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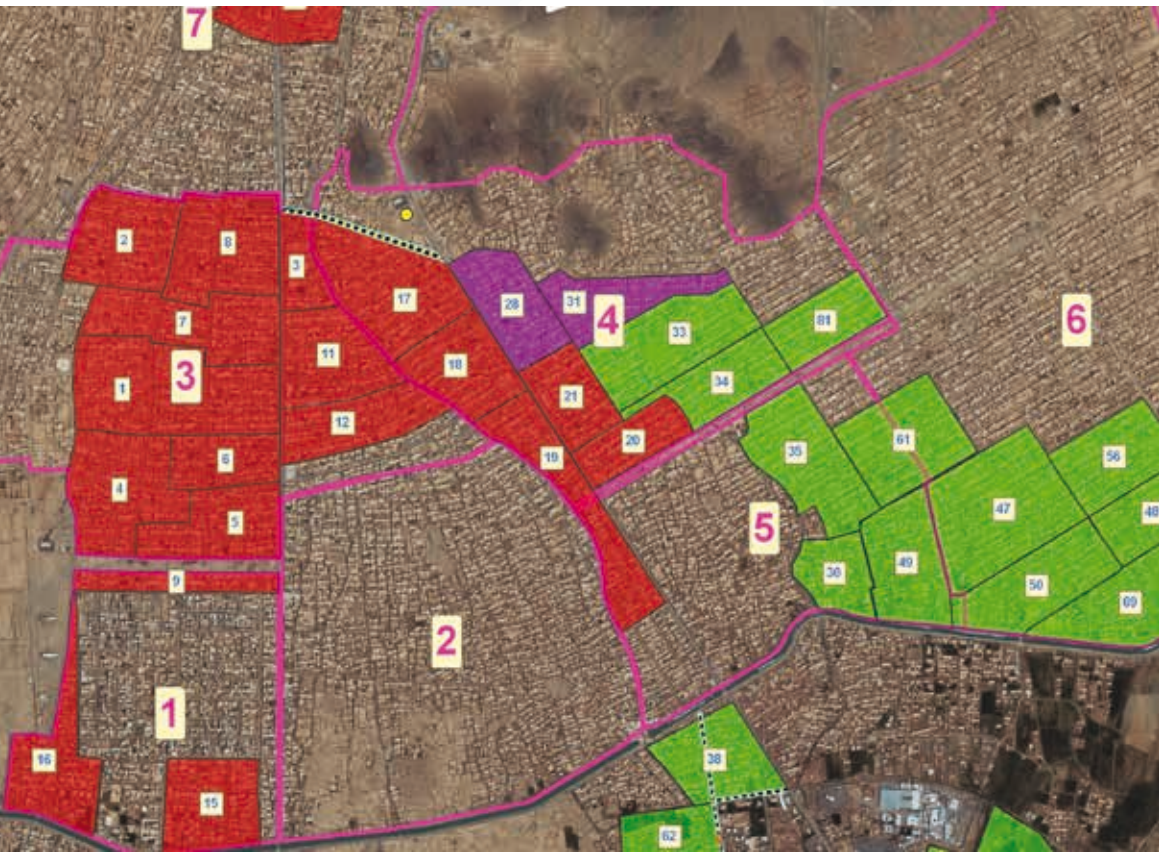

# MANAGING URBAN LAND INFORMATION:

## *LEARNING FROM EMERGENT PRACTICES*

*SECURING LAND AND PROPERTY RIGHTS FOR ALL*

UN HABITAT
FOR A BETTER URBAN FUTURE

GLTN
GLOBAL LAND TOOL NETWORK

MANAGING URBAN LAND INFORMATION: *LEARNING FROM EMERGENT PRACTICES*


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United Nations Human Settlements Programme (UN-Habitat)
P.O. Box 30030, Nairobi 00100, Kenya
Tel: +254 20 762 3120
Fax: +254 20 762 3477
www.unhabitat.org

Cover Photos ©UN-Habitat / Jan Turkstra

Authors: Jan Turkstra, Remy Sietchiping

Contributors: Clarisssa Augustinus, Chukwudozie Ezigbalike

Support: Victor Wainaina, Esther Njeri, Naomi Mukora, Vera Marosi

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# FOREWORD

Land in cities is a critical component of urban development, particularly when dealing with land use, urban planning, taxation and protection of fundamental rights. Unfortunately, insecurity of land tenure is a major bottleneck for urban development and severely affects the lives of poor urban people.

To address this challenge many urban projects have been implemented to develop comprehensive spatial databases on land that are intended to improve urban and environmental planning, raise revenues through property taxation and improve land tenure security.

New technologies, such as very-high resolution satellite images, geographical information systems, the processing capacity of computers and the internet, have developed rapidly over the last 10 years and are a driving force behind the development of urban digital databases.

Unfortunately, many urban land information projects have partially or completely failed, mainly because they have ignored or underestimated the fact that land information needs constant updating and, above all, has to be anchored in stable and capable land institutions.

This publication and the collection of pertinent case studies show that where there are no good land governance practices, such as in many post-conflict countries, land information can only be used to a limited extent. Projects should be designed with these limitations in mind but should also be seen as building blocks and experiences for the development of more comprehensive and integrated land information systems.

I am convinced it is useful to examine UN-Habitat's experiences in countries that have developed and use land information, for example Libya, Somalia and Afghanistan, which demonstrate how to create land databases that have information that can be fully used.

Dr. Joan Clos,
Under-Secretary-General of the United Nations,
Executive Director UN-Habitat.


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# EXECUTIVE SUMMARY

## BACKGROUND

Information about land – its use, ownership, value and development potential - creates possibilities to develop and implement specific projects and programmes and is a pre-requisite for urban land administration and management. For example, without spatial referenced data on land, spatial planning would be based on urban planners' scattered, incomplete and inaccurate knowledge or on estimations, while programmes to raise property taxes or improve tenure security would be impossible to implement. The more accurate and complete the data and the better the capacity and capability of land institutions, the more support can be given to improve the efficiency and effectiveness of land administration and urban land management.

The rapid evolvement of Information and Communication Technology (ICT), Geographical Information Systems (GIS) and remote sensing imagery with its high spatial resolution has created an opportunity for the fast development and use of land information. Technology is no longer a bottleneck in land administration and urban development projects. The undeniably positive impact of ICT development on the quality of, and access to, land information in developed countries is, however, not a guarantee that technology has had a similar impact in (post)conflict and developing countries.

Land information requires spatially-related data that is structured in such a way that data can be processed to get relevant land information. There are many websites (www.fig.net; www.gsdi.org; www.gltn.net) with information explaining why land information is important, and how to develop land information. The need for standards, metadata, procedures, development of inter-institutional relations for data exchange and data sharing are emphasized. However, for many (post)conflict countries and other developing countries, these recommendations are of limited value due to underdeveloped and unstable land institutions and weak governance.

This study evaluates how land information is developed, how it is used in a number of developing and (post)conflict countries, and what can be learned from these emergent practices. Based on these countries' experiences, guides have been formed on how to develop land information that is realistic, cost effective and that can be applied, maintained and gradually improved and expanded to support urban development projects in developing and (post) conflict countries to get tangible and required results.

The *challenges* in developing sustainable land information for urban land management in developing and (post)conflict countries are:

1. How to "implement urban land management and land administration" at scale that is relevant and sustained by capable and stable local/national land institutions that are supported by land information;

2. How to get support from politicians, decision makers and broader society to develop an urban land policy that is pro-poor, promotes gender equality, supports environmentally sustainable development and improves living conditions for people;

3. How to evaluate the level of governance at local and national levels;

# EXECUTIVE SUMMARY

Continued

4. How to analyse the capacity and effectiveness of land administration institutions and spatial planning agencies and determine if they are able to integrate datasets (incremental development of Spatial Data Infrastructures);

5. How to improve (or develop, restructure) land administration institutions;

6. How to determine appropriate, realistic and essential land data sets with feasible accuracies based on user demand and selection of a coverage approach (area based, sporadic or systematic);

7. How to convert land management projects into processes, and combine short-term results with long-term vision;

8. How to make realistic use of GIS / ICT and internet sources and create systems with easy access to land information for all stakeholders;

9. How to develop human capacity in land information;

10. How to identify a lead agency and a national/local champion to drive the development and use of land information;

11. How to integrate a top-down approach (land policy, legislation) with a bottom-up approach (improving security of tenure, local development plans);

12. Where to start (for example, projects or policies) with the development of land information in (post) conflict and developing countries.

## CASE STUDIES

The case studies for this report were selected using the following criteria:

- Urban projects with a land information component in developing, transitioning or (post) conflict countries;
- Use of digital data (for example GIS);
- Availability of documented information;
- Local project staff who are willing to give feedback on the study.

A final selection was made from the potential list of case studies to ensure that all regions (Africa, Asia, Arab States and Europe) were included and that a variety of applications of land information (spatial planning, land administration and urban environment) was featured. UN-Habitat was associated with 12 out of the 17 case studies. More information and direct communication was available from some projects (Somaliland, Afghanistan, Libya, Egypt, Colombia, Mozambique, Indonesia and Kosovo) compared to other projects. Other case studies were analysed mainly on the basis of project documents, websites, evaluation reports and interviews with staff directly involved in the projects.

An analysis of these case studies and other documented experiences with land information led to the development of five criteria that were used to evaluate positive and negative elements of the case studies. For each of the criteria, several case studies were selected to describe the performance of the case studies and for each variable the analysis of the case studies was integrated into a model which indicated poor and good performing case studies.

## GUIDES

The analysis of the case studies is the basis for developing recommendations in the form of guides. These guides are organized around the following five criteria and for each criterion a number of requirements are developed.

1. Level of governance is analysed;
2. Approach (embedding of land information in stable land institutions);
3. Involvement of stakeholders;
4. Essential components of a Land Information System are addressed;
5. Access and use of land information is guaranteed.

While these five criteria are, in essence, ideals, fulfilling them might not be feasible in a specific situation. For example, the fifth criteria might only be possible to achieve in the long term, possibly decades. In that case (for example in post conflict countries) it is more relevant to focus on how to create the conditions to reach that stage in the future and especially where to start.

The guides are a tool that facilitates the design of feasible and realistic projects for the development and use of land information; they are based on lessons learnt and avoiding the mistakes made in the case studies (do's and don'ts).

What constitutes good practices of land information for urban land management?

Based on the review and assessment of the case studies, the following conclusions were made to ensure the effective and sustainable development of land information to support urban land management:

- Understand how land information is really used;

- Be realistic about:
  - level of governance
  - institutional and human capacity
  - costs-benefits;

- Think big (information is a process), start small (information as a project);
- Address all essential components of a Land Information System (technology, data, staff, management and funding);

- Involve stakeholders and beneficiaries;

- Strengthen the position of marginalized groups (poor people, women, ethnic minorities);

- Include and combine top-down activities (land policy, legislation, institutional capacity) and bottom-up activities (land management projects such as settlement regularization, spatial planning, settlement upgrading, increasing tenure security and raising property tax).

The document presents literature and project document reviews, informal interviews, contributions and discussions with key stakeholders and informants. The work was conducted between 2009-10 over a period of several months. This document also contains guidelines on sustainable land information for urban land management. It is hoped that this study and the guides will contribute to the development of realistic land information projects that are sustainable and that support poor people in society and, especially, will help the sustainable development of cities.

# 01

# INTRODUCTION

# 1. INTRODUCTION

This report has been prepared for the Global Land Tool Network of the Land, Tenure and Property Administration Section of UN-Habitat and shows how land information has been used in a number of urban land management projects. It is intended to be used by people who are involved in the development of projects and programmes on land management and urban development, and by those looking for the most efficient, effective and sustainable approach to the development of land information to support urban land management.

The starting point for the study is that UN-Habitat's Medium-Term Strategic and Institutional Plan 2008-2013 (MTSIP) recognizes that a combined normative and operational approach (Enhanced Normative and Operational Framework) is required to contribute effectively to the sustainable development of cities and to stabilize the growth of slums. Much has been written on what needs to be done (normative approaches) and GLTN is developing tools on how normative approaches should be implemented to achieve secure land rights, improve land administrations, and contribute to more effective spatial planning. But, facing the realities of slum growth, environmental deterioration, weak institutional structures and the poor quality of land information requires an analysis of how far the normative approach and tools have been, and can be, implemented and what the critical success factors are.

This report describes and evaluates how land information-related projects are implemented, and what lessons have been learnt from emergent practices in implementing pro-poor land tools to achieve sustainable urban development.

While many stand-alone projects related to land information (security of tenure, land-use planning, land taxation, environmental planning) that have specific funding (local, national and donor) have been successfully implemented, the scale of the problems of rapid urbanization, urban poverty and conflicts requires solutions at scale and projects need to be expanded, institutionalised and converted into continuous processes. For example, information should not be collected haphazardly (Nkwae, 2008), data should not be collected for a specific purpose without considering how to keep it up to date, how data will be disseminated, and so on. This sounds obvious, but in many countries this cannot be done and the result is a lot of talking and little action on the ground. This, along with society's needs and pressure from donors, means that projects are started with the risk that theoretical recommendations cannot be put into practice. The shift from projects to programmes requires "a common goal, long-term commitment by the parties, a strong local ownership, wide stakeholder participation and good local management capacity" (FAO, 2007:38). The question is: what should be done when these conditions are not met?

One necessary approach is to integrate disciplines and activities at different levels (national and local). For example, access to land is fundamental for ensuring access to housing, extending infrastructure and promoting the sustainable growth of cities; effective property tax collection will enable local governments to develop and implement investment plans.

# 01 INTRODUCTION

This report analyses to what extent land information for urban land management projects is embedded within the institutional and political context of countries and cities; it also looks at how land information is collected, used, maintained and how compatible/integrated it is with other datasets.

One challenge is to evaluate how projects have achieved short-term results while, in the long-term, are contributing to a gradual improvement in the quantity and quality of land information that is appropriate for a specific country/city and is fully embedded in local and national institutions. The absence of good governance might mean that holistic and integrated land information approaches can only be implemented through an incremental and bottom-up project approach.

Successful, stand-alone projects will result in urgently required products and achievements in the short-term. These projects might lack the proper foundation or framework data (geodetic network, policies, legal framework and land institutions) to be able to expand to a more integrated development of land information. In this case, the challenge is to combine, expand and institutionalize the projects and gradually improve the quality and robustness of the products. This can be done with improved "top-down" activities and by converting products into permanent processes and service delivery.

The report begins by outlining the purpose and objectives of the study and this is followed by a description of the case studies (chapters 2 and 3). Chapter 4 describes the criteria for the development of sustainable land information, which is also the basis for the guides that are presented separately. Chapter 5 reviews the criteria for a number of the case studies and explains how land information projects can be positioned for these criteria. Chapter 6 presents the conclusions and recommendations for the phased development of land information for urban land management.

02

# PURPOSE AND OBJECTIVES

## 2. PURPOSE AND OBJECTIVES

The purpose of this report on pro-poor, sustainable land information for urban land management is to show how land information was collected and used in a variety of urban land management applications. It does this by describing and analysing case studies from a number of countries where UN-Habitat and other organizations work.

There are several fundamental problems with land information; lots of data are collected but hardly used, decisions are made without enough information, projects are not converted into a continuous process, and land information is collected on an ad-hoc or project basis only.

This report documents lessons learnt from operational activities and emergent practices, and describes how projects act as initiators of change to improve urban planning and quality of land information.

The main objective is to learn from these operational activities, analyse the experiences and develop normative products (report and guides) for knowledge sharing to improve cost-effective development and use of land information.
The guides are based on emergent practices and the report examines how these guides can be implemented as a normative approach and tool.

The report illustrates three main urban land management applications using land information:

1. Land administration (security of tenure, land/ property taxation);
2. Spatial planning (regional and urban planning, slum upgrading, settlement regularization);
3. Environmental planning and management.

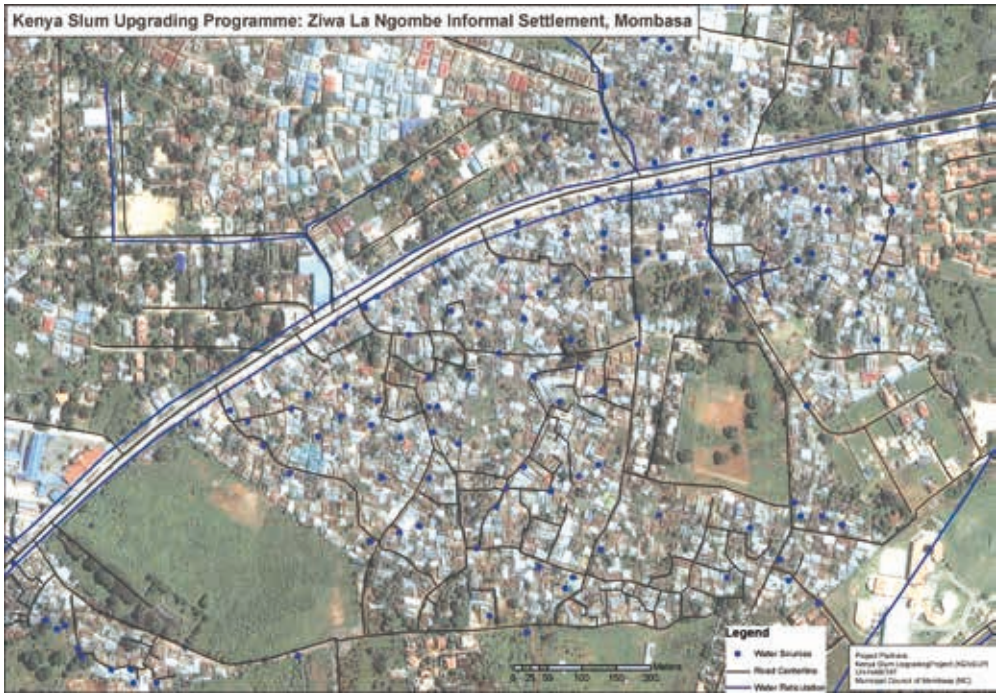



**Figure 1: Slum Upgrading Programme, Ziwa La Ngombe Settlement, Mombasa Kenya.**

03

# CASE STUDIES

## 3. CASE STUDIES

Information on 23 countries was collected for this research. From these countries, 11 were selected as case studies for more detailed analysis. These 11 case studies were chosen to represent a variety of developing countries and different land information themes or applications. They had the opportunity for evaluation and feedback and the lessons learnt are considered to be of interest beyond the city or country itself. The case studies show how land information was collected and used in different projects and programmes.

Each case study is described according to the following: the project context, data collected, how data was used, lessons learnt and if the land data is sustainable (keeping data up to date, expansion of data, technical capacity and financial resources). See annexes.

The case studies are grouped into three main themes: land administration, spatial planning, and environmental planning and management.

Not all case studies could be analysed in the same way and with the same level of detail, but all of them included an analysis of the following five criteria: governance, approach used, involvement of stakeholders, components of a land information system, and access/use of land information.

UN-Habitat was not directly involved in five of the eleven case studies (Colombia, Philippines, Malawi, Mozambique and Burkina Faso) but was involved in six of them (Somaliland, Afghanistan, Indonesia, Kosovo, Libya and Zambia).

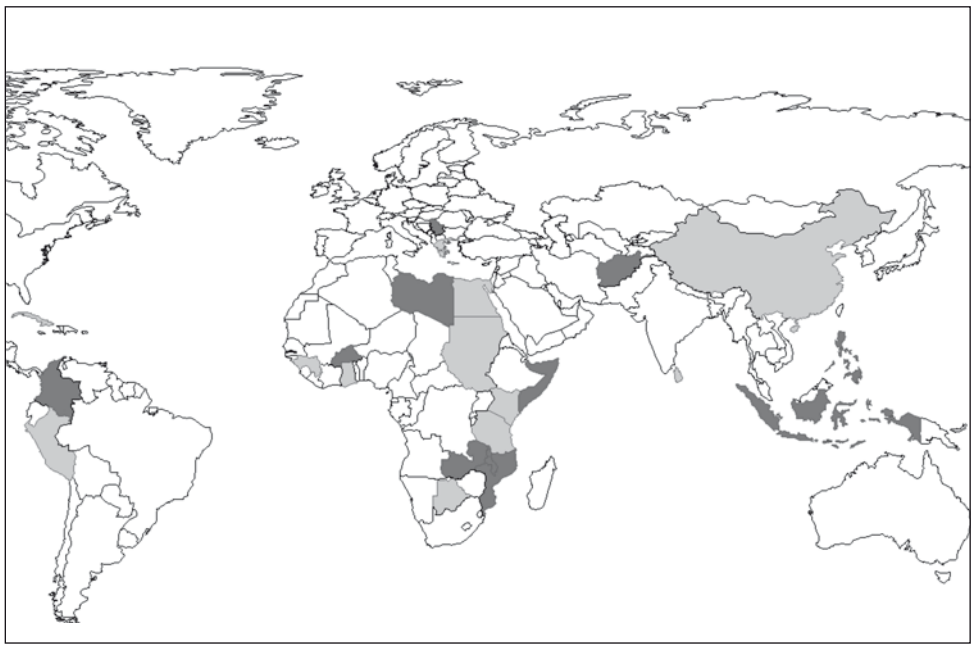


**Figure 2: The 23 countries from where information was gathered.**

**Table 1: Case studies.**

| MAIN THEME | NR | Country | City | Land Information Theme |
|---|---|---|---|---|
| Land Administration | 1 | Somali Region / Somaliland | Hargeisa | Property Taxation |
| | 2 | Afghanistan | Kandahar | Settlement Regularization, Security of Tenure, Taxation |
| | 3 | Indonesia | Aceh | Housing |
| | 4 | Philippines | (National) | Land Administration |
| | 5 | Kosovo | (National) | Cadastre |
| | Others studies: Botswana, Ghana (National Land Administration), Maldives (Land Policy and Land Administration) | | | |
| Spatial Planning | 6 | Colombia | Paipa | Ordenamiento Territorial |
| | 7 | Libya | (National) | Spatial Planning |
| | | Liberia | Monrovia | Rapid Urban Sector Profiling for Sustainability (RUSPS) |
| | 8 | Burkina Faso | Ouagadougou | Inner-city upgrading |
| | | Kenya | Mombasa | Slum Upgrading |
| | 9 | Malawi | Blantyre | Master Planning |
| | 10 | Mozambique | Maputo | Structure Planning |
| | Other Studies: Sudan, Juba (Guided land subdivisions), Egypt, Cairo (Greater Cairo Strategic Urban Development Plan and GIS), China, Wuhan (Urban Planning), Greece (informal developments), Tanzania, Dar Es Salaam (Slum Mapping) | | | |
| Environmental Planning and Management | 11 | Zambia | Lusaka | Urban Environmental Management Information Systems |
| | Other Studies: Sri-Lanka, Batticaloa (Sustainable City Programme), Cuba Cienfuegos and Santa Clara (Agenda 21 and Environmental Management Information System), Peru, Trujillo (Environmental Atlas) | | | |

# 04

# LAND INFORMATION CRITERIA

# 4. LAND INFORMATION CRITERIA

This report assumes that, despite the enormous progress in spatial and communication technologies (GIS, internet), in data collection and access to data (for example, satellite images, web-based data sources, and national / local data-collection efforts), the impact this has had on urban land management in developing countries is limited. The link between data and its use is not obvious or straight forward and has many non-technical aspects that are often overlooked. Limited data – data of poor quality, which is difficult to access – or data that ignores some realities – informal development, poor people or women – is a hindrance to urban development projects. Too much data – data that cannot be used – is a waste of resources. Sustainable land information, in this report, refers to land data that can survive a project phase, are locally driven and embedded, and are supported by an enabling environment (policies, laws and land institutions).

The five land information criteria described below were developed on the basis of the experiences of the case studies. These experiences were supported by literature and experience that:

- Politics plays a role the use of land information;
- Good Land Information in itself is no guarantee that women, marginalized groups and poor people will benefit from improved access to and ownership of land
- The development of land information through isolated projects can gradually be expanded into a more institutionalized process.

The criteria described below, explore how to evaluate the case studies with regard to what type of data was collected, what kind of Land Information System (LIS) was developed and how it was used, maintained and institutionalized. The lessons learnt formed the basis for developing guides on the effective and sustainable development of an LIS for urban development, and which takes into account the specific circumstances and complexities of cities in (post) conflict and developing countries.

## CRITERIA 1: LEVEL OF GOVERNANCE IS ANALYSED GOVERNANCE IS RELATED TO THE POLITICS OF LAND INFORMATION SYSTEMS (LIS).

LIS are developed with the purpose of supporting land management and urban development processes. Land management can mean urban planning, land administration, environmental management, transport planning, infrastructure development, settlement regularization and improvement. However, to be able to implement urban development projects and see changes happen in, for example, the built environment or improved land administration with increased levels of land tenure, then basic governance principles should be in place.

Land governance "refers to the processes by which decisions regarding access to, and use of, land are made, the manner in which those decisions are implemented, and how conflicting interests in land are resolved or reconciled. Land governance is thus a techno-legal, procedural and political exercise" (UNECA, 2009:40). Good governance means "that government is well managed, inclusive and results in desirable outcomes. The principles of good governance can be made operational through equity, efficiency, transparency and accountability, sustainability, subsidiarity, civic engagement and security" (FAO, 2007:6).

# 04 LAND INFORMATION CRITERIA

Many countries, however, have poor land governance that is mostly due to incompetent and ineffective land institutions, a situation that might be very convenient for the rich and powerful benefiting from the lack of transparency in urban land management.

If governance is weak, urban development processes can only have a limited impact. Where there is weak governance, the level of land information should be limited and related to what an urban development project can achieve. Characteristics of weak or ineffective governance include corruption, weak institutions, lack of horizontal and vertical coordination among governmental agencies, limitations of the credit market and low efficiency of land administration systems. These conditions can prevent the beneficial effects of a LIS from being realized (adapted from Deininger and Feder, 2008).

For example, a "big bang" approach to increase the level of land information dramatically will not be useful in a situation where there is weak governance. A limited urban development project approach that focuses on a stand-alone application might be more practical; the amount of land information required should be directly related to such a project. Stand-alone projects might be the only workable option and, in those cases, a broad, corporate LIS might be too ambitious. A stand-alone LIS should preferably not be developed for too long or expanded in isolation so as to avoid a situation where different LIS are developed in the same area ("silos" of incompatible data).

Lack of basic conditions, or a weak "foundation", is the main cause of poor land governance. This foundation consists of a policy framework, a legal framework, institutional capacity, a primary geodetic network, education and training, funding and finance, and stakeholder engagement (Burns, 2007:69). Weak land institutions, for example, might lack human capacity such as technical and management skills as well as resources, or land institutions do not perform due to a lack of dedication resulting from poor incentives.

### CRITERIA 2: LAND INFORMATION IS A SUSTAINABLE, SCALABLE, CONTINUOUS, INCREMENTAL PROCESS EMBEDDED IN STABLE LAND INSTITUTIONS.

Reports such as the Land Information Management for Sustainable Development of Cities (FIG/UN-Habitat, 2004) and Guides for Implementing a LIM Strategy (UN-Habitat, 2008) give valuable recommendations on the development of Land Information Systems. However, the reports have several assumptions, for example that there is a national land policy, that good land governance can be implemented and that there is the capacity, willingness and a positive attitude to achieve the higher goals of sustainable development. The reports are based on the idea that decision making is heavily dependent on reliable and relevant spatial information. They also promote data sharing, the integration of land information in national spatial data infrastructures, completeness, and the belief that land information should be reliable, secure, easily accessible and relevant.

However, as described in the report on Land Administration Reform (Burns, 2007:64), these guides tend to overlook the level of development that

some countries are at how long it takes to improve the level of governance. In situations where there are informal institutions and land administration is based on customs and traditions or in (post)conflict countries, the recommendations are not relevant in the short-term. If the institutional environment and governance structures are underdeveloped, a proposal for integrated land information systems, data exchange between land institutions and web portals for easy access to information might very well stay at the proposal stage because implementation will not be possible.

The design of a LIS is, in many cases, over-ambitious, technically driven, based on technical capabilities rather than needs, it underestimates the time and effort it takes to develop a LIS, and it ignores the specific context, the cultural / social sensitivities and complex institutional arrangements. Ambitions, once defined, are hard to scale down during the implementation process. Grand visions are fine as long as there is also a clear strategy and time frame on how to achieve those goals and objectives. A LIS is a social, institutional and technical process; realistic timeframes, staffing and funding are required for the different phases and each phase also requires tangible results and genuine local and national support.

The technical/theoretical attractiveness of a Spatial Data Infrastructure that is designed to avoid data overlaps, and to make all land-related data compatible and exchangeable among spatial data producers and consumers means that many LIS projects are technically driven and over-look management, financial and social components. It took developed countries a long time to develop stable and capable land institutions such as national mapping, cadastral agencies and land registers where all the different basic components are in place, for example basic data sets, data maintenance, legislation, policies, management, trained staff and budgets.
What is observed is that a large LIS developed for a single project (for example, the development of a master plan land titling project) requires enormous effort to develop maps and other geo-databases with attractive stand-alone products but has no strategy for data maintenance or data expansion. This is due to lack of institutional embedding, lack of funding and lack of political support.

Taking the local or national conditions into account, especially in (post) conflict and developing countries, it might be more suitable to have a limited scope for a LIS which can also be project based and for a specific area only. This minimalist approach can be expanded in time if conditions and priorities allow it.

### CRITERIA 3: STAKEHOLDERS ARE INVOLVED

The development and use of land information for urban development is political and sensitive. Land tenure, land conflicts, the use and development of land and land speculation are directly related to people owning and/or occupying land. Decisions regarding land use and land ownership affect people's living environment so it is important that people are involved in the collection and processing of land data and in decisions regarding land development (land use zoning, settlement regularization and improvement, land taxes, and land dispute resolution).

# 04 LAND INFORMATION CRITERIA

It is important that people participate in decision to develop consensus building and to make a land management project a people's process. It is also crucial to identify and involve other stakeholders, such as local authorities and others tiers of government, as well as industry and private investors (UNECE, 2008).

Some components of land information are highly technical in nature (aerial surveys, use of satellite images, land surveying, mapping, database design, and use of software) and require specialised skills. Other components of a LIS are subjective, socially- and culturally-related (customary land traditions and laws), context specific (what kind of land data to collect, the priorities) or are related to how to register what (ownership, land use, property characteristics). Obviously, what is even more important for decisions on land (actions to improve security of land tenure, land use development, settlement upgrading). The development of land information requires consensus among all relevant stakeholders to be able to collect the correct information and to manage it for decisions regarding land.

The development of LIS specifications requires input from a wide range of groups. These are not only the people in a LIS project area, but also the different government institutions (land development is cross cutting), private sector, utility companies and representatives of specific groups (religious, clans and community-based groups).

## CRITERIA 4: ESSENTIAL COMPONENTS OF A LAND INFORMATION SYSTEM ARE ADDRESSED.

A LIS can be seen as a geo-database but to make a LIS useful to support urban land management a combination of technology, data, people, management and funding should be in place. These components should be given equal attention and developed to the same level. The focus and initial emphasis of LIS on technology (hardware and software) has gradually been replaced by a focus on data, although many still use software packages with functions that are not used or even required. Today, computers are standard office equipment with increased processing power and more user-friendly software. Web-based data sources, especially the availability of high and very-high resolution satellite images, are important as a spatial data source for urban land management.

A land institution needs people with the right mix of qualifications to operate a LIS, such as internet technology and administrative support staff, data operators and staff with specific skills on surveying, database design, modelling, web-design, cartography, remote sensing, etc. Also, the number of staff members, salaries (as part of motivation and dedication) and a positive and challenging work environment (training opportunities) are important for a functional LIS.

A LIS needs managers with technical and management skills who also have the ability to connect an institutional LIS with other spatial data sets developed and used in a country or city. Intra- as well as inter-institutional relations at management and operational levels are crucial for a LIS to move beyond the isolated project phase to a wider corporate LIS, and even towards a local or national spatial data infrastructure.

A LIS needs investment (example in staff, equipment, data and offices) that should be related to the benefits

and services the survey is generating. A clear and long-term budgetary commitment from the government on how to finance a LIS is essential to define its scope and ambitions.

### CRITERIA 5: ACCESS TO, AND USE OF, LAND INFORMATION IS GUARANTEED.

There is considerable effort and cost involved in producing land data which should be easily available to all parties involved in the spatial development of any country, city or, especially, community.
Who uses data and how they use it can vary. The public might be able to access data on websites for example, only to consult and view spatial development plans or cadastral type data; specialized agencies may only access other datasets.

While a lack of data is most often mentioned as a bottleneck to urban development projects, in many cases a problem is access to data. Data may exist but is poorly structured, has incompatible formats or is not accessible to others besides the producers themselves. The reasons can be technical, personal (information is power, it has value and will only be made available for favours or money) or institutional (no incentives to make data available). The mushrooming of digital (geo) datasets in CAD (computer-aided design) and GIS formats has created lots of ad-hoc project based digital datasets. However, they lack a sound database structure, institutional embedding in stable and recognized land institutions, and policy about distribution (including sale) and access to land data. Land data requires processing to derive at meaningful land information. Land information is essential to support strategic decisions on spatial planning, land tenure improvement etc, and to improve the efficiency of land institutions. In many projects, there are GIS systems in place but the data input equals data output. Many stand-alone maps are produced as illustrations of a planning document, including, for example, a final zoning or land-use plan that lacks the possibilities of analysis and modelling based on basic data sets, scenario development and evaluation.

Having data on land is no guarantee of positive intervention in informal development, urban sprawl, slums, or gender discrimination in land tenure, inheritance and property rights etc, but it is a first step. Turning the results of data analysis into action requires that the criteria "access and use of land information" as well as the other four criteria, are fulfilled, which might be a long and incremental process due to the inherent conflicts between different groups in a society.

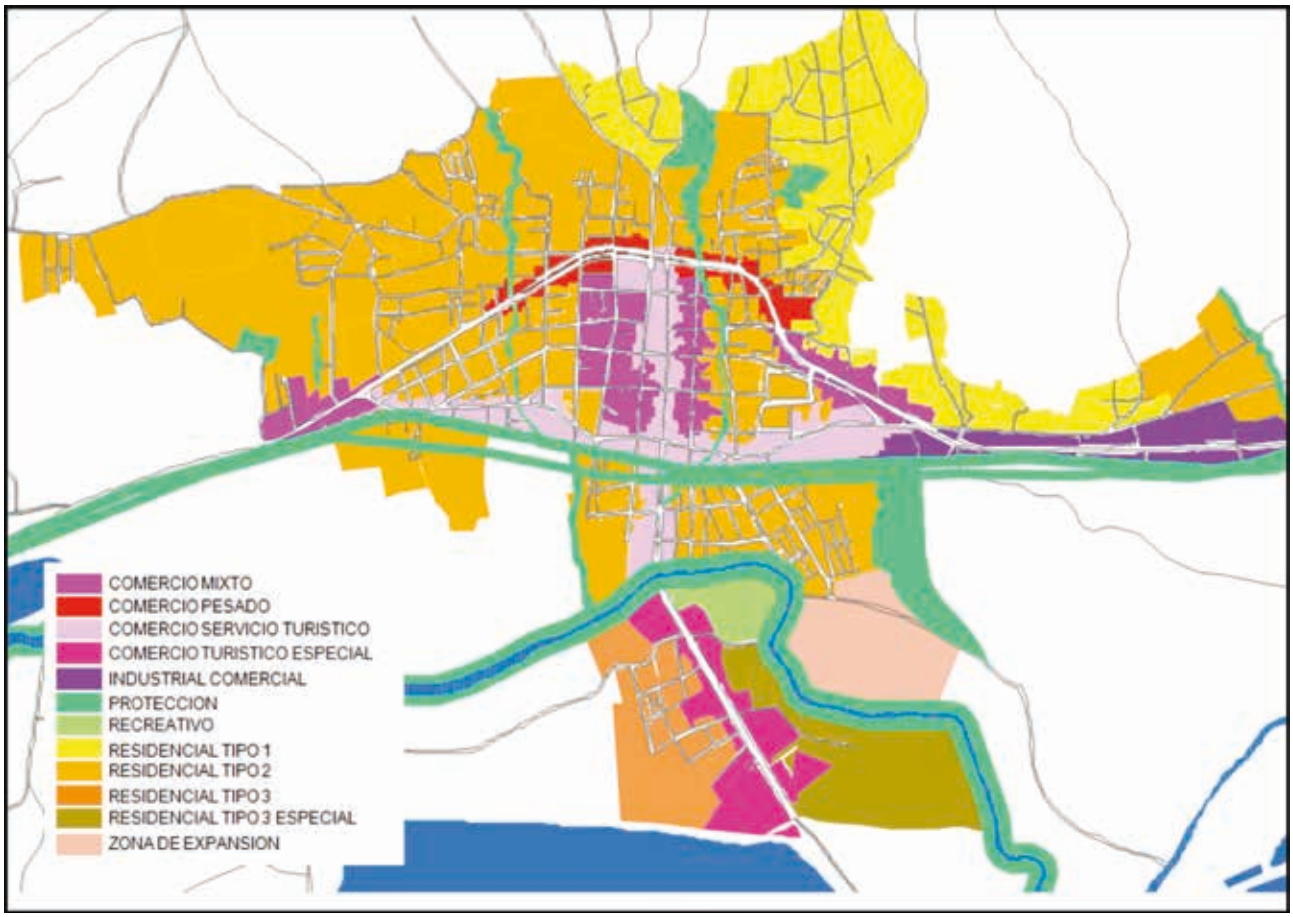



**Figure 3: Land-use plan, Paipa, Colombia.**

05

# ANALYSIS OF THE CASE STUDIES

# 5. ANALYSIS OF THE CASE STUDIES

The 11 case studies are briefly described (see annex) and with other case studies (see chapter 3) and practical experiences and literature (see references) are the basis for the development of the criteria described in the previous chapter. In this chapter the case studies are analysed. This analysis is the basis for the lessons learnt and the development of guides on the development of sustainable land information to support urban development.

## 5.1. GOVERNANCE

Governance cannot be easily influenced or changed by a single project or activity. The development of good land governance is a long-term process and is a prerequisite for, but not a guarantee of, sustainable development. Weak or poor levels of governance means that ambitious projects fail to achieve their goals. Projects or programmes need to look beyond their scope and take a broader view - see the whole picture: the society, the government, the institutions and the cultural and economic factors.

For land information projects, good governance is important because it creates the conditions in which land data are maintained, expanded, properly used and integrated into institutions that are supported by policies, budgets and staff. An operational project to register properties for taxation is relatively simple, but projects related to the development of GIS datasets for spatial planning require a much higher level of good governance.

The underlying assumption of developing land information and using this information for urban land management under weak governance is that land management projects can and should contribute to better land governance. The "bottom-up approach" of a local land management project can help to empower the population (participation, demanding influence in decision-making) and to strengthen local land institutions. However, under chronically bad governance and where there are conflicts of interest, this approach might not work.

It is therefore essential that developers of LIS programmes and projects for urban land management are aware of the influence of the level of governance on LIS development and are especially aware of the possible limited impact of a LIS due to bad governance. In short, a realistic LIS that is modest in scope should be developed in circumstances of weak or bad governance.

## BOX 1: PROPERTY TAXATION IN HARGEISA, SOMALILAND.

The capital of Somaliland currently has many land-related problems, which is not surprising in a country that has had such a long period of conflict and where cities are also experiencing rapid urban growth and poverty. Somaliland is not recognized as an independent state by other nations and among the land-related problems are unclear land ownership records, unplanned areas, informal areas used by internally-displaced people, weak local and national institutions, and limited and poorly-maintained land records. The problems are overwhelming.

UN-Habitat was asked to support Hargeisa's urban development and one of the objectives was to increase municipal revenues through property taxation. Property taxation in general is based on an inventory of properties, preferably a large-scale map identifying all properties and related data on ownership/occupancy and physical data (land and parcel size, use of building, building material, etc). A property inventory is a challenge in a data poor environment that is developing like Somaliland. The methods used were satellite imagery and attribute data collected by field surveys stored into a GIS (see annex). These proved to be fast and cost effective. Property taxes increased from US$69,000 in 2005 to US$589,000 in 2008.

Lessons learnt

- Resist the temptation to expand the project objectives to include urban land management (for example, land tenure) instead of limiting them to revenue generation only;
- Political support, cooperation with municipal council and support to local district offices are essential factors in the success of the project;
- The property tax system is a relatively simple concept and the project was based on a locally-known structure;
- The stand-alone project and "keep it simple approach" with quick, measurable results was another factor in the project's success;
- Avoid being overambitious; for example, the introduction of differential tax rates was not accepted;
- Learn from technical mistakes and make changes in the land database.

The main conclusion is that the level of governance in Somaliland permits the levying of taxes in some cities but not all. For example, a similar project was successful in Borama but not in Burao. The man reason for this was that support from the mayor was not enough; elders, clan leaders, religious leaders are also influential and in Burao they refused to support data collection for unclear reasons.

An expansion of the property database to include land ownership has still not been initiated more than five years later due to the lack of a solid, legal and institutional framework.

## BOX 2: INCREMENTAL SETTLEMENT REGULARIZATION IN KANDAHAR, AFGHANISTAN.

Kandahar contains a large informal settlement developed on non-productive desert land that is inhabited by over 100,000 people. It requires improvement in basic services and increased tenure security. The municipality aims to increase revenues and also wants to transfer (sell) the land to the inhabitants.
A project to record all the properties in the area into a GIS database was initiated with support from UN-Habitat.

The combined incentives of the key stakeholders were the key to the success of the project. Inhabitants wanted to upgrade and increase security of tenure and hope for a land title); local government wanted to raise revenues and gain popularity; the national government hoped to improve living conditions of poor urban citizens; and donors wanted measurable and visible results. However, the weak governance manifested in the judicial system and cadastre meant that transfer of titles against a far below market value is uncertain. Further expansion of the property inventory to the rest of the city is uncertain as people are not convinced that they will benefit from paying property taxes and see improvements in their neighbourhoods. Management of the database by local municipal staff without outside financial and technical support has yet to be done. While all data are recorded into a GIS database, most of the taxation takes place through paper records.
Lessons learnt

- The regularization project in Kandahar obtained essential support from local and national governments, donor funding (Canadian), technical advice and local support (UN-Habitat);
- Support from local leaders and inhabitants is important; all parties had their own and compatible incentives to actively participate a win-win situation;
- An integrated (upgrading and increasing security of tenure), step-by-step, "keep it simple" approach proved successful;

The project in Kandahar was presented to the national Government (the ministries of urban and local development) to raise awareness about the problems of land tenure in informal settlements and that a national settlement regularization policy is needed. The land information developed in Kandahar (the property database) will need a long-term commitment from local and national governments and donor support to be able to develop land institutions that can fully use, maintain and expand this geo-database.

## BOX 3: SPATIAL PLANNING, PAIPA, COLOMBIA.

The Government of Colombia has created a variety of spatial planning and urban development laws in recent decades and municipalities are obliged to develop spatial development plans. The requirements for local authorities regarding the content and process of the plans are specified in great detail. Colombia has well established institutions capable of providing specific datasets (for example, digital maps, environment, demographic data) and expert support to the municipalities. The governmental structure of Colombia is decentralized to a great extent and there is a culture of public participation.
Lessons learnt

Development and implementation of the spatial plan of Paipa:

- Legislation and planning procedures are important;
- A critical mass of GIS experts and specialized land institutions producing core data sets are making the development of spatial plans possible;
- Spatial plan development is outsourced, local institutional embedding is low;
- Spatial planning is heavy data demanding and technically complex;
- Participation is low due to complexity of the planning process;
- Implementation and finance of proposed projects is unclear;
- Plan updating will have to be outsourced again.

Due to decentralization, local governments have a lot to say in the development of their areas. However, particularly small municipalities such as Paipa are not able to develop plans and maintain the related GIS datasets due to lack of capable municipal staff.

### BOX 4: SPATIAL PLANNING AND GIS DATA BASE DEVELOPMENT, LIBYA.

Libya's spatial development plans that was developed in the 1980s required revision and updating. The Government of Libya, through its Urban Planning Agency, developed a very large and ambitious planning project (Third Generation Planning Project) to develop new development plans at regional, sub-regional and local level. The project used the latest GIS and RS technology over a four-year period (2005-2008). All spatial data was to be developed from scratch and in GIS format. The project was still not finished by 2010 and the GIS data sets were not completed.

Lessons learnt
The main reasons for the delay and the unlikelihood that the 3GPP project will be converted into a sustainable process are:

- Libya's government structure is highly centralised, lacks transparency and institutions are weak;
- Spatial planning and land information is not integrated, inter-institutional co-operation limited and ad-hoc;
- Spatial planning is based on an out-dated blue print approach and conversion to a contemporary continuous planning process requires a shift in thinking and takes time;
- Management of the project lacks technical, management and political support;
- Staff capabilities and motivation are limited;
- GIS specifications are too ambitious given the governance and institutional capacity.

While ample funding was available which facilitated the procurement of equipment it takes time, skills and management to collect data and store data into a geo-database as well as the use of data to support spatial planning;
Large budgets and ambitions alone cannot overcome the limitations of weak governance. It takes time to develop institutions. Project ambitions need to be in line with the political and institutional realities and the scope of change and development.

**Table 2: Level of governance and land information of the selected case studies**

| CASE STUDY | LEVEL OF GOVERNANCE | Land information objectives | Remarks |
|---|---|---|---|
| Hargeisa, Somaliland | Low | Low | Realistic land information ambitions (single, standalone application) in relation to the level of governance |
| Kandahar, Afghanistan | Low | Low/medium | Ambitious project with multiple objectives with could go beyond the level of governance |
| Paipa, Colombia | Medium | Medium | Balanced LIS and governance level but LIS dependent on funding and national expertise |
| Libya | Low | High | LIS ambitions beyond the level of governance. |

Table 2 shows the level of governance and the ambitions regarding the expansion of land information during the project phase. In Hargeisa, Kandahar and Paipa, the land information reached the limit of what can be achieved within the levels of governance. The proposed major increase in the level of land information in the Libya project is beyond what can be realized given the limited level of governance.

## CONCLUSION

Although it is an abstract concept, the level of governance influences how much progress can be realized in a specific period of time with the improvement of land information. Where there is weak governance - which can range from corrupt government to a lack of human and institutional capacity - stand-alone projects with a limited scope might be the only option. They could also be seen as a small contribution to improving the level of governance.

Many projects on the development of digital databases and information systems in developed countries fail to meet their objectives and are either cancelled or take more time and resources than were planned. The Tribal Land Integrated Management System in Botswana is another example of a system which was overambitious ("big bang" approach) and complex (IT infrastructure, lack of qualified staff, time frame too short) to implement. Costly changes were required to implement the system.

The realities of many developing countries are that governance and land institutions can be an unpredictable; they can be unstable and so LIS projects should incorporate uncertainty. In short, development of land information can be ambitious but should be realistic given the level of governance and the abilities of each actor. Constant reflection, a learning approach, the ability to adapt to changing circumstances and an acknowledgement that good practices cannot be directly replicated are some of the lessons learnt about the influence of governance on the development and use of LIS.

## 5.2. DEVELOPMENT OF LAND INFORMATION: A PROJECT OR PROCESS APPROACH

Land information is not an objective in itself but is a condition necessary to achieve the goals of increased tenure security, settlement upgrading, spatial planning etc. There are two basic approaches to the development of land information:

### 1. PROJECT APPROACH

This approach is mostly ad-hoc, stand-alone and is therefore limited to the life-span of a project. From a technical point of view this approach is not advisable as the land data might not be maintained and could disappear when the project ends. However in (post) conflict countries and many developing countries this might be the only feasible and practical approach. In developed countries it took a long time to develop stable land institutions to achieve the amount and accuracy of land information available today.

Developing the specifications of a land information system requires a realistic analysis of the circumstances: what can be achieved in the short term and how can a LIS be gradually expanded and embedded in land institutions. One challenge is to work with a top-down (land policies, legal frameworks, development of specialised land institutions) and a bottom-up (stand-alone, single application projects) approach at the same time.

Another challenge for urban planning projects is how to maintain and use maps and other spatial data sets created for the development of a master plan, and how essential land information, for example land use maps, can be maintained to respond to things such as a new planning request, building control or settlement upgrading.

### 2. INSTITUTIONAL OR PROCESS APPROACH

Land information, ideally, should be developed and maintained on a continuous basis to reflect the changes in the built environment and land ownership, for example. Every day, houses are built, buildings are sold, populations change, and infrastructure is expanded. To keep the land information current, different land agencies - mapping, cadastre, utility companies, environmental and planning agencies, and other spatial data producers - need to have staff, procedures and data models. There should also be inter-institutional cooperation to agree on data standards and procedures to exchange and use land information.

Horizontal linkages – the inter-institutional cooperation/data exchange between different institutions – and vertical linkages – intra-institutional cooperation and layers of spatial information at different scales – that are required for the development of a "spatial data infrastructure" are either absent or underdeveloped in many countries. There might also be a conflict or lack of interest in cooperating, or a lack of awareness and vision on how to reach an institutionalised level of land information.

Besides the lack of legal frameworks, policies and technical capacity, it is mainly an unstable situation in many developing countries and especially (post) conflict countries in which political and personal priorities might shift rapidly and funding (both from local/national and donor sources) are far less secure or for a limited period.

BOX 5: LAND ADMINISTRATION AND MANAGEMENT PROJECT (LAMP), PHILIPPINES.

www.phil-lamp.org

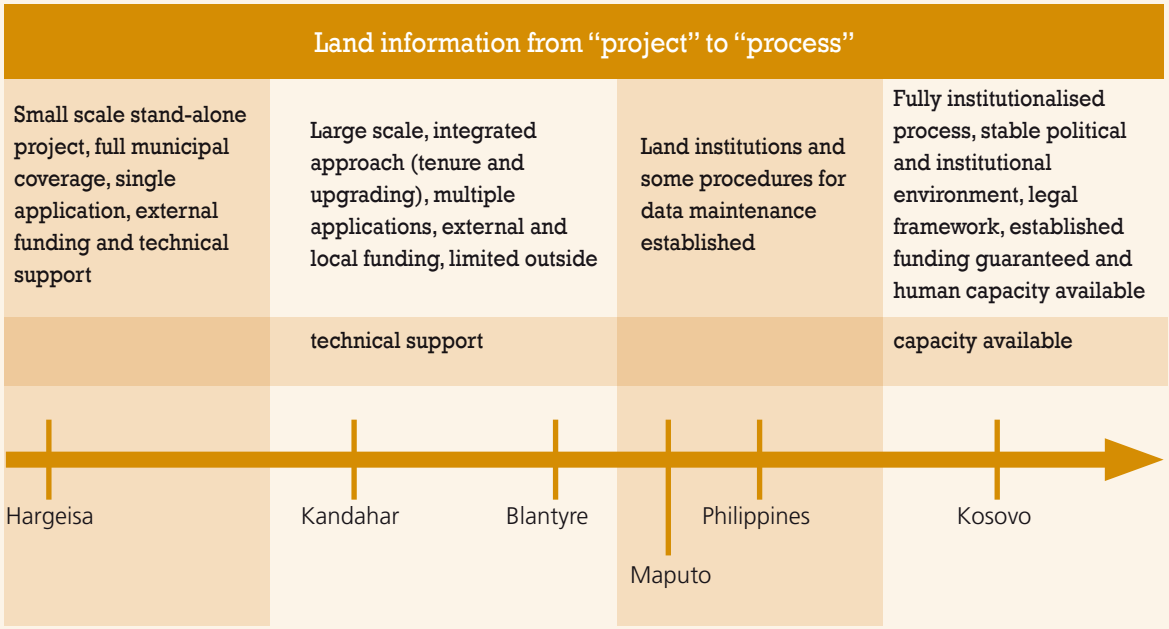
Applications: LAMP aims to address various land administration applications (land adjudication and land registration, property valuation, mapping).
Legal and Institutional framework: the project created a comprehensive support framework (legalisation, institutional arrangements, capacity building, and communication strategy).
Political support: unknown but apparently limited.
Scale and time frame: LAMP is a major, national project covering several components (land policy, institutional strengthening, tenure security, and property valuations). The project's ambitions are high and include the coordination between different land administration agencies. This requires political, institutional and financial support and commitment over a long period (15-20 years).
Funding: World Bank and the Australian Government
Expertise: There is some foreign technical expertise and project management. Most technical capacity appears to be available from within the country, but the complexity and ambition of the project might hamper short-term results and is only cost-effective in the long run while political and institutional patience is limited.

BOX 6: MASTER PLANNING, BLANTYRE, MALAWI.

Applications: The master plan of the year 2000 was developed to address spatial development challenges in Blantyre, such as unplanned development, lack of infrastructure, lack of employment and weak institutions. The previous structural plan for the city was developed in the 1970s and was completely out-dated. The new planning process included the development of new thematic maps and a land use map for the city.
Legal, political and institutional framework: The strategic action plan was fully supported by the Blantyre municipality and urban planning department. Whether the data collection effort was valued at a political level is unclear, but no real effort was made to institutionalise the land information and get regular data updates, and land data might be out-dated and of limited value.
Scale and time frame: The development of the Blantyre plan took several years. Follow-up (detailed plans at district level and funding/construction of the proposed projects will take several more years.
Funding: The development of land information was supported by national and international funding.
Expertise: An outside, South African consultant facilitated the development of the reports and GIS maps. It is unclear if Blantyre's municipal council will be able to maintain the GIS databases.

## BOX 7: STRUCTURE PLANNING, MAPUTO, MOZAMBIQUE.

Applications: A single, stand-alone planning proposal for Maputo's municipality supported by standardized and specifically developed land information in GIS format (several datasets processed from existing datasets developed by the university.
Legal and institutional framework: City council of Maputo supported by the World Bank's Institutional and Financial Reform and Improved Service Delivery Programme.
Political support: Mainly from local councillors
Scale and time frame: The structure plan (seven reports, many maps) was developed in a one-year period. At the same time, planning laws were developed and approved. In one ordinance, support was given to institutionalize the project-based GIS database.
"To facilitate the implementation of policy and planning, a national GIS database should be established with information on topography, socio-economic data, environment, infrastructure and facilities. The database should be available in different formats including the internet" and "The GIS database should be maintained through the collection and processing of information and should be from a statistical, environmental, technical and scientific point of view relevant and have linkages between national, provincial, district and local level". It seems that this recommendation is not yet materialised. The opportunity to expand the current GIS data with data layers at a more detailed scale and parcel level data might be lost and as such the conversion into a process GIS doubtful.
Funding: World Bank loan of US$200,000
Expertise: Local experts from universities, the private and public sectors.



An additional problem in many developing and (post) conflict countries is that there are no base maps and no geodetic framework. This means it is possible that land information developed through the project approach might not be converted to a sustainable process because the scattered project databases are incompatible.

The above diagram shows a continuum for the development of land information. The ideal situation is the fully institutionalized process of development, maintenance and use of land information with most western countries, including Kosovo, close to this level. It will take a long time, probably decades, for a city or country currently at the initial stages of development to reach the ideal, for example Somaliland and Afghanistan.

In a situation with absent or weak land institutions, a project approach might be the only approach capable of delivering results in the short term. An example of this would be land information as a stand-alone project depending on outside financial and technical support.

Two serious major mistakes in urban land management projects that have a land information component are 1) to try to shorten the process of developing land information, and 2) to underestimate the complexity of the process. For example, if the project in Afghanistan expanded and maintained short-term results and there was both national and local political support, the project might expand. Alternatively, the LAMP project in the Philippines might not survive because it was too ambitious given the support it has. Kosovo, however, has the advantage of being a small country (less than two million urban and rural land parcels/plots in the whole Kosovo) with strong support from European Union countries and skilled human resources. If political stability continues and it is admitted to the EU, the cadastre project will reach EU standards.

The main conclusion is that there is no one approach to fit all situations. The objectives and ambitions for the development of land information should be based on an assessment of the existing situation with regard to: political support, the legal framework, institutional capacity (technical and management), funding and development priorities. Preferably, outside support should allow local people to embrace the process, so that they can clearly see what is in for them and what clear benefits there are from investing in land data and land institutions?

## 5.3. INVOLVEMENT OF STAKEHOLDERS

Land information is not a goal in itself but it is required to support urban land management. The type of data that is collected and used (or not used) will affect the inhabitants of a city or neighbourhood. But who are the stakeholders? How are they involved? How can they benefit from improved land information?

Land information is related to the use, ownership, transfer and inheritance of land and property rights. These are all highly sensitive and, in many cases, political in nature. Making decisions about land without the real participation of key stakeholders (landowners, the community, the public and private sectors) is against the principles of good governance. Decisions without their participation can be a source of conflict and they can also be ineffective because people will not cooperate.

# 05 ANALYSIS OF THE CASE STUDIES

It is essential that all people affected by decisions regarding land are directly or indirectly involved in the collection of data, its use and any decisions. Stakeholders should be involved to ensure their opinions are heard, to make certain that the interests of individuals and those of the society at large are balanced, and that vulnerable groups are protected.

Effective land management requires a land policy, a legal basis and procedures for everyone with an interest or stake in the land to be able to participate, that decision-making processes are defined, and that land information is available.

## What kind of land information for what?

Land information relates mainly to the use, physical characteristics, such as parcel size, infrastructure availability, quality and size of the construction, and ownership / occupancy of land. This information is important for urban planning and informal settlement upgrading / regularization and should fully cover the area; informal settlements should not be excluded. Databases on land should include gender-disaggregated data and data related to other disadvantaged groups. There should also be information on how data are used to reduce negative gender impacts. For instance land information project with focus on ownership can have a negative impact on women in case of inheritance, divorce etc (Burns, 2007:142).

## Who are the main stakeholders?

Depending on the application of the land information, the stakeholders will vary. For urban planning at medium and small scale (citywide, sub-regional and national level) and for the development of land policies it is difficult and impractical to directly involve all citizens. Indirect participation by communities may be more suitable and in that case coordination with public agencies and the private sector is more important. People are usually more interested in participating in land management when it directly affects their own property and community.

When land information deals with interventions at the neighbourhood level, the involvement of the inhabitants is crucial to determine the reality on the ground, to accommodate their needs and wishes, and to get their collaboration and acceptance of actions undertaken (for example, legalisation, upgrading or relocations).

When engaging with members of a community it is important that the voices of women, minority groups and young people are heard, and not just those of the male head of households. All of these groups might have different needs, requirements and opinions.

Other stakeholders are the private sector, (for example shop owners, small- and medium-size enterprises and large companies), religious leaders, elders, government representatives (district leaders and

council members) and public sector agencies at local, regional and national to coordinate interventions and public sector investments level (infrastructure, housing, land administration, education, health and public works). In many developed and (post) conflict countries, international non-government organizations (NGO), the United Nations and donor agencies may be stakeholders in assisting the communities with funding and expertise.

## How to organize engagement of stakeholders?

The engagement of stakeholders can vary from being very limited (informing some members of a community) to full and active involvement (for example, developing plans, community mapping, decision making on upgrading, land titling).

It is sometimes difficult to motivate and raise people's interest to get them to participate in discussions on urban planning and settlement improvement, especially when people feel that they are not genuinely involved. Voices should not only be heard but also taken into account in final decision making; it is even better if people can influence the decision-making process. An NGO with experience in social action and community mobilization might facilitate community participation and can also act as a mediator between different members of a community and stakeholders. If many voices are heard, different opinions will be expressed and conflicts can be resolved by finding methods on how to come to an agreement. Some social behaviour, for example excluding women, may need to be changed and ways found for all members of a society to have an opportunity to really express their opinion.

The development of officially recognized Community Development Councils with elected leaders in Afghanistan has proved to be effective. The CDCs are organized at sub-neighbourhood level and consist of 250 households. The allocation of block grants (from donors) means that people can control the improvement of their streets and neighbourhoods.

The engagement of the public sector, specialized agencies and politicians is another challenge to increase the quality, exchange and use of land information. Lack of coordination between public sector agencies leads to many spatial development plans not, or only partially being implemented. Plan implementation depends on, for example, the allocation of budgets for roads and other infrastructure investments; if, for example, the Ministry of Public Works disagrees with the spatial planners, plans will not be implemented or investments will be made in an uncoordinated manner.

Land information can be collected on an ad-hoc project basis (which might indeed be the only option in a given situation) but preferably specialized land agencies (mapping, cadastre, land administration and taxation) should be involved to have sector-wide and inter-institutional agreement on what data to collect and how to structure and store it.

## BOX 8: SETTLEMENT REGULARIZATION, KANDAHAR, AFGHANISTAN.

Main stakeholders, responsibilities and level of participation
Municipality: The main stakeholder of the settlement regularization programme is the municipality. It is the local government agency that is responsible for the registration of property information and the issuing of occupancy titles and collecting of property taxes. The upgrading of info rmal settlements is also the municipality's responsibility.
Ministries: The Ministry of Urban Development is involved with the physical planning, planning standards and supporting the process of land transfer and sale of land to inhabitants.

Specialised land agencies: There is no national mapping agency for large scale mapping and no national cadastre. There was collaboration with other donor supported projects for mapping and local governance.

Community: The beneficiaries of settlement regularization are the inhabitants. The owners/ occupants are directly involved with property registration and indirectly through the community leaders (at Community Development Council level, sub-district leaders and district manager).

Women: There is no direct involvement in the regularization process. Women are not and cannot be (co)registered as a property owner and for woman-headed households a male family member will stand in. However, women do participate in the settlement improvement process and specific projects of female Community Development Councils.
Marginal groups: Most inhabitants are poor and they benefited from the project through improved tenure security and settlement upgrading.

Donor: Because of the decade-long conflict and poor economic situation in Afghanistan, the international community is supporting Afghanistan. In Kandahar, the Canadian International Development Agency (CIDA) supports settlement regularization, including major infrastructure components.

UN-Habitat: The Governance and Development Support Programme in Kandahar is implemented by UN-Habitat in collaboration with local communities and the municipality. Some outside expertise is provided but local UN-Habitat staff do most of the work.

## BOX 9: LAND ADJUDICATION FOR HOUSING RECONSTRUCTION, ACEH, INDONESIA.

National government: The Indonesian Government created the BRR (Rehabilitation and Reconstruction Agency) as a specialized agency to manage and coordinate the massive international support after the 2004 tsunami disaster.

Specialised land agencies: BPN (National Land Administration) was unable to handle land adjudication rapidly on a large scale using conventional approaches. However, BPN was not by-passed but was supported by the Community Driven Adjudication (CDA) approach.

Community: The participants and beneficiaries of the CDA process are previous landowners recovering the rights to their land. The beneficiaries' claims are verified by local leaders and if consensus is reached the land claim (statement letter) is forwarded to the authorities (BPN).

Women: Many women were widowed and children were orphaned after the tsunami. These vulnerable groups received special protection to prevent their inheritance rights being violated.

Marginal groups: The area of Aceh was prone to conflict (Free Aceh Movement) and poverty before the disaster. Most beneficiaries of the CDA process are low-income groups.

Donor: The tsunami disaster led to large amounts of external funding being made available.

World Bank: The Community Driven Land Adjudication process is part of the Reconstruction of the Aceh Land Administration System (RALAS), which is a World Bank-supported project. UN-Habitat focused on reconstruction of housing.

## BOX 10: INNER-CITY UPGRADING, OUAGADOUGOU, BURKINA FASO.

Government: The municipality and central government were the main drivers behind the "voluntarily and negotiated" re-location of the inhabitants and the re-development of the centre of Ouagadougou. An inter-institutional committee was created to implement the project.

A detailed survey was made of the households and parcels but the land data was developed and used for the project only on stand-alone basis.

Community: Although the inhabitants did not have formal land rights the government decided that the collaboration of the inhabitants and compensation for them were essential for the success of the project.

Women: Both women and men participated in the relocation process.

Marginal groups: Most inhabitants were living in the city centre and their livelihoods from shops, trade and market activities were directly related to their central location. Relocation to the periphery of Ouagadougou required either the creation of new employment opportunities or maintaining economic activities in the city centre with the disadvantage of travelling daily to the city centre 10 kms away.

Funding: This is essentially a self-financed project; the high value of the land in the city centre was (partly) compensated for with larger plots and houses on the fringe of the city, where land values are lower compared to the city-centre.

## BOX 11: ENVIRONMENTAL MANAGEMENT INFORMATION SYSTEM (EMIS), BATTICALOA (SRI LANKA), LUSAKA (ZAMBIA) AND SANTA CLARA (CUBA)

Municipality: The Sustainable Cities Programme (SCP) and the EMIS component was a global programme (technical cooperation facility) of UN-Habitat and UNEP to support a number of cities. Ministries and specialised land agencies were not directly involved, although the institutionalizing of the EMIS was a specific objective that was achieved in Lusaka but not in Batticaloa and Santa Clara.

Community: The participants of the SCP and EMIS workshops were from institutions and academia but involvement by the community could only be achieved in case the SCP reached the implementation stage (some "bankable" projects in Lusaka).
Women: Gender parity was an explicit objective and integral aspect of environmental planning and management.

Marginal groups: The three cities selected from the SCP/EMIS project have large groups of people living in poor conditions but are not directly involved in the development of EMIS.

Donor: Seed money was used to develop concepts and pilots, and in Sri Lanka additional donor funding was obtained. The data collected in Batticaloa proved useful when the tsunami struck Sri Lanka and national and international agencies and NGOs were needed to manage relief and reconstruction projects. In Cuba, land information was used as part of local development plans (Agenda 21) based on priorities identified by the community.

UN-Habitat: The SCP and related EMIS projects are based on ideas developed by UN-Habitat. The step-by-step development of an EMIS (see annex) seems a viable option but case studies show that implementation is dependent on local and ad-hoc motivation of a variety of stakeholders.

**Table 3: Involvement of stakeholders in development and use of land information.**

| STAKEHOLDERS | | CASE STUDIES | | | |
|---|---|---|---|---|---|
| | | Kandahar | Aceh | Ouagadougou | Lusaka, Batticaloa, Santa Clara |
| Government | Local | + | + | + | + |
| | Regional | + | + | - | - |
| | National | + | + | + | ? |
| | Specialized land agencies | - | + | - | - |
| Society | Men | + | + | + | + |
| | Women | - | + | + | + |
| | Marginalized groups | + | + | + | - |
| | Private sector | + | - | + | - |
| | NGO/CBO | - | + | - | - |
| Others | Donor | + | + | N/A | + |
| | Technical | + | + | N/A | + |

**+ Involved**
**- Not involved**
**N/A Not Applicable**
**? Unknown**

Table 3 shows the main stakeholders in the development and use of land information. It can be seen that embedding land information in specialized institutions is a problem except in the case of Aceh. Most case studies show that land information is a stand-alone, project based activity, for example in Ouagadougou. All the projects need much more time, funding and technical support to survive this initial stage.

In Kandahar, the role of women in the collection and registration of land information is limited and ownership of land and property is restricted to men. Although women participate through specific workshops in neighbourhood improvement or livelihood activities, they are not equal partners with men in land registration and land ownership. In the other case studies women are actively involved, although the participation of men and women is limited by their being in relatively abstract projects concerning the environment.

### *Conclusion*

Before initiating the collection of land data it is necessary to create a list of stakeholders and a strategy on how these stakeholders can participate in

a meaningful way in the development and use of land information.

The four case studies show that many projects (except Ouagadougou) depend on outside financial and technical support and so the driving forces are from outside. This reduces the engagement of local stakeholders.

The involvement of all relevant stakeholders not only fulfils (donor driven) pro-poor, gender sensitive policies but it is also more effective. Land information is not a technical exercise only but is intrinsically related to power, politics and social relationships.

What is less clear from the case studies is how much influence some stakeholders have. The relocation of inhabitants from the inner city of Ouagadougou might have been less voluntarily in reality than is claimed by the project documents. Women and marginalised groups' roles and decision-making powers are also not clear from the case studies and need more in-depth analysis.

## 5.4. COMPONENTS OF A LAND INFORMATION SYSTEM

The development of a land information system involves more than collecting and storing data. Ther e are five components of a LIS: *data, technology, people, institutions and funding*. Similar improvements are required for all five components to avoid over-investment in one of the components. A classic mistake made frequently in the past was to buy hardware and software to show that "something is happen" - to have tangible things to show to higher-level authorities and visitors to information centres. An awareness that equipment is not the critical issue and the fact that computers have become common has shifted attention to data; the cost distribution of a LIS is often referred to as 20 per cent (equipment) – 80 per cent (data). But information systems also need qualified and motivated people to develop and operate them, institutional arrangements and management that have a vision, and technical skills to orientate and support the development of a LIS, that facilitate access to it (clearing houses, websites and portals) and support its use.

*Data and data models;* quantity, quality and structure of data sets

Urban land management requires information on land-use patterns, infrastructure, parcel maps with ownership records, environmental data, population data and topographical data among other things. Some of these can be obtained through the interpretation of high resolution remote sensing imagery. Some data is difficult to extract from remote sensing data and some data cannot be got from it at all. Without extensive fieldwork, it might be difficult to obtain socio-economic data from satellite image interpretation on population, land ownership, employment and mobility, or to get specific environmental data, such as on water and air pollution and underground infrastructure or the location of services such as primary schools and basic health facilities. Secondary data, such as census data, are important and especially useful when integrated with the primary data sets.

Data models are required to be able to process and combine the different data sets to get meaningful information that will support urban land management (Tomlinson, 2003). Not having these models may create a *data rich but information poor* situation.

Although good and compatible data are recognized to be a critical factor in developed countries the situation is more complicated in many developing

countries. There are different reasons for this; for example, weak or non-existent national data providers such as mapping agencies, census organizations and cadastres. While many projects have been initiated, most of them are stand-alone and lack continuity due to insufficient funding, they are not embedded in stable institutions or they are politically misused. Unrealistically high standards for data precision are unsustainable; data quality is relative and should be based on need and economical possibilities.

*Technology*; hardware and software, networks
"Technology" in a LIS consists of software, hardware and networks (internet, intranet, local area networks, etc.) as well as information and communication technology (ICT) support. Enormous improvements have been made in GIS, remote sensing and ICT. The processing power of computers has increased dramatically as has the variety and performance of printers and plotters and the performance of networks. Due to price-performance, the improvement of both hardware and software and user-friendliness of software packages, technology is becoming a less critical element of a LIS. However, costs are still high for an average municipality in a developing country, while networks and the internet might be absent or of limited capacity. While, illegal versions of software are wide spread in many countries, free software can ease the costs of commercial packages. Also, the costs of maintenance, cartridges and paper in addition to power failures can sometimes frustrate the use of GIS technology. Technology is also an imported good that has to be bought with hard currency and this increases dependency on a limited number of providers.

*People*
A LIS needs to be developed, maintained and used, which requires sufficient staff with the right qualifications (operational level, analytical level, technical managers). Especially in the public sector, motivation (salary, positive and challenging working environment, training and career opportunities) is important to ensure that staff members are committed and that turnover is low.

While progress is made at the operational level in expanding manpower capacity with GIS skills, this is not the case at more senior levels for database design, development of planning models, or at the management and political level. GIS knowledge at senior level is limited; managers and urban planners are hardly aware of the possibilities and limitations of GIS. It is surprising that when planners are asked to identify their demand for (GIS) data to support a land-use planning process their answers are vague. A "learning-by-doing" approach might be a pragmatic option at the operational level, but at the management level short seminars, in which positive and measurable results can be demonstrated, are an option to get support for the use of GIS and stimulate inter-institutional cooperation. At the political level the same holds true; short-term results and tangible outputs are required to gain support, for example from municipal councils. This makes the gradual, muddled through, implementation of GIS a feasible option. It might conflict with theoretical and technical models, but the complexities and realities determine the limitations in development of Land Information Systems.

*Management*

While data, technology and people are obvious elements of a LIS, management is less obviously an element. "Management" consists of the inter-institutional arrangements, legal framework, political support, institutional stability and working culture. It is closely related to the wider concept of governance (see criteria 1).

It is important that managers who are responsible or involved in land information systems have technical skills and experience, and can develop a vision with clear objectives, set realistic time frames, stimulate staff and allocate adequate resources to achieve results. The quality of management increases when managers are appointed based on their expertise, they have a mandate to operate and they are dedicated to contributing to the development of land institutions and land information.

Unfortunately, the life span of many managers and politicians is short, and their agendas are filled with daily events. Politicians have their own circle of supporters who are appointed to public institutions and so political instability spreads to institutional instability. Under such circumstances it is difficult to discuss complex projects such as the structured development and use of GIS/LIS/ICT; a pragmatic, but organised, step-by-step approach might be the only viable option.

*Funding*

A land information system requires resources. Data, especially up-to-date and reliable data, needs adequate funding and investments should be justified and recovered through direct improved services or sale of products (databases, maps). It is not uncommon for more data with higher than needed accuracy is collected due to unclear vision of real use and need of information. Transparent and sound economic principles should be applied to justify investments. There are costs but obvious there should also be benefits by making good use of the information to get improved services and also, possibly, to generate revenue.

Where no measurable benefit can be achieved due to lack of good-quality data, lack of manpower, weak internal organizational structure or other factors, then minor LIS investments or no investments should be made.

The development and use of a LIS should preferably be a continuous process. People, organizations, politics, economics and technology are developing and adapting to changing circumstances. The effective use of a LIS is based on a coherent long-term vision and short-term results. A critical review of the main driving forces and incentives among the different potential beneficiaries should be done to increase the possibility of successful and continued use of the survey. An incremental approach or phased development is recommended to avoid a situation where the return on investments is beyond the period of elected politicians or even faster changes in higher-level management.

## BOX 12: PROPERTY TAXATION HARGEISA, SOMALILAND.

Technology: The project made use of a Quickbird satellite image (61 cm spatial resolution) to get spatial data (footprint of buildings through on-screen digitizing and PDAs to record field data). ArcGIS (ArcView) was the GIS software used. The PDAs used were not optimal, it was too ambitious regarding the use of GPS. Additional images were acquired, mainly for other activities such as urban planning and for use as a base map.

Data: In the GIS database each property was delineated and small huts were digitized as points. A coding system was developed (unique cadastral identifier) to establish location, to link to attribute data and to hyperlink with a photograph of the building. Tax invoices were generated automatically. Many variables were collected to be able to introduce different tax rates for different types (quality, use). However the municipal council did not want to change the flat tax rate. The number of variables was considerably reduced because flat tax rates required only plot and building size. Survey costs were approximately US$1 per property ($50,000 for 59,000 properties, surveyed and digitized in under a year).

People: Local and international UN-Habitat staff developed the property database in collaboration with the Hargeisa Municipality and its five district offices. International staff provided on-the-job training for local staff. Field staff were trained to use the PDA. Development of an information centre at the municipality was started but after several years it was still not operational due to lack of staff (and funds to pay them). Handover of the process to the local government is unclear and the process is still not fully locally sustainable.

Management: Project management requires embedding within the municipal structure and a vision on how to expand the property database towards a municipal information system supporting other applications (land registration, urban planning)
Funding: The European Commission funded the project. Tax revenues increased considerably but it is unclear how the funds were used to improve the neighbourhoods of Hargeisa and when the municipality is willing and able to fund database maintenance and the invoicing process.

## BOX 13: SETTLEMENT REGULARIZATION, KANDAHAR, AFGHANISTAN.

Technology: The project used ArcGIS (ArcView) GIS software and Microsoft ACCESS as the database software.

Data: Through cooperation with other projects, GIS files were obtained and used to create a parcel map for part of Kandahar. A coding system was developed (unique cadastral identifier) to facilitate the location of the parcels and a link to attribute data. Paper sheets and measurement tapes were used to collect field data (ownership/occupancy and property characteristics) and data was digitized in the office.

People: The property database was designed, based on the structure of the Ministry of Interior, by local and international UN-Habitat staff and the municipality. One week in GIS training and on-the-job assistance was provided. This was enough for database development and basic operations, a "learning by doing" approach. Operational GIS skills are limited to only a few people so staff capacity is still a fragile part of the process.

Management: The project depends heavily on outside support (financial and, to a certain extent, technical). Although there is strong local and national political support it still has to be seen whether the project can be fully managed and maintained by the municipality.

Funding: The Canadian International Development Agency funded the project as part of a larger project. A simple and pragmatic approach makes the process relatively cheap (survey costs around US$4 per parcel) and only a small portion of the property taxes generated (average US$18 per parcel annually) are needed to keep the process going. In 2010, the municipality collected approximately US$185,000 in property tax.

## BOX 14: SPATIAL PLANNING AND GIS DATABASES, LIBYA.

Technology: The project used ArcGIS (ArcInfo), ArcGIS server, ArcGIS image server and a variety of additional software's (for example image processing, AutoCad). Hardware consisted of servers, high-end workstations and plotters, large flatbed scanners and printers. A special designed information centre was built with the vision to have a national information centre connected to a number of regional information centres of the Urban Planning Agency. Internet capacity is limited but is improving.

Data: All data was developed from scratch and use was made of LandSat images, SPOT (five metre resolution), Quickbird images and digital aerial photographs (10 cm resolution, ortho-rectified) to develop geo-databases at the different planning levels (regional, sub-regional and local). The specifications of the datasets (topographic, thematic and planned features) were developed during the project phase and covered many themes (environment and infrastructure among others) for which no data existed in the country and had to be collected from field surveys. The datasets could not be completed and accuracy was questionable. Planning proposals were developed with limited use of the GIS database.

People: The development of the GIS databases to support spatial planning was sub-contracted to local consulting offices who used foreign expertise. The data was used only to a limited extent for urban planning because of unclear specifications and lack of capable and motivated staff from the Urban Planning Agency who could give feedback and store and use the data.

Management: The project depends heavily on outside support (technical). Lack of political support along with weak and unclear management meant that datasets were developed very slowly, were incomplete, and were not properly stored on servers to make full use of the data. No clear plan existed for data maintenance or further development.

Funding: The funding for the project was sufficient and in theory was enough to deliver the information required by the contract. However, the scale and complexity of the project combined with a lack of experience in such projects, means that funds were poorly used and managed, and funding had to be increased several times during the project period. However, there were still not enough funds to deliver the agreed product.

## BOX 15: CAIRO, EGYPT.

Technology: The project used ArcGIS (ArcInfo) GIS software and related software for image processing.

Data: The General Organization for Physical Planning of Egypt (GOPP) is developing a corporate geo-database for Greater Cairo through re-structuring of its own data, collecting new data and exchanging data with other agencies. The database covers land use at building block level (large-scale map) and also databases at medium and small scale (infrastructure, unplanned areas, and proposed land uses and projects). Quality control and maintenance appear to be critical bottlenecks as is the structure of the various datasets. It is intended that the database will be continuously updated and expanded to be able to respond to the many information requests from the planners and management of GOPP.

People: The geo-database was developed by GOPP staff and local consultants. While some external support was provided, this was mainly for use and modelling of the GIS data. There is also a good mix of staff with a variety of needed skills (ICT support, GIS operators, planning experts supported by GIS experts).

Management: While senior GIS expertise is available and there is basic GIS knowledge among senior GOPP management, the long-term plan (technical, financial and application) for the corporate GIS data is still unclear.

Funding: The development of the GIS data is entirely funded by the Government of Egypt. It is considered to be sustainable and depends on internal GOPP priorities.

# 05 ANALYSIS OF THE CASE STUDIES

**Table 4: Improvement of land information components**

| | Data | Technology | People | Management | Funding |
|---|---|---|---|---|---|
| Hargeisa | + | + | + | 0 | + |
| Kandahar | + | + | 0 | 0 | + |
| Libya | ++ | ++ | + | - | +++ |
| Cairo | ++ | ++ | ++ | + | ++ |

**+** **some improvement**
**++** **considerable improvement**
**+++** **major improvement**
**0** **no improvement**
**-** **negative development**

*The grey boxes indicate a bottleneck or imbalances between the various LIS elements. For example, the funding in the Libya project was not accompanied by a similar increase in data, technology and people and especially not in management*

Table 4 shows whether there is a positive, negative or neutral improvement for the five elements of a LIS during the project phase. It shows there are no ideal projects where all five elements have equal improvement during the project phase. Data, technology and funding were not critical in all four cases, but people and especially management were critical in all cases.

To be able to benefit from the investment in, for example, technology (acquisition of computers and software) an equal improvement is needed in data, people and management. Libya is one country where considerable improvement was made in data and technology with the latest versions and high-end GIS software and equipment. However, the benefit of these investments was limited due to lack of staff (many licenses hardly used, software over-specified) and, especially, weak management and poor institutional organization. In this situation, the resources spent on technology were an over-investment.

In Hargeisa and Kandahar, only modest improvements were made in all five components and LIS projects had to be limited to stand-alone applications because of the weak institutional environment. In both of these (post) conflict countries, some basic intra-institutional capacity needed to be developed first ("standalone databases" are only silos if they exist) before applying a citywide LIS approach. The experiences in Hargeisa and Kandahar show that there was little over-investment and efficient use was made of the limited available resources in both countries. In Cairo, management was a critical element but considerable improvements were made in all components. The LIS or geo-database is related to the planning organisation as a whole and is not directly related to a specific project. However, planning requires a lot of data that has to be obtained and re-structured from other organizations such as utility companies, censuses, public transport and road networks, and includes not only existing situations but also planned situations and on-going projects. With a clear vision

and the support of higher management, the GOPP data could be expanded and improved to become a corporate database. It is not clear how far the GOPP database can be connected to and made compatible with the databases of other government sectors.

*Conclusion*

The development of a LIS requires that all the five components of a LIS should be developed at the same level and speed. A LIS chain is as good as its weakest link. Technology and funding are not the bottlenecks in many cases, while people, and especially management, are critical. Also, in developed countries projects to develop digital databases and information systems fail to meet deadlines and need additional funding during the implementation phase. It is tempting to design technically and theoretically sound systems, but numerous examples show (besides the four mentioned) that over-investment is common in hardware and software that have many unused functionalities, the equipment and licenses, maintenance and supplies are not organized, the systems are too complex to use, and accuracy specifications are overdone. Procurement and acquisition orders attract a lot of attention, but the real bottlenecks are staff and management.

## 5.5. ACCESS AND USE OF LAND INFORMATION

Land information always exists in one form or another, for example as old maps and paper records, but increasingly it is recorded in digital form. Digital land information is, however, no guarantee of access and use of land information. Without clear data structure, data models and standards, and information on where to find what kind of land information, digital files might be less accessible compared with information that is well organised in a non-digital format.

To increase *access* to land information, the following points should be considered:

- **Data content and data structure;**
  Obviously what is not collected and stored cannot be accessed, but a fundamental problem is "digital chaos" or fragmentation of information. Successful LISs depend on the possibility of integrating primary and secondary data sets from a variety of sources, using spatial units and coding systems. The increase in numbers of computers and stand-alone, scattered data collection projects has resulted in incompatible, duplicated, incomplete, out-dated, and non-standardized data sets that are only for use by the producer. In this situation, little or no use can be made of land information.

- **Land information distribution policy; who can use what:**
  Land information might be sensitive and access to it may be restricted to specific agencies and authorized people only. However, the absence of a clear data distribution policy is more common. This can be attributed to a lack of knowledge about the value of land information, lack of skills in organizing land information (technical, organisational, pricing), and unclear legal frameworks (copyrights, illegal copying and selling).

- **Level of ICT development and computer literacy:**
  To be able to distribute and access digital land information there needs to be a specific level of ICT development. Poorly-developed internet services (and unstable power supply), a limited distribution of computers and poor computer skills (among land information agencies' staff and the public in general) will limit the distribution and access to land information.

- **Level of organisation:**
  In cases where there are weak and unstable land agencies it is difficult to organize land information in such a way that it can be exchanged, through portals for example. Exchange of information may be limited to the controlled or uncontrolled transfer of files, possibly on a personal basis, without clear rules and procedures.

*Access* to land information will increase its use but there is no guarantee that this will happen. What can be seen in several of the case studies is that land information is under-utilized. The idea that more *data* is better is not valid for land information. There is always a limited amount of money, time and manpower available for collecting and maintaining land-related data. If data is not strictly needed and its use is uncertain it is better not to collect data and concentrate what is really relevant and needed.

The collection of an extensive and large variety of spatial data has stimulated the use of computers and GIS technology. Pioneers in the early stages of automated information systems dealt with the relatively simple, well-structured processes of description, inventory and retrieval. Cadastral, mapping and census applications deal with the "what is where" question. Land management, especially urban planners, are responsible for more complex problems such as prediction and scenario development, that is, *what if* questions. In the early 1990s, Openshaw (1993) concluded that datasets in developed countries are not used for strategic planning and that there are geographic data systems (GDS) rather than geographic information systems (GIS). An analysis of recent case studies on spatial planning (Blantyre, Maputo, Libya and Paipa), shows that only in Paipa use was made of some analytical functionalities of a GIS to support planning decisions.

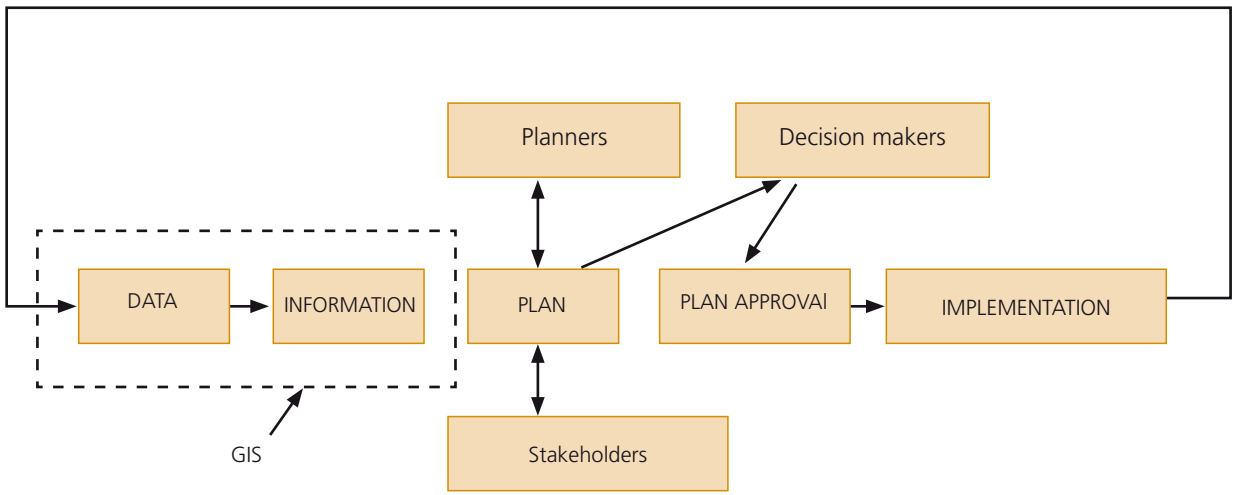



**Figure 4: Theory of GIS support for the planning process.**

Figure 4 shows the theoretical model of how GIS can support the planning process. First data is collected (satellite images, topographical and thematic datasets). These data will be processed using specific models such as suitability models, multi-criteria analysis, environmental impact assessment and so on to produce information[1]. This information is an input to assist planners and the stakeholders to develop a plan.

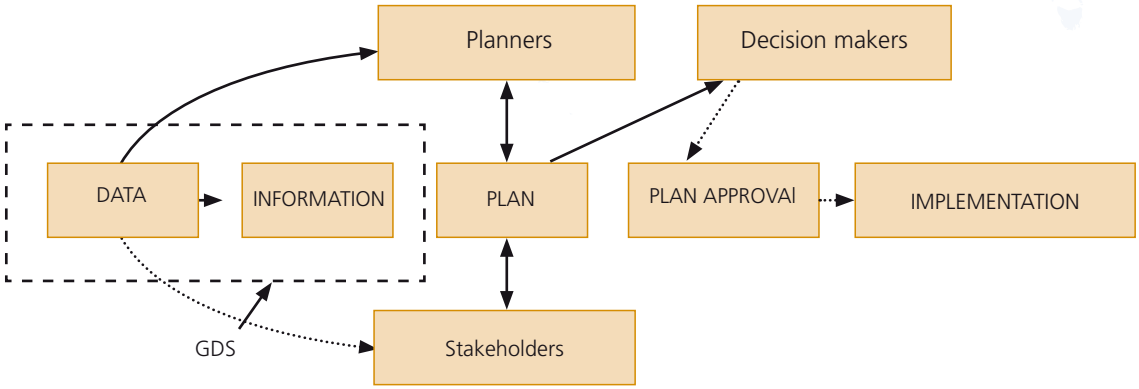



**Figure 5: GIS or GDS? The reality of the use of GIS in the spatial planning process (dotted line indicates incomplete interaction). Geographical Data Systems (GDS) instead of Geographical Information Systems (GIS).**

The involvement of stakeholders is important to ensure the plan is embedded and is supported by society, and that national policies are included in the plan to increase the likelihood that the plan will be implemented. The planner is responsible for plan preparations, development of alternatives, and explaining the advantages and disadvantages of the different planning alternatives. The planner is also responsible for ensuring that all relevant data and information is used, processed and clearly presented to facilitate discussions with the stakeholders and decision makers. The decision makers are responsible for plan approval. Plans are, hopefully, implemented and the line back to data in Figure 5 illustrates the cyclical or continuous nature of the planning process. Figure 5 also shows that projects such as the spatial planning project in Libya, but also the planning projects in Blantyre and Maputo, develop data, but it also indicates that this data, however valuable in itself, is not used or is only partly used to develop information. The data is used and becomes part of the planner's knowledge. The plan produced with this approach is difficult to evaluate, complicated to explain to other stakeholders; it is more an outcome

[1] Information in this context is defined as data processed with a specific objective

of a design process than a clear and transparent planning process in which a methodology and models are used. One main problem is that decision-makers are left unclear about what choices to make, what the advantages and disadvantages are of certain decisions and whether the plan is supported by correct information. Another serious problem of such a trial and error approach is that implementation of development plans is uncertain and the plans might end up as just a report on a shelf and that urban development is done in an uncoordinated manner with all the negative consequences that this leads to.

"Corporate geo-information system strategies" or an "enterprise computing framework for building a spatial information technology info-structure" are proposed as a productive alternative for minimizing the data paralysis problem. Such proposals are intended to integrate the structures of the data producers' different (spatial) data sets. The development of such a municipal information system (Turkstra et. al., 2003) is a basic condition to effectively use GIS for land-use planning and other operational and strategic applications with a positive benefit / cost ratio.

### BOX 16: KOSOVO CADASTRE SUPPORT PROGRAMME (KCSP).

Access to land information: The main aim of the KCSP project was to re-establish the cadastre system to be able to implement reconstruction activities and promote economic development and resolving long-standing conflicts. A new Kosovo Cadastral Agency (KCA) was established, a new geodetic framework was established and ortho-photos were made.

The cadastral information and ortho-photos were made available to a wide range of stakeholders such as banks, courts, the Ministry of Environment and Spatial Planning, municipalities and property owners. The website of KCA (www.kca-ks.org) describes the products available and how to acquire the topographical and cadastral, aerial photographs and so on. Access to land information by the KCSP project is somewhere between a clearing house and a portal.

Use of land information: The cadastre produces information to support the core activity which is to describe and register property characteristics and the ownership of the properties. The direct users of the cadastre are banks, courts, fiscal authorities, housing and property claims commissions, municipalities, and property owners mainly for consultation.

But the cadastre data is also valuable for other users. Base maps, ortho-photos and street addresses are used by a wide range of ministries (public services, health, environment & planning, utilities, statistical office).

The establishment of an inter-ministerial coordination committee and a Land Administration Policy are essential elements needed to avoid the KCA operating is isolation and land information only being used for the cadastral functions of KCA alone.

The KCA data is mainly used for operational, consultation, and descriptive use but also used as a basis for further expansion of the land information by other agencies.

## BOX 17: GREATER CAIRO STRATEGIC URBAN DEVELOPMENT PLAN, EGYPT.

Access to land information: The main aim of the Greater Cairo Strategic Plan is to guide the long term expansion of Cairo and the redevelopment of existing built-up areas. The land information is mainly an internal database of the planning agency and is used by a limited number of staff. Access to the data is through file transfer, but portals appear to be a feasible option for the near future.

Use of land information: The GOPP greater Cairo GIS database consists of five geo-data bases (infrastructure, topography/environment, proposals, administrative boundaries and land use), and the quality and coverage varies between the databases. Some data are not used or only partly used, some data are only used for consultation and a limited amount is used for descriptive and analytical purposes. Specific attention is given to develop data on unplanned and unsafe areas.

## BOX 18: MASTER PLANNING BLANTYRE, MALAWI.

Access to land information: Apparently the geo-databases developed for the master plan of Blantyre are not easily accessible and, after finishing the plan in 2000, no updates or systematic storage of the database were done. Access to most data is through the transfer of files.

Use of land information: While the geo-database with all the different GIS maps has been used to develop the master plan, the data have been used mainly for descriptive purposes in some topographic or thematic issues and as a basis to develop a land-use plan. The analytical possibilities of the geo-database and day-to-day support to the municipality have either not or only partly been used, while the issues of informal settlement, livelihood and urban sprawl have been addressed but are not directly based on land information.

**Table 5: Access and use of land information.**

| USE of LAND INFORMATION | ACCESS to LAND INFORMATION | | | | |
|---|---|---|---|---|---|
| | Personal contacts | File transfers | Clearing house | Portal | Service architecture |
| Not used at all | | | | | |
| Partly used | | | | | |
| Operational/consultation | Blantyre | Cairo | Kosovo | | |
| Descriptive/operational | | | | | |
| Analytical | | | | | |
| Support business | | | | | |
| Support women and the poor | Blantyre | Cairo | | | |

**First remark:** Use of land information
Figure 5 shows that land data is used but not all data, for example in the case of Cairo. The analytical use of well-structured land data with GIS software was not observed in any of the case studies and land information is mainly used for operational and/or descriptive purposes.

No specific use of land information to improve the situation of woman could be found but the living condition of poor people was addressed in Blantyre and Cairo.

**Second remark:** Access to land information
Access to land information ranges from personal contacts, ad-hoc unstructured and informal networks, the structured transfer of specific files, clearing house to improve where to find what, portals for direct access to land information and service oriented architecture with more focus on processes and business support and less on focussing on land information only.

Only Kosovo is reaching a mature level of access to land information. Accessing land information is almost impossible for outsiders in Cairo and Blantyre, but similar problems are observed other case studies, for example Kandahar, Hargeisa and Libya.

It appears to be easier and more technical to develop access to land information than to increase the level of data use.

06

# CONCLUSIONS AND RECOMMENDATIONS

# 6. CONCLUSIONS AND RECOMMENDATIONS

This chapter summarizes the assessment of the different criteria for the 11 case studies. On the basis of the findings recommendations are made, a list of do's and don'ts per criteria, and the description of an incremental approach to developing land information.

**Table 6: Analysis of the case studies**

| City/Country | | Criteria for Sustainable Land Information | | | | |
|---|---|---|---|---|---|---|
| | | Governance | Balance of LIS components | Engagement stakeholders | Access and use of land info. | Process approach |
| 1 | Hargeisa, Somaliland | - | + | 0 | + | - |
| 2 | Kandahar, Afghanistan | - | + | + | + | - |
| 3 | Aceh, Indonesia | + | | + | | + |
| 4 | Philippines | + | | + | + | |
| 5 | Kosovo | ++ | + | + | + | + |
| 6 | Paipa, Colombia | ++ | + | + | + | ++ |
| 7 | Libya | - - | - | - | | 0 |
| 8 | Ouagadougou, Burkina Faso | + | | + | | - |
| 9 | Blantyre, Malawi | + | | | | - |
| 10 | Maputo, Mozambique | + | | + | | - |
| 11 | Lusaka, Zambia | + | | | | - |

**-/ -- Negative and very negative**
**0 Neutral**
**+ / ++ Positive and very positive**

Table 6 shows an analysis of the case studies. No full judgment can be made for all criteria of the 11 case studies. Paipa and Kosovo are fairly positive case studies, which may be due to the relatively stable institutions and level of governance. Hargeisa and Kandahar have positive elements but land information is developed on a project basis and further expansion and institutionalization is not certain. Aceh had good intentions (due to the exceptional tsunami and its effect) but it is unknown if community involvement in land adjudication will continue. The project in the Philippines had a good approach, but re-structuring land administration at the national level is rather ambitious. Land information development and use in Libya is negative; it is influenced by the weak level of governance and management of land institutions, and the large effort in the collection of land data and investment in technology can only be used to a limited extent. The projects in Ouagadougou, Blantyre, Maputo and Lusaka all had positive elements, but it remains to be seen whether these projects will be followed up with additional efforts to maintain land information and strengthen land institutions.

A major mistake the case studies revealed is a misplaced, overambitious approach in which where there are no clear objectives about what to achieve, unrealistic time frames, and no ideas on what to do with the collected data when the project is finished.

If projects do not develop into a process in which there will be a continuous effort to maintain land information, or where there are no land institutions with reliable land data, then new projects will always have to re-invent the wheel. There will always be repeated project initiation costs, management and institutional set-up fees, and so on.

## RECOMMENDATIONS

Based on the analysis of the case studies on the development of land information in the context of urban land management applications, the main recommendations are:

1. Be realistic about what can be achieved in a certain time period. The level of governance (either bad or weak) and a volatile, unstable environment might be a critical constraint in what can be achieved, especially regarding the use of land information. The development of land information is a time-consuming process and should be kept as simple as possible. Land information can be expanded if there is a real need for it.

2. Avoid the technology-orientation of a LIS. Technology (hardware and software), as shown in the case studies, is not a bottleneck in the development of a LIS.

3. Local leadership and the involvement of stakeholders is a basic condition. There should be incentives and clear benefits for all stakeholders to motivate them to participate and get involved.

4. The lack of technical and management capacity of institutions developing and using land information is a critical bottleneck; leadership needs to be convinced of the benefits of land information and be willing to accept (technical) support on its development and use.

5. Accept long time frames, the phased development of land information with clear achievements, and options to adjust to changing and unforeseen circumstances.

# 06 CONCLUSIONS AND RECOMMENDATIONS

6. Accept situations where a "muddling through" and stand-alone project approach is the only viable option for developing land information. Be willing to accept the fact that land information cannot be realistically developed and applied before basic conditions are in place, especially in countries where there is conflict.

**Table 7: Recommendations (do's and don'ts) for the development and application of land information**

| | Land Governance | LIS elements | Stakeholders | Access and use of land information | Project/process approach |
|---|---|---|---|---|---|
| Do's | Analyse the level of (land) governance | Balance the improvement of all five elements | Promote the meaningful engagement of all stakeholders | Accept that many analytical functions of a GIS are not used | Accept that a stand-alone project approach is the only viable option in certain situations |
| | Analyse the legal framework and policies regarding land information | Convince managers of land institutions of LIS benefits | Emphasise the inclusion and empowerment of woman and vulnerable groups through LIS | Use land information for the benefit of woman and poor people | Focus on short-term results; develop a long-term vision and incremental implementation |
| | Connect top-down with bottom-up activities | Assess staff capacity and motivation; develop phased capacity building | Include stakeholders in participation AND decision making | Avoid the collection of land information which will only be partially used or not used at all | Accept outside technical and funding support on for a specific period |
| | | Learning by doing and on-the-job support | Promote the effective sharing and exchange of land information within and between land institutions | Promote the access to land information | |
| Don'ts | Assume that (bad/ weak) governance are independent of LIS projects | Over-investment in technology | Develop inter-institutional development of LIS if land institutions are weak | Assume that GIS analysis functions can support spatial planning | Design and try to implement an integrated land information approach when conditions are not ready |
| | | Collect data without clear and agreed use of the land information | Let international stakeholders become too dominant and lead the development of LIS | Unnecessarily restrict access to land information | Overestimate the management, technical capacity and stability of land institutions |

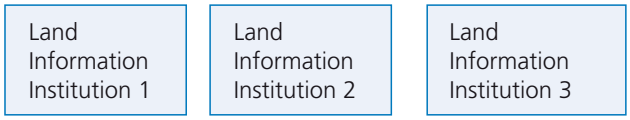
## DEVELOPMENT STAGES OF LAND INFORMATION

One of the main findings from an analysis of the case studies is that the level of land information is closely related to the level of institutional development, the possibilities of data sharing and data exchange. However, to be able to develop and implement urban land policies, such as land tenure improvement, spatial planning and environmental planning that requires a wide variety of social and physical datasets, a specific level of land information should exist.

In case of less-developed land information, urban land policies cannot be implemented and only those projects with a limited land information requirement can be implemented.

The development of Land Information Systems is a continuous and incremental process and four general phases or levels of development can be distinguished. Leapfrogging phases to by-pass a development stage, or develop the phases too quickly, is not recommended.

### PHASE 1: "PROJECTS"




Phase 1 is the initiation of automated systems within different, unconnected land organizations (for example, mapping, land registration, cadastre, spatial planning, environment and infrastructure). A planning agency might start introducing CAD and GIS systems in which paper maps are to be digitized. A land administration institution might start with automated land records. The different agencies are not collaborating and even within organizations little streamlining or redeveloping of the database structure of analogue records is taking place. This phase can also consist of stand-alone projects without any guarantee of follow-up or institutional embedding, such as in the case of Hargeisa.

The positive aspects of this phase are that products are generated, existing processes of data storage and retrieval are made more efficient, and staff's experience and capacity with automated systems is developed. It is a typical bottom-up approach, learning-by-doing and sometimes spontaneous initiative by some ambitious staff eager to introduce and work with automated systems.

A negative aspect of this phase is that many land data files might not be compatible (accuracy, projection, coding and classification systems), they are irrelevant, inaccurate, out-dated or duplicated. Land data from different projects within the same institution are incompatible with each other, let alone with other institutions. The database structure might be similar to the paper records and little attention is given to the redesign of the land records to address specific challenges (addressing the need of poor people and women).

Before a LIS can be developed to a phase 2 level, there needs to be a certain level of land information development and intra-institutional cooperation. The challenge is to improve this fragmented LIS at phase 1 to a higher level of land information (phases 2, 3 and 4).

In short, phase 1 is required before phase 2 can be reached. However, based on lessons learnt Phase 1

might be shortened if the conditions for phase 2 are present. The minimum conditions for Phase 2 are:

- Technical knowledge and genuine awareness exists that phase 2, 3 and 4 have additional benefits;
- Existence of political support exist;
- Management levels of different institutions are willing to cooperate.

### PHASE 2: "DATA EXCHANGE"


For some institutions data exchange is of limited value, but for others, such as a spatial planning agency, the benefits are obvious. When a planning agency can obtain reliable and up-to-date information on for example road networks, environmental data (land cover) or base maps, the planning agency can concentrate its land information development on core planning issues (for example, land-use planning) instead of collect the datasets belonging to other agencies.

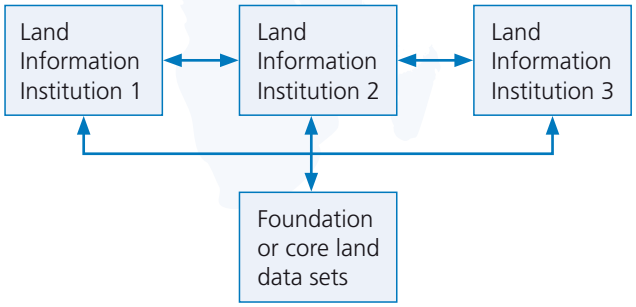
Data exchange may be hampered by incompatibility or lack of data, and data exchange will only survive when both (or more) institutions are convinced of the benefits (what's in for me). In many cases, data exchange at phase 2 takes place on an ad-hoc or personal basis.

In this phase there is also a need for agreement on standards, accuracy coding systems and so on, and the further automation and management of the land information managed by each institution. Land institutions are maturing and are more aware of the importance of being the custodians of core land information.

To facilitate the exchange of land information, key people - at management and technical- operational level - who are able and willing to act as drivers for change should be identified. Exchange and cooperation might result in changes in working practices and there may be resistance.
When data is exchanged between institutions it becomes clear that some land information is crucial for many agencies and can be classified as foundation data. Examples of this are base maps, satellite images, aerial photographs, administrative boundaries, population data, contour lines, geodetic networks, parcel maps and so on - basically land information developed by mapping agencies, cadastre and census bureaux.

In many developing countries, foundation data is incomplete and only some elements are available.
A first step to deal with this is that land institutions become aware of who manages what type of land information (metadata, a simple catalogue /inventory of data, and contact details).

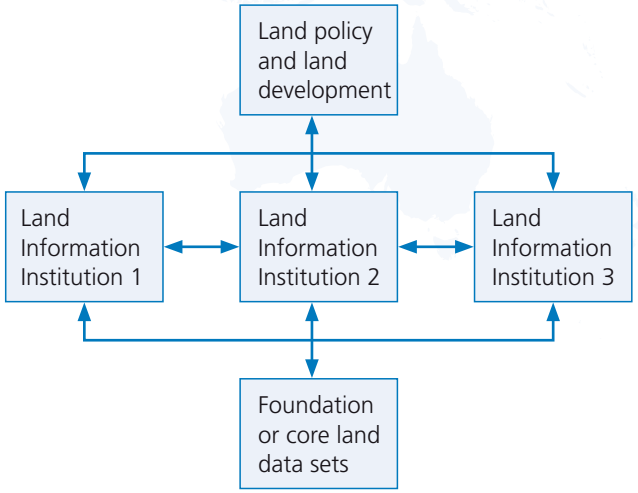
## PHASE 3: "DATA SHARING AND INTEGRATION"




Phase 3 shows that (some) core or foundation datasets and institutional arrangements are in place and can be used by different land institutions. These foundation data can also include the rules, conditions, standards and fees for using the land data.

This phase will see a further improvement of land information managed by the different land institutions, CAD systems might be expanded to GIS systems and more advanced database management systems are installed. Staff with different skills (ICT support, GIS/LIS operators, GIS managers) increase their skills and experience and new staff can be recruited because of training opportunities in the country.

## PHASE 4: "DATA INFRASTRUCTURE AND LAND POLICIES"




Phase 4 is the "ideal" situation as, for example, promoted by Spatial Data Infrastructure (www.gsdi.org). Another example is the INSPIRE programme of the European Commission (www.inspire-geoportal.eu). This programme aims to make available relevant, harmonized and quality geographic information to support the formulation, implementation, monitoring and evaluation of policies and activities that have a direct or indirect impact on the environment.
This is the phase where land policies are formulated based on knowledge of land problems. Policies on urban land management (environmental, land tenure, spatial planning, and so on) can be implemented due to integrated and up-to-date land information.

# ANNEXES: CASE STUDIES

| Main Theme | Nr | Country | City | Land information theme |
|---|---|---|---|---|
| Land administration | 1 | Somali Region / Somaliland | Hargeisa | Property taxation |
| | 2 | Afghanistan | Kandahar | Settlement regularization, security of tenure, taxation |
| | 3 | Indonesia | Aceh | Housing |
| | 4 | Philippines | (National) | Land administration |
| | 5 | Kosovo | (National) | Cadastre |
| Spatial planning | 6 | Colombia | Paipa | Ordenamiento territorial |
| | 7 | Libya | (National) | Spatial planning |
| | 8 | Burkina Faso | Ouagadougou | Inner-city upgrading |
| | 9 | Malawi | Blantyre | Master planning |
| | 10 | Mozambique | Maputo | Structure planning |
| Environmental planning and management | 11 | Zambia | Lusaka | Urban environmental management information systems |

# CASE STUDY 1:

## BETTER INFORMATION FOR BETTER CITIES; MUNICIPAL REVENUE GENERATION THROUGH PROPERTY TAXATION.

MAIN THEME: LAND ADMINISTRATION
TOWN/COUNTRY: HARGEISA, SOMALILAND

# CASE STUDY 1

## INTRODUCTION

Hargeisa is located in the Horn of Africa, near the Gulf of Aden, along the border of Ethiopia. It is the capital of the self-proclaimed republic of Somaliland, a region with its own government and institutions. Hargeisa is Somaliland's largest city.

In Hargeisa, the quality of infrastructure and other municipal services is poor (for example water, sewerage system, solid waste collection and paved roads) and one in five households (many of them internally-displaced people) lives in a temporary, makeshift structure. To respond to these development challenges, local governments need money. The concept of property taxation exists in Somaliland, but the tax database is very out-dated and there is little enforcement of taxes.

For the Support to Priority Areas in the Urban Sector (SPAUS) project and later the Urban Development for the Somali Region (SUDP), one objective was to improve local revenue collection and delivery of basic services. The advantage of property taxation is that properties can be identified relatively easily. This is especially relevant in developing countries where incomes are usually difficult to determine and tax evasion is a major problem.

## SPATIAL DATABASE CREATION

To be able to collect property taxes there has to be an up-to-date database with information on the property and owners or occupants. The number of variables, quality and coverage has to be determined for the specific local situation and complying with laws and regulations and preferably based on existing practices (regulations, procedures, institutions, staff). The problem in Hargeisa, as in many other developing cities, is not the unwillingness of property owners to pay taxes, but the lack of information or institutions that can guarantee the taxes are collected and appropriately invested in the improvement of infrastructure and basic services.

A lack of maps and the cost and time needed to develop large-scale base maps meant that other solutions were needed. Very-high resolution satellite images became available (IKONOS, 1999 and Quickbird, 2001) and in 2004 it was decided to obtain these images for the project. Use was made of satellite images with natural colours and spatial resolution of 61 cm. The program made use of satellite images with natural colours and spatial resolution of 61 cm Natural colours were preferred so that the images were also useful for urban planners (satellite image used as a kind of base map, and backdrop images to sketch strategic action plans). The images were also useful for wall posters in municipal offices and in public meetings to facilitate participation in the different planning and housing projects.

The identification and collection of accurate spatial data was not feasible (for example, parcel boundaries, footprints of buildings) and were not actually required because the tax bills were based on data collected by surveying each property. Instead of opting for a parcel-based database it was decided to develop a building-based spatial database. Through on-screen digitizing, a sketch of the footprints of all buildings in Hargeisa was made. Due to the initially limited capacity of digitising and use of GIS in Hargeisa, and to make a quick start, it was decided to digitize the satellite image in Nairobi (at the Regional Centre for Mapping of Resources for Development).

Very small structures, mostly informal "temporal" dwellings, locally known as Buuls, of less than 9 m² were digitized as dots. Semi-detached or row housing

# CASE STUDY 1

could only be divided into individual dwellings after fieldwork had been done as they cannot be reliably distinguished using a satellite image only. In addition to the buildings, some other features were digitized, for example rivers, main roads, airport, dams and administrative boundaries of districts, sub-districts and neighbourhoods.

After fieldwork and dividing the building blocks into individual buildings a total of 59,000 buildings were found to be in Hargeisa; these were 37,000 residential, 7,200 commercial and almost 15,000 others, for example institutional buildings, as well as walled land without buildings.

**Table 8: Digitized data**

| Spatial Feature | Content | Number | Time (hours) | Remarks |
|---|---|---|---|---|
| Polygon | Individual buildings and building blocks | 37 160 | 320 | 31 seconds per building |
| Point | Small structure (< 9 m²) | 13 256 | 30 | 8 seconds per point |
| Segment | Rivers, roads | 50 | 50 | |

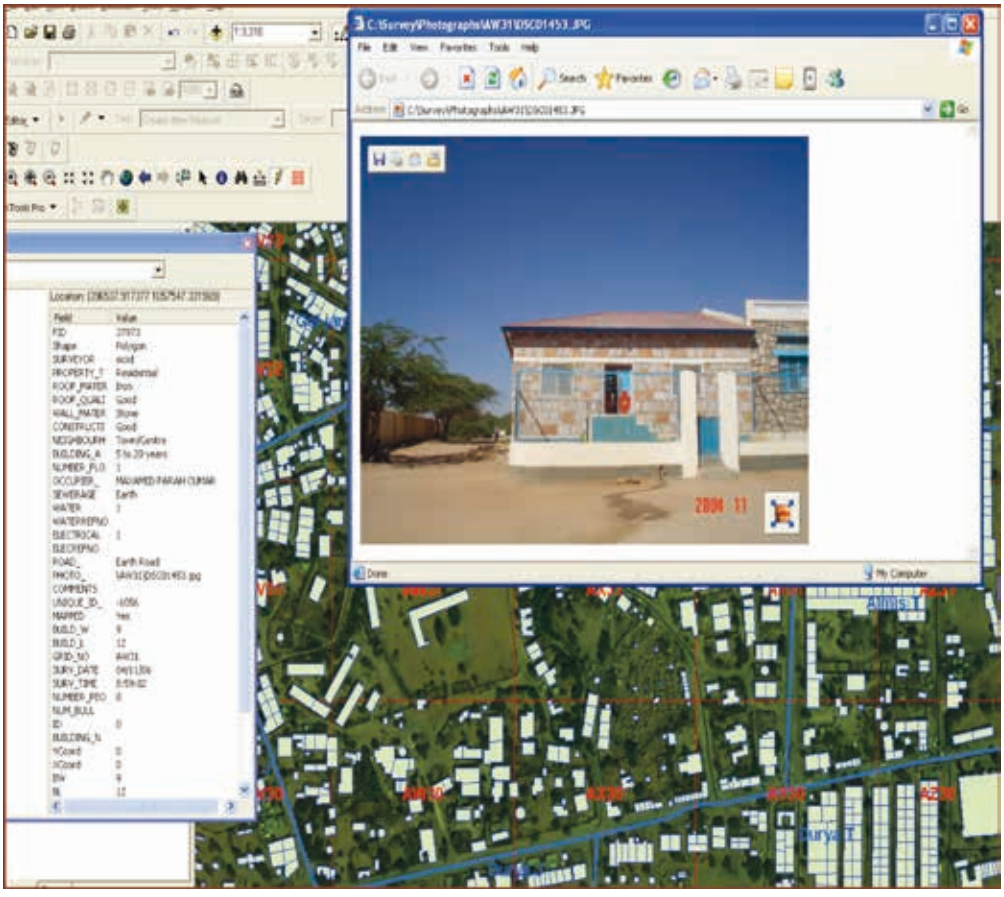


**Figure 6: Satellite image and derived footprints of buildings, database variables and hyperlinked ground photo of the property.**

## ATTRIBUTE DATABASE CREATION

The property variables listened in table 2 describe the physical characteristics of the property (dimensions, use, and quality) and details about the occupier. The database is hyperlinked to a digital ground photograph. Use was made of a personal digital assistant (PDA) to enter the data into the fields.

**Table 9: Property variables**

| Main variables | Values |
|---|---|
| Location | Unique identifier and coordinates (geo-referenced satellite image) |
| Sewerage | Septic, none, earth |
| Water | Yes, no |
| Electricity | Yes, no |
| Road access | Earth road, hard road, none |
| Name of occupier | |
| Type of property | Vacant land, residential, commercial, hotel, other |
| Number of floors | |
| Age of building | < 5 years, 5-20 years, 21-50 years |
| Roof material | Concrete, corrugated iron, others |
| Wall material | Stone, clay/brick, concrete, other |
| Quality of construction | Excellent, good, poor, derelict |
| Building size | $x^2$ metre |
| Plot size | $x^2$ metre |

# CASE STUDY 1

During the British colonial period, land and property records were developed in Somaliland. However, following independence in 1960 and the civil wars in the 1990s, records were not updated and many were lost and destroyed. Importantly, the concepts of property inventories and taxation are not new in Somaliland. A review of the tax system revealed that tax levels are very low and based on a flat rate that does not reflect the value of property. For example, a good quality, commercial building in the city centre is taxable at the same rate per square meter as a low quality residential dwelling on the outskirts of the city, and only for the ground floor is taxable.

A proposal was made to classify properties separately for residential and commercial property into different quality levels (A, B, C, D and E) as a proxy for property value. Location was also taken into account and properties were divided into two groups: city centre and the rest of the city.

The project has the following objectives:

- To create an up-to-date GIS property inventory (including a new spatial identification code -ID);
- To collect data to be able to introduce a differential tax rate based on property quality, use, location and the number of floors.

Unfortunately, the project staff underestimated the opposition to changes by the municipal council members to introduce this new concept of differential tax rates and that most of the data collected were actually intended for this purpose. Data on the variables in table 9 were collected and, although most variables were not needed, they can facilitate a differential tax system at a later stage

## APPLICATION

The Geographic Information System developed in Hargeisa helped to increase annual property tax revenue from US$169,062 in 2005 to US$588,754 in 2008. However, it is not known how this money was used and if indeed it was used to implement neighbourhood improvement programmes.

## LESSONS LEARNT

The main lessons learned from the experience in Hargeisa are:

1. Set realistic ambition level; while the initial focus was limited (property tax only), still the ambition to introduce differential tax levels, use of GPS for mapping, could not be realised due to lack of political support within the municipal council.
2. Check that and verify if implementation is technical, socially, culturally, political feasible and be prepared of sudden change of situation. There was local political support for property taxation, for example in Hargeisa and Boroma but implementation in Burao was not possible due to opposition by some local groups.
3. It proved to be the right decision to focus on one issue (taxation) with quick, visible results and realistic quality of spatial data in relation to funding and timing available but with a view to expansion (for example land tenure).
4. Human capacity, knowledge transfer from UN-Habitat to municipality was initiated by developing a municipal information centre and on-the-job training of local staff.
5. Develop and implement a sustainable plan to make sure that a property taxation system which will need continuous updating. For example the database need to be updated and the role of actors clearly defined.
6. Experience in one city (Hargeisa) cannot be directly repeated in other cities without carefully reviewing of the local political and institutional situation

# CASE STUDY 2:

## INCREMENTAL REGULARIZATION OF INFORMAL URBAN SETTLEMENTS.

MAIN THEME: LAND ADMINISTRATION
COUNTRY/TOWN: KANDAHAR, AFGHANISTAN

# CASE STUDY 2

## INTRODUCTION

In the northern fringe of the city of Kandahar, a large informal settlement has developed over the last three decades on mainly government owned desert land. Currently the settlement contains some 12,000 parcels with an estimated population of 100,000 people. The area is inhabited by rural-urban migrants from different regions of Afghanistan, internally-displace people and households from Kandahar itself.

## MAIN CHALLENGES

The informal settlements create the following challenges for the Municipality of Kandahar:

- Insecurity, location of active insurgents, lack of employment opportunities and poverty;
- Lack of access to basic services;
- Tenure insecurity;
- Low level of sense of community;
- Limited local funds to invest in the settlements;
- Weak institutional capacity.

## REGULARIZATION OBJECTIVES

The international donor community is supporting Afghanistan to address these challenges. The Canadian International Development Agency made funding available to support development and UN-Habitat in Kandahar adopted an integrated approach to improve the living conditions in informal areas.

The objectives of the project are:

- To increase security of tenure through the issuing of a municipal notebook ("certificate of occupancy") which creates a "de-facto" security of tenure. The notebook will only be issued after an inventory is done after an evaluation of each parcel and its occupants on a case-by-case basis. The notebook is not issued if there are the following unresolved problems: parcels are too large (> 500m²); they occupy unsuitable areas, for example river beds; there are land conflicts with neighbours or the land is claimed by others; there are irregular and narrow road patterns that make upgrading too costly (judged by local planners); they are not registered.
- To provide basic services such as road improvements, drainage, water provision, electricity. This infrastructure is developed through contracts to local companies but also through contracts with community development councils (CDCs);
- To increase municipal revenues; the issuing of a certificate of occupancy by the municipality not only increases the acceptance by the Municipality of the informal occupancy of government land and the increase in "de-facto" tenure security, but also facilitates the levying of property taxes.

## REGULARIZATION APPROACH

The following approach was adopted to achieve the objectives, and anticipates that the regularization process can continue even after donor and technical support is no longer available.

- Integrated: security of tenure, upgrading, tax collection, community development;
- Participatory and community-based (CDC, sub district leaders, municipality-led, UN-Habitat support) and pro-poor;
- Step-by-step approach especially regarding tenure security, practical, results-based;
- Appropriate land information systems, keep it very simple;
- Technical, legal and socially sustainable. The technology applied is based on the following criteria: that which local municipal and UN-Habitat staff already know (for example, Microsoft office, AutoCad); what type of data is available (for example, high-resolution satellite images, base maps), data structures used before (household questionnaires); and how this is can be improved. Standard GIS is added. Standard GIS and a cadastral identifier were introduced and there were and there were some modifications to the

questionnaire. Through a Presidential Decree, permission was obtained to transfer the land on which there was an informal settlement to the municipality, and then to transfer the land to the inhabitants of the informal settlement. There is already an agreement on the transfer fee (70 US cents / m² land), which is well below the market price. The social aspects consist of having the support of the local community (CDCs, people, local leaders and the mayor); there is something in it for all parties, except those such as land grabbers parcelling large land plots for speculation, or occupying land not suitable for development. Genuine squatters who will have to be relocated will be compensated with another parcel of land.

## DATABASE CREATION

The data needed for such a regularization process consist of spatial data and attributes:

## SPATIAL DATA

Reliable, large-scale base maps (topographic, parcel) or aerial photographs are not available or accessible in many countries. In Kandahar, there is a general land-use map created by the Afghanistan Information Management Services, which is used in the planning of the household interviews and coding of blocks. However, it is not accurate enough to create a parcel map.

IKONOS and Quickbird high-resolution satellite images are available and there is also a large-scale map showing building footprints derived from the Quickbird image. This map is used as the basis for the parcel map. High geometric accuracy will not be achieved, but this is not considered to be a problem as long as all parcels are appropriately identified on the map and the information in the attribute database is correct (including parcel size and building volume).

## ATTRIBUTE DATA

To be able to regularize the settlement data that is collected, the following are needed:
Location: identification of the parcel regarding district, sub-district, block and parcel number to generate a unique identity.

Owner/occupier: name, identity number, number of persons living on the plot, land conflict with neighbours.

Property: use of the plot, for example residential or commercial), plot size, building volume, number of floors, grade (quality indicator).

## APPLICATION

The household interviews and field measurements are created by a team of two engineers and eight assistants from the municipality who have UN-Habitat support. In the office, a team of one engineer and two assistants are carrying out quality control and digitizing. In two years, 25,000 properties were recorded. In 2010, tax revenues from the 10,000 plots located in the informal settlement were US$182,000. Taxes range from approximately $18 for a poor-quality dwelling to $174 for a shop. In the informal settlement, around 25 per cent of the parcels could not be issued a notebook (de-facto land ownership) due to problems with unsuitable location, unacceptably irregular layout or land conflicts. Through the Presidential Decree, land was transferred from central to local government and the Municipality of Kandahar was allowed to "sell" the land to the inhabitants in the informal settlement.

The whole process supports the integration of the informal settlement into the city proper. The close involvement of the community in upgrading the infrastructure not only increased the quality of life in the area but also boosted a sense of citizenship with the expectation of an improved security situation.

# CASE STUDY 2

## LESSONS LEARNT

The two most important lessons learned are:

1. Team building – get everyone on board. The parties concerned are the communities (inhabitants, community councils, and local leaders), the municipality (Mayor, district managers and technical staff) and donors (CIDA and UN-Habitat). Make sure that everyone agrees, but that they also have a genuine self-interest in making the process a success.
2. Keep it simple and close to existing systems and procedures. While advanced systems, high accuracy, elaborated databases and so on can be developed and explained to local staff, getting things done at the operational level and in a sustainable way (without outside funding or technical expertise) is a different process altogether.

Still critical within the context of GLTN are: the role of women in the registration of properties; the institutional capacity of the municipality; political support in case of change of the mayor; the opposition of powerful warlords involved in land grabbing; avoiding a situation where the informal settlement is an "island of excellence"; and, to develop a wider application, a roll-out programme to develop a city-wide policy and continuous programme. Also, the general security situation in Afghanistan and Kandahar is volatile and makes the implementation of such programmes challenging for all parties involved.

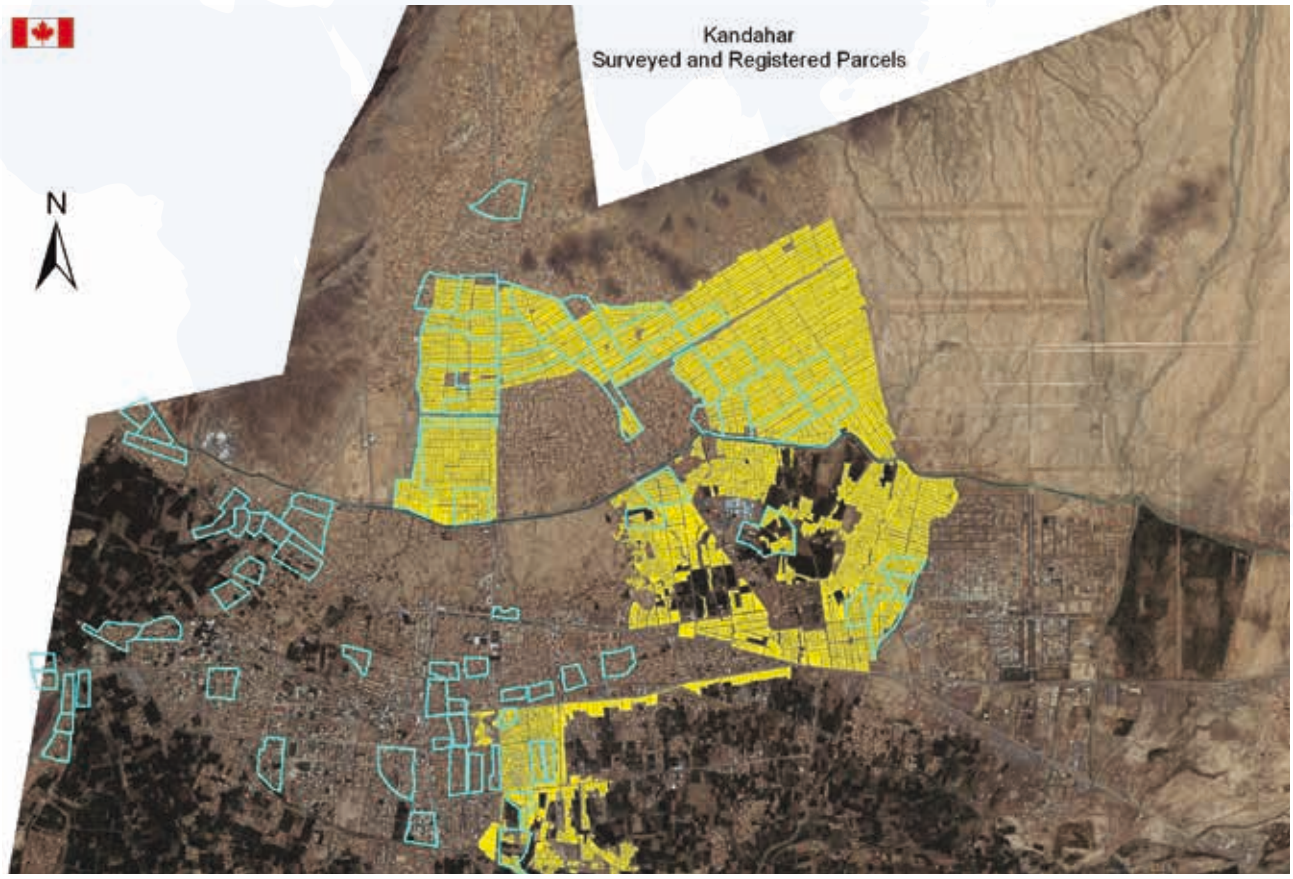



**Figure 7: Location of surveyed and registered properties in Kandahar (yellow) and Community Development Councils (blue)**
**Credit: UN-Habitat team Kandahar, Afghanistan**

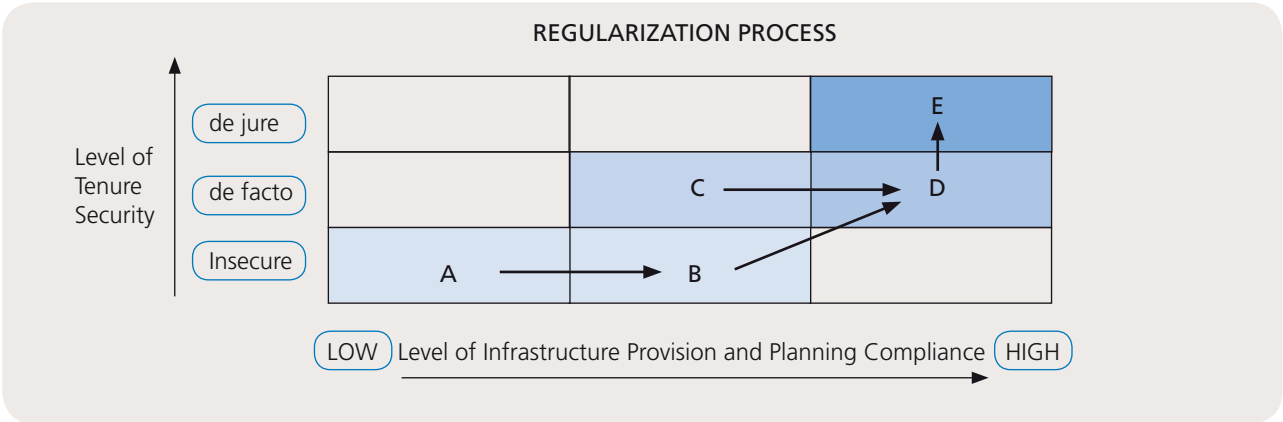



**Figure 8: Incremental Settlement Regularization Process, improving security of tenure AND settlement upgrading. A= Insecure land tenure and low level of infrastructure; E:formal security of tenure and High level of infrastructure**
**Credit: UN-Habitat Afghanistan**

# CASE STUDY 3

## LAND ADJUDICATION FOR HOUSING RECONSTRUCTION

MAIN THEME: LAND ADMINISTRATION
TOWN/COUNTRY: ACEH, INDONESIA

# CASE STUDY 3

## INTRODUCTION

Aceh, in the north of the island of Sumatra in Indonesia, was one of the areas mostly severely affected by the tsunami on 26 December 2004. Between 130,000 and 160,000 people died (4 per cent of the province's total population; up to 75 per cent of coastal village communities). More than 500,000 people were displaced and 120,000 families left homeless. The authorities were faced with an enormous challenge to build 130,000 houses and reconstruct infrastructure and institutional buildings. Aceh also had a history of three decades of armed conflict between the Government of Indonesia and the Free Aceh Movement that was settled in August 2005 with the Helsinki agreement.

Due to the devastating disaster, there was an urgent need to provide shelter and rebuild the communities. This was facilitated by unprecedented levels of funding from the international community. In addition, many NGOs were involved in helping in the tsunami-affected areas and were under pressure to act quickly.

In 2005, the government set up the Rehabilitation and Reconstruction Agency (BRR) to manage this massive reconstruction process and to coordination the different NGOs and other international agencies such as the Red Cross/Red Crescent, UN agencies and the World Bank, and to do this by applying principles of efficiency, transparency and accountability. A "rights-based approach", very much in line with UN-Habitat's "people's process", was the basis for not only reconstructing buildings and infrastructure but also for re-developing communities and livelihoods.

To be able to rebuild houses, schools, clinics, governmental buildings and so on, land needed to be securely allocated and property rights established. It was realized that a conventional approach, in which the national land administration organisation surveyed and registered land, was too time consuming and an alternative, faster and approach that was acceptable to citizens, communities and the government needed to be developed. This approach was called "Community Driven Adjudication".

## PARTICIPATORY LAND MAPPING AND COMMUNITY DRIVEN ADJUDICATION (CDA)

The survivors of the disaster wanted to return to the plots they occupied before the tsunami, instead of moving to a plot in a resettlement area. People were afraid that land grabbers might "steal" land and they started installing markers on their plots after the debris was cleared, bodies had been retrieved and buried, and any remaining assets were recovered.

Participatory, or community, land mapping is based on a system in which people have greater say, involvement and decision-making in the development of the neighbourhoods and settlements. In Aceh, communities were to re-establish land boundaries and drew up village and neighbourhoods maps. Although the national land administration agency (BPN) agreed to community-based land adjudication prior to formal surveys and issuing of land titles, it is possible the BPN viewed this more as a temporary solution to sort out land matters provisionally. The CDA process was part of the Reconstruction of Aceh Land Administration System (RALAS), a World Bank project executed by BPN.

# CASE STUDY 3

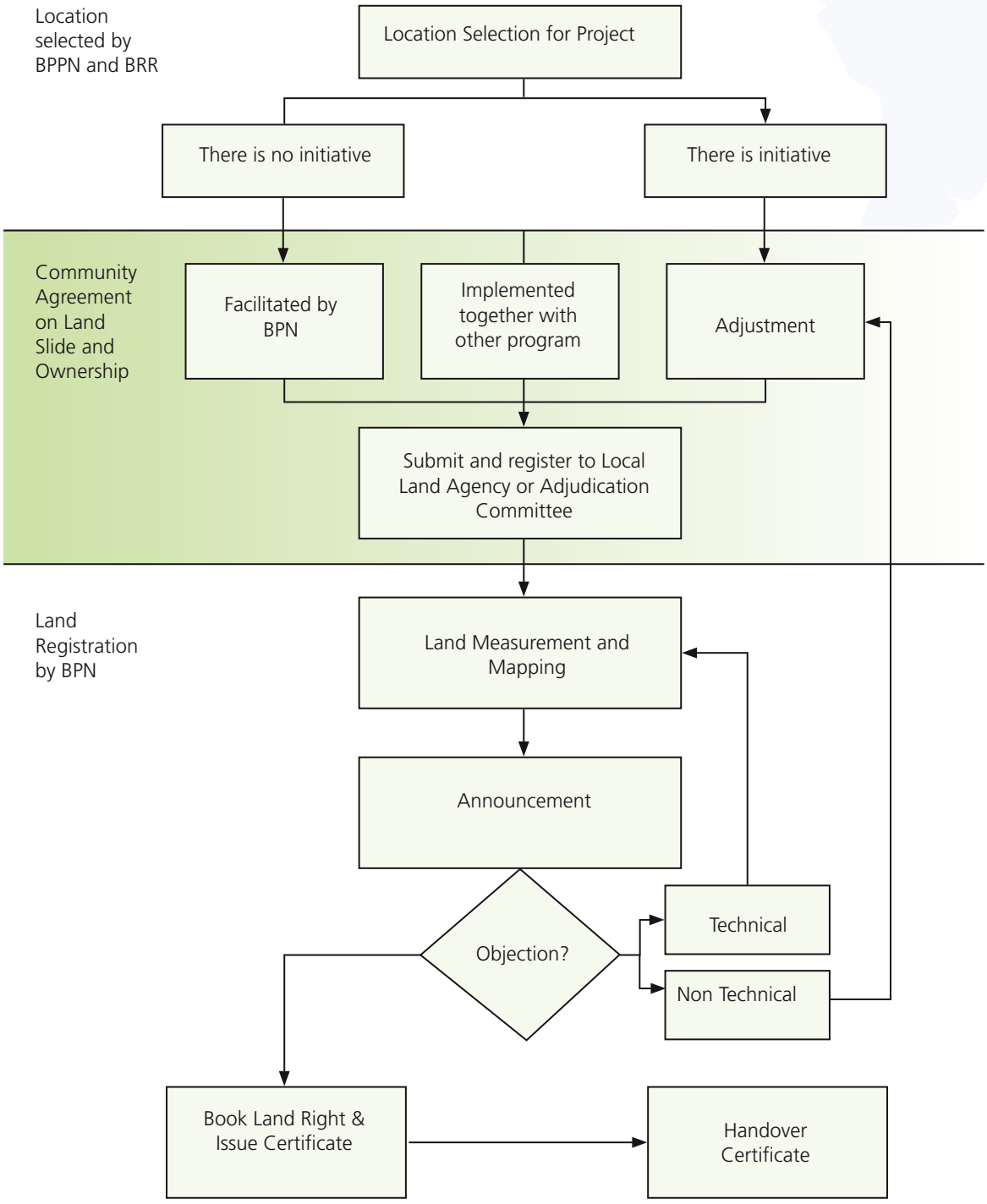



**Figure 9: Reconstruction of Aceh Land Administration System (RALAS) process for land certification. Credit: National Land Administration Indonesia**

# CASE STUDY 3

The land-related problems were enormous. RALAS's task was to restore land rights for 600,000 parcels and protect the rights of the occupants. This was in a context where paper land records were destroyed, land parcels hardly recognizable, a third of the BPN staff in Aceh had died, and large vulnerable groups such as windows and orphans, with inheritance rights needed protection. Of the 300,000 parcels affected by the tsunami, 25 per cent had formal titles and 75 per cent had customary land rights, which made it difficult to issue individual titles for all parcels. In these cases, customary communal land rights were more suitable.

To be eligible for housing assistance, people needed to secure their land tenure and the community-adjudicated land-mapping was the first step in selecting the beneficiaries of housing assistance.

*This Participatory Community Land Mapping and Community Driven Adjudication (CDA) process consists of:*

1. Identifying previous tenure conditions;
2. Confirmation of the beneficiary by the community;
3. Marking the plot location on the village map by the beneficiary in consultation with neighbours;
4. Display of the map in a public space to see if there are any complaints;
5. Certification of maps by village, community and religious leaders;
6. Beneficiary completes a Statement Letter for Land Title/Ownership;
7. Content of the Statement Letter, for example family details, status of land, availability of land certificate, duration of land owned, how land was acquired, is witnessed by village head, community and religious leaders;
8. Letter registered at the National Land Office (BPN) or with the Adjudication Committee.

The CDA process has no legal status, but when there are no conflicts between members of the community the BPN will accept the survey and formalize adjudication of the land within 30 days. It will issue title certificates within 90 days. Due to the specific circumstances, titles were issued free of charge, meaning there were no taxes or other charges.

Although the CDA process is low-tech, it is an improvement on the process of the pre-tsunami period as it is digital; if back-ups are made and properly stored it will prevent the records and cadastral maps being lost. Due to the destruction of records on land, the collective memory of the community functioned as a type of human archive. In customary environments, it allowed communities to take collective decisions on relocation within the village boundaries and thus within their customary control. For example, land swaps were often done: communal village land was re-divided into individual plots on a customary basis, then mapped and submitted for titling. Erstwhile individual plots were re-allocated and given the status of collective land. So, on a customary basis, the status quo was maintained ("managed"), while individual titles were issued in new and safer locations.

Applications reconstruction

- Relation between community land mapping, CDA and housing reconstruction;
- CDA as input to spatial planning? (Planning requires security of tenure);
- CDA process seen as a necessary preparatory work;
- Integration of community-based action planning with community contracting.

## LESSONS LEARNT

Community participation, commitment from the government and external support are essential, especially to act quickly after a natural disaster. Sustainability of the CDA process is not clear due to criticism and the limitations of the RALAS project.

# CASE STUDY 3

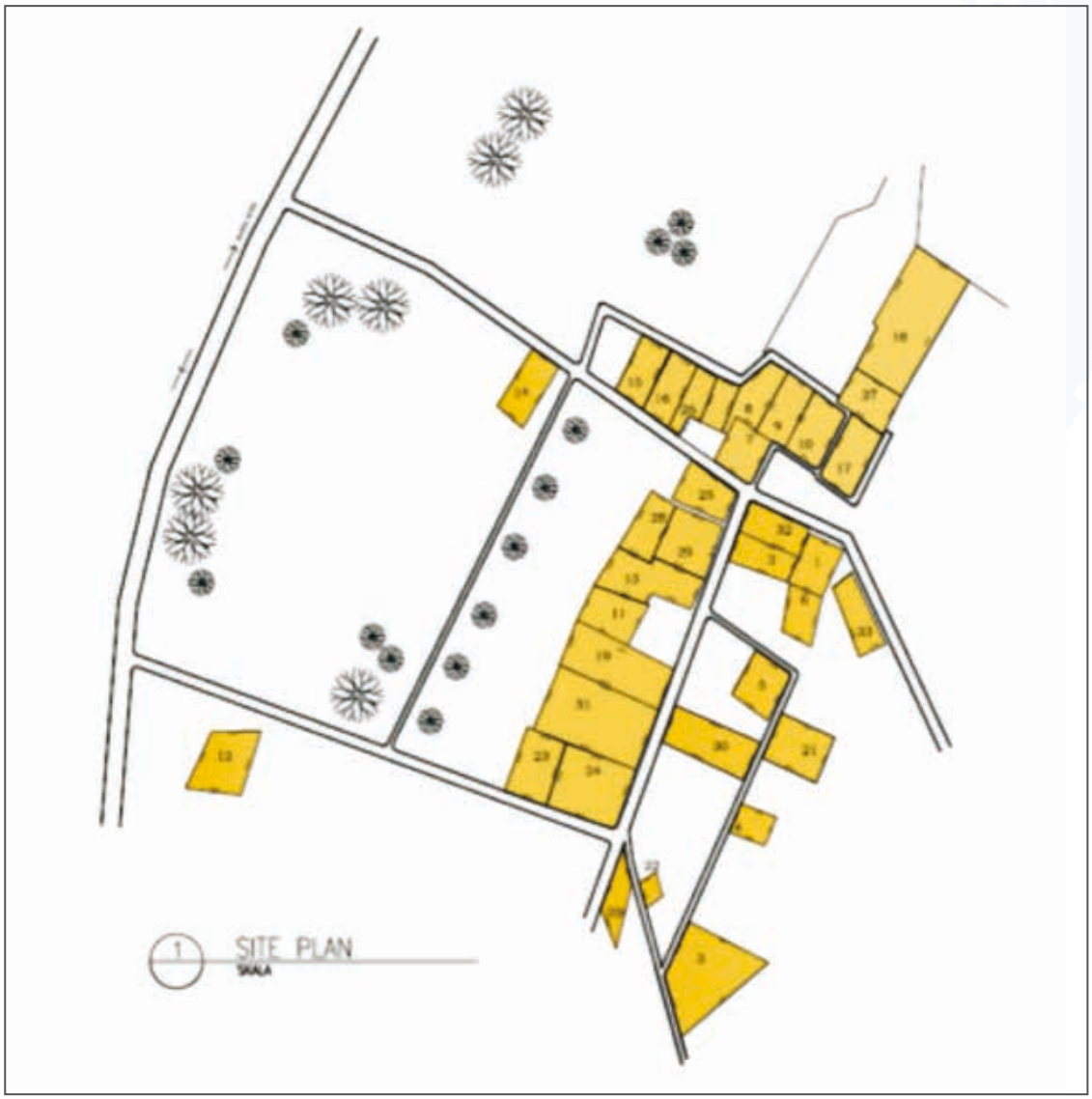



**Figure 10: Example of a Community Driven Adjudication map (source www.unhabitat-indonesia.org). Credit: UN-Habitat Indonesia**

# CASE STUDY 4

## LAND ADMINISTRATION AND MANAGEMENT PROJECT.

MAIN THEME: LAND ADMINISTRATION
COUNTRY: PHILIPPINES

# CASE STUDY 4

## INTRODUCTION

The Land Administration and Management Project (www.phil-lamp.org) in the Philippines is a major attempt to re-organize and coordinate the activities of a number of land administration agencies through the development of a National Land Administration Authority (LAA). The segregation of land-related activities in institutions which communicate poorly resulted in data duplication and limited and outdated databases. According to Roberts and Kanaley (2006), in the Philippines, "(T)ransfer of deeds and titles is extremely difficult and unnecessarily increases delays and transaction costs, thus impeding business development. Significant percentages of total land parcels are untitled, disputed, or undervalued" (Roberts and Kanaley, 2006). This situation means economical development is hampered due to inefficient land markets, there is insecurity of land tenure, and opportunities for revenue generation are missed. Unclear land titles also restrict the use of land as collateral for loans, and urban development is complicated and time consuming because of the unclear legal status of those occupying the land. LAMP tries to respond to these challenges by developing inter-agency coordination mechanisms and by promoting standardization of information and procedures, and transparency and accountability principles.

Land administration problems in the Philippines are:

- the incomplete and inappropriate classification of land;
- incomplete titling of privately claimed alienable and disposable land;
- antiquated, overlapping and inconsistent land laws;
- obsolete/ineffective land information systems that are difficult to access;
- limited spatial referencing or indexing for title records;
- inefficient land records management systems;
- absence of a complete, updated set of cadastral maps;
- limited access to the title register and high costs in using it;
- inappropriate methods and assessments for land valuation;
- under-performance in the collection of property taxes;
- duplication and overlap of land administration activities;
- lack of mechanisms to resolve land administration issues;
- erosion of public confidence in the land administration system.

**LAMP** consists of five main integrated components:

1. Land policy: legislation and regulations;
2. Institutional development and capacity building: to be able to implement transparent, responsive and more service-orientated institutional arrangements for land administration, and to develop the capacity of local academic institutions to provide land administration education and training;
3. Tenure security: increase the level of tenure security in urban and rural areas through an accelerated, systematic land adjudication programme and the establishment of an efficient and accessible land registration system;
4. Property valuation: raise the quality of government and private sector property valuation performance, to realize a single valuation base for taxation and to ensure sustainable improvement through institutional and educational reform;
5. Project management: establish administrative capacity, systems and plans for the management of LAMP2. This component provides support to the Department of Environment and Natural Resources (DENR) and the Department of Finance (DOF) to manage LAMP2, support to the establishment and implementation of monitoring and evaluation systems and technical assistance at all levels to implement LAMP2.

## APPLICATIONS

LAMP's objectives are achieved through the establishment of Provincial Project Implementation Offices (PPIO). The main aim of the PPIO is to increase tenure security through systematic adjudication teams that are based in the different municipality offices. They are responsible for developing an accelerated land adjudication programme and the establishment of an efficient and accessible land registration system.

The development of a "one-stop-shop" is intended to offer land-related services and information (titles, maps and mortgages) but also to deal with complaints, be closer to the communities and to be in one place.

## LESSONS LEARNT

The project's goals - to coordinate the work of different land administration agencies and to develop implementation offices and one-stop-shops - require long-term thinking in the Philippines and other developing countries. (The project mentions it will take 15-20 years to develop LAMP at scale). Although all efforts were made to create a comprehensive framework for land administration reform (legalization, institutional arrangements, capacity building and a communication strategy), including short-term results and a long-term vision, after many years the main bottleneck to implementing the project was that the objectives could not be reached within its time span.

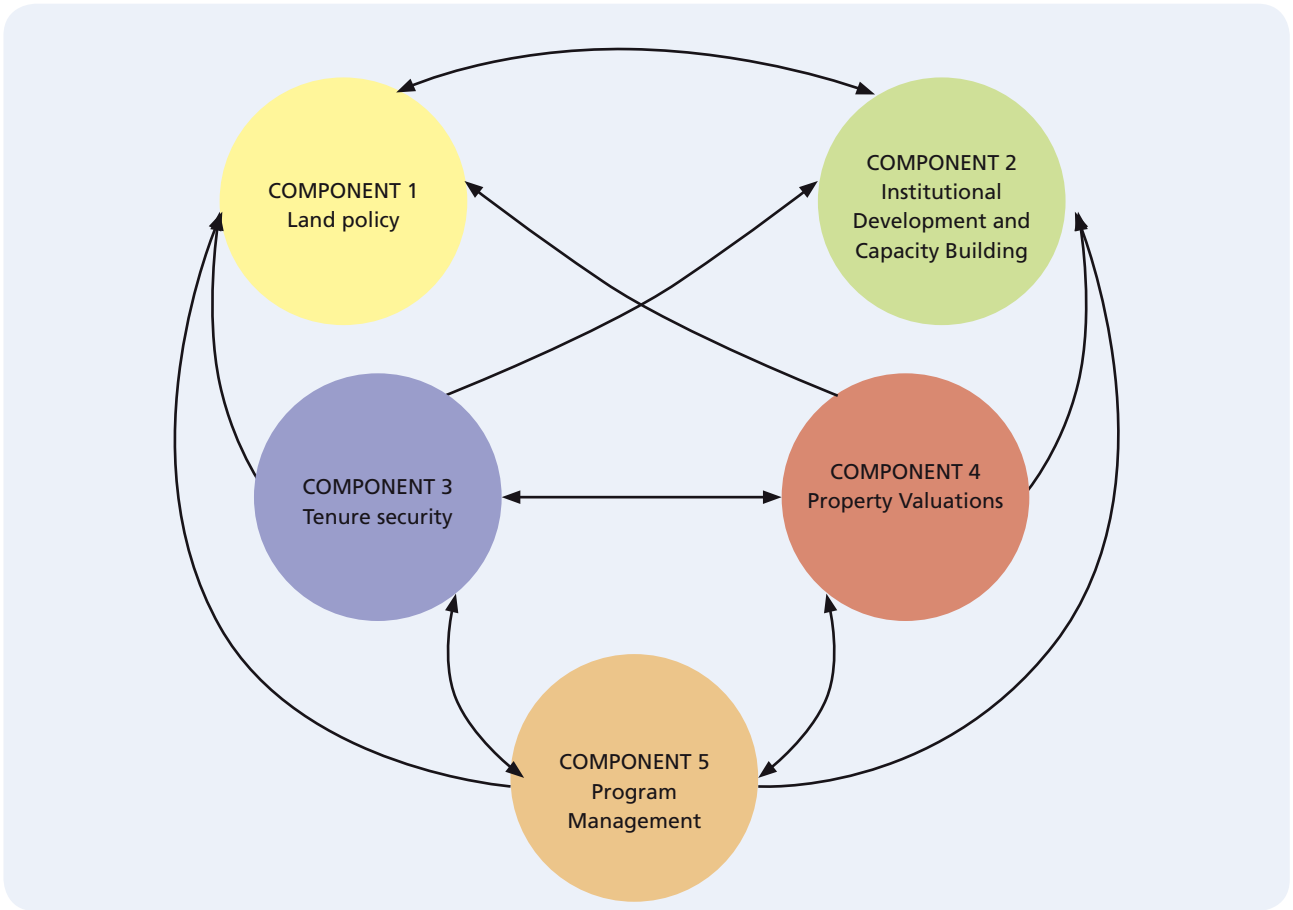



**Figure 11: Components of the Land Administration and Management Project (LAMP) phase 2. Credit: LAMP, The Philippines**

# CASE STUDY 5

## KOSOVO CADASTRE SUPPORT PROGRAMME (KCSP)

MAIN THEME: LAND ADMINISTRATION
COUNTRY: KOSOVO

# CASE STUDY 5

## INTRODUCTION

After the Balkan War, between 1998 and 2008 Kosovo was governed by the United Nations Interim Administration Mission in Kosovo (UNMIK), which was gradually overtaken by the Provincial Institutions of Self-Government (PSIG). In 2008, Kosovo became a self-declared independent state recognized by some 62 countries.

In 1999, an assessment of the housing and property rights and property registration showed that many property certificates and boundary markers were partially destroyed, survey equipment removed and discriminatory legislation had been applied for more than a decade.

Based on this assessment and other more in-depth studies, the Kosovo Cadastre Support Programme (KCSP) was developed to re-establish the cadastre system. The KCSP was implemented by UN-Habitat in the period 2000-2003 and was supported by Sweden, Switzerland and Norway.

## KOSOVO CADASTRE SUPPORT PROGRAMME

Kosovo has a population of around two million people (2005 survey), an estimated 1.8 million parcels and a land area of 10,900 km². A functional cadastral system was seen as a pre-requisite for implementing reconstruction activities, to promote economic development and resolve long-standing conflicts including property conflicts.

The KSCP focused on developing the Kosovo Cadastre Agency (KCA), a new organization. Its objective was to establish "a well-functioning land sector, which will contribute to economic growth, democratic and sustainable development when supported by a real property market, rights protection, and an improved cadastral and land registration system. Equally, municipal cadastral offices will be able to render proper land and property services to the beneficiaries".

Effective co-ordination between donors and Kosovo institutions was fundamental to achieving the programme objectives.

The first priorities were to reconstruct and regularise the housing and property rights; in the second phase the priority was to expand the cadastre system to assist with property taxation, urban planning and environmental management, and production of data to assist economic and development planning (integrated land information systems). A gradual and incremental approach was adopted.

The main components of the project were:

1. Establishment of a steering committee;
2. Public information;
3. Capacity and organization for cadastral activities;
4. Creation of a homogenous reference network;
5. Aerial survey and development of ortho-photos;
6. Reconstructed cadastre information in digital form;
7. Develop model for future cadastral and LIS;
8. Legal framework;
9. Training system.

The project's budget was US$10.67 million.

## KOSOVO CADASTRAL AGENCY (KCA)

KCA is an executive agency of the Ministry of Public Services and was established as a new and central cadastral agency but with close relations to local authorities and devolutions to these authorities facilitated through 25 Municipal Cadastral Offices (MCOs). The KCA was intended to become technically independent within three years so capacity building and on-the-job-training were a major component of the KCSP. The KCA consists of a cadastral unit, survey/GIS unit, a legal unit and a training unit.

## DATABASE CREATION

Due to the destruction or loss of cadastre information and the destruction of geodetic network monuments,

# CASE STUDY 5

the spatial component of the cadastral reconstruction process was developed from scratch. A new geodetic reference network was established and an aerial survey of approximately 80 per cent of the country was done (8,000 km² of rural area and 500 km² urban area) and digital ortho-photos were created (scale 1:2,500 for rural areas, 1:1,000 for urban areas). Details of ownership and other textual information were recovered from paper files, back-up tapes, field surveys and personal verifications.

## LESSONS LEARNT

The long-term vision of expanding the cadastral system into a Kosovo Spatial Data Infrastructure similar to developments in and quality of Western European countries is ambitious. Although 20 years ago Kosovo and other countries that were part of the former Yugoslavia suffered a devastating war, rapid progress was made to reconstruct and modernize land information in Kosovo. An initial focus on emergency operations to handle the immediate land and property disputes, and later on reconstructions of land information, institutions and the legal framework, proved to be workable in Kosovo.

The digital ortho-photos were also useful for urban planning as was the vision of a cadastre that should expand to a land information system for additional benefits. Other positive aspects were the long-term vision, development of a land administration policy and the ambition to become part of the European Union. The involvement of as many stakeholders as possible and informing the general public contributed to the embedding of the project into Kosovo society. An improved governance situation and financial support and technical assistance were important success factors. The political support of the government and the priorities it identified, a user-needs analysis, and the gender and ethnic sensitivities of the project were also important elements. However, the future of the KCA depends on the Kosovo consolidated budget funds and customer fees.

# CASE STUDY 6

## SPATIAL PLANNING: PAIPA, COLOMBIA

MAIN THEME: SPATIAL PLANNING
TOWN/COUNTRY: PAIPA, COLOMBIA

# CASE STUDY 6

## INTRODUCTION

Colombia developed planning legislation (law 388 from 1997) which reviewed previous planning laws from 1989 and 1991. Law 388 describes in detail (139 articles) the obligations of small (<30,000 inhabitants), medium (30,000-100,000) and large municipalities (>100,000 inhabitants) regarding the development of spatial plans.

The law includes specifications on land use information, the spatial planning process including public participation, and details on expropriation of land and the capture and use of land value increase due to spatial planning. Law 388 is based on the Constitution of 1991, in which institutional strengthening, decentralization and participation are key principles.

The country has well developed specialist institutions in charge of collecting and analysing specific data (for example, mining, environment, hydrology, soil, natural hazards, land cover and land use). There is also a national mapping and cadastre agency (IGAC- Instituto Geografico Augustin Codazzi), which produces topographic and cadastral digital databases. The country has a planning culture and one of the most decentralized planning systems in Latin America in which municipalities have the authority and responsibility for promoting social, physical and environmental development according to the law.

## ORDENAMIENTO TERRITORIAL (TERRITORIAL OR SPATIAL PLANNING)

Spatial plans (Planes de Ordenamiento Territorial - POT) in Colombia are considered to be a basic instrument for the spatial development of a municipality. POTs are defined as a combination of objectives, regulations, policies, strategies, goals, programmes and action plans to guide and manage the land use and physical development of a municipality.

Colombia is rich in biodiversity but also prone to many natural hazards such as earthquakes, landslides, and flooding, which means the environment has a key role in spatial planning. The spatial consciousness of the people might have influenced the content of the planning law, which explains in detail that POT, for example, should identify the location of settlements that are prone to natural hazards and where to relocate the inhabitants of these areas. Other legal requirements are that the plans should identify how rural and urban areas are connected; determine, locate and protect environmentally sensitive areas and cultural heritage areas; analyse the level of infrastructure and social service provision in both urban and rural areas; land use classification; and determine urban limits and potential urban expansion areas.

## DATABASE CREATION

The requirements of the law mean that municipalities are obliged to collect a large amount of spatially-referenced data. Topographical maps for rural areas (1:25,000) and urban areas (1:2,000), ortho-photo maps, parcel boundaries and cadastral database can be obtained from IGAC - Instituto Geografico Augustin Codazzi (the national mapping, cadastre and geographic institute), while many thematic data sets can also be obtained from national institutes. Smaller municipalities such as Paipa are particularly reliant on consultants to collect additional data, integrate this data, assist in the planning process, guarantee compliance with the law and develop the final POT that reflects the interests of society.

## APPLICATIONS

The planning process in Colombia is divided into five phases:

1. Initiating the planning process
2. Diagnosis (analysis, synthesis and evaluation)
3. Potentials (scenarios and plan proposals)
4. Tools

## IMPLEMENTATION.

For phase 2 (diagnosis), five major subsystems are developed: administrative, biophysical (for example natural resources and natural hazards), social (for example demography, housing, social services and infrastructure), economical and land use. For each sub-system a spatial analysis is made and different zoning maps are developed. Finally, these different zoning maps are integrated to develop an evaluation of the area (potential, limitations, land-use conflicts and land-use suitability.

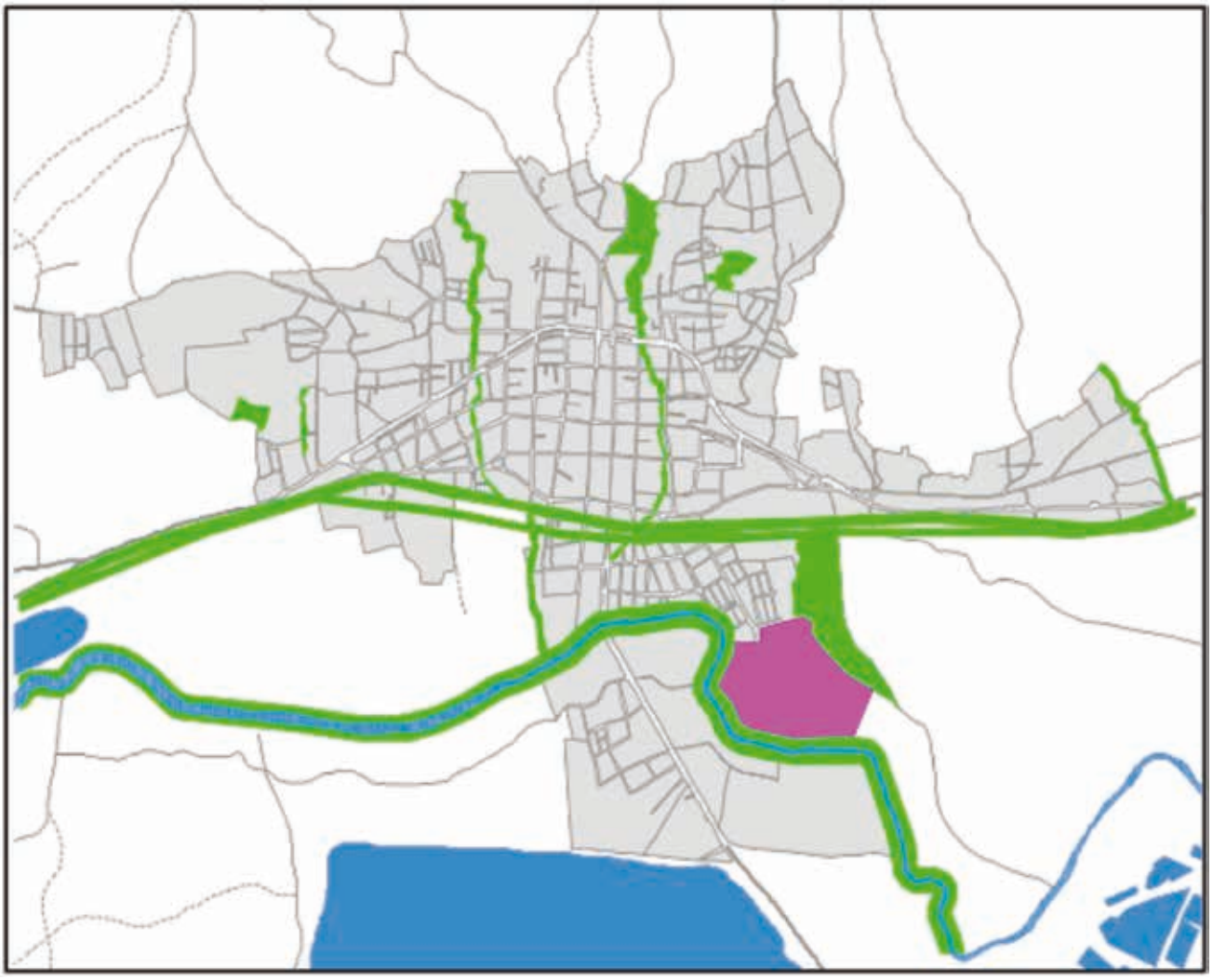


**Figure 12: Urban area of Paipa, Colombia, location of existing and future urban areas as well as area to be rehabilitated and protected. Credit: Instituto Geografico Augustin Codazzi (IGAC), Colomabia**

# CASE STUDY 6

Paipa is a mainly rural municipality, 395 km² in size and with a population of 27,766 inhabitants (census 2005) that is approximately equally divided between urban and rural areas (Source: www.municipioscolombianos.org). The main economical activities are agriculture and tourism.

## LESSONS LEARNT

The case study on spatial planning in Colombia shows that to be able to develop spatial development plans, an environment is required which consists of: planning legislation, availability of basic thematic and topographic datasets and a planning culture locally embedded (decentralisation and participation). In addition, due to a well-trained, critical mass of GIS specialists, data processing and development of scenarios based on up-to-date land information is possible and support the political decision-making process.

The weak points are that the legislation is so detailed and requires such an exhaustive list of data and procedures that repeating a planning cycle is costly and time consuming, which poorer municipalities especially cannot afford. For example, the approval of the POT Bogota consisted of 517 articles in a 278 page document, while the technical annex of the plan alone was 462 pages. Although there is a strong emphasis on plan implementation, it is unclear how interventions are financed (such as infrastructure and social housing) and how plan violations are avoided. The participation process, although fully recognized by the law, does not always get much attention due to the technical orientation of the spatial plans. The emphasis on municipal development plans that regional planning does not always get enough attention which may create unbalanced inter-municipal developments.

Colombia developed a National Spatial Data Infrastructure in which a variety of data producers are participating (census, planning, mapping, cadastre and so on) and inter-institutional cooperation is established and operational at political, management and technical level. The planning datasets are fully integrated with the databases on land ownership and with the property taxation databases. The development of this NSDI is still far from complete both in territorial coverage and at different scale levels. http://sigotn.igca.gov.co/sigotn; SIGOTN: GIS for planning and territorial planning.

# CASE STUDY 6

# CASE STUDY 7

## SPATIAL PLANNING PROCESS IN LIBYA

MAIN THEME: SPATIAL PLANNING
COUNTRY: LIBYA

## INTRODUCTION: 3RD GENERATION PLANNING PROJECT AND SUSTAINABLE URBAN DEVELOPMENT

The development of spatial development plans in Libya had had two phases since 1969. The first planning phase covers the period between 1970 and 1980 (1st generation plans) and, due to rapid developments, new plans were developed in the early 1980s (2nd generation plans). These plans were already outdated by the year 2000 and the Libyan Government decided that new plans had to be made using the latest technology such as GIS and Remote Sensing.

This 3rd generation planning project (3GPP) started in 2005 and is based on the principles laid out in the National Spatial Policy (NSP) 2006-2030. The NSP stresses the importance of sustainable development that focuses on environmental sustainability (for example water) and economically-viable development and projects. The 3GPP includes the development of four regional and 18 sub-regional development plans as well as hundreds of master plans and detailed urban development plans.

Libya today is very different from how it was in the past. Current, rapid socio-economic development requires a different planning approach, a more flexible, continuous and strategic planning process with options to revise and develop new urban development plans before 2025 (the end of the 3GPP planning period) when the need arises. This is especially relevant for areas with rapid development.

## DATABASE CREATION

The Urban Planning Agency (UPA) of Libya and UN-Habitat realised that not only the 2GPP plans were outdated but so were the base maps and thematic data, which was also inaccurate, in paper format or just did not exist at all. In short, the 3GPP began in a data-poor environment. On the other hand, knowledge within Libya on new technologies, such as GIS and RS, was available and it was decided to make a major effort within the 3GPP to develop base maps and thematic datasets in a GIS format, and to use satellite images and digital aerial photography for thematic / topographic data extraction and base map production.

Figure 13 shows which images were used and at what planning levels. Except Quickbird, the images and digital aerial photographs were corrected to be able to develop the required maps with topographical, thematic and spatial planning features.

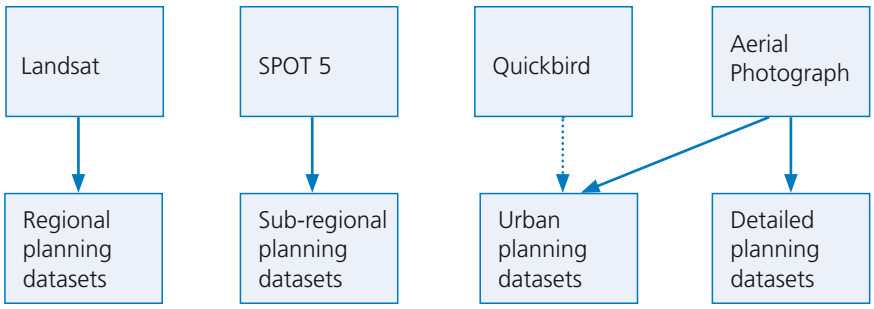



**Figure 13: Overview of remote sensing imagery for map production and data extraction. (Quickbird images are not used for map production but facilitate data collection, such as building and land-use inventories for the preparation of urban plans)**

# CASE STUDY 7

## GEOGRAPHICAL DATA MODELS

After the specifications (spatial resolution, coverage) of the images were defined, the details of the geo-databases had to be developed. Table 10 illustrates the main geo-databases of the 3GPP. The topographic and thematic datasets illustrates the "existing" situation and some historical data from the 2GPP (2nd Generation Planning Project). These two datasets are (in principle) the input which will define future developments, such as the areas suitable for urban expansion. The datasets are also used to define areas to be protected from further urban developments, such as productive, rain-fed agriculture areas, wadis (river beds) and buffer zones around key areas like power plants and airports.

**Table 10: Overview of main 3GPP GIS datasets.**

| Planning Level | Images | Coverage (km²) | Spatial Resolution | Scale | Main Geo-Databases |
|---|---|---|---|---|---|
| Regional | Landsat ETM | 1 700 000 | 15 metre | 1:250 000<br>1:100 000 | • Topographical<br>• Thematic<br>• Planned |
| Sub-regional | Spot 5 | 215 000 | 5 metre | 1:25 000 | • Topographical<br>• Thematic<br>• Planned |
| Urban | Quickbird | 11,000 | 61 cm | 1:5 000 | • Building inventory |
| | Aerial Photography | Approximately 3 500 | 30 cm | | • Base map<br>• Land Use (1980, 2006, 2025) |
| Implementation | Aerial Photography | | 10 cm | 1:1 000 | • Base map<br>• Planned Land-use |

Examples of topographic datasets at the regional level are: transportation (for example roads, railways and airport), built-up areas (urban industrial, mixed urban areas), hydrology (wadis, coastlines), administrative boundaries, technical infrastructure and land cover. Examples of thematic datasets at sub-regional level are: traffic (busnet, public transport terminals), environment (noise zones, solid waste disposal sites, pollution areas and the decline of groundwater), meteorology (temperature, rainfall), landscape (protected areas, desertification, and mineral resources) and planned land-use in the 1980s.

All the topographic and thematic data are inputs for models that should create either more insight into specific features (for example transport and environment information) and eventually should also support decisions on land-use planning (for example, the selection of areas suitable for urban expansion).

At regional level, major decisions had to be made on the settlement structure and growth pattern based on the physical, social and economical studies for areas consisting of more than one municipality. At sub-regional level, areas for urban expansion had to

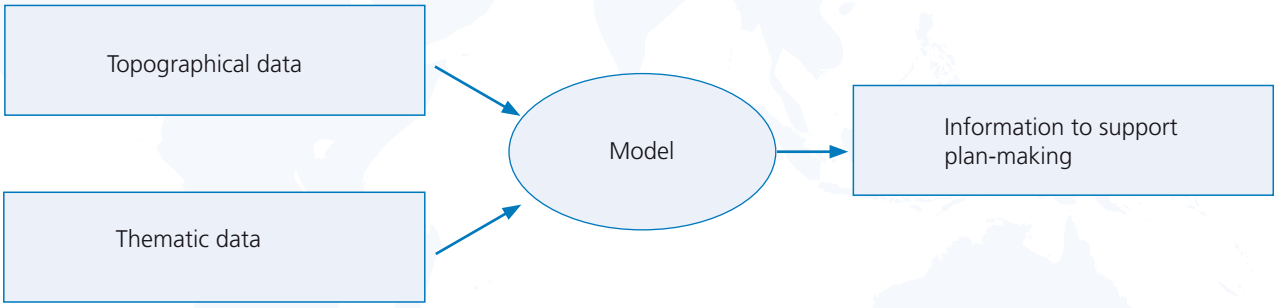



**Figure 14: Data as input in GIS models and output as planning information**

be identified again based on up-to-date data and analysis. By using combined data and specific design models, planners can not only analyse the physical development trends at regional and sub-regional level, but they can also develop the vision and proposals for future development.

Figure 15 presents one of the scenarios for the Tripoli Agglomeration. At the urban level, not only development needed to be managed but new base maps needed to be created as they were outdated. All urban areas were covered by digital aerial surveys and corresponding large-scale base maps were produced.


**Figure 15: Tripoli Regional Development Plan (part of one of the alternatives developed by the National Consulting Bureau for the 3GPP).**

# CASE STUDY 7

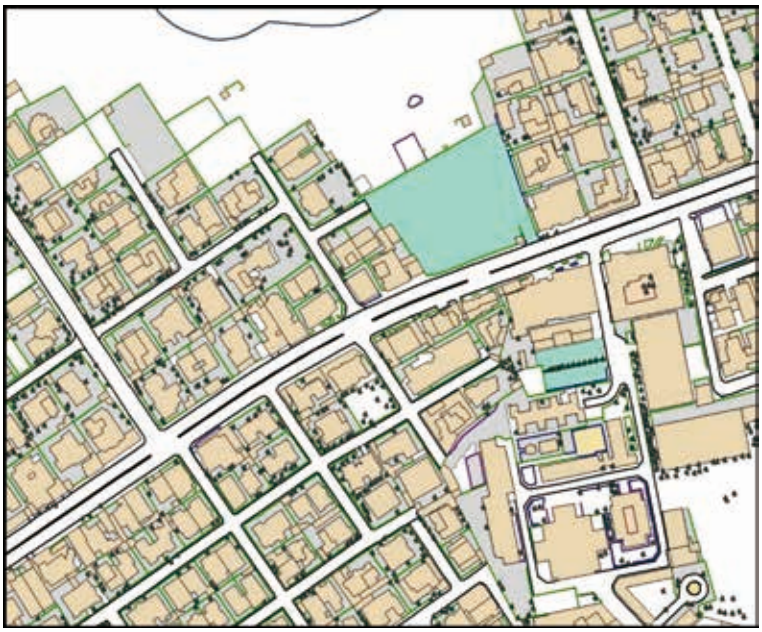


**Figure 16: Example of 1:1,000 base map with some of the over hundred features of the geo-database.**

## LESSONS LEARNT

Developing a massive amount of data through a "big-bang" approach has proved to be difficult. The project in Libya showed that the request for lots of spatial data that was not directly needed led to a split between the development of spatial development plans and the development of GIS data. The creation of land information becomes an objective in itself, it took much longer than expected, and became a stand-alone exercise in which information intended to support planning decisions could not fulfil that role. Many qualified national and international experts with ample funding could not overcome poor management. In short, land information cannot be bought; it needs to be developed and embedded into transparent and well-managed institutions.

The Libya case study shows that GIS and RS technology can play a positive role but it should be embedded within the inter-institutional organizational structure. Technology also needs support from dedicated and motivated staff at management and operational levels so that it is the productive support tool for which it has the potential. Political support, in the form of good governance, and a genuine effort to strengthen land and planning institutions is possibly what was missing most in Libya.

# CASE STUDY 8

## CITY CENTRE RE-DEVELOPMENT (ZACA)

MAIN THEME: SPATIAL PLANNING
TOWN/COUNTRY: OUAGADOUGOU, BURKINA FASO

# CASE STUDY 8

## INTRODUCTION

The city of Ouagadougou has grown rapidly in recent decades and has a population of 1.5 million people (2006). The city also expanded from 8,400 ha in 1980 to 30,000 ha by 2000. As cities grow, so does the need for more commercial and institutional areas. The location of these areas is critical and competition for scarce, centrally-located land is intensifying. The area around the central market in Ouagadougou, next to the airport, was inhabited by lower-income families who mostly engaged in informal economical activities and who had occupied the area for many decades. Central and local government's plan was to re-develop the city centre into a modern business district. They would relocate the families and offer them better accommodation on the fringes of the city.

## ZONE D'ACTIVITÉS COMMERCIALES ET ADMINISTRATIVES (ZACA)

The ZACA area around the central market (Grand Marche Rood Woko) was used by thousands of small-scale businesses. It was approximately 80ha and the extension zone (Zone d'Extention, ZACA 2000) was approximately 120ha and was inhabited by 12,500 people occupying around 1,600 parcels. The idea of redeveloping the ZACA area goes back to the 1990s and implementation started in 2001. The fire of the Grand Marche in 2003 accelerated the process of dispersing the market activities to other peripherally-located markets. The ZACA area was identified as an area that the government want to redevelop with higher densities and mainly for commercial and office activities While urban re-development is a common phenomenon in more developed countries, it was an innovation in Burkina Faso. Although many inhabitants had no formal title, they had been living in the area for many years and the government recognized their possession rights.

It was decided to develop a strategy that featured:

- An awareness and publicity campaign, openness about the objectives and access to information;
- No forced eviction, negotiated and voluntarily relocation supported by compensation;
- Detailed surveys of households and parcels to identify who was eligible and to determine levels of compensation (including relocation to new serviced plot and house);
- A participatory approach;
- The creation of an inter-institutional committee to implement the ZACA project.

**Figure 17: Proposed redevelopment for the Commercial and Administrative Central Area (ZACA) of Ouagadougou, Burkina Faso**
**Credit: ZACA project, Government of Burkina Faso**

# CASE STUDY 8


**Figure 18: Location of the ZACA area**
**Credit or Source: Biehler, 2006**

The ZACA project aims to create a modern Ouagadougou and to develop high-quality residential areas, wide street layouts and space for business and office activities. The idea of modifying the urban space and city transformation has had an enormous impact on the inhabitants of the area, many of them also engaged in business activities.

Most of the former residents of ZACA were moved almost 10 km south of the city centre, where there is no good public transport. The area is around 95ha and is divided into 1,303 residential parcels ranging between 300m² and 600m². There are also parcels for social facilities and parks. The project improved the quality of housing, access to improved infrastructure and people were closer to schools. The negatives are the poor location in relation to places of work and city-centre activities including leisure, and that inhabitants still do not know if they live in the city or in a village. Commercial opportunities are limited and the incomes of people involved in sales and trade have dropped.

## LESSONS LEARNT

The ZACA project has demonstrated that a large "voluntarily and negotiated" re-location of 12,500 people is feasible based on participation and, above all, compensation. Whether the ZACA approach of urban redevelopment can be repeated in other low-income residential areas that are less attractive to re-develop and with lower land values, in other words going to scale, is

# CASE STUDY 9:

## URBAN STRUCTURE PLANNING

MAIN THEME: SPATIAL PLANNING
TOWN/CONTRY: BLANTYRE, MALAWI

# CASE STUDY 9

## INTRODUCTION

Blantyre, the largest city of Malawi, has a daytime population of one million inhabitants (2007) and between 500,000 and 750,000 at night. Its area is 228 km². Limbe in the east was a separate town but is now integrated into Blantyre and the city has two central business districts. Blantyre is a transport node with road and rail (freight) connections to the rest of Malawi and neighbouring Mozambique. The city economy is based on industry (shoes, cotton, metal and plastic factories), trade and services.

## URBAN PLANNING

Blantyre's previous structure plan was developed in the 1970s and, after several revisions, was finally published in 1980. In 1999, a new urban plan using a strategic planning process was developed and the Urban Structure Plan for Blantyre was finalised in 2000. The plan consists of three reports (background studies, development strategies, and policies and proposals). The vision for 2015 is that Blantyre will be a city that that is socially vibrant, environmentally responsible and economically competitive. The general objectives are: social (adequate infrastructure), environmental (orderly, coordinated physical environment), institutional (capacity building), economical (efficient and prosperous urban economy) and financial (economic growth). The main challenges are a lack of employment, poverty, an increase in numbers of squatters, weak institutional capacity, and poor social services and infrastructure. Concrete action has been proposed to address these issues with the design of development strategies for each sector. These strategies address Blantyre-specific issues with due consideration for the economic, social and environmental reality in the city. To implement the strategies a number of projects that are regarded as being critical for success have been developed. This culminated in a list of specific projects to be undertaken by the Municipal Assembly, its development partners and the inhabitants of the city.

## URBAN LAND DEVELOPMENT

The annual population growth of Blantyre is five per cent, well above the national population growth of three per cent. The higher rate for Blantyre is due to rural-urban migration. The city is unable to accommodate its growing population in a planned fashion, which resulted in an increase in the squatter population from 44 per cent in 1977 to 55 per cent in 1999. There is a housing shortage of 63,000 units while the provision of affordable housing is insufficient.

The urban fringe consists of public land that accommodates a sizable semi-rural population. Legally, all customary land that falls within the city boundary is public land but the de facto management of this land is customary. The de facto split in authority that is apparent in the management and control of public land is problematic. Chiefs act as custodians of public land within the city limits and allocate land to people who request it. New settlers often believe that they hold some legal title or own the land, which complicates future development. The uncoordinated allocation of land lessens the ability of the Municipal Assembly to plan an area comprehensively, and the issues of existing rights and compensation are ever present when new development is planned (source: Urban Structure Plan, Blantyre).

# CASE STUDY 9

The Urban Land Management strategy aims to provide adequate land for current and future development, create growth centres, and to develop protocols with chiefs to contain squatting and urban sprawl. An additional 5,448 hectares of land must be made available to accommodate the anticipated population growth of the city by the year 2015.

Emphasis will be on resources and they will be allocated to stop unplanned settlement completely, to provide planned land for new settlement even if it only means controlled squatting and to upgrade the most dense, unplanned areas.

The land immediately outside the Blantyre City Boundary is under pressure from growth on the city fringes creating urban sprawl. There is also a tendency for entrepreneurs to set up their businesses just outside the city boundary, presumably to avoid planning permission and the payment of city rates and taxes.

Spatial data and areas for future development
Background studies cover a wide range of aspects and address questions such as: Where are we? What are the key issues in urban development? Who are the main stakeholders? The studies are the basis of a vision of urban development for Blantyre and consist of the following aspects: physiological features, a socio-economic profile, an economic profile, the natural environment, urban planning and land-use, the built environment conservation profile, urban infrastructure, services and utilities, roads and traffic, social and community facilities, housing and urban institutions, and financial management. The plan was developed with the participation of key stakeholders: utility companies, government departments, civil society, private sector, university, political organizations, media, representatives of citizens, the donor community and faith group leaders.

## LESSONS LEARNT

The Urban Structure Plan of Blantyre is based on the strategic action planning approach in which not only land-use and planning control are important but so are participation, coordination and a list of actions and projects developed to achieve the vision and aims of the plan. Informal land development by low-income households and businesses, the conflict between formal and customary land allocation is analysed and negotiation proposed to find a solution for informal land occupation. The development of serviced plots is a possible solution to stop further informal land developments.

It is unclear whether the action plan with concrete proposals (for example for utilities US$28.6 million, housing and land development US$56.7 million) and also institutional strengthening can be financed and implemented. The commitment of the main stakeholders is vague. The plan was made with outside technical and financial support and the data collected are stand-alone, although owned and used by Blantyre municipal institutions. The structure plan needs a follow up through the development of district and layout plans.

While the plan is data rich (28 GIS maps), it seems that the map of future urban development was not generated based on spatial analysis but was based on local knowledge, planning expertise and discussions with stakeholders.

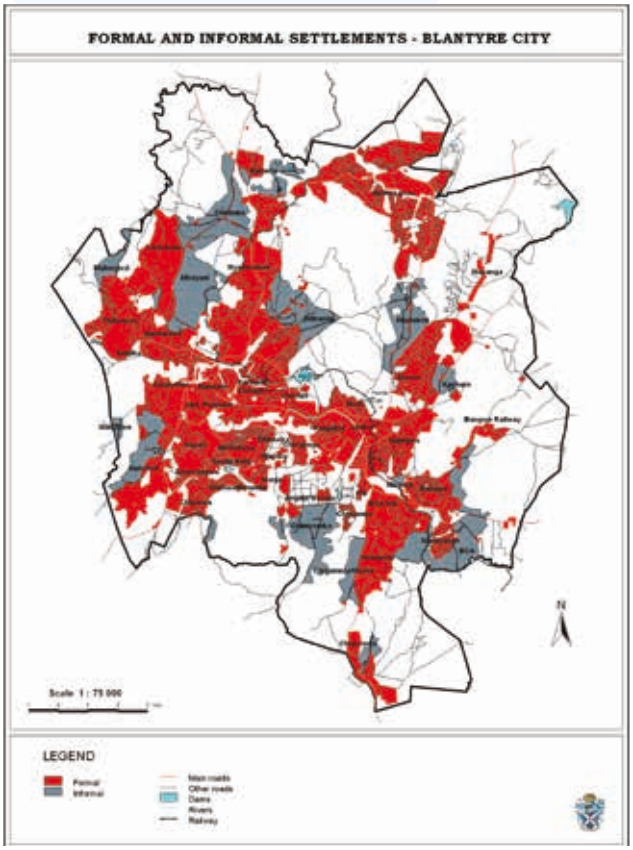



Figure 19: Location of formal (red) and informal (grey) residential areas in Blantyre, Malawi. Informal areas houses 55% of the population on 25% of the residential land. Credit: Urban Structure Plan Blantyre, Malawi

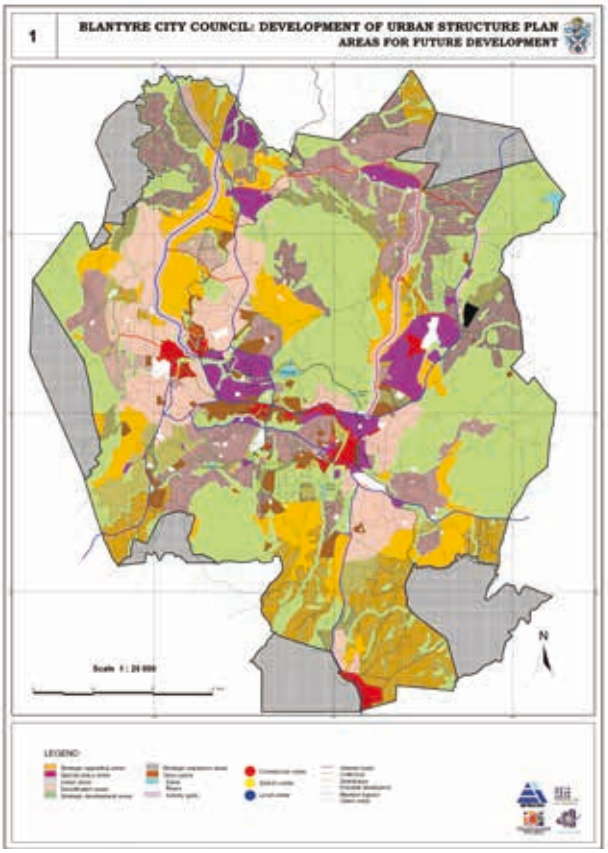



Figure 20: Location of urban expansion areas, Blantyre, Malawi .
Credit: Urban Structure Plan Blantyre, Malawi

# CASE STUDY 10

## STRUCTURE PLANNING

MAIN THEME: SPATIAL PLANNING
TOWN/COUNTRY: MAPUTO, MOZAMBIQUE

# CASE STUDY 10

## INTRODUCTION

Maputo, the capital of Mozambique, has a population of 1.15 million inhabitants (2007). Approximately 75 per cent of its population (800,000 people) live in informal settlements and 54 per cent live below the poverty line. If neighbouring Matola is included the population of '"Greater Maputo", the population rises to 1.7 million inhabitants. Mozambique became independent from Portugal in 1975; between 1977 and 1992 there was a civil war. Mozambique is one of poorest countries in the world with a per capita annual income of US$320, although the incomes in Maputo are higher, the majority of the population cannot afford a serviced plot with a basic dwelling. Maputo has been growing rapidly with 3.9 per cent annual population growth. The city is expected to have 2.2 million inhabitants by 2020.

The latest valid urban plan was developed during the colonial period and goes back to 1969. An attempt was made to develop a metropolitan plan in the 1990s, and between 1969 and 2007 several ad-hoc detailed plans were made for scattered, small areas of Maputo. Between November 2007 and October 2008, a new Structure Plan for Maputo was developed by a team of local experts who applied a participatory process. In this, the population of the city's seven districts could raise issues in regular meetings. The Structure Plan of Maputo was developed for US$200.000.

## LAND ALLOCATION

In Mozambique, access to land is mostly informal and is done by simple occupation of land (mostly greenbelts outside the peri-urban and urban areas) or by paying for land that is subdivided and located in peri-urban areas. Land allocated through the state or customary practices is decreasing and the informal market is the main mechanism of land supply (Negrao, 2004). The spontaneous expansion of the city is the result of a state and a population being too poor to develop and allocate urban land through planned development, installation of infrastructure and provision of security of tenure.

## STRUCTURE PLAN MAPUTO

The structure plan makes up seven volumes with over 400 pages of text and many maps. The plan has an introduction (background, justification and objectives), a description of the current situation, the structure plan and planning regulations.

The political objectives/orientation for planning are based on Resolution 18 on the "Politicas de Ordenamiento Territorial" (Spatial Planning Policies) approved by the Government on 30 May 2007. The main objectives are that spatial plans should promote decentralization, participation, include environment sustainability, equity and access to information by all stakeholders involved in spatial planning and plan implementation strategies.

The master plan is legally embedded into a new law on Spatial Planning. This Law 17 was approved on 11 July 2007, and covers in 31 articles on aspects such as planning concepts, principles, procedures on how to develop and who is developing which spatial plans, approval procedures, expropriation of properties, guarantees to the population and participation. Ordinance 23, valid from 1 July 2008, describes in 90 articles with much detail the rules and regulations on spatial planning. Article 76 refers to databases, spatial planning content; format and relation to planning is of special interest. The paragraphs of this article state:

- to facilitate the implementation of policy and planning, a national GIS database should be

# CASE STUDY 10

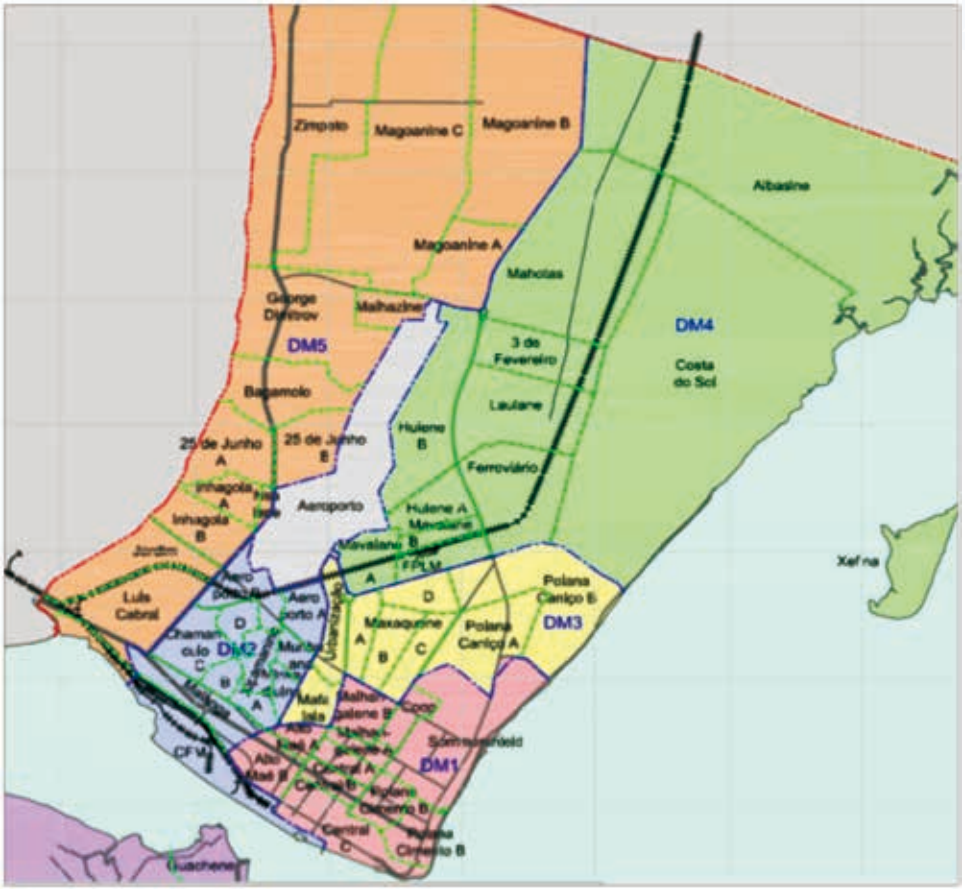



**Figure 21: Boundaries of some of the 7 districts and 64 neighbourhoods of Maputo. Credit: Structure Plan Maputo**

established with information on topography, socio-economic data, environment, infrastructure and facilities. The database should be available in different formats, including on the internet;

- the GIS database should be maintained through the collection and processing of information and should be relevant from a statistical, environmental, technical and scientific point of view, and have linkages between national, provincial, district and local levels.

## DATABASES

The structure plan of Maputo identified a number of priorities, such as regularization of the informal settlements, to increase population density from 70 to 140 persons/ha, and to limit urban expansion. The current situation is described and analysed and consists of the following main types of information: land-use, mobility, accessibility and (sub)centres, synthesis of existing situations and development potentials, infrastructure, environment, schools, historical buildings and a list of priority projects and their locations. For the different themes, subgroups were formed and an executive and steering committee installed with representatives from the different government sectors. The final plan was produced through a combination of governmental policies and preferences, limited stakeholder participation and local experts.

Plan implementation and lessons learnt

The total budget of Maputo city amounts to only US$12 per capita (ProMaputo II Decemeber 2009). However the implementation of the proposed structure plan is calculated to cost around US$850 million or US$6,160 per household for a 10-year period. The Maputo municipal development

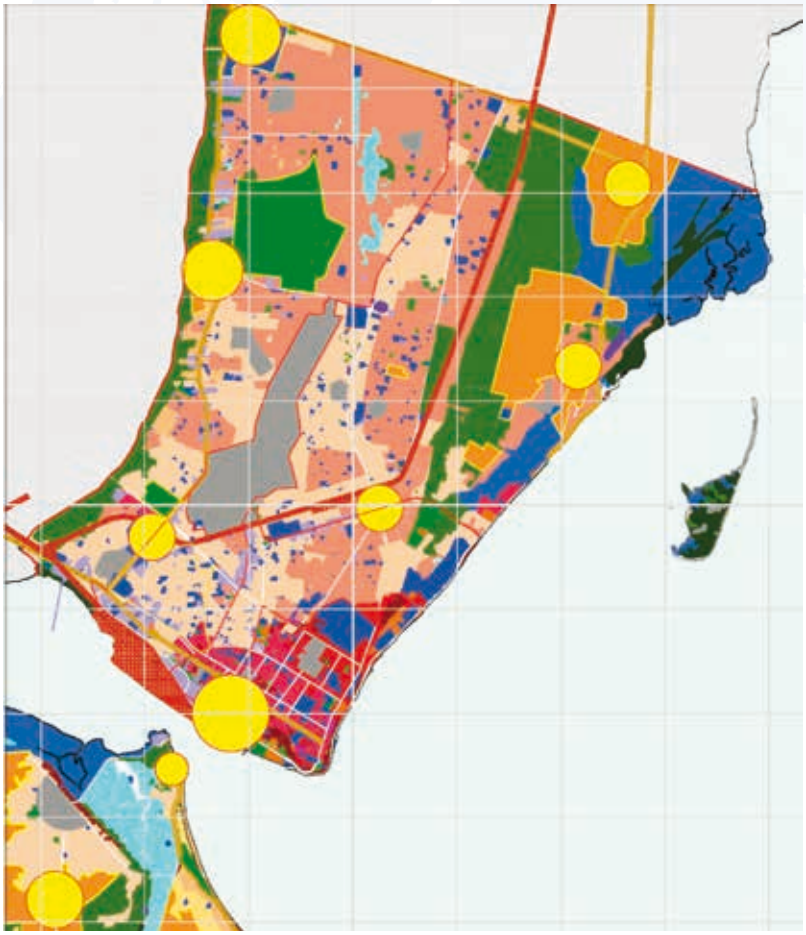


**Figure 22: Proposed land-use with location of several decentralised business districts (yellow circles). Credit: Structure Plan Maputo**

programme (ProMaputo I and II) of the World Bank and the City Council of Maputo are partly financing components (institutional and financial reform and improved service delivery) that are also part of the Maputo Structure Plan (www.worldbank.org).

The Maputo Structure Plan is a major local effort to analyse and propose the future physical development of the city. The GIS data collected was based on previous university studies on Maputo but were updated and integrated for the structure plan. This resulted in a compatible set of data at a scale of 1:125,000 that can guide planning and investment decisions at city level. More detailed land information is required to address the issue of the currently very low level of property tax collection and to address the issue of tenure security.

The GIS data is project-focused but might fit the GIS datasets at a larger scale (parcel/building based) in future to support land administration projects and more detailed urban development plans at district/ neighbourhood level.

A spontaneous land allocation process, to convert agricultural land into urban land and the further subdivision of informally-acquired land, appears to be the main way to obtain access to land and housing. This land development process might conflict with the implementation of the structure plan.

The technical/academic orientation of the process to develop the structure plan meant that the regular monthly meetings in the seven city districts to allow for public participation were attended by a limited number of people.

# CASE STUDY 11:

## ENVIRONMENTAL MANAGEMENT INFORMATION SYSTEM

MAIN THEME: ENVIRONMENTAL PLANNING AND MANAGEMENT
TOWN/COUNTRY: LUSAKA, ZAMBIA

# CASE STUDY 11

## INTRODUCTION

Lusaka is Zambia's capital and largest city, and is an important trading centre. Its population is about two million with a six per cent annual population growth; 75 per cent of the population live in unplanned areas. Unplanned settlements have insufficient clean water supplies, poor sanitary facilities, poor road infrastructure and insecure land tenure. The city covers an area of 380 km2 of mostly flat relief.

## SUSTAINABLE CITIES PROGRAMME (SCP)

The SCP is a world-wide technical cooperatio n facility of UN-Habitat and UNEP. It works at city level in collaboration with local partners to strengthen their capabilities for environment planning and management. It is a participatory process model to promote good governance. Employing a common conceptual framework tested in many countries, the programme adopts a style and methodology unique to each city to meet that city's specific needs. The SCP emphasizes that properly planned and managed cities hold the key to human development in a safer environment. Good urban governance is characterized by the principles of partnerships, transparency and accountability. The SCP also promotes gender parity as an integral aspect of environment planning and management. The SCP has four distinct phases:

1. Start-up (for example identify stakeholders, collect information)
2. Strategy and action planning (for example agree on strategy options, action plans)
3. Follow-up and implementation (for example implementing neighbourhood demonstration projects, bankable projects)
4. Consolidation and replication (for example institutionalizing of EMIS).

The SCP was implemented in Lusaka from 1997 to 2001. During the start-up phase an environmental profile was developed that identified a number of issues of immediate concern (solid waste management, unsafe water supply, poor sanitation, congested central business district, poor and inadequate housing, crime and urban violence, and poverty and social inequality). Also, community profiles in three settlements were compiled to collect socio-economic data (land use, gender, household size and property ownership) and to ask about residents' needs and priorities.

## ENVIRONMENTAL MANAGEMENT INFORMATION SYSTEMS (EMIS)

EMIS is part of the Lusaka Sustainable Cities Programme and is an organized, participatory process through which information, relevant to environmental management, is identified, generated and utilized in a routine manner. Lusaka had uncoordinated use of spatial information among stakeholders, no physical planning base for informal settlements, no holistic plan to generation, use and manage spatial information in the city, inadequate use of IT and lack of standards to use and manage spatial information among stakeholders.

Figure 23: Environmental Management Information System (EMIS) includes: setting up the system (staff, software and hardware), collection and processing of data and using information to support decision making and institutionalize the EMIS. To prevent too much time being spent on data collection, different thematic working groups define the priorities on the type of data to store in the EMIS.

In Lusaka, base maps were prepared using Quickbird imagery, scanned maps and layout plans. Thematic data layers consist of land-use maps, zone maps for

# CASE STUDY 11

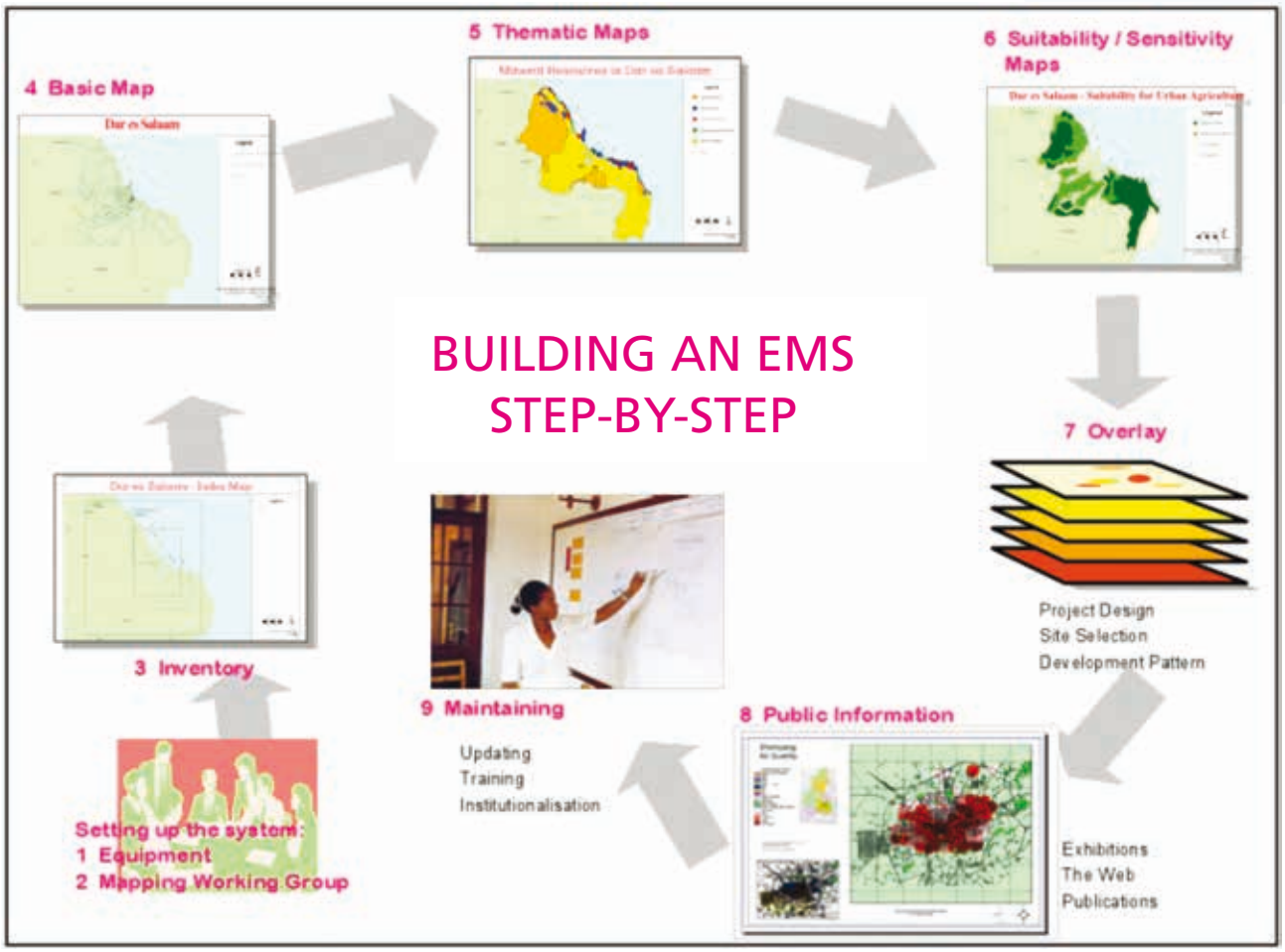



**Figure 23: Environmental Management Information System (EMIS) includes: setting up the system (staff, software and hardware), collection and processing of data and using information to support decision making and institutionalize the EMIS. To prevent too much time being spent on data collection, different thematic working groups define the priorities on the type of data to store in the EMIS.**
**Credit: UN-Habitat**

the management of solid waste, water and sanitation for Lusaka city, community maps for unplanned settlements, maps of flood-prone areas, malaria control, and areas unsuitable for human settlement.

## EMIS PROGRAMME ACTIVITIES

EMIS includes on-the-job training for the Resident Development Committee (CBO leaders) in basic map reading and networking with other stakeholders in the city, the generation of information on property ownership, gender, land-use and ward boundaries and the study of general development trends in the city. EMIS also provides customer-tailored baseline information to facilitate implementation of development programmes.

## PROBLEMS, SUCCESSES AND COMMENTS

There was a lack of interest from some key stakeholders; accessing baseline information and sustainability of the EMIS are the key challenges and lack of adequate equipment and software.

To overcome those problems, the awareness programmes supported by UN-Habitat's Programme Manager (HPM) were continued to sensitize stakeholders on the importance of EMIS for environmental planning and management in the city. Practical applications of EMIS to solve environmental planning problems have attracted commitment from stakeholders.

Achievements of the EMIS in Lusaka are: the establishment and maintenance of the system within the municipality, on-the-job training for staff and stakeholders, specific staff recruitment and promotion of participatory planning approaches.

## LESSONS LEARNT

Key success elements of the EMIS are:

- The participation/motivation of staff and population;
- Political support and commitment; city council and policymakers should support the process;
- The sustainability of the EMIS process (funding);
- Expansion/compatibility with large scale maps;
- Incremental and continuous development; institutionalization.

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# ACRONYMS

| | |
|---|---|
| 3GPP | 3rd Generation Planning Programme (Libya) |
| ADB | Asian Development Bank |
| BPN | National Land Administration Office (Indonesia) |
| BRR | Rehabilitation and Reconstruction Agency (Indonesia) |
| CDA | Community Driven Adjudication |
| EMIS | Environmental Management Information System |
| ENOF | Enhanced Normative and Operational Framework |
| EPM | Environmental Planning and Management |
| FAO | Food and Agricultural Organisation of the United Nations |
| FIG | International Federation of Surveyors |
| GDS | Geographical Data Systems |
| GIS | Geographical Information System |
| GLTN | Global Land Tool Network |
| HPM | UN-Habitat National Programme Manager |
| IDP | Internally Displaced Person |
| ICT | Information and Communication Technology |
| ITC | International Institute for Geo-Information Science and Earth Observation |
| IMPP | International Manual of Planning Practice |
| INTA | International Urban Development Association |
| LAMP | Land Administration and Management Project (Philippines) |
| LIM | Land Information Management |
| LIS | Land Information System |
| POT | Plan de Ordenamiento Territorial |
| RALAS | Reconstruction of Aceh Land Administration System (World Bank Project, Aceh, Indonesia) |
| RS | Remote Sensing |
| SCP | Sustainable Cities Programme (www.unhabitat.org/scp) |
| SDI | Spatial Data Infrastructure (www.sdi.org) |
| UPA | Urban Planning Agency, Libya |
| UNECA | United Nations Economic Commission for Africa |
| UNECE | United Nations Economic Commission for Europe |
| UN-HABITAT | United Nations Human Settlements Programme |
| ZACA | Zone d'Activités Commerciales et Administratives; Ouagadougou, Burkina Faso |

# ABOUT GLTN

## THE GLOBAL LAND TOOL NETWORK

The main objective of the Global Land Tool Network (GLTN) is to contribute to poverty alleviation and the Millennium Development Goals through land reform, improved land management and security of tenure.

The Network has developed a global land partnership. Its members include international civil society organizations, international finance institutions, international research and training institutions, donors and professional bodies. It aims to take a more holistic approach to land issues and improve global land coordination in various ways. These include the establishment of a continuum of land rights, rather than a narrow focus on individual land titling, the improvement and development of pro-poor land management, as well as land tenure tools. The new approach also entails unblocking existing initiatives, helping strengthen existing land networks, assisting in the development of affordable gendered land tools useful to poverty stricken communities, and spreading knowledge on how to improve security of tenure.

The GLTN partners, in their quest to attain the goals of poverty alleviation, better land management and security of tenure through land reform, have identified and agreed on 18 key land tools to deal with poverty and land issues at the country level across all regions. The Network partners argue that the existing lack of these tools, as well as land governance problems, are the main cause of failed implementation at scale of land policies world wide.

The GLTN is a demand driven network where many individuals and groups have come together to address this global problem. For further information, and registration, visit the GLTN web site at www.gltn.net.

ABOUT THIS PUBLICATION

Managing Urban Land Information draws lessons from various experiences in post-conflict and developing countries. It is intended for land experts, government officials, donors and others involved in land information projects to avoid the costly development of an urban land information system that is too complicated, cannot be sustained or fails to support urban land management.

In this publication, you will find useful case studies that emerge from UN-Habitat's operational experiences in a number of post-conflict and developing countries as well as other well-known cases.

This publication demonstrates that developing land databases at scale that directly support land management activities, such as urban planning, property taxation and increasing land tenure security, requires a long-term process and should be anchored in stable land institutions. One of the key lessons learnt outlined in this publication is that in the absence of a stable institutional and political environment only ad-hoc land information projects make sense, but that stand-alone projects of limited duration can also contribute to reaching the goal of sustained urban land information.

Ultimately, it is clear that land information is very helpful to undertake sustainable urban development, especially in post-conflict and other countries with underdeveloped land institutions.

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UNITED NATIONS HUMAN SETTLEMENTS PROGRAMME
UN-Habitat
P.O. 30030, Nairobi 00100, Kenya
Tel: +254 20 76 23120
Fax: +254 20 762 4266
Website: www.unhabitat.org

For more information please contact us:
GLTN Secretariat
Facilitated by UN-Habitat
P.O. 30030, Nairobai 00100, Kenya
Tel: +254 20 76 5199
Fax: +254 20 762 4256
E-mail: gltn@unhabitat.org

www.gltn.net

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