Land administration in a 'cadastre-less' environment

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KEYWORDS

Multi-purpose cadastre, informal rights, restitution claims, survey, land tenure

SUMMARY

The process of land administration is under constant social, political, economic and environmental pressure. As such, it requires a constant flow of information between land owners, users and administrators. The unit of land information is commonly the land parcel. This parcel-based information forms the cadastral system.

It follows that land administration in a 'cadastre-less' environment is problematic because of the lack of these basic units of land information. Therefore, the creation of a spatial level of land information is practically a pre-requisite for a coherent land administration framework.

This paper explores two examples of how practitioners have created an informal cadastre in order to facilitate land administration for the purposes of land reform and the administration of informal settlements in a local government environment.

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1. INTRODUCTION

It is well known that the political history of South Africa has given rise to inequalities in the ownership of land. Land Reform in South Africa has attempted to address these inequalities through three programs: Land Redistribution, Land Restitution and Land Tenure Reform.

All three of these programs have been widely criticised for non-delivery by land professionals, the academic community and the general public. Regardless of these criticisms, land reform in South Africa has made considerable advances in its attempt to balance past inequalities.

Progress of Land Reform in South Africa	
Land Restitution	Out of 65,000 claims submitted to the Commission on Restitution of Land Rights by the 31 December 1998, 48 852 have been settled.
Land Redistribution	772 626 hectares of land have been transferred to former 'landless' individuals and communities.
Land Tenure Reform	The Communal Land Rights Act has been passed after 6 years of drafting.

(Didiza, 2004)

The relative successes of the Restitution and Redistribution programs can be attributed to their association with the existing cadastral system. Redistribution is simply a transfer of ownership through the current registration system. Restitution, although more complex, involves either a transfer of ownership or the valuation of historical rights with a view to comparable redress through either financial compensation or alternative land.

However, once land reform leaves the 'safety' of the existing cadastre it enters an environment where few legal and technical tools are available to provide government and practitioners with the means to effect change.

Without a technical and legal framework within which to operate, practitioners and local government institutions have been forced to resort to informal methods of identifying and administering informal land. This paper explores some experiences of practitioners, their methods and results when attempting to facilitate land administration in the 'cadastre-less' environment.

2. LAND ADMINISTRATION PROBLEMS IN THE 'CADASTRE-LESS' ENVIRONMENT

Between 1997 and 2000, the Border Rural Committee was contracted by the European Union Foundation for Human Rights to undertake research into problems surrounding land administration in South Africa from both a practical and policy perspective. One of the products of this research was the development of a Land Administration Handbook that was used to train government officials in how to deal with these practical land administration issues. (Rawlins and Westaway, 2000)

All top and middle management government officials whose job descriptions involved dealings with land were targeted for training. Training was conducted in a workshop format with the facilitators getting feedback from participants on specific problems which they were faced with in performing their land administration functions.

It was interesting to note that participants working in the former homeland areas, the 'cadastre-less' environment, highlighted the issue of boundary disputes as being a key area of failure in their jobs. Reasons given were a lack of institutional and technical support, specifically, no legal basis to perform surveys recognised by government and communities. (Rawlins, 2000).

Participants highlighted the following issues as being key problems:

- "Pegs missing;
- Cost (of transport);
- (Survey) Standards (with respect to methodology and accuracy);
- Coverage (holes in the parcel-based system)
- Boundary encroachment"

(Rawlins, 2000, p13)

Practical issues arising from these problems were mainly concerned with land use regulation, such as zoning and building permits, and the designation of areas for burial. Issues of land ownership and transfers were not mentioned by participants as being problematic even though the facilitation of transfers fell within many of their job descriptions.

Research into the issue of transfers in these areas showed that transfers were being undertaken outside of the formal procedures (Atkinson *et al*, 1998). However, no quantitative research was undertaken to verify this perception.

Without a properly defined spatial framework land administration in these areas is chaotic. The lack of a formal cadastre, and no legal and institutional means to create one, has lead to a breakdown in land reform and land administration.

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However, in cases where these 'cadastre-less' areas fall within priority land reform areas measures have been taken at a practical level to circumvent the lack of a cadastre in the interests of progress. In this regard, two cases are presented.

3. LAND RESTITUTION IN THE 'CADASTRE-LESS' ENVIRONMENT

In December 1998, 7 villages in the former homeland of the Ciskei lodged restitutions claims for land lost as a result of betterment planning. In short, betterment planning involved the re-organisation of communities by changing where the people lived, how they accessed their land and how much land was available to them for use. Also referred to as villagisation, this involved moving people's homesteads away from their adjoining arable land to a central village.

As a result, people received smaller lots for occupation and often lost their rights to their arable land. New land was 'zoned' as arable even though it was sometimes unsuitable for arable use. Old arable lands that were located far away from the new village were re-zoned as grazing lands.

The restitution process required that the extent of loss be quantified. However, at the time of betterment there was no formal cadastre in these areas and without any means to formally identify the extent and location of pre-betterment rights it was left to the community to describe their historical properties.

The Border Rural Committee (BRC) developed a methodology to assist communities with the quantification of their loss. The method developed by BRC involved two means of data collection and a data verification process. (Border Rural Committee, 2001)

Archives were searched for any reference to plot sizes and location. This yielded some references from Magistrates' records on average arable and residential plot sizes. In two cases maps accompanied these records. However, these maps were not to scale and when overlaid with existing maps in a GIS some 'rubber-sheeting' was required to fit the geographic features with the same existing geographic features. This was deemed unreliable. In addition, the maps appeared to be sketches and not the result of survey work.

Secondly, community members were questioned about the size of their arable and residential plots. However, most means of measure were given in steps (paces) with very few people being able to give sizes in Morgen. Plot sizes were then calculated by working out the average length of a step as being 30cm. These methodological problems called for a means of verification.

In order to spatially identify the original boundaries a simple hand-held GPS was used. Typically, arable plots were defined in terms of how much land could be cleared in a particular season for cropping as well as how much time and resources people had at their disposal to plough the land. The wide variation in the original spatial description meant that

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the relative inaccuracy of a non-corrected GPS reading would be a sufficient means of survey.

Initially, BRC staff called upon the surviving community members of the betterment era to accompany them to the old sites. The amount of time required to access these areas, especially by people of this age (mostly in their 70s and 80s), limited the number of surveys that could be undertaken by BRC staff members. It was then decided to attempt to train community members to conduct their own surveys.

The training lasted a morning and the afternoon was spent conducting surveys under staff supervision. Each waypoint reading was linked to a Claim Number in order to assist with the creation of polygons in the GIS. 'Surveyors' were also asked to start and finish at the same location. The differences in the start and end points provided some indication of inaccuracy in the uncorrected GPS coordinates. In all cases inaccuracies were less than 10 metres.

The GPS was collected each Friday for downloading and input into a GIS. Polygons were constructed from the points and linked to the claim information via the Claim Number. The final polygons were overlaid with existing map information such as recent aerial photographs and topo-cadastral map sheets. In cases where polygons intersected areas that were obviously never arable, such as very steep slopes and rivers, the polygon boundary was adjusted using a 'best fit' scenario.

The following image shows the typical survey result.
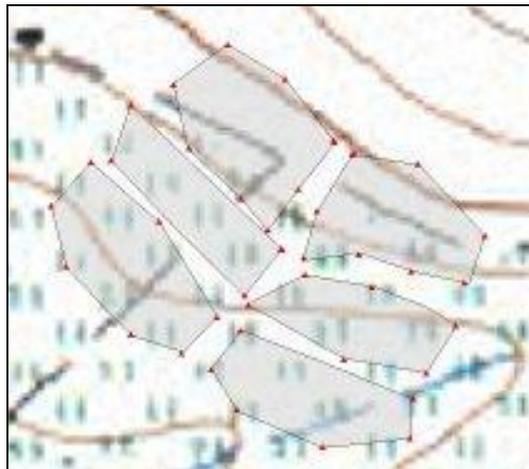
Arable boundaries were not allowed to overlap as it was assumed that arable allocations conducted by the Headman were exclusive. However, residential boundaries frequently did overlap where homesteads were located close together. This is because there was never any definite line between where one person's property started and another's ended.

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The sizes of the arable and residential allotments were calculated using a GIS and compared with the other two sources of data. At this stage it was determined that a step was in fact approximately 1 metre as this was a consistent error factor between the reported size of properties and the surveyed size. This was verified with a sample of questionnaire respondents who were asked to demonstrate 10 steps, which was then measured using a tape.

The other key importance behind the GPS surveys was that it allowed the community to participate directly in the process. The results were presented back to them for endorsement before being submitted to the Land Claims Commission.

The final result of the process was that the Regional Land Claims Commissioner accepted the survey results and compensated the communities a total of 80 million Rand for their loss of land.

The re-creation of the historical informal cadastre was ultimately the key in securing the validity and extent of the claims. The fact that the relatively inaccurate community-based GPS survey was accepted by government as an acceptable means of verification goes a long way to providing hope for the inclusion of low-cost surveys in the formal cadastre.

4. LAND TENURE REFORM IN THE 'CADASTRE-LESS' ENVIRONMENT

The second case does not relate directly to the establishment of tenure security which is usually the goal of tenure reform. Rather, the case aims at managing information on the population in a local government environment.

In 2003 Digital Mapping Services was contracted by the Buffalo City Municipality to develop a multi-purpose cadastral system. The purpose behind this System is to combine all parcel-based information into a single information management tool.

The following diagrammatic representation of the System depicts its initial conceptual design as a parcel-based information management tool.

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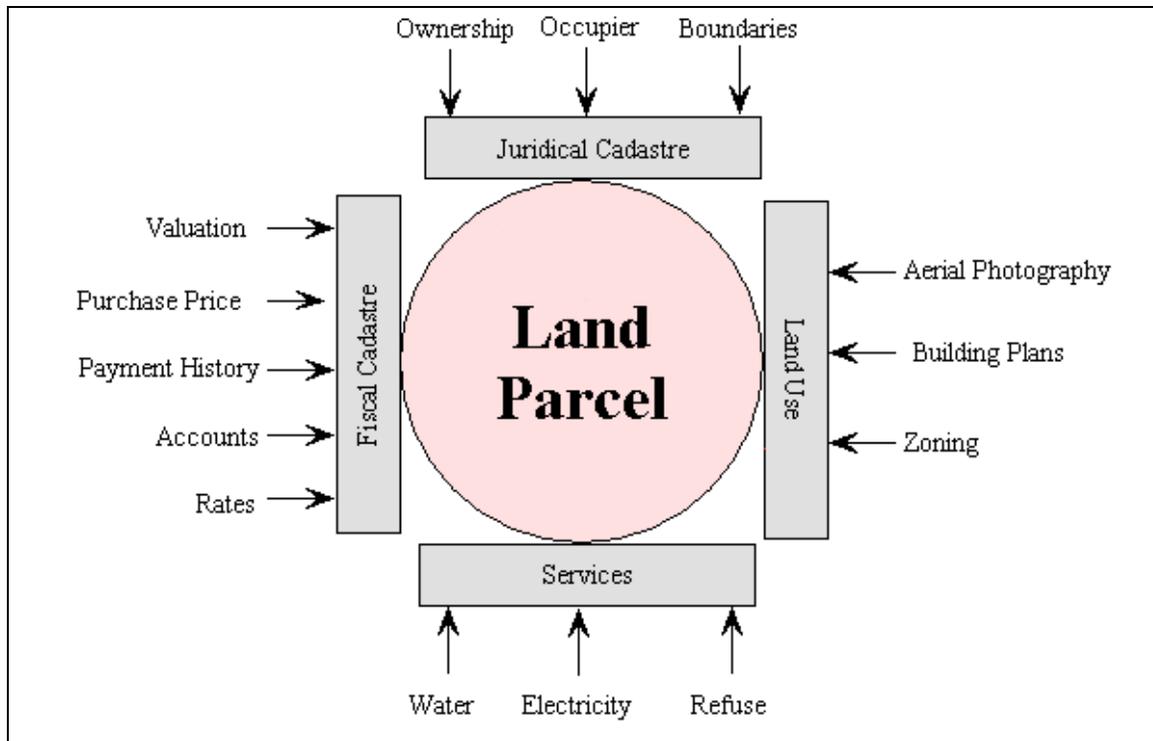
A unique identifier (the LP Key) is associated with all information relating to the parcel thus enabling the Deeds, Survey, Financial, Planning and Engineering systems to communicate with each other. The LP Key is structured to provide the name of the surveyed allotment area (abbreviated), the erf or farm number and the portion number.

The problem with this model is that it does not allow for overlapping parcel information or informal rights. The issue of overlapping parcels exists within the formal cadastre in the form of Sectional Titles and Leased Portions. Sectional Titles and Leased Portions are located on top of existing erven. To cater for this the LP Key structure was amended by appending the Sectional Unit or Leased Portion number onto the LP Key for the underlying erf.

Even though many Leased Portions do not have spatial descriptions the System locates the portion within an erf. The spatial description of the Leased Portion is provided by a physical description on the lease agreement.

This method simply extends the parcel-based system to cater for a few non-spatial exceptions. However, in informal settlements there is no parcel-based information on which to base the system.

Because basic land information is required for land use, disaster and revenue management it was imperative that a spatial layer be created and inserted into the multi-purpose cadastre. To create the informal cadastre the Municipality decided to use a line mapping exercise.

Rectified aerial photography (25cm/pixel) was used to digitise informal settlement boundaries, land parcels, top structures and visible service infrastructure. In the case of parcel delineation a distinction was made between parcels where the boundaries were clearly visible (fence lines) and parcels where some interpretation was required (Hedin, 2004).

Although the line mapping exercise does not represent a formal cadastre it is envisaged that it will be used as the basis for formalisation when formal layout plans are required for servicing purposes. The problem with this method of parcel creation is that it is reliant on the currency of the photography.

The inclusion of this layer into the multi-purpose cadastre is also through an LP Key where the village name is used in place of the allotment area and the 'erf' number is arbitrarily assigned by the Survey Department.

Property ownership was considered too costly to adjudicate and administer. However, the need for the inclusion of an Account Holder simulates, to some extent, the juridical component of the informal cadastre.

Many properties in informal settlements do not require a rates or services account. However, most households have an electricity account where the name of an account holder is recorded. The benefit of using this level of information is that it remains current, being updated by the account holder should they sell their property. This effectively removes the responsibility of record maintenance from the Municipality.

While this process addresses the inclusion of rural informal settlements into the multi-purpose cadastre is does not cater for urban informal settlements. The constantly changing nature of these types of settlements as well as their high density meant that line mapping could not accurately record boundaries between 'shacks'.

The solution to this problem comes in the form of Disaster Management which is particularly applicable to these areas because of the high incidence of fires. After a fire (or flood) the Municipality compiles a beneficiary list of affected households for compensation and relocation purposes. The Planners draw up a 'semi-formal' layout plan for the affected area which is passed on to the Survey Department for pegging.

The beneficiaries are allowed to decide who should be allocated new *in situ* sites and who should be relocated to new sites elsewhere. Those who are selected to remain *in situ* on a new site are required to sign a Certificate of Acknowledgement of the beacons. The Certificate comprises a layout plan and declaration. A portion of the Certificate is depicted below:

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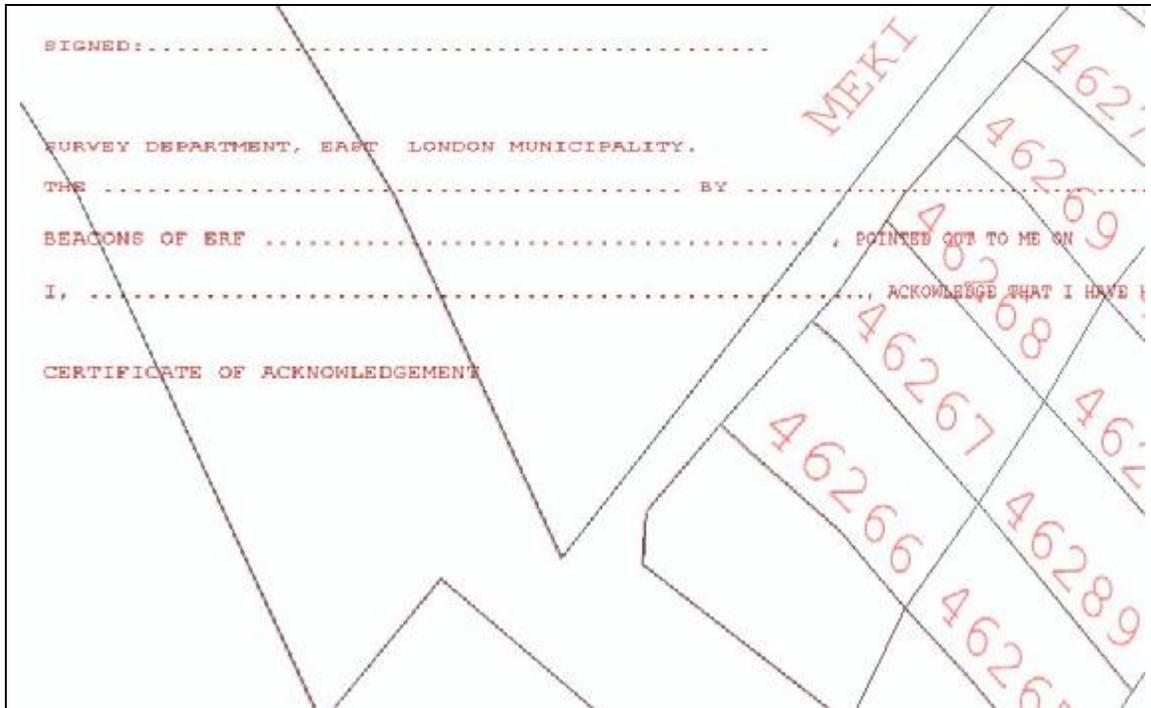
The allocation of these 'pseudo-cadastral' plots seems to be respected at the *de facto* level. The Survey Department reported that a year after one such allocation no encroachment had occurred. What makes this more extraordinary is that the entire process of planning, survey and allocation is completed within two weeks.

The next step in the process is the formalisation of these areas through proper planning and survey and, ultimately, registration. The following image shows the three stages of the process. The aerial photograph depicts the *de facto* situation before the fire. The red lines represent the 'pseudo-cadastre' surveyed and allocated immediately after the fire and the green lines represent the formal cadastre approved by the Surveyor General.

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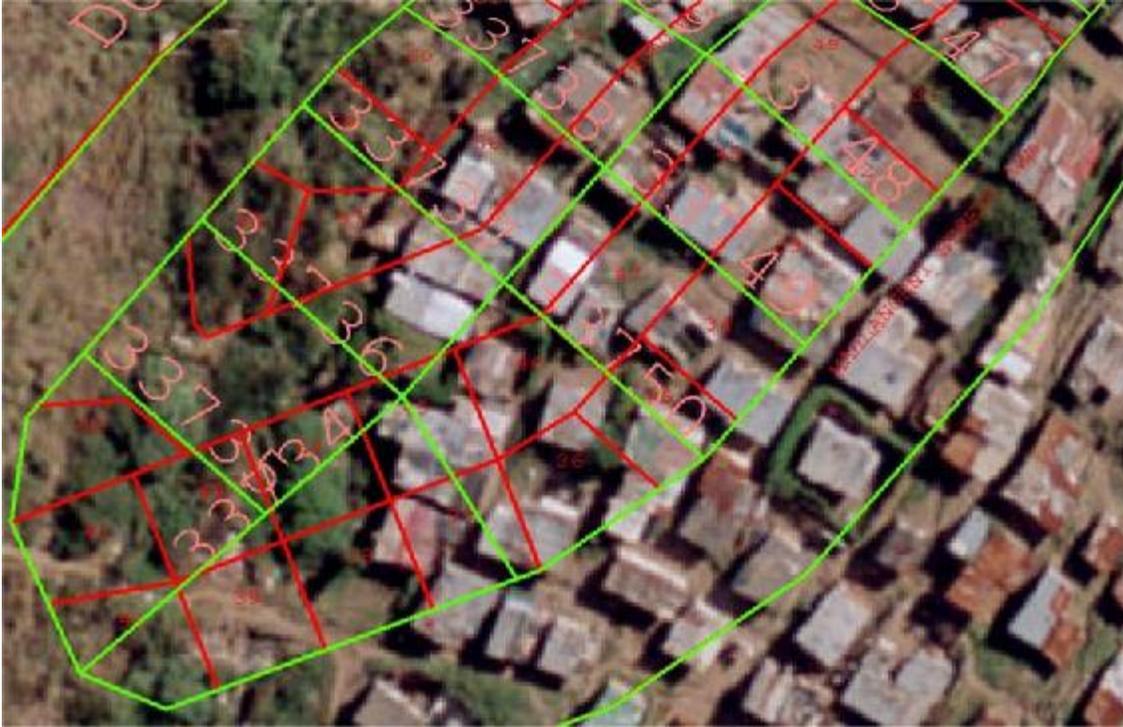
5. CONCLUSION

The administration of land is almost impossible without some form of cadastre both from the perspective of land information management and the delivery of land reform products. Although many countries do not provide for interim measures in their 'cadastre-less' environment this work has shown that local-level arrangements can provide solutions.

The costs, legal processes and time factors involved in the creation of a formal cadastre need not hamper land administration where communities and local authorities can participate within a commonly accepted legal and technical framework.

While this is ideally an interim measure towards the goal of integrated spatial planning it can be sustained for as long as the levels of participation between communities and government persist.

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BIOGRAPHICAL NOTES

Dylan Rawlins is a Land Administration and GIS Consultant specializing in low-cost land information management options for small and medium-sized local government institutions. Formerly employed by the Border Rural Committee, a land reform NGO in South Africa, to conduct land administration research at community and policy level.

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