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Wicked Problems, Soft systems and Cadastral Systems in Periods of Uncertainty

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Abstract

There have been a number of problems when cadastral systems, or elements of cadastral systems such as titling programmes, have been used in property formalisation programmes in developing countries. This is often not so much a fault with the technical systems that make up the cadastral system but the fact that the situation in which they are used can be categorised as wicked. In these situations, conventional project management techniques are unlikely to succeed as it is extremely difficult to identify a specific problem with clear objectives to be addressed. The situation is often too complex to break it up into sets of small projects. The soft systems methodology, using systems thinking and systems concepts, provides a process and a structure for incremental improvements to such situations which involves all the stakeholders in a continual learning cycle.

1. INTRODUCTION

In this paper we provide an overview of how land managers and consultants should conceptualise situations in which cadastral systems are implemented. We proceed by outlining a number of the drawbacks that have been observed in the implementation of land registration and cadastral surveying in rural and urban situations. The context of this discussion is the developing world, where poverty, rapid rural to urban migration, international migration and social and political instability prevail in a number of developing countries. We then discuss tame problems and wicked problems, and how a situation should be understood before land administrators initiate any intervention in the tenure system. Thereafter, we discuss soft systems as a theoretical model to conceptualise a wicked situation and the soft systems methodology as a way of attempting to improve such a situation. We then provide some pointers as to how the interrelated systems of land tenure, land management and administration and the cadastre should be conceptualised in a wicked situation based on experiences in informal settlements in South Africa in the 1990's.

Cadastral systems, in particular land registration and cadastral surveying, constitute a critical system for effective land administration in a market economy. Given the right circumstances, cadastral systems contribute to enhancing social and political stability, improving the economy, and improving government's efficiency in land administration and service delivery. Cadastral systems contribute to social and political stability through improved tenure security. Increased security of tenure arises out of a reduction in land related conflicts. When conflicts do occur, formal legal procedures exist to resolve them, thus contributing to the fair treatment of all citizens. Land registration, in the form of titles or deeds, provides legally recognised documentary evidence of rights and interests in land that particular persons are meant to enjoy. Cadastral surveys provide a documentary record of the artefacts, or monuments, that delineate the areas where these rights may be exercised. Increased tenure security contributes to improving the economy in that it encourages investment in land. People will invest in improving their land if they are confident that their investment is secure. Moreover title deeds can be used to mortgage land, thus stimulating credit inputs in land. The cadastral system underpins a formal land market, which encourages efficient economic use of land. Over time, land markets should ensure that land is held by productive users. Furthermore, cadastral systems contribute to good governance and fair taxation. The information derived from the processes of adjudication, registration and cadastral surveying provides the means for government to value land accurately and consequently tax land equitably. In this way government can continue to supply basic services to its clients.

However, a number of attempts to implement cadastral systems have been deemed to be a failure, especially in the developing world. Individualisation of tenure, cadastral systems and land titling and registration can lead to confusion and create more uncertainty in a land tenure system than existed before these processes were implemented.

In the rural context, individual tenure systems upheld by titles have often been implemented with the object of improving agricultural outputs in developing countries. Drawing on Shivji (1998, 1995 as cited by Payne 1997), Migot-Adholla and Bruce (1994), Barry (1999) and Lawrence (1984), the following problems can occur:

- the process of titling and tenure individualisation creates confusion and the powerful and more influential get themselves registered as owners or long term leaseholders to the disadvantage of others;
- land registers do not reflect reality on the ground;
- land markets do not emerge, or they do not emerge on the scale expected, or informal markets emerge which discourage

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the use of land as security for credit;

- land is held increasingly for speculative purposes;
- registration does not increase the demand for agricultural credit; and
- titling often works against the interests of women and children.

In the urban context, cadastral systems have been used to formalise land rights in urban informal settlements. Rapid rural -urban migration and growth in informal settlements pose a major challenge. "It is projected that by 2020, 63 percent of the population (in Africa) will live in cities. This represents a potential time bomb over the next decade, and there could be explosions of urban violence and social unrest as social disparities become more acute." (Farvacque-Vitovic C and Godwin 1998). At present, informal settlements constitute 30-80 percent of developing world cities (UNCHS 1996).

As with the rural cases mentioned above, attempts to apply land registration and cadastral systems to informal settlement situations have often not been successful. Residents in a particular settlement may hold positive attitudes to cadastral systems and the potential benefits that might accompany them. However, a range of complex, interrelated social, political, economic, legal and physical factors might persuade them not to use the legal cadastral system. As with rural cases, in the urban context, informal land markets may supersede the formal market and powerful individuals may seize control over the land tenure system. The result for the individual is that land tenure security is diminished and due to the uncertainty of ownership, land in affected areas has no value as security or credit. This discourages investment in the area by the people living there (Barry 1999).

The above suggests that individual tenure and cadastral systems should not be used in many instances. The alternative for land managers then is to do nothing. Clearly this is not feasible in many cases, especially in the urban context. What should be examined is the way that tenure transformation and cadastral system projects are implemented in each particular situation. The notion of wicked problems and soft systems theory provide a framework and a methodology within which to understand each particular situation and develop strategies to improve them.

2. WICKED PROBLEMS

In the developing world, where many of the variables are uncertain, issues surrounding land policy, land tenure and land management can often be categorised as 'wicked problems'.

Rittel in the 1970's characterised a class of problem which he termed 'wicked', in contrast to 'tame' problems. Tame problems are not trivial problems, but they can be tackled with confidence. Tame problems are understood sufficiently that they can be analysed using established methods, and it is clear when a solution has been reached (Buckingham 1997).

In contrast, wicked problems:

- cannot be easily defined so that all stakeholders agree on the problem to solve;
- require complex judgements about the level of abstraction at which to define the problem;
- have no clear stopping rules - a project has no clear end;
- have better or worse solutions, not right and wrong ones;
- have no objective measure of success;
- require iteration - every trial counts;
- have no given alternative solutions - these must be discovered;
- often have strong moral, political or professional dimensions. (Buckingham 1997)

In short, attempting to state the problem is a major problem in itself. What is needed is a way of thinking about a situation, analysing it and responding to it. Soft systems thinking provides an empirically based theoretical foundation for this. As the discussion on soft systems below will show, many situations in which tenure transformation takes place can be classified as wick problems.

3. SOFT SYSTEMS THINKING

Systems deal with the complex organisation of a number of different connected elements (Checkland 1999). A system can be defined as a collection of parts or elements that interact with one another to function as a whole, thus showing properties which are properties of the whole, rather than properties of the component parts (Kauffman 1980, Checkland 1999). Tenure systems and cadastral systems can be classified as systems of human endeavour or human activity systems. According to Senge, invisible fabrics of interrelated actions, which often take years to play out their effects on each other, bind systems of human endeavour. Because individuals are part of these seemingly distinct actions in systems of human endeavour, it is difficult for them to visualise the whole pattern of change. There is a tendency to focus on snapshots of isolated parts of the system, and consequently the deepest problems do not seem to get solved (Senge 1990).

Systems can be classified as hard or soft. Hard systems apply to structured or tame problems, whereas soft systems apply to unstructured situations where the 'problem' may be classified as wicked. Our interest here is in soft, unstructured or wicked problems.

Similar in concept to wicked problems, Checkland (1999) contends that in contrast to hard problems, soft problems often have obscure goals. It is not always possible to design a system that is necessarily appropriate or in fact desired. Unstructured or soft problems are manifest in a feeling of unease but which cannot be explicitly stated. For example, drawing on Barry (1999), depending on who asks it, the question: "Is land tenure in urban Xhosa-speaking communities secure?" does not necessarily identify a hard, clearly identifiable problem. It acknowledges perhaps that some tenure related problem exists in these communities. Such a problem may be more aligned with other systems such as those designated to enforce law and order, than with systems whose primary purpose is to support land tenure security. For instance, if tenure security is problematic because gangsters or political organisations intimidate and evict legal landholders, then the situation is unlikely to be improved by altering the cadastral system. Systems relating to law enforcement, education, economic opportunities, employment opportunities and spatial development patterns are likely to be as much part of such a problem as cadastral and land tenure systems.

4. SOFT SYSTEMS METHODOLOGY

The soft systems methodology (SSM) is essentially an action research methodology intended to bring about improvement. It has been derived and developed by Checkland and a number of others over a period of thirty years by summarising experiences from action research projects where the researchers were immersed as participants in the problem situation. Through processes of modelling, iteration, reflection and negotiation it draws together different perceptions, assumptions and points of view of different people who are involved in a problem situation in a cycle of learning.

The soft systems methodology expresses the situation in which a perceived problem exists in terms of structure and processes and the relation between the two, rather than as a clearly defined problem. Moreover in soft systems, history always changes the agenda. "The contents of such systems are so multi-various and the influences to which they are subject so numerous that the passage of time always modifies the perception of the problem. Such perceptions of the problems are always subjective and they change with time" (Checkland 1981:155). Consequently, Checkland's (1981, 1999) model of soft system's practice views unstructured (wicked) problems as conditions to be alleviated, rather than problems to be solved.

Structure may be examined in terms of physical layout, power hierarchy, reporting structure and the pattern of communications, both formal and informal. Process may frequently be examined in terms of the basic activities of deciding to do something, doing it, monitoring how well it is done and its external effects, and taking appropriate corrective action. Checkland's experience suggests that the relationship between structure and process, the climate of the situation, has frequently been found to be a core characteristic of situations in which problems are perceived (Checkland 1981, 1999).

It is not possible to adequately describe the soft systems methodology (SSM), and we provide only a summary of its main features. The reader is directed to Checkland's various works for a detailed description of the methodology.

Figure 1 NO ONLINE VERSION OF THE FIGURE IS AVAILABLE

The Process of SSM (after Checkland 1999)

Early descriptions of SSM involved a series of seven steps. More recent descriptions of SSM, involve four main activities which are depicted in figure 1. These activities are:

1. Finding out about a problem situation, including the cultural and political dynamics of the situation;
2. Formulating some conceptual systems models of an ideal world from the perspective of different stakeholders in the situation;
3. Debating the situation, by comparing the conceptual models with the real situation, and seeking from that debate both (a) changes which would improve the situation and are regarded as both desirable and (culturally) feasible, and (b) the accommodations between conflicting interests which will enable action-to-improve to be taken;
4. Taking action in the situation to bring about improvement. (Checkland 1999:A15)

In finding out about the problem situation, activity 1 above, Checkland suggests the building of "rich pictures" as a starting point in the exploratory discussion with people in a problem situation. These pictures are developed iteratively and depict the present situation, its main stakeholders, the issues and relationships, and form the basis of debate among stakeholders to generate a general understanding of the situation. Based on this process the roles of clients, problem owners and problem solvers are established and analysed in the cultural context of the situation. What are the dynamics of the social norms and values in the situation being studied? Lastly, a political analysis is done by studying how power is expressed in the situation (Checkland 1999, Checkland and Scholes 1990). Checkland emphasises that this last analysis may have to be carried out with a great deal of sensitivity, as discussion of issues hinging on power can seldom be conducted openly (Checkland 1999).

The second activity in SSM involves building conceptual models of the various systems that exist to structure an exploration of the problem situation. These are intellectual models of what the modellers perceive to be an ideal system for a particular view of the

problem situation and should not purport to represent the real situation. Modellers should ignore the idiosyncrasies of the real situation. Conceptual models provide a framework for discussing reality, structures to "stimulate, feed and structure" the debate about the real situation (Checkland 1999:A21). The tools of this model building process are root definitions, CATWOE and multi-level thinking, which we discuss below.

Root definitions are a clear description of the systems to be modelled. They are similar in essence to a corporate mission statement. A single corresponding definition of the whole system is not likely to be found, given that people interpret the world in a variety of different ways. It is therefore necessary to begin with building several models for each human activity system, and then, in the course of a debate, learn about their correspondence to the real world. For example, in the context of a land management situation, depending on who the observer is, root definitions might initially take the form of "a system to improve agricultural output", "a system to improve tenure security" or "a system to tax land holdings" and then expanded upon. These root definitions are initially constructed around a transformation process T, and then elaborated upon by considering the other elements which make up the mnemonic CATWOE. These elements are:

- C -customers -the victims or beneficiaries of T
- A -actors those who would do T
- T-transformation process -the conversion of input to output
- W -weltanschauung -the world view which makes this T meaningful in context
- O -owners- those who could stop T
- E -environmental constraints -elements outside the system which it takes as given

Checkland and Scholes (1990)

Multilevel thinking implies that the analyst(s) should think in terms of a hierarchy of systems, wider systems and sub-systems. The system is the level at which transformation process 'T' takes place. The level below this is the sub-system level and that above the wider system. From the subsystem(s) emerges properties which contribute to the system, from which in turn emerge properties which contribute to the wider system. Different observers will hold different world views and may also view the ordering of these systems, wider systems and subsystems differently (Checkland 1999). Moreover, the same observer may change the order of these over time as the situation changes (see Barry 1999).

Having developed the systems, they need to be evaluated and if necessary further developed. Criteria for evaluating and developing conceptual systems models are encapsulated in the five E's:

- efficacy -does it work?
- efficiency -does the output justify the resources used?
- effectiveness -is the transformation meeting the long-term objectives?.
- ethicality -is the transformation morally acceptable?
- elegance -is this an aesthetically pleasing transformation?

(Checkland 1999, Checkland and Scholes 1990)

A number of iterations may be required before a workable conceptual model of a system for each root definition is arrived at.

Stage 3 involves comparing the conceptual systems models with the real situation and using the comparison to define desirable, feasible changes in the real world. In terms of SSM, the set of questions to be addressed in arriving at these decisions (and in building the conceptual models) are:

- What combination of structural, process and attitudinal change is needed?
- Why is it needed?
- How can it be achieved?
- What enabling action is also required?
- Who will take the actions?
- When?
- What criteria will be used to judge success or lack thereof and completion of the transformation process?

heckland (1999:A30)

As figure 1 shows, the inquiring, learning cycle of SSM does not stop. It is an iterative, continual learning process. A key feature of SSM is the advice to keep a project vague and wide ranging for as long as possible.

Avoid arriving at definitive conclusions, and don't ignore the current situation by concentrating on some utopian future. At times the process may be more important than the outcome. Going through SSM will change the situation, and this will probably include a

changed opinion about what problem managers were really trying to solve. A clear, absolute goal is never reached (Underwood 1997).

5. CADASTRAL SYSTEMS, SOFT SYSTEMS AND WICKED PROBLEMS

The notion of classifying problems as wicked and the application of soft systems thinking to analyse land tenure situations arose out of a study of cadastral system usage in urban Xhosa-speaking communities during major social, political and economic change in South Africa in the 1990's (see Barry 1999). In rapidly changing situations and situations in which transforming land tenure and introducing cadastral systems involves substantial social change, attempts to reduce land tenure management to a few simple outcomes is naïve and likely to result in outcomes that the formulators of such strategies are incapable of contemplating.

In essence, many of these situations fall into the category of wicked problems. Take for example the case of formalising property rights in informal settlements during South Africa's transition in the 1990's. Drawing largely on Barry (1999), but also on Barry and Mayson (2000), Fourie (1993), Davies and Fourie (1998), Cross (1994, 1993) and Byerley and McIntosh (1994), the following may be observed in an analysis of the tenure system within a settlement:

- The State may view the formalisation process as a means to alleviate poverty and settle people permanently on the land. In contrast, different factions in the informal settlement may have different motivations for living in the settlement. For example, to some it may be a temporary living arrangement whereas to others it may be a means to pressurising the state to provide permanent land rights or securing some economic benefit such as a government housing subsidy. The housing subsidy can be translated into money if the house can be sold and this money can then be invested in land that the recipient holds elsewhere (e.g. in an area where land is held under a form of customary tenure).
- Conflicts and internal competition between various power levels and sub-groups within the community may be internalised in struggles for land, resources and power.
- The community may act in concert in certain situations even though there is ongoing tension and competition within the community. Subgroups are inter-dependent in that they have to act in concert to achieve the broader aims of the community as a result of the relationships between the community and external forces such as the local authority.
- Subgroups form and dissolve continually over time and individuals showing allegiance to one sub-group may sever ties and seek alignment with another faction within a community.
- Overriding group rights may be exercised in certain situations, even when there has been a strong demand for individual rights. Some analysts reason that this is due to the fact that tenure practices in many informal settlements mesh western-based individual tenure with customary practices. For example, in being granted formal land rights, a community may demand, and be granted, individual titles to land with individually demarcated parcels. However, a community, or subgroups within the community may insist on approving any person to whom this land right may be transferred. Violent conflict between groups or individuals seeking to challenge these group rights and other groups claiming such an overriding right may occur.
- Internal rules are not static but are subject to continual change due to the effect of tension and conflict within the local system and between the local system and external actors. Land tenure rules are important and required by groups at settlement level for land administration, such as land allocation and dispute resolution. However, the tenure rules tend to be manipulated by subgroups as they compete for land, resources and power.

In South Africa in the 1990's, the following were observed in an analysis of systems external to the informal settlements

- For a time, there were policy and legislation vacuums while old laws and policies were being repealed, new policies were being formulated and new laws promulgated. Even when it existed, in some instances land policy of the country was swept aside and replaced by an alternative local settlement level land policy dominated by factions within a settlement, or within local government.
- Major organisational restructuring of provincial and local government occurred, which in South Africa incorporated a redefinition of the geographic jurisdictions of land administration organisations, the redeployment of personnel and the replacement of personnel.
- This period of change was characterised by capacity problems in local and provincial government.
- During the initial period of negotiation between 1990 and 1994, the power and legitimacy of the State to enforce law and order in certain situations was severely curtailed. As an example relating to land administration and land tenure, there were a number of land invasions in urban areas, which the state did not, or could not, forcefully prevent. Forceful prevention would have had both political and racial implications, something which both central and local government

wished to avoid. In such situations local government was effectively dysfunctional and unable to carry out its administrative mandate in areas where land invasions had taken place. Power was firmly held by certain factions within groups of land invaders. Moreover, there was an initial considerable upsurge in political violence during the early part of the 1990's. Whereas politically motivated violence subsided after the 1994 elections, the incidence of violent crime remained high.

- It was apparent from the behaviour of officials, politicians and other land tenure stakeholders that the external stakeholders to informal settlements requirements of the cadastral system were not clear, nor were they homogeneous. Statements by different people reflected conflicting beliefs about land management, land administration and the cadastral system. In addition, their requirements changed over time.

(Barry 1999)

Clearly there is no prescription as to how to proceed with formalising land rights in an informal settlement in an environment similar to that described above. Not only is the social-political system within the community dynamic and conflict prevails as the dominant culture, the wider systems such as those pertaining to law making, law enforcement, governance and policy formulation are not clear and the hierarchies of these systems continually change.

Strategies to address such a situation should take into account that intervention may create more turmoil than exists at a particular time. However, inaction, a "do nothing" strategy, may also result in social unrest. Strategies should be designed to deal with "mistakes" or unintended outcomes of any interventions. Moreover the hierarchy of objectives that managers have to address in dealing with such a situation may continually change and there may have to be compromises in one or more of the five E's mentioned above.

Soft systems thinking provides a framework for exploring and understanding land tenure situations in an uncertain environment and a methodology for drawing the different actors into the process and performing interventions. It does not prescribe a method or technique, as this should be devised according to each situation. Checkland (1999) refers to methodology as the guiding principles of method. SSM provides a way of structuring the processes of generating understanding of the situation and continually, incrementally devising courses of action to improve a situation in which there are no right answers, and in fact for which there may be no solution. The process of continually developing conceptual models of the situation, and debating these conceptual systems with various stakeholders with what exists in reality, may assist in improving the situation. Ideally this process should contribute to improving understanding, reducing conflicts and engendering positive attitudes to any action that the owners of the situation may choose to embark on. In volatile, changing land tenure situations, SSM, or at least aspects of it, provides a suitable framework for tackling wicked problems that in themselves are difficult to articulate and define, and for which a clear set of generally agreed objectives cannot be established.

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