

Urbanisation Versus Occupation in the Beira Municipality: How Land Registration Supports Spatial Planning Processes

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Key words: Access to land, Cadastre, Digital Cadastre, Informal settlements, Land management, Legislation, Spatial Planning

SUMMARY

Beira, with a population of more than 500.000, is the second largest city in Mozambique and is located in the estuary of the Pungue river. New residential and industrial areas are needed to provide homes and work for the growing population. Presently in the Beira Municipality urbanisation often follows occupation and not the other way around. This hampers spatial planning processes seriously: in case an urbanisation plan can be enforced, one can hardly build on the reserved spaces. One of the reasons is that due to speculation these spaces are already occupied. In many cases those speculation activities are managed by the Municipality: the Municipality tries to find a way to avoid open conflict, court cases or worse by supporting resettlement. By national law there is no need to compensate this form of land use other than for the assets that it has (trees, crops).

One of the objectives of the Phased Transformation of the Beira Municipal Registry Project is that spatial planning processes should be improved in such way that the demand for new urbanisation areas can be met. This needs an alternative approach towards speculation than so far has been applied. During urbanisation projects, before the announcement of the implementation, an inventory of the existing land tenure situation in the field should be carried out. Once this 'recordation' had been finished, from that moment land use obtained by speculation should be defined by the Municipality as 'illegal land use'. This new attitude towards illegal land use should be incorporated in the regulations of the Beira Municipality. The recordation requires a spatial component and can be done by aerial imagery. Monitoring the area by aerial images is required in order to identify illegal occupation. These imageries can function as important evidence material for illegal land use. The result of this approach is that informal occupation - before the announcement of urbanisation - is recognised, costs for resettlement are included in the business case of the urban development and the unrestrained (illegal) occupation of land has come to an end. Once the new regulation of 'illegal land use' has been applied, it should be clearly communicated to the citizens of Beira. Enforcement of this new regulation is very important. In general there should be understanding that illegal (i.e. not recognised) occupation delays the process of spatial planning and implementation of urban plans. This is not in the benefit of the community as a whole. Presently the Beira Municipal Land Registry is not able to facilitate urbanisation processes, amongst others because of the condition of

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the paper based archive. Therefore it is planned to pilot the new approach in two urbanisation areas within the Beira Municipality.

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INTRODUCTION

Beira, with a population of more than 500.000, is the second largest city in Mozambique and is located in the estuary of the Pungue river. The city is facing numerous challenges. According to recent studies, Beira is seriously threatened by climate change. The city is just a few metres above average sea level and a clear adaptation strategy is required to provide enduring protection against water related problems such as floods, coastal erosion and salt water intrusion. Beira needs to make sure that it has adequate and safe water supplies (drinking water, water for agricultural purposes) in the future. In addition, changes are needed to the drainage and sewage systems to prevent the flooding of the city. The increased demand for water will affect the Pungue river and the delta.

Spatial developments also need to be addressed. The expansion of the coal transport and export activities of the port of Beira is required to utilize the great economic potential. This will have a major impact on the infrastructure. New residential and industrial areas are needed to provide homes and work for the growing population. The currently poor living conditions of a large part of its inhabitants, mainly due to poor basic infrastructure and service coverage, need to be improved.

In 2013 a Consortium, under the leadership of Deltares, finalised the Masterplan Beira 2035. This plan sets out an integrated vision for the city, describing how it can respond to all the challenges in the decades to come. The Masterplan project is part of the Global Water programme and is approved by the Municipality of Beira and the Beira Stakeholders. To ensure that the plans are actually implemented, investors are involved in the follow-up in early stages. In 2016 decisive steps will be made to prepare and finance three important implementation projects:

- Two pilot projects for land development:
 - o residential neighbourhood (Mazara);
 - o commercial/industrial zone (Munhava);
- A new port access road project.

All three projects have important implications for the present, largely informal, land users. For the Consortium and possible investors it is important that, regarding land use rights, transfers of such rights and resettlement, the IFC Standards (IFC, 2012) for Environmental and Social Performance are met.

A mission to assess the capacity of the municipality of Beira including the land registry was organized in December 2015 by VNG international. The assessment concludes that “the Masterplan Beira cannot be fully executed [...] without improvements in the Beira Municipality. The situation of the Beira’s municipal Cadastre is so serious that it would be easier to develop an entirely new

registration than improve the current register.” Therefor a scoping mission to the Beira Municipal Land Registry (MLR) was organized in July 2016.

SCOPING MISSION

This paper presents the results of a first scoping mission by a team of experts from Kadaster International and VNG International, to Beira, capitol of the Province of Sofala, in the Republic of Mozambique – from July 11th till July 15th 2016. Objective of the mission was to draw up a Plan of Action for the phased transformation of the Beira Municipal Land Registry in order to prepare a longer term support by Kadaster International to the Beira MLR. All this is in the context of the Beira Masterplan and its implementation projects.

The mission was expected to result in the following deliverables:

1. An analysis and diagnosis report of the present Beira MLR;
2. The outline of the Beira MLR project, giving due attention to phasing and to the urgent short term actions to support the priority projects that are under preparation.

Both deliverables are included in this paper:

- Chapter 2 describes the present situation of the Beira MLR focussing on the spatial planning process;
- Chapter 3 describes an outline of the phased transformation of the Beira MLR in general and the two pilot projects for land development in particular.

1. PRESENT SITUATION OF THE BEIRA MUNICIPAL LAND REGISTRY

As mentioned in the introduction of this paper, due to climate change and populations growth, there is an urgent need for new urbanisation areas in the municipality of Beira. To analyse the development of these areas, the focus of the present situation of the Beira MLR will be on the spatial planning process. Relevant departments of the Beira Municipality were visited during the July '16 mission: Studies and Projects (Spatial Planning) Department, Topographic (Land Survey) Department, Legal Department and Cadastral Department.

1.1 The DUAT system

In Mozambique the Land Law recognises a use right to land, known by the Portuguese acronym, DUAT (Direito de Uso e Aproveitamento dos Terras): ‘right of use and benefit of land.’ While a DUAT does not confer full ownership (the state owns all land in Mozambique), it is a long-term user right that covers a period of up to 50 years. Although not always supported by a DUAT certificate, according to the legal procedure there are three forms of DUAT acquisition:

- a. Through occupation by local community, governed by customary law;
- b. Through good faith occupation: after using the land for at least ten years without objection. The rights of those who occupy the land in good faith are well described, except in cases of agricultural use. Transactions in good faith are allowed by law;

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c. By application;

For DUAT acquisition through good faith, there is no limit in time. All other DUATs are issued for a period up to 50 years and are renewable. They can be inherited, but not traded. The basic provision of the Land Law states that “the land is the property of the State and cannot be sold or otherwise alienated, mortgaged, or encumbered.” One may apply for extension, portioning or removal of structures on the DUAT parcel. In practice, it happens that DUATs are informally traded for example in the context of infrastructural works. There is evidence of growing interest in DUATS, especially in the form of plots in planned, peri-urban areas.

The Land Law applies to both urban and rural areas, but makes a distinction between the two. In urban areas, ‘provisional’ DUAT’s are issued for an initial two years, during which a building permit must be obtained. Once this permit is issued, the provisional DUAT can be renewed for another two years. The municipality has the legal means to withdraw DUATs from holders that do not effectively invest and use their land according to the DUAT. In practice, more renewals are granted as construction progresses, or even without construction. Because of this lack of enforcement there is no binding time constraint on the provisional DUAT in urban areas. In this sense it is roughly comparable to a lease.

In urban areas, a request for DUAT can only be made after the Assembly approved that the area is to be developed for urbanisation. The DUAT allocation process contains several steps and starts with the legalisation of the existing occupancy by families (regularisation) or communities (delimitation). After the DUAT has been applied, the applicant needs to submit a plan in order to get a license to build. This means there is an obligation to develop the obtained (DUAT) land. The right to use and exploit land needs renovation every two years during the construction and development phase. This implies a verification if everything runs in accordance to requirements. In case there are no developments there will be no extension. In practise there are difficulties to organise this renovation process. There is no overview of what is going on.

1.2 Spatial development procedure in Beira

Presently most of the current spatial planning activities in Beira are related to allocation of plots in areas available for urban expansion. In most cases plots will be available for purposes of housing. The main framework for all spatial developments in Beira is the Masterplan Beira 2035. A Structure Plan is used for broader and global overview. From this plan the implementation plans are defined. After the announcement of the plans by the Municipal Assembly, the implementation of the urbanisation area can start. The spatial planning procedure is displayed in figure 1.

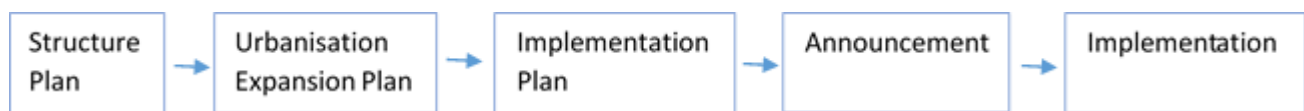


Fig. 1 Spatial Planning Procedure

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The legal approval of the development of an urbanisation area is done by the Assembly. The Land Law does not oblige to consult the Land Registry and Cadastre during the spatial planning process. The Municipality of Beira does apply three public consultations during the spatial planning process. After the approval of the Assembly, the announcement of the decision is published in newspapers and radio, not (yet) via internet and through the neighbourhood secretariats.

1.3 Observations and findings

This section identifies the main observations and findings as collected during visits to departments within the Municipality and during workshops held during the week of the mission in Beira.

It has been observed that in general two types of activities take place after the announcement that a site will be prepared for urban developments:

1. Many informal building and construction activities start in those areas. People understand very well that the provided infrastructure, like roads and utilities will bring added value, but did not apply for a DUAT and did not receive any license to build.
2. People speculate that the expected increase in land value can be easily captured: the original holders of land use rights (DUATs) in those areas start selling their land use rights to others.

The experience from surveyors is that people occupy land as soon as they hear that there will be an urbanisation project. In Beira land has become a commodity that is traded. As a result of this people request for DUATs in an opportunistic way.

In both situations people cannot meet the requirements (for development) – but often the objective is to gain the DUAT only with the purpose to sell it. In cases of the above mentioned activities (no license to build and speculation) it may be better to speak about ‘illegal’ activities. In this respect it has to be mentioned that in many cases those activities are managed by the Municipality: the Municipality tries to find a way to avoid open conflict, court cases or worse by supporting resettlement. By law there is no need to compensate this form of land use other than for the assets that it has (trees, crops). In contrast to the law the Municipality of Beira adopted an attitude that people that do use land in such informal way, are being compensated if their land is needed for allocation to a person who received a DUAT. In other words: if a person received a DUAT there will be a discussion with the informal land users on the related plot. There is a compensation – in practise often much higher than the compensation that can be derived from the valuation table as in use in Beira. At the same time the Municipality encourages the informal land user to apply for a DUAT on land that is available.

Summarizing land use and land occupation in Beira, the following situations can occur (see table 1):

1. The land use is legally acquired and formalised by a DUAT certificate;
2. The land use is legally acquired, but not formalised by a DUAT certificate
3. The land use is not legally acquired, although it is formalised by a DUAT certificate;
4. The land use not legally acquired and there is no DUAT certificate available.

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So a distinction can be made between formal and informal land use rights and legal and illegal acquisition of land use rights. The above mentioned first situation occurs when a DUAT is acquired following the legal procedure. The second situation occurs in cases of occupation by local community and through good faith occupation. The third situation occurs when events take place like corruption, manipulation and/ or speculation. Because of the Land Registration System in Mozambique, until recently no enforcement of this situation was possible. The illegal situation was disproved by the DUAT certificate. Nowadays there is a new law that penalises those who ‘illegally’ buy and sell DUATs (cases of land speculation). In such cases courts may decide to condemn people for several years to prison. This new legal reality is not yet communicated and therefore not understood by the people. However, the Municipality uses this law already in practise. The fourth situation can by definition occur in cases of e.g. land abstraction. Although evidence is hard to achieve, this illegal situation is punishable according to the National (Municipal) Land Law.

	Formal	Informal
Legal	Law followed in letter and spirit; usually documented via certificates (DUAT’s) (situation 1)	Legal (societal and/or historical accepted) access to land; no (official) documents (situation 2)
Illegal	Certificates (DUAT’s) gotten via unethical processes (situation 3)	Criminal land access (situation 4)

Table 1 Situations in land use and land occupation in Beira (based on Laarakker et al., 2014)

Presently most of the spatial planning activities in Beira are related to allocation of plots in areas available for urban expansion. The request for a DUAT is linked by the Cadastral Department (in co-operation with the Spatial Planning Department). It is repeated in the Cadastral Department that some pieces of land are attributed twice. According to the employees this cannot be avoided due to the fact ‘that the cadastre is not digital’ and the internal problems related to access of the cadastral archive.

The existing cadastre and land registry in the Municipality of Beira, is partly based on the colonial land administration and partly on the system of DUAT. The colonial archive of the land administration in Beira is not well maintained – and this is an understatement. This archive suffered from destruction and manipulations. The archive related to the administration of land use tenure system looks better – but the spatial component is underdeveloped. As a consequence it is possible – in practise - that more than one DUAT is provided for one parcel. This means that one of the main functions of the cadastre (and its archive) cannot be applied. In general there is a need for significant improvements – in indexation, in identification, in linking and organising documents, in accessibility and (above all) in protection of the data. The most important documents are at ground floor, the less important data are in the well protected (and from an architectural perspective) well designed archive areas in the basement of the Town Hall. However, the basement is prone to flooding.

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Because of the problems with the Cadastral archive, the link with the cadastral information (during the spatial planning process) is organised via a field inspection. In advance to the announcement of the implementation plan, a field inspection in function of the urban development, is performed in order to identify existing land use. The neighbourhood secretary plays an important role in this process. During such field inspection plots can be identified that are already in use and developed. The result of this inspection is a list with land use holders. There is no evidence on the spatial coverage of the plot. The inventory-list is then compared with the known situation in the Beira Municipal Cadastre. But again, evidence documents are difficult to find in the archive. Double DUATs cannot be identified.

Another problem is that DUATs which are not implemented as developed land cannot be identified by the field inspection. This may also be valid for recognised colonial land rights. Private land rights were abolished under the 1979 land law, but land rights of those who remained in Mozambique after the revolution are recognised. There is no system where employees of the Municipality can check which land is registered and who is holder of the DUAT. The Cadastral Department does not know the number of parcels or DUATs in the Municipality.

All these results in implementation of developed spatial plans that are not always under control – also because of lacking of enforcement of the Land Law. In other words: there are many conflicts and disputes: use rights and buildings are being sold to others while the plots are occupied by someone else. According to the surveyors there are also a lot of disagreements between citizens or between citizens and the municipality about the surface of plots. Fifty percent of the cases in the Legal Department in Beira have to do with land conflict and disputes.

The implementation plans, as designed by the Spatial Planning Department, are very well ‘linked’ to reality. The outer boundaries and other existing objects are being surveyed in the field and used as basis for spatial design of plots and infrastructure. This implies that, from a technical perspective, the boundary points of the designed plots can be easily located and identified in the area of concern. This is a real condition in case of implementation of spatial plans where new constructions are added to reality.

Infrastructure, buildings and other constructions and the planned location of the sewage system in the field is known, especially the ‘main infrastructure’. This is not the case for the location of systems for running water and electricity – the maps with the design for those utilities, as well as the surveys in the field, are not available to the municipality. This causes problems and damage in case of excavations.

Regarding the allocation of land use rights, for large plots the autonomy of the municipality is limited. Approval from provincial or national government is required. In practise those allocation processes are not very well coordinated with the municipality, amongst others because of the lack of data exchange. The Spatial Planning department in Beira is the only department that uses a Geographical Information System (GIS). There is no municipal infrastructure for spatial data management in place. Such infrastructure would allow for sharing of spatial data produced by other

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departments or even organisations. For example data from the Cadastral Department could be used in the spatial planning process. A Spatial Data Infrastructure (SDI) also allows integration with organisations outside the municipalities – e.g. organisations responsible for water supply and electricity, but also with Provincial and National government.

For the implementation of spatial plans in urban development areas devices for land survey with the Global Positioning Systems (GPS) are in use. Conversions from Geographical Information System to the GPS receiver are done manually by typing – conversions to well-known exchange formats as GPS Exchange Format (GPX) or RINEX (Receiver Independent Exchange Format Version) are not operational. In a manual conversion it is very easy to make typing errors. Those errors are propagated later. Also the old cadastral maps don't have a coordinate reference. This complicates data sharing in an electronic way.

The Cadastral Department wants to improve. Also there is strong political commitment when it is about the development of the land administration in general in the Municipality of Beira and more specific when it is about land administration in relation to the implementation of the Masterplan Beira 2035. Mayor Simango personally joined several sessions during the mission, including workshops on 'Digital Cadastre' and 'Land Rights for Spatial Planning'. Mayor Simango is looking for partnerships in those areas.

An ongoing development is the design of a system for land administration by the Catholic University of Beira. So, a business relation between the University and the Beira Municipality already does exist. Technical expertise is certainly available within the University. However, the present design of the system is doubtful, because international ISO Standards are not used.

2.4 Diagnosis and recommendations

The way the archive is managed presently is not a foundation for building trust with potential investors. The rather chaotic archive structure reflects on the Municipality image. External and international investors should have confidence in the role of the Government as information manager.

2.4.1 Urgent need for digitisation of the paper based land administration and development of an SDI

A proper SDI contributes to avoidance of the problems described above. There is a clear need for such infrastructure in order to better organise the link between cadastral and spatial planning processes based on principles of data sharing for a common goal: better services to citizens and investors. Therefore the digitisation of the existing paper based land administration, with inclusion of the registration processes, is for sure the number one priority identified during this mission. In any case the DUATs part of the Cadastre should be digitised, because presently there is no system where employees can check which land is registered and who is holder of the DUAT. The colonial part is step two – starting with re-indexation and re-organisation. Cadastral Maps are not well

maintained since long time, the co-operation between surveyors within different departments needs improvement as soon as possible.

The need for computerisation of the Cadastre is based on broad and municipal wide concept of a so called ‘Multipurpose Cadastre’: land administration in support to tenure security, spatial planning, taxation, decision making and information provision to citizens, companies and government. In the second part of this report, the subject Multipurpose Cadastre will be further elaborated. Next there is an urgent need for quality improvement and completion of the existing land data, for modernisation of the access to land data, for sharing of land data in a transparent way and for sharing of data from and with other governments.

Design and development of requirements for a cadastral system and SDI is only possible in case there is willingness to co-operate between stakeholders – this is a condition to develop functional requirements. Within the municipality there is willingness to co-operate, however the necessary qualitative capacity is limited.

2.4.2 Improvement of the implementation of spatial planning process is needed

In concern to the spatial planning process, it is relatively well organised. However there are serious implementation problems. Presently urbanisation follows occupation and not the other way around. In case an implementation plan can be enforced, no one can build on such reserved spaces: because of speculation these spaces are already occupied. This should be included as a restriction in the land administration. The process of providing and managing building permits also needs improvements.

Once the inventory of the existing situation (the field visit) during urbanisation projects has been carried out, from that moment land use obtained by speculation should be defined by the Municipality as ‘illegal land use’. This new attitude towards illegal land use should be incorporated in the regulations of the Beira Municipality. The inventory of the existing land use situation will further in this report called ‘recording’. This recording (before the announcement of the implementation) requires a spatial component and can be done by aerial imagery (see for example Lemmen et al. 2009). These imageries can function as important evidence material. Informal occupation - before the announcement - is recognised, costs for resettlement are included in the business case of the urban development. Once the new regulation of ‘illegal land use’ is applied it should be clearly communicated to the citizens of Beira. For example by warning people on billboards that illegal occupation will be linked to a penalty (also for demolishing erected buildings). The boundaries of the concerning area should even be marked in the field. This could be done for example by fences or trenches (excavations). Enforcement of this new regulation is very important. Monitoring is required in order to identify illegal occupation. Again this can be done by aerial imagery. In general there should be understanding that illegal (i.e. not recognised) occupation delays the process of implementation and that this is not in the benefit of the community as a whole.

Last but not least, the co-ordination with other governmental levels should be improved. According to the head of the Spatial Planning department the municipality should be the ‘one and only’

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manager in case of implementation of spatial plans. The municipality should be in the position to enforce laws. It is important that plans can be transformed to environments for investments.

2.4.3 IFC standards

Informal and customary land use is well protected and those rights are de facto recognised by the Municipality in case of urban developments. This is in alignment with IFC standards 5 and 17. Note that the IFC standards are applicable in case of involuntary resettlement, but this should be based on a proper data provision from the beginning. Before the implementation of urban development (which may be related to investments) an overview of the existing situation should be developed with inclusion of a spatial component based on evidence from the field. Aerial imagery can be used for this purpose. This can be done by the municipality – and, according to IFC standard 30, this activity should be included in the investment plan. The IFC standards seem to be in alignment with the Voluntary Guidelines on the Responsible Governance of Tenure (VGGT, see FAO, 2012) but there is no formal UN statement on this.¹

2.4.4 Co-operation with National Government needs attention

The co-ordinating task on Land Administration in Mozambique seems to be with DINAT - Direção Nacional de Terras. Further investigation of the regulations need to be executed to verify this. Anyhow it is known that automation efforts are made within DINAT in order to establish a Cadastre and Land Registry for rural areas. This development and the functional requirements should to be analysed and assessed on options for re-use of this software within the Municipality of Beira. If re-use is not desirable existing Open Source software can be assessed in order to find up to which level it can be implemented. Open Source options are:

- The Social Tenure Domain Model from the Global Land Tool Network;
- FLOSSOLA and Open Tenure as developed within FAO.

Closed source options may also be considered. Thomson Reuters Aumentum could be a likely candidate. Note that the ISO 19152 Land Administration Domain Model is followed in all suggested software. This has benefits in data sharing and renewal of software in the future. Cost, quality and lead-time to operational status of a Land administration should be considered. Other primary and secondary cities may be involved in this process and municipalities may learn from each other.

2.4.5 Capacity building on modern land administration approaches

There is an urgent need for the development of competences in land administration. To improve the efficiency in the spatial planning and implementation process there is a need for new technology and adequate trained staff. Presently the municipal surveyors already uses GPS and there is even a GPS antenna on the rooftop of the Beira Town Hall. Besides this innovation there is a strong willingness to use other modern approaches in land administration. Discussion is needed on which

¹ *Consulted organisations: FAO and Landesa..*

data can be published and in which way. But there are only very limited competences when it is about ICT (Information and Communication Technology). As mentioned above, expertise is available at the Catholic University of Beira, but this should be managed.

Other options for support in ICT developments are also needed: design of the infrastructure, selection of software for land administration, customisation, management of infrastructure (servers, network), data protection etc. It was clearly identified that there is a substantial learning curve ahead when it is about land administration for sustainable development. Everyone is eager to learn. The train the trainer concept is seen as successful when other Municipalities are involved.

2.5 Conclusion present situation of the Beira Municipal Land Registry

The process of uncontrolled urban expansion does not contribute in a positive way to reach the objectives of the Masterplan Beira 2035. Without any adjustments to a well-developed urban planning process with related implementation and a well-developed land administration, it is strongly questionable whether these objectives can be achieved at all. The costs of not having a proper land administration are higher than the investments that need to be made to implement these adjustments.

3 ACTION PLAN FOR THE PHASED TRANSFORMATION OF THE BEIRA MUNICIPAL LAND REGISTRY

This part of the report contains the plan of action for the phased transformation of the Beira Municipal Land Registry (MLR) in the context of the Beira Masterplan and related spatial planning processes. This report starts with the definition of the purpose of a land administration system. During the July '16 mission to Beira this is not explicitly discussed with the Municipality. However, concerning the Beira situation, this report is based on a purpose that seems to be obvious. Furthermore different scenarios are described to implement the transformation. In these scenarios the two pilot areas for land development (Mazara and Munhava) as priority areas in the Beira spatial planning process, have been taken into account. This plan of action elaborates on the conclusion in part 1 of this report with specific areas of attention:

- The spatial planning processes;
- The registration (recognition and recordation) processes;
- The registry (the archive);
- Priority areas.

3.1 The purpose of Land Administration Systems

Defining the action plan it should be clear if the transformation should result in a single-purpose or a multi-purpose cadastre. Following that decision the method to reach this purposed needs to be developed.

3.1.1 Single-purpose or multi-purpose cadastre

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A single-purpose Cadastre is a land information system that records land parcels with only the juridical attribute “land right”: the legal right on a parcel with annotations and restrictions. The purpose of such a Cadastre is mainly legal certainty. In a multi-purpose cadastre the land information system records many more attributes. These

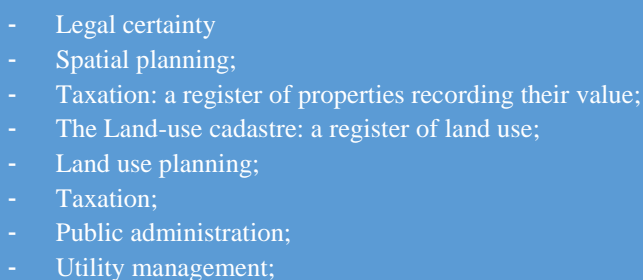
- 
- Legal certainty
 - Spatial planning;
 - Taxation: a register of properties recording their value;
 - The Land-use cadastre: a register of land use;
 - Land use planning;
 - Taxation;
 - Public administration;
 - Utility management;

Figure 2 Main purposes of Land Administration Systems

attributes are needed to serve the different systems and institutions. In figure 1 an overview is shown of possible purposes. This enumeration is not limited.

In both systems, single- and multipurpose Cadastre, building a spatial component (the cadastral map) is strongly recommended. The choice of having a single-purpose or multi-purpose Cadastre is very much influencing the implementation stage of the transformation process. Efficiency should be the goal of the transformation process. This means that variables like time, money and quality of data have to be considered.

In general it can be said that there is a relation between the land registration and spatial planning processes. Building a multi-purpose Cadastre in Beira, with the priority on legal certainty and spatial planning, therefore seems to be obvious for this moment. The number and levels of other attributes is something that should be discussed in a later stage.

3.1.2 Methods to reach a single- or multiple-purpose cadastre

Methods and tools in land registration do exist and develop rapidly, supported by excellent private companies, modern technology and new information and communication possibilities. Land administration can be a process of continuous upgrading to higher levels of detail, quality and usability. By adding capacity building to the game?, implementation and true action can be generated. Satellite imagery and new sensor techniques allow for fast basic inventory of general boundaries, using feature extracting technologies. The possibility of crowd sourced data, open source software and national open data policies are an opportunity, community involvement can be organised. The so called ‘Fit-For-Purpose approach’ (FIG and Worldbank, 2014, Enemark et al. 2015) provides a new, innovative and pragmatic solution to land administration, focussing on developing countries where traditional land administration procedures are not delivering. A solution should be found that directly aligns with the Beira specific needs, being affordable, flexible and accommodating different types of land tenure. In finding the best method, next principles are to be considered (based on Enemark et al., 2015):

- Visual boundaries rather than fixed boundaries
- Aerial imageries rather than field surveys

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- Accuracy relates to the purpose rather than technical standards
- Opportunities for updating, upgrading and improvement
- Building the legal and regulatory framework
- A framework designed along administrative rather than judicial lines
- A continuum of tenure rather than just freehold
- Flexible recordation rather than only one register
- Ensuring gender equity for rights in land
- Building the institutional framework
- Holistic institutional framework rather than sectorial silos
- Good land governance rather than bureaucratic barriers
- Flexible ICT approach rather than high-end technology standards
- Transparent land information with access for all
- Capacity development and change management
- ICT Infrastructure development

3.2 Phased transformation

The phased transformation of the Beira Municipal Land Registry consists of next 2 elements:

1. Transformation of the procedures;
2. Professionalising MLR, the introduction of ICT (information system) included.

As mentioned in Part I of this report, within the Municipality there is willingness to change. It is absolutely preferable to involve the not only the expertise of Kadaster, but also knowledge of VNG, University of Twente (ITC), the Catholic University of Beira, private company and the Embassy during the phased transformation of the MLR. This needs to be more elaborated in a common plan, but in general it can be said that the expertise of VNG could be very useful during the transformation of the procedures, whether the knowledge of Kadaster, ITC and the Catholic University of Beira can be used in professionalising MLR and the introduction of ICT.

3.2.1 Transforming of the procedures

This chapter describes two scenarios in the transformation of procedures. Professionalising MLR and the ICT system should follow the scenarios as chosen.

The Land Register and the access to this Register is an important element in the spatial planning procedure. The implementation process of urban developments should consider existing rights and registered rights should be known, complete and accessible. The inventory of the existing situation requires a spatial component. The current register and archive do not meet any of these conditions. In the ongoing Beira spatial planning process, for the two already indicated pilot areas, the scenario preference should anticipate the current situation: a decision has already been taken on the boundaries of the pilot areas and first progress success is desirable.

Scenario 1: The planning process is leading the registration (recordation) process

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In this process the registration (recordation) of existing land use and land rights is part of the spatial planning implementation procedure.

Advantages of scenario 1

- Efficiency:** The recordation and implementation process can be synchronised. The fieldwork will contain both. Clients (land users) immediately are aware of the existing and new situation.
- Quality:** The quality of the recordation process (the FFP-procedure) will rest on the spatial planning process. Demarcation of the plots follows the implementation plan. Consensus (accuracy and exact location) needed in harmonising the recordation process and the spatial planning process could affect the quality standards.
- Costs:** The total costs of the recordation and the spatial planning process are relatively low.

Disadvantages scenario 1

- Time:** The recordation process should result in as much as possible undisputed claims on land. Disputes resolution can be a time consuming process and could interfere with the project planning.
- Quality:** The quality of the surveyed plots could contradict with existing informal land use situation. New fences and trenches do not match with existing natural boundaries.
- Costs:** Although total costs of the recordation and spatial planning process are relatively low, allocation of costs (registration costs versus spatial planning costs) will need specific attention.
- Competences:** Planning staff and registration staff have to cooperate in strong partnership. Willingness to cooperate and broad knowledge is needed.
- Legal certainty:** There is a risk that the recognition of the existing legal situation (land use in good faith) is of minor importance because of conflicting procedures and interests.

Scenario 2: The registration process is prior to the planning process.

In this process the existing land use and land rights are demarcated and adjudicated before the start of the spatial planning process.

Advantages of scenario 2

- Quality:** The quality of the surveyed plots is in optimal relation with the registration goal 'legal certainty for existing land users'. The quality of the recordation process (demarcation in the FFP-procedure) will follow the actual situation. Natural visual boundaries will lead the FFP-method.
- Costs:** Allocation of costs is simple and clear.
- Time:** The recordation process goes ahead of the spatial planning process. The run time of both processes is independent and processes in different areas could run parallel. The disputes resolution process is could be almost finished when the spatial planning process starts.

Competences: Registration needs specific competences and training. There is no need for broad education of staff.

Legal certainty: The focus is only on existing land use. The existing legal situation (land use in good faith) is recognised, recorded and accessible in the planning process. No conflicts of interest with the planned land use and implementation of planned land use.

Disadvantages of scenario 2

Efficiency: The recordation and implementation process are not synchronised. Both processes need fieldwork. Both processes contain the announcement (and objection) phase.

Costs: The total costs of the recordation and the spatial planning process are relatively high.

Time: Disconnecting both procedures needs efficient planning to avoid delay where processes meet in one specific area.

3.2.2 Scenario recommendation

Advantages and disadvantages in both scenarios seem balanced with a light preference for scenario 2, because of the secured property rights for all land users. But the choice for a scenario also should be a realistic option, considering actual circumstances in Beira.

The recommendation is to use both scenarios in different areas with different spatial planning stages. This means that scenario 1 should be used in the areas where a decision on urban development's already has been taken (the two pilot areas). Scenario 2 then should be used in other areas in the Beira Municipality. In short, the chosen scenario should support the Municipal decision-making process. Doing so the phased transformation of the MLR can run in phased but parallel projects, to start with the most important pilot areas. The realisation of the pilot areas Mazara and Munhava won't be affected by the transformation in professionalising the MLR. Future urbanisation projects gain advantages of this approach.

3.3 Professionalising MLR and introduction of ICT

The transformation in professionalising the MLR should contain next steps:

Step 0: Agreement on the final action plan

Step 1: Digitalisation of data

Step 2: Development of a land administration (information) system in several phases

Step 3: Improvement of the quality of data and processes

Step 4: Accessibility of the data

Step 5: Introduction of data maintenance

REFERENCES

Enemark, S., McLaren, R., Lemmen, C., 2015. Fit-For-Purpose Land Administration – Guiding Principles. UN-HABITAT / GLTN, Nairobi, Kenya. Available at:

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<http://gltn.net/index.php/resources/publications/publications-list/download/2-gltndocuments/2234-fit-for-purpose-land-administration-guiding-principles>

FAO, 2012. Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of Food Security. Rome. Available at:

<http://www.fao.org/docrep/016/i2801e/i2801e.pdf>

FIG and Worldbank, 2014. Fit-For-Purpose Land Administration. FIG Publications No 60, FIG Office, Copenhagen. Available at: <http://www.fig.net/pub/figpub/pub60/figpub60.htm>

IFC, 2012. IFC Environmental and Social Performance Standards and Guidance Notes. International Finance Corporation, World Bank Group, Washington, US, 2012. Available at: http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/our+approach/risk+management/performance+standards/environmental+and+social+performance+standards+and+guidance+notes

Laarakker, P., Y. Georgiadou and J. Zevenbergen, 2014. Person, Parcel, Power - Towards an Extended Model for Land Registration. Proceedings of FIG Congress, Kuala Lumpur, Malaysia, 16 – 21 June 2014. Available at:

http://www.fig.net/resources/proceedings/fig_proceedings/fig2014/papers/TS05C/TS05C_laarakker_georgiadou_et_al_7394.pdf Land Matrix (2015). The Online Public Database on Land Deals. Available at: <http://www.landmatrix.org/en/>

Lemmen, C., J. Zevenbergen, M. Lengoiboni, K. Deininger and T. Burns, 2009. First experiences with high-resolution imagery based adjudication approach for social tenure domain models in Ethiopia. Proceedings FIG/World Bank Conference. Land governance in support of the Millennium Development Goals, 9-10 March, 2009, Washington D.C. Available at:

http://www.researchgate.net/publication/43090344_First_experiences_with_High_Resolution_Imagery_Based_Adjudication_Approach_for_Social_Tenure_Domain_Model_in_Ethiopia

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