore experiences a boom in the land market linked to IT and its global connections. These consequences have come about via the centralization of both land records and management, away from the village panchayat to the district level.

The study is based on detailed ethnographic research methods and concludes at two levels. First, when e-governance projects intervene in land issues, the political economy of land markets rather than techno-managerial features of the project can shape outcomes. By raising fundamental issues in understanding the societal aspects of e-governance, it highlights the need to replace politically neutered concepts like 'transparency', 'efficiency', 'governance', and 'best practice' conceptually more rigorous terms that reflect the uneven terrain of power and control that governance embodies. Both conclusions suggest that researching 'E-governance' needs to move beyond narrow technocratic concerns and be located in grounded ways set in larger political economies of corporate led globalization in cities of poor countries.          •

# Modernising the Register of Deeds in Dane County, Wisconsin, USA

Property registration systems have been studied extensively, as countries have attempted to find ways to make property markets work better. The United Nations Economic Commission of Europe (1996, p.9), observed:

"A system for recording land ownership, land values, land use and other land-related data is an indispensable tool for a market economy to work properly, as well as for sustainable management of land resources. All industrialized nations with a market economy maintain some sort of land register system that fulfils the above requirements."
Most analyses of registration systems, however, look at them either from the point of view of the users to calculate transaction costs in order to make changes in the procedures of registration and thereby make land markets more dynamic, or from the perspective of the requirements of a market economy (See Burns et. al., 2003) to make institutional recommendations in countries moving toward a market economy. Such a focus on system creation and organization is useful in exploring options for the design of such systems. However, once established, land registries perform more or less well. How to evaluate this performance once the offices and system are established is important for improving that performance over time. As Adlington (2002, p.2) observed,

"…despite the significant resources being invested by the donor community for modernizing land administration infrastructure, there is little systematic discussion of the key elements of such a system and of what constitutes effectiveness within particular socio-economic, cultural and temporal contexts."

The International Federation of Surveyors (FIG) addressed this performance-monitoring question in a paper on benchmarking cadastral systems, with the objective of making comparisons across systems (Steudler and Kaufmann, 2003). Such an approach is difficult to use, however, because of the different institutional and legal contexts in which registration/cadastre systems function. A more useful approach for monitoring performance is to develop indicators of performance of a single system over time. As part of the policy to shift the Land Registry in the United Kingdom to an independent executive agency, specific indicators were established to show government whether the new Land Registry was meeting goals of gradually improving efficiency and effectiveness (HM Land Registry Executive Agency, 1996). John Manthorpe prepared an analysis of these performance indicators (Manthorpe, 2000).    •

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# Land registration in Scotland: Changing from Deeds to a Title Registration System

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The presentation touches upon the following points

- Brief Introduction to Registers of Scotland
- The Sasines (Deeds) Register
- The Land Register
  - *Development of the Land Register*
  - Reasons for Change
  - The Land Registration (Scotland) Act 1979
  - Sporadic versus Systematic Change
  - The Costs of Change
  - Problems and Issues
  - Benefits of Change
  - Customer Service
  - Information Provision
  - E-services
  - Income
  - Looking to the Future
  - Potential Benefits in the Indian Context

# Enhancing cadastre and land registration for economic growth in Nepal

Land is a valuable resource and property of people where they live, have their livelihood and on which their progress and prosperity depend. The cadastral survey and registration of land parcel of an owner provides him property, freedom and facilities that a citizen is entitled to have. In Nepal, land property belongs to family and father, mother, son and unmarried daughter will have equal right except a woman's personal property given by their parent.

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The land registration and survey of private land existed in Nepal earlier than 5th century as per the stone inscription of Trust Land offered to Ratneshwar Mahadev, Kathmandu on Sambat 399 Ashsad Shukla 10 (according to Hindu calendar). Complete and updated land revenue records of Nepal have been maintained since 1911. Modern cadastral survey and registration of private and other land commenced in 1965 and completed in 1998 of whole of Nepal (41.3% of territory) and maintained which abolished various tenure systems and simple single land tenure and administration system was established. Resurvey started in 1995 but due to lack of modern technology, political will and insufficient qualified surveyors the progress got delayed. Computerization and establishment of LIS is also initiated.

Nepal has more than 15% biodiversity of the world which has to be protected perpetually. The remaining 58.7% unsurveyed land covered by forest, pastures, rocks and water bodies is required to be surveyed, registered and managed. She also has more than one third of her population below the poverty line and pro-poor legislation and access to land is required to be formulated and be implemented. Land development, land use zoning and infrastructure development necessitated the digital cadastral maps/data and up-to-date land records. In the past, every strike/ attack affected survey works and preparation of cadastral and land records. Recently the College of Geomatic Engineering and Land Resources Management in affiliation with Purbanchal University is established to conduct B.E. level course in Geomatics..

The paper briefly describes how the Nepalese cadastre and land registration developed and its present and possible future programmes to tackle the problems being faced and the contribution to be provided by the Nepalese survey community on fulfillment of national and millennium development goals.                                       •
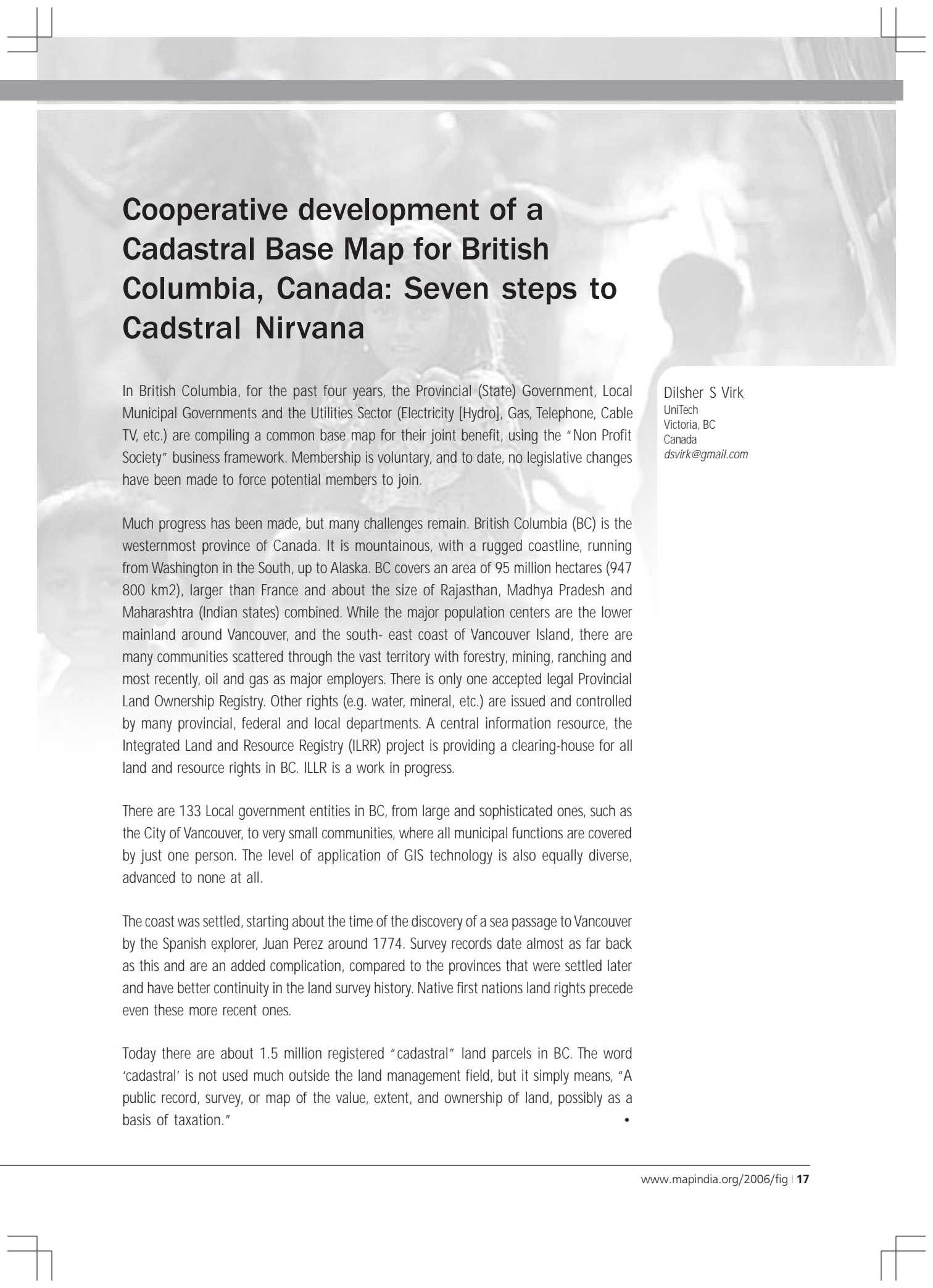
# e-Conveyancing: Challenges and ambitions

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Conveyancing is defined as the legal process (preparing the sales deed, mortgage and other related documents) of creating, transferring and dealing with an interest in land, i.e., it is a right of ownership in or over land, such as a freehold or leasehold. Presently, the existing system of manual conveyancing causes anxiety and tension to all those who are involved because of its inherent shortcomings. However, it is expected that a comprehensive electronic conveyancing (e-Conveyancing) system which is capable of facilitating electronic conveyancing of documents, online investigation of title, networked communication between the parties, simultaneous completion and registration, etc., would address these limitations by reducing delays, saving time and money and bringing greater transparency.

But, for most jurisdictions the laws relating to property transfer are extremely complicated and so it is no simple matter to convert paper-based systems built up over several centuries to straightforward electronic processes. So, the author of this paper took up an extensive study about these issues, basing on the input from the initiative taken up by the HM Land Registry of England and Wales and the Dutch Kadaster of the Netherlands on e-Conveyancing. This report is the result of that study and contains a description of those issues, such as customer orientation, institutional and operational changes, data and process security arrangement, services and functionalities to be delivered, business and implementation strategies etc., which need to be addressed to make the dream of e-Conveyancing a reality in any country.

**Key words**: e-governance, e-commerce, e-conveyancing, electronic conveyancing, conveyancing, cadastre and land registry, institutional changes, legislative reforms, digital signature, hashing, encryption, asymmetric cryptography, cryptoserver, public key infrastructure, trusted third party, public key, private key.　　　　　•

# Cooperative development of a Cadastral Base Map for British Columbia, Canada: Seven steps to Cadstral Nirvana

In British Columbia, for the past four years, the Provincial (State) Government, Local Municipal Governments and the Utilities Sector (Electricity [Hydro], Gas, Telephone, Cable TV, etc.) are compiling a common base map for their joint benefit, using the "Non Profit Society" business framework. Membership is voluntary, and to date, no legislative changes have been made to force potential members to join.

Much progress has been made, but many challenges remain. British Columbia (BC) is the westernmost province of Canada. It is mountainous, with a rugged coastline, running from Washington in the South, up to Alaska. BC covers an area of 95 million hectares (947 800 km2), larger than France and about the size of Rajasthan, Madhya Pradesh and Maharashtra (Indian states) combined. While the major population centers are the lower mainland around Vancouver, and the south- east coast of Vancouver Island, there are many communities scattered through the vast territory with forestry, mining, ranching and most recently, oil and gas as major employers. There is only one accepted legal Provincial Land Ownership Registry. Other rights (e.g. water, mineral, etc.) are issued and controlled by many provincial, federal and local departments. A central information resource, the Integrated Land and Resource Registry (ILRR) project is providing a clearing-house for all land and resource rights in BC. ILLR is a work in progress.

There are 133 Local government entities in BC, from large and sophisticated ones, such as the City of Vancouver, to very small communities, where all municipal functions are covered by just one person. The level of application of GIS technology is also equally diverse, advanced to none at all.

The coast was settled, starting about the time of the discovery of a sea passage to Vancouver by the Spanish explorer, Juan Perez around 1774. Survey records date almost as far back as this and are an added complication, compared to the provinces that were settled later and have better continuity in the land survey history. Native first nations land rights precede even these more recent ones.

Today there are about 1.5 million registered "cadastral" land parcels in BC. The word 'cadastral' is not used much outside the land management field, but it simply means, "A public record, survey, or map of the value, extent, and ownership of land, possibly as a basis of taxation."                                                                  •

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# Innovative technology for land administration (with emphasis on pro-poor land management)
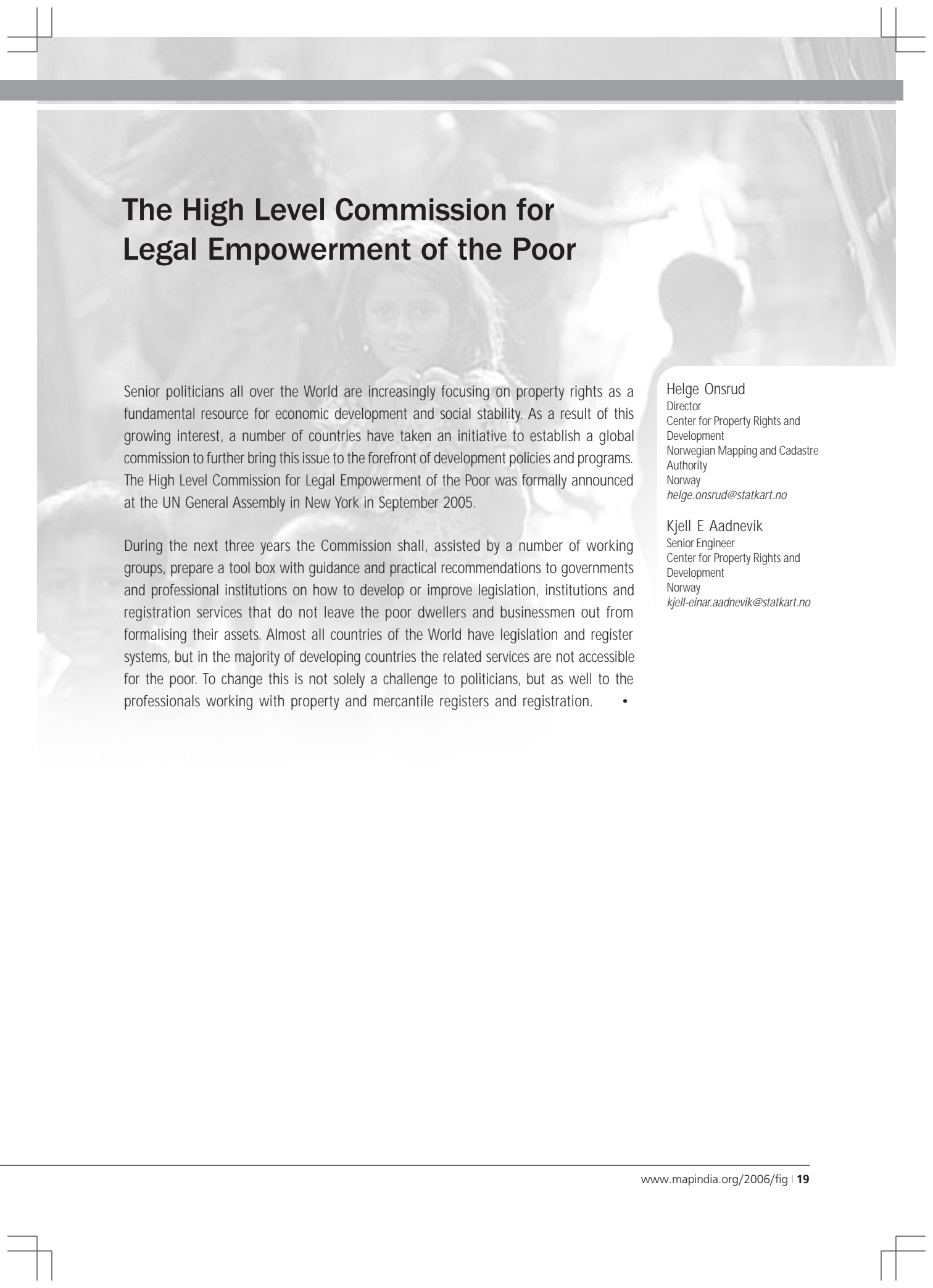
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According to Homeless International, there are about 900 million people who live in slums worldwide, and among them are 570 millions that live in the Asia-Pacific region. They do not have safe and secure housing. They are mostly evicted from their lands, and compelled to live in health- and life- threatening environments. In order to deal these problems, UN-HABITAT provides pro poor land management concept with flexible approach depending on local society and circumstances.

This paper discusses technological innovations needed for effective land administration to have effective pro poor land management. These innovations relates to

a) land tenure paradigm that provides the poor better tenure security,

b) technologies (such as Geo-ICT) for effectiveness in the processes of land administration i.e. determination, recording and dissemination of land information on tenure and use rights of land, and

c) land information systems enabling easy access to land information for all users.

These issues are elaborated with practical cases applicable to pro poor land management procedures.                                                                •

# The High Level Commission for Legal Empowerment of the Poor

Senior politicians all over the World are increasingly focusing on property rights as a fundamental resource for economic development and social stability. As a result of this growing interest, a number of countries have taken an initiative to establish a global commission to further bring this issue to the forefront of development policies and programs. The High Level Commission for Legal Empowerment of the Poor was formally announced at the UN General Assembly in New York in September 2005.

During the next three years the Commission shall, assisted by a number of working groups, prepare a tool box with guidance and practical recommendations to governments and professional institutions on how to develop or improve legislation, institutions and registration services that do not leave the poor dwellers and businessmen out from formalising their assets. Almost all countries of the World have legislation and register systems, but in the majority of developing countries the related services are not accessible for the poor. To change this is not solely a challenge to politicians, but as well to the professionals working with property and mercantile registers and registration.     •

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# GIS-GPS Integrity: A case study on land records, Kerala, India

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The GPS and TPS are the today's technologies for various "field survey application" like Cartography, Cadastral Mapping, Engineering Survey and Land Management etc. While GIS and CAD systems are serving wide range of users for rest of the Job like processing visualization, management, analysis, and display of geographic knowledge

With the increasing use of both technologies together by various users a requirement was felt for the integration of two to have all GIS functionality in field with GPS or TPS. The idea is to aid surveyors with a tool to visualize, edit, manage and analyze the data and attributes right in the field at the time of data collection.to increase efficiency and save time by manifolds. The seamless data flow between GPS/TPS and GIS would also be of great advantage as one need not to think about the different data formats and data structures used by different TPS/GPS or GIS manufacturer.

Many GIS developers provide flexibility to extend and customize GIS software to meet individual's requirement by using GIS based development libraries and open Interfaces. Here a case of Leica MobileMatriX developed on ESRI's ArcMap Platform to integrate GIS with GPS/TPS is discussed to explain advantages of GPS GIS integration and status of present Industry and GIS/GPS community towards this goal. Possiblity of further customization of MobileMatriX using a COM language, e.g. Visual Basic, either to the ArcObjects components, Survey Analyst components or the MobileMatriX components is also discussed. A case study on Land Records, Kerala with GIS/TPS/GPS integrated in local language Malyalam is also discussed. •

# Landgate: A case study

In 2003 the Department of Land Information (DLI) in Western Australia (WA), brought on stream its new Landgate Portal unified Web access point to all of state government information. Landgate brings together technology offerings from some of the world's leading vendors in the Spatial Sector. Oracle Spatial, ESRI's SDE and ArcIMS and Earth Resource Mapping's ECW and Image Web Server are integrated in this portal. The service was developed to provide access to spatial information across government agencies as well as to many business sector clients and community groups. It has achieved this by providing various user channels such as conveyancing, industry, surveying, planning and many others are planned. WA's model for sharing data across government agencies places it at the forefront of similar developments in Australia. As part of a total e-Government strategy Landgate represents an opportunity to improve their services whilst reducing their own investment in technical infrastructure. Key agencies such as the Water Corporation and Fire and Emergency services (FESA) have come out strongly in support of this service. Sharing of data means agencies can get on with the business of developing their own plans rather than worry about key spatial assets required to underpin their operations.

Part of DLI's mandate was to provide online distribution of over 5 terabytes of aerial photography to a variety of Government, Industry and free-to-air Public applications. To meet this need, DLI approached ER Mapper to develop a web application that would integrate the imagery from their Image Web Server with the cadastral data served from their ESRI Eview4 Server. This would be available to a variety of clients in a multi-channel deployment from the Landgate Portal ER Mapper used the RightWebMap product, a rapid development tool, to develop an application called Map Viewer which is launched from the Landgate Portal allowing viewers to display multiple airphoto images in a "layered view" stack overlaid with the Cadastral vector information. This project went on stream in November 2003 and serves hundreds of users simultaneously in Government, Industry and the Public via Intranet/Internet communications. This site can be viewed by going in your browser to www.landgate.com.au. Future versions are expected to offer other services such as WMS as the need arises. This paper will provide an insight into the LandGate Solution deployed at DLI, WA:

- Overall architectural solution at DLI, WA
- ER Mapper's Rapid Development Framework (RightWebMap)
- Successful deployment of 5 Terrabytes of Aerial Imagery
- Online Imagery Solutions •

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# Combination of large scale mapping and operations; its importance in wide-area cadastre-projects

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COWI A/S is one of Northern Europe's largest consultancy service providers in the engineering sector. It's Division 4 "GIS and IT", joint with Kampsax India Private Limited (KIL) and other former Kampsax A/S components - has executed more than 27 large-scale cadastre/mapping projects with value of ca. 50 MUSD in the past ten years. Members of COWI/Kampsax have experience in cooperation with the planning and preparation of these projects on behalf of international institutions and carried out the operations over all phases of the projects. Kampsax India Private Limited (KIL) -as part of the COWI-Group- is engaged in the production of very large mapping projects from all over the world though mainly from Europe and Latin America with over 35 digital Photogrammetric instruments working round the clock.

The most recent experience of a combined operation of an abroad COWI project-team, elements of COWI A/S in Denmark and KIL has been the Actualization of Land-registry and Legal Property in the Central American country El Salvador. Not only the value of the project is remarkable with around 12 Mio USD, financed by the World Bank, but also the involved project-team with around 250 staff (in El Salvador) and 15-30 involved staff in Denmark, Poland and India. The tight time-plan of the COWI-Project and the need for a photogrammetric vector-mapping for a Spanish company working in a contiguous area showed the urgent need for an international project-management and close coordination between the world-wide dispersed production-sites. But not only will the operational point of view be presented but also deducted recommendations pointing to the preparatory staff of the national and international institutions. The use of recent large-scale aerial and satellite photogrammetric maps in the preparation of cadastre-projects by decision-makers on the client-side has a beneficial influence in the pre-budgeting of the projects. The identification of urban areas, mountainous area, access roads, and hidden settlements is vital for the design of a cost structure for execution and supervision.

Even prior to taking the decision to undertake a large cadastre-project, by means of rectification of old cadastral data on recent high-resolution large-scale aerial photogrammetric maps, KIL can help the clients to prepare basic data before sending out teams on the field. Sometimes older cadastral data suffers from geometric distortions and displacement, but still reflects to a good extend the topology of the geometric relations of the parcels. Rectified this data is an invaluable input to cadastral verification and actualization projects. KIL presents an overview over the last technical developments, partially programmed in India. •

# The Core Cadastral Domain Model: A tool for the development of distributed and interoperable cadastral systems

A standardized Core Cadastral Domain Model (CCDM), covering land registration and cadastre in a broad sense (multipurpose cadastre), will serve at least two important goals:

- Avoid reinventing and re-implementing the same functionality over and over again, but provide a extensible basis for efficient and effective cadastral system development based on a model driven architecture (MDA), and

- Enable involved parties, both within one country and between different countries, to communicate based on the shared ontology implied by the model. The second goal is very important for creating standardized information services in an international context, where land administration domain semantics have to be shared between countries (in order to enable needed translations).

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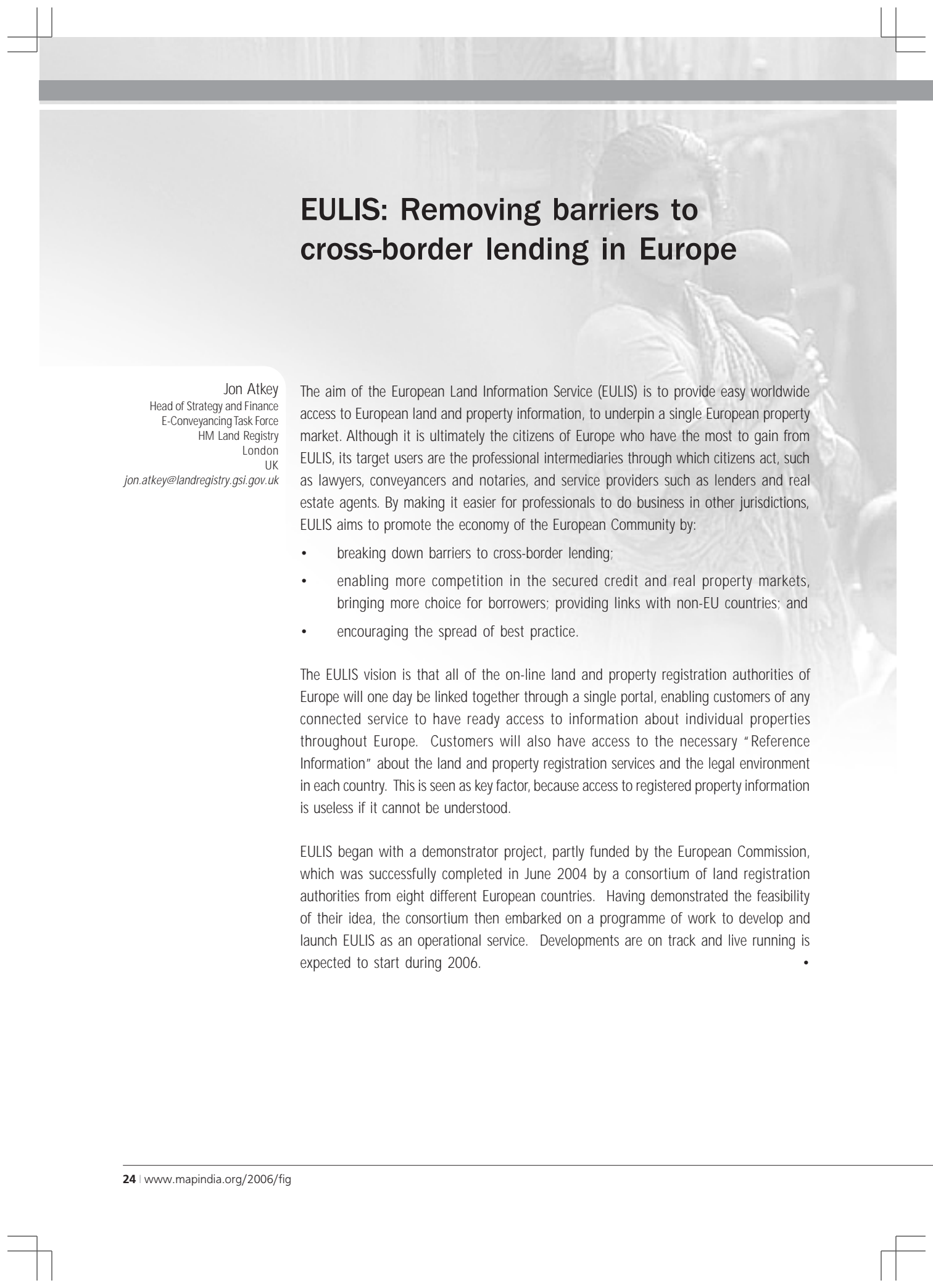Enschede
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This paper presents an overview of the core cadastral domain model. The model has been developed in a set of versions, which were each time adjusted based on the discussions at workshops with international experts and the experience from case studies in several countries of the world (Netherlands, El Salvador, Bolivia, Denmark, Sweden, Portugal, Greece, Australia, Nepal, Egypt, Iceland, and several African and Arab countries). Important conditions during the design of the model were and still are: should cover the common aspects of cadastral registrations all over the world, should be based on the conceptual framework of Cadastre 2014, should follow the international ISO and OGC standards, and at the same time the model should be as simple as possible in order to be useful in practice.

The heart of the model is based on the three abstract classes:

- RegisterObject (including all kinds of immovables and movables)

- RRR (right, restriction, responsibility)

- Person (natural, non-natural and group)

The model supports the temporal aspects of the involved classes and offers several levels of Parcel fuzziness in both 2D and 3D space: Parcel (full topology), SpaghettiParcel (only geometry), PointParcel (single point), and TextParcel (no coordinate, just a description). The model is specified in UML class diagrams and it is indicated how this UML model can be converted into and XML schema, which can then be used for actual data exchange in our networked society (interoperability). •

# EULIS: Removing barriers to cross-border lending in Europe

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The aim of the European Land Information Service (EULIS) is to provide easy worldwide access to European land and property information, to underpin a single European property market. Although it is ultimately the citizens of Europe who have the most to gain from EULIS, its target users are the professional intermediaries through which citizens act, such as lawyers, conveyancers and notaries, and service providers such as lenders and real estate agents. By making it easier for professionals to do business in other jurisdictions, EULIS aims to promote the economy of the European Community by:

- breaking down barriers to cross-border lending;

- enabling more competition in the secured credit and real property markets, bringing more choice for borrowers; providing links with non-EU countries; and

- encouraging the spread of best practice.

The EULIS vision is that all of the on-line land and property registration authorities of Europe will one day be linked together through a single portal, enabling customers of any connected service to have ready access to information about individual properties throughout Europe. Customers will also have access to the necessary "Reference Information" about the land and property registration services and the legal environment in each country. This is seen as key factor, because access to registered property information is useless if it cannot be understood.

EULIS began with a demonstrator project, partly funded by the European Commission, which was successfully completed in June 2004 by a consortium of land registration authorities from eight different European countries. Having demonstrated the feasibility of their idea, the consortium then embarked on a programme of work to develop and launch EULIS as an operational service. Developments are on track and live running is expected to start during 2006.  •
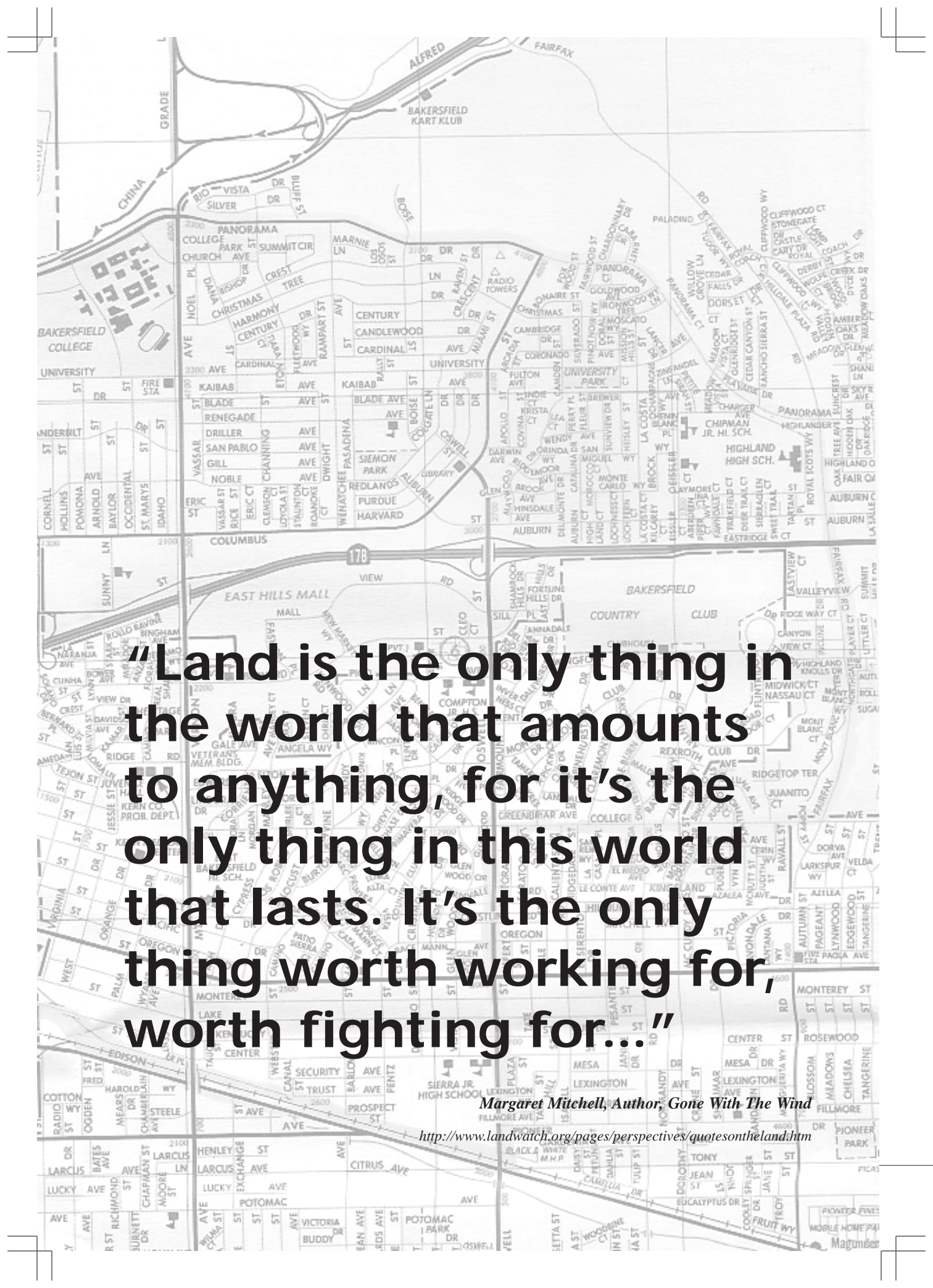
# Potential of high-resolution satellite data and other Geo-ICT for land valuation in urban areas

The use of satellite-based Remote Sensing (RS) data, Global Position System (GPS) and Geographical Information System (GIS) are being established in various applications and the process of semantic spatial information systems has now became a reality. The urban development is a complex phenomenon, which is changing rapidly. Hence, it requires enormous amount of dynamic data to support the decision system. RS technology has proved to be time and cost effective. High-resolution satellite data can be used for base map preparation, land-use map preparation and many other maps of the urban area, which can be updated frequently. These base-map can be made more accurate using GPS. These data, along with GIS software, has enabled surveyors to create more detailed maps for surveys.

This conceptual paper reviews land valuation methodology followed in Karnataka in general and with respect to Bangalore in particular. Though, a well-established system is available for Land Administration as well as for land valuation in Karnataka, it is not efficient and effective in serving the growing need of common man in urban area. In order to make an efficient land valuation system, various factors can be taken into account and different scenarios can be visualized through GIS and arrive at a comprehensive property valuation module which will enable general public to know the cost of their property according to Government rules.                    •

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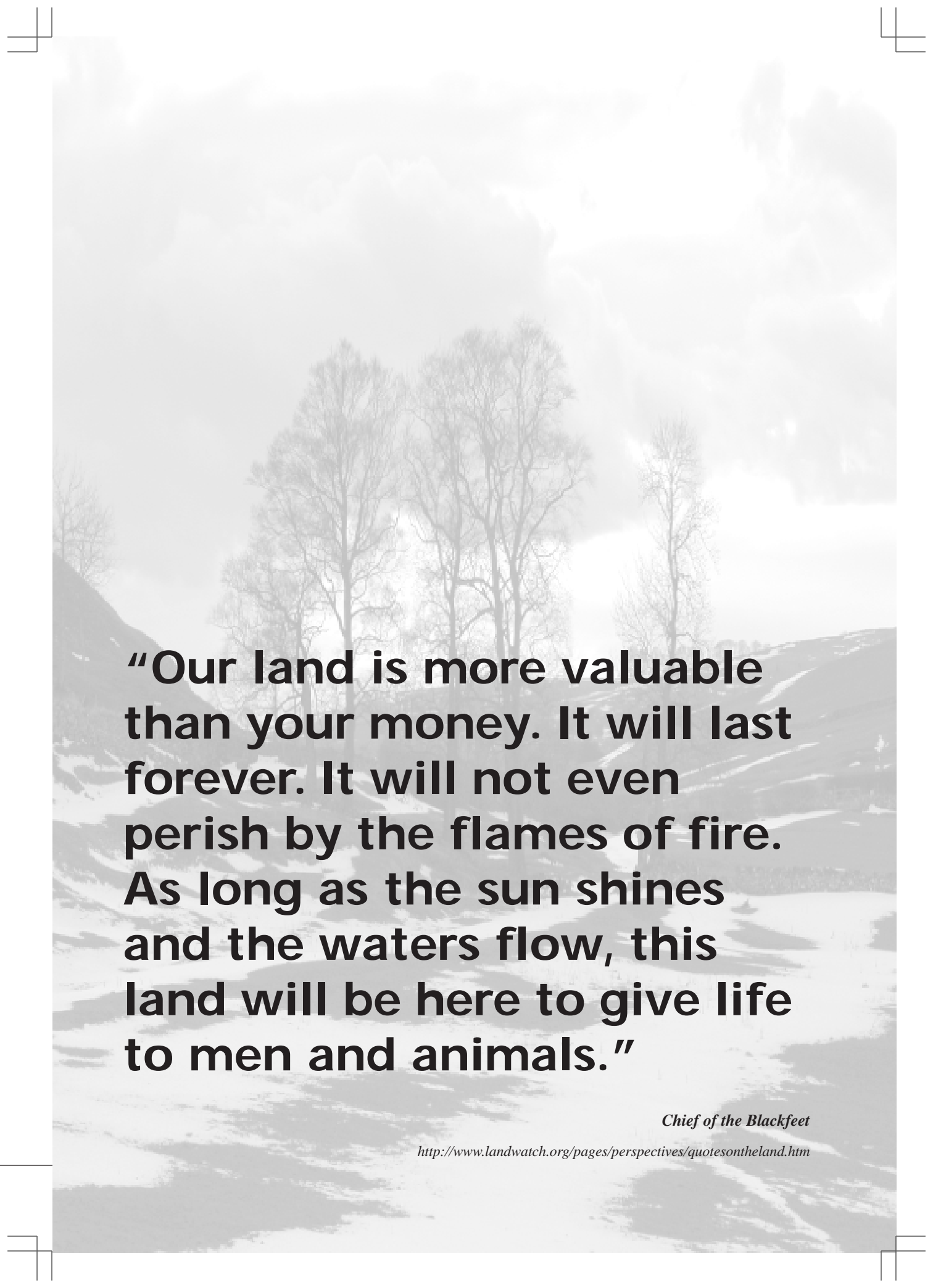ISRO, Bangalore
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# "Land is the only thing in the world that amounts to anything, for it's the only thing in this world that lasts. It's the only thing worth working for, worth fighting for…"

*Margaret Mitchell, Author, Gone With The Wind*

*http://www.landwatch.org/pages/perspectives/quotesontheland.htm*

"Our land is more valuable than your money. It will last forever. It will not even perish by the flames of fire. As long as the sun shines and the waters flow, this land will be here to give life to men and animals."

*Chief of the Blackfeet*