THE USE OF NEW FORMS OF SPATIAL INFORMATION, NOT THE CADASTRE, TO PROVIDE TENURE SECURITY IN INFORMAL SETTLEMENTS

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ABSTRACT

1. INTRODUCTION

Conventionally cadastral systems have supplied spatial information for land administration, spatial planning, billing for cost recovery from services etc. Given that most developing countries, and especially in sub-Saharan Africa, have very little cadastral coverage, the emphasis should be on the generation of more appropriate forms of large scale spatial information, rather than on the production of a few accurate cadastral parcels. This is especially important for the regularisation/upgrading of informal settlements, where most residents cannot afford registered rights. New approaches to spatial information are required to upgrade and manage these areas. These approaches should be linked to new urban development approaches that move away from upgrading single informal settlement areas, to the formalisation of these areas at city level scale.

An appropriate geo-spatial data infrastructure (GDI) should be developed, which facilitates this type of urban development and management. Such a GDI could also supply new forms of legal evidence for tenure security in cities, linked to anti-eviction and adverse possession laws.

2. CADASTRAL AND LAND INFORMATION SYSTEMS ARE INADEQUATE FOR INFORMAL SETTLEMENT UPGRADING

There have been major problems with cadastral coverage in sub Saharan Africa, which in turn means that the land information is inadequate for land administration, planning etc., especially for informal settlement areas. A review of the cadastral and Land Information Management systems in sub Saharan Africa (UNECA:1998), using the best data available, indicates that:

– There is no documentary evidence of title for up to 90 percent of the parcels in developing countries, with an estimated less than 1 per cent of sub-Saharan Africa being covered by any kind of cadastral survey (UNCHS:1991:3, 1990:4);

– Cadastral systems, generally in manual form, and with incomplete coverage, are supplying most of the available land information. No alternative source of comprehensive information for land management has been developed (Okpala:1992; UNCHS:1991). This means that land information is probably only available for 10 percent of the area of most developing countries, and 1 percent in Sub Saharan Africa. Available land information often relates only to the part of the city or rural area where formal legal procedures were used for planning (UNCHS:1998:4). Yet most decisions need to be made about the informal and/or customary parts of the country, which are not covered by the cadastre (Okpala:1992:94). Despite numerous initiatives during the last decade in sub Saharan Africa to set up new land information systems or to modernize existing ones, limited results have been achieved (Durand Lasserve:1997:12, UNECA:1996).

This situation exists because there is a general lack of financial, technical and human capacity throughout the developing world, and especially in sub Saharan Africa. Not only is there minimal coverage, but from another angle, present approaches to land registration systems, and by default land information systems, are criticised because:

– The majority of users in a developing country do not benefit from the system;
– They do not supply urban tenure security for the majority and/or facilitate housing and service delivery and management for the poor;
– The link between titling, LIS, poverty alleviation and agricultural productivity has not been established in Africa;

That is, land registration systems (and by default the LIS associated with them) are seen as:

– Centralized and expensive to the user as they are designed for use by the middle class and educated (Hirtz:1998) and/or previous settler population (United Nations:1997:4, UNECA:1998);
– Only capable of recording legal land parcels and not the 30-80 percent of illegal land parcels (urban) (UNCHS:1996:4) and customary areas which exist in most developing countries (Bruce and Migot-Adholla:1993:261-2, UNECA:1998);
– Based on individual rights and unable to accommodate group rights and family rights (Jansen and Roquas:1998);
– Not transparent and user friendly, especially to women (De Zeeuw:1997).

These problems need to be taken into account when upgrading/regularising informal settlements, as they generally contain low income residents. Also a range of local land tenure rules, including group, customary, and women's rights, can be found in these settlements. A review of urban tenure in developing countries (Fourie:1999) shows that often informal settlement residents do not gain from regularisation/upgrading programmes, especially where registered rights such as freehold and leasehold are allocated during regularisation. This is because:

– Only a small proportion of households can afford even the subsidised cost of a site with a title (FIG/Habitat:1998:20);

- Public money is misdirected when subsidies are used to enable low-income groups to obtain freehold title, as there is wide-spread evidence of 'downward raiding' as occupants realise the true market value by selling to higher income groups (Payne:1997:18, Farvaque and McAuslan:1992);
- Where there are numerous tenants in an informal settlement, freehold often forces existing low-income tenants out of an area, as they can no longer afford the rents, which rise dramatically after titling (Payne:1997:46);
- Women's land rights tend to be nested in the land rights of the family. By individualising the rights when titling takes place women can become landless. Also, when the rights are initially created women, and especially widows, can lose their land rights to male members of the family/household who tend to be recorded as the head of household;
- Low-income people transfer their freehold land informally (Huchzermeyer: 1999:20). While governments quite often subsidise the initial land delivery that includes the individualised title, they seldom subsidise the subsequent transfers of the land. Informal transfers are undertaken because low-income groups cannot afford the transfer costs and/or are not familiar with the corporate culture of the land professionals (Durand Lasserve:1998:252); and

If the low income residents of cities, usually found in informal settlements, do not benefit from upgrading programmes by acquiring permanent registered rights, it is likely that they are also not benefiting from the spatial information usually associated with the land parcel. One can therefore conclude that firstly, most cadastral systems in sub Saharan Africa supply inadequate tenure security for the majority, as well as spatial information coverage for equitable urban management. Secondly, that the coverage that exists does not include informal settlement areas and/or dwellers. Thirdly, that even if it was possible, extending coverage to these areas using present cadastral (LIS) approaches is not appropriate. Therefore innovative approaches need to be developed for:

- The upgrading of informal settlements;
- The supply of spatial information for the delivery and maintenance of services (including land and information services) in these areas; and
- Tenure security for informal settlement residents.

3. UPGRADING INFORMAL SETTLEMENTS

One of the key lessons that has been learnt is that informal settlement regularisation/upgrading approaches need to be city wide and should not be undertaken on a settlement by settlement basis. International experience shows that:

- Central government funding is common for *ad hoc* settlement by settlement regularisation/upgrading (Azuela and Duhua:1998 –Mexico and El-Batran:1999a,b – Egypt). City wide coverage with **full** regularisation is rarely, if ever achieved, even in the largest regularisation programs in the world (Azuela and Duhua:1998 –Mexico). This is largely because they are so costly (Durand Lasserve:1998:240) and therefore less costly approaches need to be adopted to achieve a city wide approach;

- Regularisation is often subsidised (Huchzermeyer:1999 –South Africa; El-Batran:1999a,b -Egypt), while the maintenance of the area is often on a cost recovery basis (El-Batran:1999a,b -Egypt);
- Donor funding is common (Bestpractices:1999), but they tend to fund the initial provision of the legal tenure and services, including the capital costs, and not the ongoing maintenance of the services and the land records. If the original design created unaffordable maintenance and user costs, sustainability is often compromised. Cost recovery from those being regularised is often not successful (Banerjee:1999a,b –India);
- Local authorities rarely have a large enough tax base to undertake the task on their own (Diacon:1997; Banerjee:1999a,b); and
- Projects where all households have to become involved and pay for service installation at the same time (Huchzermeyer:1999 –South Africa) are not as successful as projects which allow households to choose when, and if, they wish to acquire individual connections (Diacon:1997). That is, individual connection to services rather than mass servicing is more affordable for poorer households.

The costs created by the design of the services (including land and information) are critical to the affordability of the services, ongoing maintenance, including currency, and sustainability. Community participation, and forms of co-management, are crucial to the design and maintenance of affordable services. In designing affordable services community/labour based inputs into the maintenance of the services and the cost of their maintenance are critical to whether a local authority is willing, and can afford, to get involved in the regularisation of informal settlements (Diacon:1997). This is especially true in relation to roads and underground sewers (de Castro:1999 -Brazil), which can be very costly to create and maintain. The same can be said for land records (Davies and Fourie:1998). Communities may well prefer to have cement footpaths as an access to every house, and agree to prevent vehicles using these footpaths, than have to pay for the cost of upgrading the settlement to allow expensive vehicular access to every house. Equally communities may prefer to have local level paper land information records rather than centralised digital records for the same reason (Davies and Fourie:1998).

The best approach to informal settlement regularisation/upgrading, according to international best practices, is a citywide approach and this has successfully been done with three Indian cities, including one with a population of over one million (Diacon:1997). Instead of focusing on individual settlements, or on the city limits, as the area for upgrading, it is being suggested that the focus should be on the creation of the primary infrastructure networks, such as the water mains, road networks and/or sewerage system of the urban area.

That is, urban planning should create a holistic infrastructure supply, which facilitates individual household connections as and when they can afford it. This combines "..three forms of intervention: the production of primary infrastructure network, the incorporation of informal sub-dividers into the production process, and the progressive servicing of areas that are already occupied, with plenty of scope for community mobilisation and self-help.. The population contributes directly to the provision and management of infrastructure and services. Such approaches also favour a less centralised form of urban management, promoting community organisation at the settlement ..level" (Durand Lasserve:1998).

Finally, the focus of funding informal settlement regularisation has generally been on the installation of services and the delivery of titles. For sustainability funding requirements need to be seen in terms of capital and maintenance costs, affordability and recoverable user charges. What is also important is the currency of the records and land information that underpins this maintenance, sustainable management and billing.

This urban development approach challenges conventional cadastral surveying in that it does not lead to land titling and the creation of cadastral parcels, nor to the land information generated by these parcels. Also it is local government focused whereas typically cadastral systems are centralised. Yet a wide range of spatial information is required to make this type of city wide upgrade practical such as, the mapping of existing settlements and dwellings and the supply of information on existing and planned infrastructure. That is, new approaches need to be developed to service these areas.

4. AN ALTERNATIVE GEO-SPATIAL DATA INFRASTRUCTURE (GDI)

Based on the city wide regularization method outlined above, taking into account the fact that in Sub Saharan Africa the cadastre and its associated LIS does not have sufficient coverage or appropriate legal/technical forms for informal settlement regularization, an appropriate GDI should:

- Be easily kept up to date at the local government level;
- Facilitate billing, cost recovery and subsidy management;
- Be affordable to users by ensuring that capital and maintenance costs (including professional skills) for the system are not so large as to make it unaffordable;
- Be transparent and user friendly to support co-management approaches to bring down costs and improve currency and sustainability; and
- Supply evidence of occupation rights, where they are supported by the regulatory framework.

An appropriate GDI would also not be exclusively based on the cadastral parcel. This is because in many urban environments there are a number of information systems being used to deliver a range of services such as electricity, waste disposal, water, roads etc., with different forms of billing and cost recovery. Most of these service delivery systems are not based on the cadastral parcel. In broad technical terms, adapted from Fourie, van der Molen and Groot (N.D), an appropriate GDI to manage city wide regularization and management would have to:

- Integrate the information systems of a number of very diverse institutions;
- Accommodate a range of formats, accuracies and spatial units (sketch maps, geo-codes, imagery, cadastral parcels etc.);
- Accommodate a range of identifiers, not just parcels, and not just one parcel identification number;
- Deal with the upgrading and incorporation of diverse information systems over time; and
- Deal with legal liability issues, both in terms of the national legal framework, as well as horizontally between organizations.

Having identified a few of the parameters for an appropriate GDI for developing world cities, it is clear that a number of these do not conform to conventional developed world approaches to GDI, and instead would throw up major technical challenges to the industry. In a paper under development Fourie, van der Molen and Groot N.D.) have started to identify the technical research agenda which would need to be addressed to be able to create an appropriate GDI for the developing world. Such a GDI would also underpin an urban management approach that would facilitate city wide regularization of informal settlements.
In developing the research agenda questions are being raised such as, "..can core data and a common infrastructure only be created by using high accuracy co-ordinates..?" Are quick and dirty solutions useful over time and/or incrementally upgradeable? "How do you manage incrementally altered spatial units in different data bases, which are being changed to increase inter-operability?.. Is it possible.. to use the existing information system used for electricity.. (installation and billing).. for the creation of a GDI?" (Fourie, van der Molen and Groot:N.D.).

It has been shown that conventional cadastral and spatial information approaches contribute little to informal settlement regularization in Sub Saharan Africa, and that new approaches need to be adopted. However, it has also been indicated that in the adoption of these new approaches we do not have all the technical answers as yet. Rather, the technical questions being raised by Fourie, van der Molen and Groot (N.D.) urgently need to be answered in a rigorous fashion, and new approaches developed, before an appropriate GDI can be put in place which can underpin informal settlement regularization at city level scale.

5. AN ALTERNATIVE GDI CAN SUPPLY NEW FORMS OF LEGAL EVIDENCE FOR TENURE SECURITY

As indicated, the cadastral system in Sub Saharan Africa is not supplying sufficient tenure security for the majority of people, especially the poor, including those in informal settlements. Another way to give these people tenure security is through utilising adverse possession and anti-eviction laws, linked to evidence supplied by new forms of spatial information associated with a GDI.

Whereas land surveyors have tended to focus on registered land rights as being the only way of obtaining tenure security, other methods also exist. While registered land rights probably supply the best tenure security, in a number of circumstances and countries other approaches have been adopted namely, anti-eviction laws and strengthening the right of adverse possession.

"Anti-eviction laws provide rules to govern the relationship between landowners (public and/or private) and occupiers in respect of the eviction of people from the land and/or house they occupy. Landowners must fulfil required procedures over a specified length of time. This usually includes giving the occupants due notice as to their intentions" (Fourie:1999). Adverse possession relates to the acquisition of property rights through occupation of the land without any opposition, for a period prescribed by law. Adverse possession applies to both private and public property (Imparato:1999; Dale:1976) and is also known as 'squatters rights.'

According to property lawyer Jude Wallace, in some countries, such as England, there was such concentration on possession, rather than ownership, that possession became ownership. By comparison, in the Roman-Dutch system (Wallace quoting Kleign) states that "ownership is the most comprehensive right a person can have in respect of a thing" (draft notes:2000).

In countries where there is insufficient cadastral and land registration coverage and/or the coverage is not equitable, regulatory frameworks have been increasingly changed to strengthen the right of possession and occupation and to diminish the right of ownership. This has been done to give a larger number of people tenure security than are provided for by the land registration system, and also to strengthen the rights of informal settlement dwellers. Examples of this are Brazil, where adverse possession rights were strengthened in 1988 (Fernandes and Rolnik:1998; Imparato:1999), South Africa with its new post 1994 land laws, and Philippines (Santiago:1998) and India (Banerjee:1999) with their anti-eviction laws, the latter still under discussion.

While these are very complex legal issues, and the implementation of these laws has hit a number of snags, such as insufficient legal aid, lack of enforcement, lack of register and boundary information of state land etc, this is not the focus of this paper. Rather, the focus is on using the spatial information associated with a GDI, which is linked to urban service delivery, as a source of legal evidence to validate people's adverse possession claims and/or prevent eviction. The need for this is demonstrated in the examples below.

In a best practices case (UNCHS:1999) members of an evicted community, Bhabrakar Nagar, in Mumbai, India, were allowed to return to the land after they had produced evidence, including maps, electricity bills etc, demonstrating their long term occupation in the area. Junior argues that in Brazil, despite the anti-eviction laws, many people have lost cases against landowners because they do not have the required proof of occupation (1999). Also, in Brazil, there have been problems proving some adverse possession claims as it is not always easy to prove the identity of the persons who have occupancy rights (de Castro:1999), because the state generally does not have good enough records of identity, marriages and births, and/or local forms of identification are not sufficiently formalized. In South Africa it is much easier to defend tenants' rights in court where some evidence already exists about their occupation and contractual status relative to a particular registered farm. The same claims on state land are harder to prove because the land is not parcelled/classified in the same way (Peter Sapsford -personnel communication).

An appropriate GDI for urban management including informal settlements, which included information from a range of sources such as the electricity billing system, planning information, mapping of the 'as built' environment rather than only the legal situation etc, could go a long way to supplying evidence for use by the courts to protect the land rights of people in terms of anti-eviction and adverse possession laws. If this spatial information was the product of a GDI it is more likely to be routinely available, consistent, have useful temporal dimensions, and be supported by knowledgeable officials, all of which are important for the courts. When spatial information exists at local government level it

generally comes from snap shots and is not stored in a fashion that makes it possible to retrieve and/or interpret routinely.

This approach, of using information from other public sector information systems and not the cadastral system to supply evidence of occupation rights, already exists in some countries where there is insufficient cadastral evidence. In Indonesia, the fiscal/tax cadastre for many years supplied the first evidence used when creating cadastral parcels. In parts of Egypt electricity bills are important evidence when a cadastral parcel is adjudicated and created.

Developing countries need spatial information for decision makers as a priority and an appropriate GDI should be able to deliver this. However, such a GDI, once in routine operation, could also be used to give a form of tenure security to informal settlement residents before, during and after regularisation. This would be a step forward along the tenure security continuum identified by Payne, who argues that "..every step along the continuum from complete illegality to formal tenure and property rights (i)s a move in the right direction,.. (and should) ..be made on an incremental basis." (1997:29,31). Over time, the GDI could be used as the first evidence when, and if, the land was titled, thereby minimising the expensive process of adjudication.

6. CONCLUSION

It can therefore be concluded from the above that:

- The cadastre and its linked LIS cannot be relied on for urban management and development in Sub Saharan Africa, where 30-80 percent of the cities are usually informal;
- New integrated and city wide approaches to informal settlement regularisation will require new approaches to spatial information and tenure security;
- A range of inter-operable spatial units and an appropriate geo-spatial data infrastructure are key technical tools for such urban management approaches; and
- Research and development needs to take place urgently to develop the appropriate technical tools.

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BIOGRAPHICAL NOTES

Dr. Fourie holds a Ph.D in Social Anthropology and has worked in the land management/surveying industry for over 8 years as an academic attached to survey departments in South Africa, as well as an international consultant. She has worked in both Africa and SE Asia for both multi-lateral and bilateral donor agencies, focusing on the integration of social and technical tools. She has had numerous papers published in international journals and is a council member of the South African statutory council for surveyors (PLATO).

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