Land registration in developing countries

– An introduction

PhD dissertation

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January 2004

PREFACE

The drive in the writing of this dissertation was a belief that Danish experience in land reform is most relevant in developing countries today. I have become increasingly conscious that part of the reason that this body of experience is overlooked lies in a combination of two factors. One is that the Danish profession in land registration is not oriented towards the developing countries. The other is that the professions in development community lack the insight into the practical aspects of land administration.

The idea emerged to write an introduction aimed at reconciling the two widely different professional fields. Having drafted that I was encouraged to expand it further into a PhD dissertation and in doing so I maintained the idea of an introduction. Chapters 4 and onwards make up this "Introduction" and they are designed so that the reader may start at chapter 4 – free of the previous sections with theory, conceptual discussion, arguing of contribution, etc.

This background in part explains the particular or strange form of the dissertation. The analysis and discussion of conceptual issues is presented separately from the passages where they actually belong. The concern was not to overload a general introduction with theory; only to provide an entrance to further theory for those interested. Likewise, there is a minimum of description. I assume that interested readers already are familiar with the substance of land registration and territorial planning and conditions in developing countries. The intention to communicate with widely different professional fields at the same time has led me to use terms in a more popular way than is normally the case. I begin by defining land registration in a broad manner with focus on it's final result namely the "potential backing of official sources of power" a definition that is independent of the particular form of land tenure. Some passages are aimed at the technical aspects and use terms in a more normal and specialised sense.

I am grateful to many people for help and inspiration in the process of writing this thesis. However, only a few shall be mentioned. At the Aalborg University Esben Munk Soerensen and Stig Enemark have persistently encouraged me to get it finished. Peter Dale gave thorough comments on an earlier draft on chapter 5. Søren Christensen, Pia Hoejgaard and Jesper Holm shared the experience during the Namibian lands-project. I am particularly grateful to my colleagues at the Division of Land Consolidation for all that I have learned about Danish land consolidation. Besides that, my great luck has been the possibility to remain in touch with the land issues in other countries thanks to an interest in developing an international dimension of our "domestic" activities. From the other end of the globe I had a re-assuring support from Clarissa Fourie, Rudi Hillermann and Colin Davies in South Africa with whom I shared the interest in the informal settlement issue. Special thanks go to Jonathan Jackson at the University of Natal for his effort in proof reading and for insightful and tactful comments. Esben Norby Clemens at the Aalborg University kindly helped putting my sketchy illustrations in shape. Again, thanks to Esben Munk Soerensen for supervision to an external student and for the final kick to get it all done.

Nonetheless, all errors and shortcomings remain my own.

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January 2004

SUMMARY

This PhD dissertation considers land registration in context of Danish development assistance. Although Denmark has about 200 years of experience in land reform and land related dispute resolution Danish development assistance has been unable to draw on this experience. The problem is defined at two levels: A problem of interdisciplinary dialogue and a problem of technical approach.

The response to this problem statement is an attempt to present land registration from a broad perspective together with some practical notion of how actually to accomplish registration -– without going too much into the details.

The bench mark for the presentation is the information problem: Any system of formalised land management and tenure provision is confronted with an information problem. The leading argument is that procedures in developing countries must be able to operate on incomplete information. This requires iterative and de-centralised procedures. Comparison is made with decision taking procedures that evolved in the course of Danish land reform before the modern information technology.

A second line of argument is that the form of land tenure need be perceived as being basically a dependent variable. This is important to overcome the alleged conceptual scepticism towards land registration. Two conceptual perspectives are presented in which the result of land registration depends on "circumstances". The theoretical analysis is illustrated by practical examples of tenure design.

The contribution lies in three aspects: In relation to development assistance, in relation to Danish development research, and in relation to ongoing cadastral research.

Index

CHAPTER 1: PERSPECTIVE, PROBLEM, THESIS, REASONING

1.1 Perspective

Property relations are a part of the superstructure in human society by being part of its institutions. They serve to confer stability on day-to-day relations between people and to promote further development of productive capacity. Human society demands such stabilising mechanisms. Land-related property relations are created by the system of land registration.

Land registration is the mechanism that defines the exact rules for control over land so that they are acknowledged and enforced by the official system of the state. Land registration is a specialised institutional activity. It is in its operation – literally and metaphorically - a most ”down-to-earth” activity, it basically identifies the pieces of land and the rights in them. People occasionally notice the fieldwork of surveying, but the results and procedures are somewhat invisible and commonly overlooked. We see our ownership documents only occasionally. We are told where to sign by lawyers and brokers, and our concern focuses on affordability and financing. The actual identification of rights happens behind the scene. We need not pay much attention to it. If uncertainty or disputes occur there are procedures ready to handle them. We take land registration for granted. We live in a rich and stable society.

Developing countries also demand stabilising institutions such as land registration. Land registration might be expected to fulfil this role since it is a mechanism in the official institution that can provide a stabilising framework for land use and access to land for the population at large. – However, this role does not materialise. Officially acknowledged and protected land rights are only delivered to ”pockets” or segments within society. Typically these pockets lie in the better off residential areas in towns, business plots and a few rural estates. The majority of people in developing countries do not enjoy the backing by their state of their particular de-facto land use. By far, most land developments happen beyond the formal system of planning, surveying and registration. The supply capacity of the formal land management system fails to meet demand.

Land registration in rich countries rest on assumptions that include gradual change, overall stability, and the availability of resources in finance and of professional knowledge. The poor performance of land registration in developing countries is because its basic approach originates from the rich countries from where it was brought. Circumstances are fundamentally different and the underlying and implicit assumptions are invalid. But land registration systems fail to adapt to these fundamentally different circumstances. Consequently the land registration systems do not deliver that contribution to stability which society demands.

The need in human society for stabilising and supporting institutions triggers a process of selection between elements that might supply this need. Whatever arrangements that succeed in stabilising and supporting land use are likely to prosper and this might happen in one of several ways. Successful arrangements can evolve as a new approach within the official land registration. Or they can originate in other structures in society that lie outside of administration. If or when such new ways of formalising de-facto land use catches on in a larger scale – they may become more established – and eventually assume the character of institutions like the old conventional land registration.

Three critical selective criteria for viable approaches to land registration that stands a chance under Third World conditions are the abilities to operate on far less information, to improvise with whatever skills available and to deliver results within short time. These are characteristic of the

informal sector. But the question is whether the formal system of land management, and in particular the land registration system, is able to respond to the new circumstances so as to adapt to the new selective criteria. The ultimate selective criterion is the supply capacity. If the official system fails to meet urgent demand for land and secure tenure for an increasing part of society – it becomes increasingly irrelevant. This has been the trend in a number of developing countries in recent decades.

Land registration has enjoyed little appreciation in Danish development assistance. A somewhat static perception of land registration tends to associate it with an insensitive imposition of conventional private property and as such not very relevant to development. Understandably, therefore, there is a prevailing tendency to avoid land registration and instead focus more on the immediate aspects of agricultural production and environment. A number of development objectives in Danish bi-lateral assistance do concern land tenure. But although Denmark has generations of experience with land reform this has been little applied in the co-operation with developing countries. It is partly due to our limited colonial history that Danish professions in land management are not oriented towards the conditions in the developing countries. Few individuals have practical working experience abroad and there is no contact with for example the Danida research environment.

There is therefore a dual need to introduce land registration to the development community and at the same time a need to introduce Danish land surveyors and others to the quite different conditions for land registration in developing countries – students as well as professionals.

1.2 Problem

Property formation is difficult to integrate in development assistance. Although Denmark has about 200 years experience in land reform and land related dispute resolution Danish development assistance has been unable to draw on this experience so as to include provision of secure land tenure in support of agricultural development and other land related development in other countries.

On the one hand the Danish profession that has the required technical insight is not oriented towards land issues in developing countries. On the other hand, those who are aware of and in touch with land issues in development assistance lack the professional background and skill to handle land tenure issues. And there is hardly any contact between these two groups. Besides, the development community is generally sceptical concerning formal land registration. The challenge is to establish a shared perception of land registration and to involve professionals from different fields in an interdisciplinary dialogue.

The problem is defined at two levels:

(1) A problem of interdisciplinary dialogue: Other professions in the development community need to have a dynamic perception of land registration so as to be able to handle land issues in project contexts. This raises the need to convey the “basics” of land registration to other professions at a post graduate level.

(2) A problem of technical approach: Land surveyors and others need be introduced to the shift in professional paradigm. This concerns conceptual issues, organisational aspects and the

practical approach to fieldwork. But there are also similarities. Despite fundamental differences, generations of experience in rich countries are also valuable.

The analytical challenge is to identify and re-appraise such underlying concepts and implicit assumptions that impede interdisciplinary dialogue and appropriate technical approach. The challenge is also to convey such conceptual re-appraisal to the various professions.

My response to this challenge has been to write an introduction to land registration in developing countries with the aim of building two bridges: Firstly, to introduce other professionals in the development community to land registration in a broad manner. Secondly, to introduce Danish land surveyors to the shift from a Danish context to that which they will find in a developing country should they become involved in a development project. Chapters 4 to 12 are written as such introduction and are intended to a answer the stated analytical questions and at the same time to be accessible for a broader audience.

1.3 Thesis

The reasoning builds on the thesis stated at the end of chapter 5:

Land planning and land registration in developing countries must be perceived within a different paradigm of information management.

A key feature of any feasible approach and administrative procedure is the ability to operate on a significant degree of incomplete information. Decision taking in planning and registration must be able to cope with a large degree of uncertainty.

The vision or hope to improve living conditions, sustainable land use and social stability through formal land management requires a re-appraisal of traditional approaches and their re-design using the paradigm of incomplete information.

This thesis sees land registration as part of the entire land development process and it approaches land registration from perspective of information. These fundamentals provide (a) a basis for re-appraising practical procedures for land registration and (b) a platform for an interdisciplinary approach to land registration.

1.4 Line of reasoning – a summary

The idea is to introduce land registration from the perspective of information. Any system of formalised land registration has to resolve an information problem. It is argued that this strictly technical description of the problem can be developed as a platform that links the technical aspects of information to land law and to organisational aspects such as decentralisation. Further this platform can set land registration in a perspective of social transition. Some conceptual inconsistencies that frustrate interdisciplinary dialogue are exposed. The idea is to use the information problem, which is essentially non-social as a neutral ground for developing an interdisciplinary dialogue.

The steps developing this argument can be summarised as follows:

Any formalised system of recognising and backing land rights pre-supposes a systematic representation of "reality", that is the actual rights as they are defined and exercised on the ground. The reasoning starts from these two fundamental categories in formal land management: "representation" and "reality". The representation must mirror the reality. This requires descriptions and decisions, the basis for which is information. The gathering and processing of this information is *the information problem*: In the process of creating land rights and in subsequently keeping consonance between representation and reality there is recurrently a need for a flow of information between reality and its representation. This information problem is the benchmark for this introduction to land registration.

We see how in little, rich and well ordered Denmark there is full information, adherence to planning regulation when property units are changed and how an almost instantaneous updating happens. But such a paradigm of full information is irrelevant in the context of a developing country with weak and ressource-starved government agencies, an enormous task of formalisation, and at the same time an urgent need to deliver impact on provision of land and secure tenure. It is quite impossible for information to be gathered, applications drafted and considered, planning regulations enforced, etc. as in Denmark. A few snap-shots are used to give an impression of the chaotic land management situation in developing countries. The implication is that so far as possible, *the information load must be reduced*. From its introduction all subsequent chapters develop this theme.

There are two classical ways of reducing information load: de-centralisation and iteration. These involve a combination of step-wise formalisation and re-organisation of decisions. To develop the issue of de-centralisation I introduce a crude vocabulary of "office decisions" and "field decisions. A strategy that stands a chance of having impact under conditions of incomplete information must "shift decisions to the field". The iterative mechanism for reducing information load is that initial stages can define tenure security using drastically reduced information. Subsequently, if resources permit and if the need is there then forms of tenure that presume more planning and reorganisation can be established. One important point here is that the essence of formal registration is the recognition by the state and its potential backing – not the resolution in detail. This is the urgent priority for millions of people in the Third World who have no protection against public planning decisions and who can not call upon the legal system if their de-facto land use is threatened by individuals. I present one example to argue that it is at least technically possible to phase data volume by phasing tenure form.

I review numerous examples on how practically to phase and de-centralise decision taking in land issues. These are grouped under two headings: adjudication and land consolidation. In the chapter on adjudication I expand the classical definition "the ascertainment of existing rights in land" to embrace dispute resolution. The basic problem is *uncertainty*, which in land tenure issues tends to surfaces in the form of a dispute. We have become accustomed over recent decades to think that uncertainty can be prevented by gathering full information. But under conditions of in-complete information a two edged strategy is needed: To prevent uncertainty by correct information and to dispose of uncertainty by way of a legal process. Disputes can be between individuals, usually neighbours. Disputes can also be between an individual and the administration. The latter type is the eternal dilemma of the state that is charged with both securing land rights and inevitably violating them more or less dramatically in its interventions. I expand the concept of adjudication to embrace the resolution of both these types of disputes, thereby, linking government intervention and tenure provision. But adjudication pre-supposes pre-existing rules

and that is land law. So, one general pre-requisite for resolving the many uncertainties about land rights is rules for de-centralised decision taking. Procedures and instructions must match what is needed. As we conclude, there is an enormous task in reducing the gap between the administered law on the one hand and informal and customary practices on the other. In other words there is a need to develop land law. It will be argued then that the information problem is not solved only by gathering information. Rather the solution lies in a combination of information and law.

The term *land consolidation* is a catchall for the pragmatic ways in which land location and ownership have mutated throughout history. An abundance of approaches are applied internationally. I demonstrate in some detail how in the Danish land consolidation process exactly those decisions that require complex knowledge are decentralised to the local level where the information is located. This is the opposite of what is increasingly the trend in our modern information society namely to gather as much information as possible so as to permit decision taking at various levels away from the field or village. I suggest that the feature of informational decentralisation lies in all the variants land consolidation variants that have proved to function worldwide. It appears that there is commonly some overlap between land consolidation, adjudication and intervention. The analysis of Danish procedures shows that these procedures have the features they have because they evolved in the days when there were hardly any local government capacity and no digital geo-data, ortophotos, GIS, internet, etc. Their way of coping with incomplete information by de-centralising complex decisions can be seen as an aspect of the information technology at that time. This is why these procedures are interesting for developing countries today.

Interdisciplinary consensus on land registration is frustrated by conceptual inconsistency.
One barrier is a *static* perception of formal land ownership – associating it with *a particular form* of ownership. Other professions in the development community implicitly assumed land registration to mean the unadapted export or even imposition of "our" forms of ownership with little regard for the particular social context. Besides, land registration is widely associate land registration with rigid formalities and an obsession about geometrical accuracy. On the part of the land registration professions there is typically the attitude that formal ownership means the conventional parcel-based free hold with land as a potential collateral and that neither forms of ownership nor registration procedures can be discussed. The static perception is therefore held mutually. There is rarely a dialogue between the two camps such as might lead to a shared understanding and to a co-operation on adaptation of tenure forms and of procedures.

Another conceptual barrier to a broad consensus concerning land registration is the problem that common vocabulary confuses rights with powers and, therefore, legal terms are used to describe non-legal situations. De-facto land use practices are commonly referred to as existing land use "rights". There is then little need to register rights that already exist and land registration appears unnecessary. But this confusion of rights and powers overlooks the absence of the "backing" by the state.

I argue that these two conceptual inconsistencies – the static perception of form of ownership and the confusion of rights and powers are the reasons that Danish development researchers are silent on what role the state should assume in provision of tenure security.

This study consistently advocates formal land registration. I agree with the critique of conventional land registration and even contribute to this critique. But I hold that formal land registration should not be avoided. It should be extended to serve the entire society and all social groups and should support all forms of common land use. The key to a more relaxed and open-minded

inter-disciplinary dialogue is to acknowledge that the form of ownership is basically of a dependent nature. The supporting administrative procedures are then also have a correspondingly dependent nature.

First I illustrate from a practical angle that ownership recognised on the basis of a block that may include several landholdings is simply easier to identify than the individual holdings because it involves only one parcel. It gives less information. Later it is shown that terms of tenure can be designed to include or exclude various commitments. Some may be appropriate in one context but not in another. It appears that there is a correlation between tenure form and the volume of information required to establish and sustain it. This leads to a definition of cadastral sustainability as a function of the resolution of cadastral information. But from a wider perspective the point is that a way to cope with the information problem is – deliberately – to design tenure forms with sufficiently low requirements of information that they can be sustained within prevailing resource constraints. Along the scale of information requirements it appears also that the "limousine" with the highest information and updating requirements is the parcel-based level of "resolution".

After this, two chapters are devoted to argue the dependent character of the form of ownership. One chapter sees land registration from the perspective of technology transfer. This permits a presentation that is for a while free of geometry and formalities. The outcome from this chapter is a perception of formal tenure as the "product" of the registration system, three other components being "organisation", "knowledge" and "technique". These four technology components are mutually dependent on each other so that change in one of them impacts on all the others. This analysis makes it easier to see that the product component of tenure form can be as subject to design as any other technology component. Several examples are used to expand the themes of earlier chapter on formalisation and the possible application of modern technology.

Finally, the dependent character of ownership is seen in the broader perspective of social change. We now refer in more general terms to "property relations" rather than narrow ownership. A theory of social change is reviewed in which property relations have a basically dependent status. This theory contends that property relations emerge in a process of functional selection. Having established that we return to the information problem. If it is true that any feasible procedure for land registration in a development country inevitably must be able to operate on drastically reduced information by comparison to conventional procedures, then failure to implement such a reduced-information system, on its own, kills the prospects of project. In other words the ability to operate on incomplete information or much less information becomes a selective criterion. Procedures or agencies that fail to apply this criterion will then not succeed to have the necessary impact. According to this theory, if a formalisation scheme fails, the affected society will search for so-called functional alternatives. Finally, I challenge conventional land registration: Do land registration agencies respond to the challenge to fundamentally re-appraise the methods of land registration so as to satisfy the urgent needs of developing countries? Are they creatively devising procedures that require less information, resources and time? On the basis of personal experience and some references these are questioned.

I contend that a state of Darwinian natural selection operates in the realm of land rights: The environment has changed for land registration. If the agencies and procedures are able to adapt to the new "circumstances" and able to deliver the impact that society needs, namely, a stabilisation of the prevailing regime of land use then they will flourish. The alternative will be to perish by becoming increasingly marginalised by competing modes of provision of tenure security perhaps catalysed by other agencies and by a consolidation of informal practices.

1.5 Levels of reasoning

Reasoning proceeds in four levels:

The information problem and it's possible solutions

The departure point in chapter 4 is from "inside" land registration mechanisms showing how a "land right" is created in Denmark. This shows how information requirements materialise in the land development process and how they are met under the Danish conditions. Re-appraisal of this conventional or "rich country" procedure departs from statement of the "information problem" and leads to the main proposition: That decisions must be shifted to the de-centralised level where the information is. The phasing and de-centralisation of decisions is the key to feasible procedures.

Re-design of formal tenure forms

Developing from these "technical aspects" of information the argument then concerns land policy: Re-design of tenure form with the deliberate aim to sequence formalisation and to reduce information load is indispensable. Examples show that this is possible. Furthermore, examples show that this is even desirable as appropriate forms of land tenure may also be more in line with actual land use practices. Examples are given where tenure forms with varying degrees of communal ownership imply a reduced information load in the registration process.

The dependent character of tenure form

The perspective of technology transfer is then applied. A simple model is introduced in which the technical aspects from previous chapters are located and the main argument about reducing information load is continued. This model is used to sharpen the focus on " formal tenure" as a "product" component. This allows us to see that formal tenure is subject to design just as any other component. The model is helpful in identifying linkages at project level. But it is equally useful in emphasising the potential flexibility in formal tenure as something that can be explored. This is held to be a key point in a dynamic perception of land registration and in the interdisciplinary dialogue.

The dependent character of property relations

The argument that formal tenure is a dependent concept is developed at a more abstract level by contending the dependent character of property relations. This serves to locate land registration in the large perspective of social change while still maintaining the link between the general conceptual level and the level of practical land registration. This section addresses the problem of inconsistent terminology as one factor that frustrates a constructive interdisciplinary dialogue. The most patient readers will at the end of the final chapter find examples in which the dependent character of property relations materialises in de-sign of particular forms of formal land tenure.

1.6 Summary

Chapter 2 locates land registration in Danish development assistance by extracts from Danida´s guidelines on agricultural development. A number of articles published by Centre of Development Research are summarised to give an impression of their position with respect to land registration. Finally, Scandinavian cadastral research is reviewed on basis of a recent collection of articles on that issue. The contribution is argued in relation to each of these three fields.

Chapter 3 explains the methodology. The idea is to shape the thesis as an introduction of land registration for a broader audience. Choice of scope, general propositions, the writers empirical background and the theory that is used are reviewed.

Chapter 4 presents *the Danish cadastral process*. This process ensures that all land developments adhere to planning regulations and that all property related registers are updated when property units are changed. The process is successful in satisfying the need for such changes, which is why there is hardly any informal land development in Denmark. The role of the private surveyor as someone chartered by the state to perform certain functions while also representing the individual citizen is a classical construction which also exists in developing countries and which can be useful in decentralisation. Finally, we will identify some of the assumptions on which the successful performance of this process rests. This gives an idea of the paradigm for land management and land information in a rich country.

Chapter 5 illustrates *the land management situation in developing countries* by a few ”snap-shots”. These are passages from various articles and reports. They convey a lively impression of a few situations. The general land management context in developing countries is established in sharp contrast to the Danish situation by comparing the underlying assumptions. The concluding statements are propositions, which are only illustrated - not proved - by the snap-shot descriptions. Chapter 2 and 3 together establish the fundamental difference in formal land management between developed and developing countries in terms of information management. Two different paradigms are involved: one assumes complete information while the other operates on incomplete information.

Chapter 6 defines *the information problem* and goes beyond it. We identify the basis for analysing the land development process in the universal and simple distinction in geo-data between reality and its representation. We then focus on key decisions in the land development process and their consequent information requirements. The concepts of office decisions and field decisions are introduced and it is argued that increased reliance on field decisions relaxes the overall information load on the process. Reasoning in subsequent chapters relies on this crude argument of the need for more field based decision taking.

Chapter 7 introduces basic concepts of *adjudication* in which we widen its usual meaning to encompass dispute resolution. In this wider meaning, adjudication is represented as an instrument for eliminating uncertainty. Specifically, the uncertainty that occurs in the course of government intervention is addressed. Adjudication is seen as a legal process in that it involves field based court rulings and it, thereby, provides one example where decisions requiring significant information can be shifted to the field. Adjudication is presented as an essentially legal process, one that eliminates informational uncertainty. Comparisons are made with Danish and English experience. References broaden the scope and suggest how adjudication can be applied also to determine the boundaries of community based land use and the extent of community tenures.

Chapter 8 introduces *land consolidation* as a process that introduces mutation into land use patterns. It is a more flexible approach and one more based on negotiation than are for example expropriation procedures. The procedure is illustrated by a detailed review of the information and decision aspect of the Danish procedure. Land consolidation is an approach to change that has the features of formality, field based negotiation and decision taking. Land consolidation can be combined with other activities such as adjudication, increased coverage of formal registration, and government intervention. References abound to land consolidation approaches taken in urban as well as rural contexts worldwide and these are briefly reviewed.

Chapter 9 interprets the shift from a rich country land administration context to a developing country from a perspective of *technology transfer*. The chapter continues to argue the case for shifting decisions to the field but does so by applying the conceptual framework on technology transfer developed at Aalborg University. Selected examples illustrate the various technology components and their linkages. Examples include: Forms of land tenure are interpreted as "products". Data infrastructure and especially the parcel identifier are seen as an aspect of "organisation". The Windows user interface and the need for CPD are represented as aspects of "knowledge", - and the digital orthophoto as an example of "technique". The linkages between these categories are pencilled in. This chapter provides a preliminary sketch of how land registration can be seen from a different perspective than the conventional one of administrative routine.

Chapter 10 sees land registration in an even broader *perspective of social change*. This chapter explains the evolution of land registration systems within a so-called functional paradigm. The logic of this type of causal explanation is introduced and basic concepts of power and property are defined. A general theory of social change, which applies these concepts and explanatory method, is then reviewed. It emerges that property as a category is a dependent variable in the process of social change. Forms of land tenure and their supporting administrative procedures should, therefore, be seen as variables and as subject to design. A final discussion applies these concepts and raises issues, which could be on the agenda in an interdisciplinary dialogue on land registration in the context of development assistance.

Chapter 11 speculates on wider perspectives. The impact of AIDS disrupts capacity building also in land registration. Land registration could be made a medium of primary education. Land-related interventions could be used as catalysts for land registration. Land registration could be promoted through private sector development. Land registration may become a post-graduate specialisation.

Chapter 12 contains annexes with further elaboration.

Chapter 13 is the bibliography. It does, however, not pretend to be a real bibliography on land registration in developing countries.

Finally, a few remarks about what this thesis is not. Its primary purposes is not to argue the case for land registration or property formalisation in developing countries. Rather, it focuses at the level of *the how-question*: it concerns practical aspects *when* land registration is carried out under conditions that prevail in developing countries. The thesis does not attempt to give a typology of land reform approaches. It seeks to limit description and the examples cited serve only to illustrate selected conceptual issues. There is no technical contribution as all examples make use of well-known techniques.

CHAPTER 2: CONTEXT AND CONTRIBUTION

2.1 Introduction

Before and during the writing process there was a temptation to gather information on land related Danida projects over – say – the last 10 years and analyse how land tenure was handled. One could review Danish land related development research from not only Centre of Development Research, but also University of Copenhagen and Roskilde University and the Royal Veterinary and Agricultural University and see their position on formalisation of land tenure. One could examine why Aalborg University where the land registration profession is located does not participate in the reseach network on land related development research (JUF). How could it be possible that the world head office for FIG (the international organisation of land surveyors) located at Lindevangs Alle in Copenhagen and the Centre of Development Research at Gammel Kongevej also in Copenhagen are not aware of each other? - But this would be a different research venture.

Instead we make a narrow selection of references to illustrate what we see as the prevailing attitude to land registration in the Danish "development community". With respect to development assistance we only refer to Danida's guidelines on agricultural development assistance. With respect to development research we only refer to selected publications from the CDR. This review sets the background for the contention that there is a "two-camp situation". Social science oriented disciplines on one side being sceptical towards land registration. Danish land registration professions on the other with only limited orientation towards their potential challenges in the poor countries.

This chapter gives a review of land related development objectives and of land related research in the Danish context. Only few texts or documents are considered but I make a detailed summary with the aim to convey a fair impression of approach and content. The review provides the scene for subsequently arguing the contribution of chapters 4 to 12.

2.2 Land registration in context of Danish Development assistance

The following brief review of the Danida Sector Policy on Agriculture identifies development objectives and strategies where land registration may come into consideration. (Danida, 1996.)

The preface lists the general development objectives. The so-called *poverty reduction strategy* has three key elements:

(i) promotion of sustainable economic growth, where income distribution policy is an integral part of economic policy,
(ii) development of the social sectors, particularly education and health as the means of developing human resources, and
(iii) promotion of popular participation in the development process, a civil society founded on the rule of law, and good governance.

In addition three *cross cutting objectives* are set:

(i) improvement of the legal, social and economic conditions of women and and promotion of women´s participation in the development process,

(ii) promotion of environmentally sustainable development and
(iii) promotion of democracy and human rights

"*Agriculture*" is seen as comprising:

- Primary agricultural production activities based on land as a primary production factor, with "land" comprising agricultural land and pastures, inland fresh water resources and forest land. …

- Processing and marketing of agricultural produce but only during the initial stages necessary for the farmer to reach the market - ….

- Services related directly to supporting primary agricultural production and to processing and marketing, including agricultural training.

The role of government in agricultural development is defined as follows:

Danish bilateral development assistance is predominantly government-to-government assistance. As the agricultural sector consists of millions of private entrepreneurs the role of government is seen as limited to the following:

(i) indirectly influencing the decisions of private entrepreneurs,
(ii) supporting private sector activities …
(iii) controlling and regulating certain aspects of the sector such as produce standards, competition, land distribution, and imports and exports.

Danish bilateral assistance in the form of sector programme support will focus on improving the function of government within these areas, paying special attention to the constraints and potential of small holder agriculture. (Ibid., preface, pp. i-v)

The issue of access to land, tenure security and land registration is addressed in the section on poverty reduction, (Ibid, pp. 32-35). The target group for Danish assistance is defined as the poor section of society and within agriculture the poorest segments of the farming population. However, a limited targeting to particular groups is acknowledged as impossible. Measures with an indirect impact on the poor may be more significant and sustainable than direct measures. Danida emphasises that the recipient government should follow a pro-poor macro economic and agricultural development strategy aimed at broad based economic and social development. This means i.a.: Conducive price and taxation policy, support services, and liberal market structures all with specific aim to benefit small holders. One section addresses the land issue directly:

"Land Ownership and Access

Farm income is to a large extent determined by ownership of or access to land (tenure rights) and water resources, which are normally distributed unevenly. Danida considers that the issue of land distribution, in particular women's access to land, must be part of the analysis related to an agricultural sector programme. In situation where the distribution is such that it clearly hinders

development of the small holding sector, Danida will include the issue in it's policy dialogue with government.

The issue of land ownership and access is complex and has to be analysed in a country specific context, taking into account particular historical, social and cultural factors. General global guidelines are not feasible.

As part of its agricultural sector support, Danida gives high priority to supporting land reform programmes initiated and promoted by governments with a view to achieving more even and secure distribution of land ownership and land user rights, among families and between men and women. Such support may include assistance to the development of adequate land registration." (Ibid., Section 3.22, pp. 34-35).

Land registration has bearing on the following headings in Danida policy:

Women's rights: Danida policy addresses women's role in virtually all particular aspects of assistance. With respect to agricultural development and land rights Danida states that although women play a crucial role in agriculture, in many countries they are excluded from owning land and accessing credit. Danida policy is, therefore, to promote a range of issues improving the situation for women and their contribution to agriculture, including access to land ownership and property rights. (Ibid, pp. 40-42.)

Democracy and de-centralisation: Danida sees a democratic environment as pre-requisite for agricultural development. Typically, however, policies influencing the farmers are introduced without dialogue and negotiation with farmers representatives and services and interventions are implemented without the active participation of the farmers concerned (Ibid., p. 44). Danida, therefore, favours a decentralisation of functions to local units facilitating improved ability to respond to local demand and conditions. (Ibid., p. 45).

Production and environment: Danida addresses the conflicts and options in reconciling increased production with environmental concerns. (Ibid., pp. 47-71). The policy considers such broad issues as land management and soil conservation, irrigation, pest management, fertiliser and plant nutrient management, and livestock. The issue of land rights appears in various aspects. For example, environmental problems may derive from failure to redistribute land to the poor and support them in an intensified production. And interventions to protect state forest and regulating the use of communal lands may reduce access for the poor to "free" firewood and grazing and appropriate compensatory measures may be needed. (Ibid., p. 50-51)

The public sector crisis: Danida acknowledges that issues relating to "a non-performing public sector" have become priorities on the policy agenda. Severe resource constraints have resulted in moral crisis in the public service. Motivation and performance is low, staff turnover is high and financial irregularities are common. "Government has left a vacuum which is not adequately filled by private sector entities and organisations in civil society such as broad-based organisations, NGO´s and the like. ... the public sector crisis will remain the major challenge to much of Danida´s co-operation on agricultural development."(Ibid., pp. 22-23)

Support services: Danida policy on agriculture includes a review of the range of support provided to farmers by government and others, and outlines Danida strategies to improve these services.

They include i.a.: Technical support services, services specific to crops, services specific to livestock, rural financial services, and farmers organisation.

2.3 Contribution to Danish development assistance

The introduction in chapters 4 to 12 has a contribution to Danida policy on agricultural development in the following aspects:

Land registration as a government service

The perspective is that land registration is a state function and essentially a role for government and that development assistance builds on a government–to–government co-operation is in line with that of Danida. Land registration is seen as a government service benefiting but - in principle and practice not limited to - the target groups of Danish assistance but being for the entire society. It is an example of measures with indirect impact.

The key government agencies responsible for land registration are identified, namely the cadastre and the land registry. These are the potential counterpart agencies in a government to government co-operation. It appears that the typical set up within land registration is - perhaps surprisingly – similar to that in Denmark. This applies also to the typical arrangement with private surveyors licensed to perform cadastral survey and advice. It also emerges that this is compatible with the active roles of local community based organisations. Critique of conventional methods in this field introduces some of the professional debate and controversy likely to be encountered in a development co-operation.

Land registration embraces dispute resolution

I high lighten dispute resolution as an integral part of land registration. The general heading is "adjudication". The usual meaning of adjudication is the ascertainment of existing rights in land for purpose of first registration. I redefine and broadens this concept to "dispute resolution" with basically two types of disputes: Disputes between individuals and disputes between an individual citizen and the administration. The former embraces the type of disputes in which numerous individual land users are involved in their daily uncertainty about access to land.

The latter type of disputes arises in the course of "interventions" such as those mentioned in the Danida policy on environmental regulation. It is in this context that assessment of compensation becomes part of dispute resolution. It is explained how the basis for resolving both types of conflicts is "pre-existing rules". This means land law that instructs how rights are defined so they can be protected and this need also include rules for compensation when, subsequently, the same rights are violated in the course of public interventions.

The implication for development assistance is that a pre-requisite to build capacity in dispute resolution is assistance to develop land law. It appears that it is in the combination of intervention and dispute resolution that the long Danish experience of land reform and land registration lies. Particularly sections 7 and 8 on adjudication and land consolidation point to relevant aspects of Danish experience in land administration. The section on adjudication relates to case studies on traditional law with particular focus on women's position.

In the annex to chapter 9 we quote a major survey of land tenure security in a region in Mocambique. The study reveals that land disputes and related tenure insecurity and also fragmentation is a major problem among small holders. The "product-implication" is that adjudication and land consolidation mechanisms are needed.

Decentralisation

The need for decentralisation is argued, but on sheer practical grounds. This so-called informational decentralisation implies the participation of community-based organisations, the consideration of local practice and knowledge. I give extensive coverage of how operations and decisions in land registration may be de-centralised, technically, organisationally and the corresponding knowledge requirements are sketched.

Danish experience in land administration is relevant in this respect. It displays from the first stages in the late 1780's the ability to de-centralise those decisions that require complex knowledge. It is precisely because the institutionalised approaches in Danish land reform evolved before the days of e-mail, fax, digital data, GIS, etc, that their organisational features are relevant for development countries today.

Land registration as support service

Danida policy acknowledges the problems of access, scarcity, and ownership to land. But there is little indication of how to tackle the problems practically. The term "land distribution" and frequent reference to "unequal land distribution" and " land scarcity" may convey the position that these are considered external to the context in which Danida assists in agricultural development.

The practical aspects of land registration are illuminated and, throughout, it is considered how practical methods may be devised within the extreme constraints and requirements in the developing countries; practically and conceptually. Land registration thereby appears as a logical support service to be combined with other support services - depending on circumstances.

Land registration as an aspect of "good governance"

There is a contribution to a dynamic perspective on land registration by emphasising that it includes the capacity to perform conflict resolution and that formal backing can be given to any form of land use. It is emphasised that land registration is essentially a state responsibility. In practice it may well be performed by local committees or similar bodies appropriately empowered.

"Pre-existing rules" is seen as basis for all types of decisions in land registration whether simple identification or dispute resolution. This is land law. A huge problem is that such legal basis for provision of secure tenure is absent. There is often an "institutional vacuum"; an absence of appropriate law and enforcing mechanisms. This leaves the ongoing struggle over land virtually unregulated. And there is often no system of rules securing women's rights.

"Pre-existing rules" to handle recognition of land rights and subsequently enforce them and to resolve disputes in a predictable manner are needed to eliminate arbitrary practices and consolidate the position of weaker segments of society. Capacity to deliver land registration services is, thereby, presented as relevant for achieving overall development objectives under poverty reduction strategy and the cross cutting objectives, such as "good governance", "democracy", "human rights", "rule of law", etc.

2.4 Land issues in Danish development research

This section attempts to give an impression of how land issues have been addressed in Danish development research. The scope of references is narrowed to selected publications from the Centre of Development Research (CDR). The CDR journal "Den Ny Verden" usually publishes a series of articles over a common theme. Articles are often condensed versions of research projects and the coverage is wide. Over the years a great many articles have touched upon land issues in various ways and all of them from a broad social science perspective.

The following reviews articles, which illuminate the complexity of particular regimes of land tenure. They are based on case studies and convey lively descriptions of specific situations of land use and of the dynamics of transition. Rather than giving a condensed review of many references I have chosen to quote more extensively from fewer sources. This offers details for later use in discussion. The following quotes serve to illustrate the broad social perspective to land issues in Danish development research and, thereby, to substantiate the alleged difference in focus as compared to the land registration professions.

The selected development research covers the following topics: Land management in perspective of environmental management, communal tenure and customary law in perspective of development, decentralisation and democracy, and land taxation. Firstly, I present extracts without comments. Thereafter, I argue how chapters 4 to 12 contribute to bridging between this social oriented research and practical land registration.

Note: The Journal "Den ny Verden" (The New World) is published in Danish and all quotes are my own unauthorised translation into English. Two references are not CDR publications: One is Broegaard (2001). The connection to the Uganda Tax Study is that CDR participated in it.

Land management in perspective of environmental management

"Den Ny Verden" (vol. 2, 1994) considers the environmental problems and the need for improved management. The volume covers the appearance of environmental issues on the agenda of development assistance. Some case studies expose the difficulties in enhancing environmental management. Other articles concern the climatic changes and environmental implications of structural adjustment programmes.

The case studies report examples of weak administrations unable to perform resource management, unclear institutional framework with competing authorities, dynamic transformation of the land tenure regime as conditioned by power struggles and by developments in production and economic conditions.

Juel K. (1994) reports a case study from Senegal. It shows how social conflicts on access to land and water and grazing renders a long term administration of local environment impossible. Changes in social relations and in the way resources are used have induced some groups to change communal rights into exclusive rights, thereby preventing especially newcomers access to grazing, forests and agricultural land. These struggles take place as attempts to seize power in central allocating institutions and also as a struggle in the interpretation of key concepts, principles and regulations.

The demand for exclusive rights comes primarily from the strongest political groups of agriculturalists and herds, who via their political position has a possibility to compensate for loss in mobility in case of drought. As mobility has lost its importance in the reduction of risks these groups wish to apply a more pragmatic strategy by limiting the number of users – and in some cases establish genuinely private grazing areas. …

Both the occurrence of private ownership to the grazing areas and the collective appropriation of state owned bore holes represent a fundamental shift in the perception of the way in which the Fulani´s traditionally have perceived their relation to land. It is also a violation of the principle of the free grazing right, as it is formulated in the law of national domain. As such these are examples on how practice and concepts are changed in a modification of use and property structures.

Those institutions that should perform the local administration are seldom in a position to establish the necessary consensus to implement a long term planning of resource utilisation in the local area. Decisions are, therefore, often taken on an ad-hoc basis, just as enforcement of rules becomes unstable and arbitrary. Often the attainment of personal advantages or political legitimacy are more important for the individual decision taker than the strengthening of the local production systems or ecological sustainability.

However, it remains that individual and opportunistic decision taking remains a fundamental pre-condition for resource exploration in Sahel. Due to the difficult production conditions the resources are best utilised when people and animals are spread as much as possible. But for this to happen it is necessary that the herds relatively independently of each other can make individual decisions, take their own risks and, finally, that they are at ease with this way of life.

A case study by Lund (1994) from this volume is from Burkina Faso. He lively describes a case where a land dispute is brought to two different authorities: The religiously based and the state authority. None of them has sufficient legitimacy to enforce it´s ruling and thereby dispose of the uncertainty and the conflict remains unresolved.

Customary law and development

"Den Ny Verden", Vol. 2, 1997 considers the issue of customary law and discusses whether it is a barrier to development. Some of the contributions relate to land and natural resource management and they illuminate with reference to case studies the dynamics of the ongoing transition of customary law and practices.

Bentzon and Odgaard review the various perceptions of customary law and distinguish between static and dynamic perceptions. In colonial days European legal tradition saw customary law as a static heritage from backward cultures. But now there is increasingly in legal thinking and in anthropology the view that customary laws are subject to an ongoing dynamic transformation. The

dynamic character of customary law is illustrated by a case study from Tanzania, Odgaard (1998). Customary rules regulating access to land and especially women's land rights reflect a historical continuity and at the same time flexibility to adjust to changing circumstances. But while common law is documented in legislation and case law, customary law is unwritten and subject to re-interpretation and changes.

Benjaminsen (1997) departs from the two different views on customary land tenure. One view holds these as a barrier to development. Others hold that customary tenure will change due to an increase in population pressure and commercialisation in agriculture. These opposite views have been referred to as *the static* and *the evolutionary theory* on land rights. A common feature is that they consider the idea of private property as superior to other forms of control over land. Private property is modern by comparison to communal tenure.

Benjaminsen discusses these concepts of land tenure with reference to a case study from Mali. The static theory holds that when many or all have access to a resource the users will compete to get the largest possible share. This leads to over-exploitation, which in the long run becomes a loss to the individual user and society in whole. Overgrazing is the classic example. This thinking has been influential in Africa and has lead to state control and privatisation. Measures could be the exclusion of local land users or fines for cutting firewood.

The evolutionary theory considers land rights a dependent variable. This means that land rights are determined by other factors, first of all, by changes in the economic value of resources. These are in turn determined by developments in technology and in markets. Besides, explaining why private rights develop the evolutionary theory has a clearly normative aspect. It considers the individual rights as the most effective and therefore as superior to all other forms of rights. One has the impression that communal ownership is considered an anachronism from earlier stages of subsistence and little market integration. Benjaminsen suggests a revised evolutionary theory contending that communal ownership is the most effective under certain circumstances. In addition, it is demonstrated that individualisation of rights does not necessarily lead to a privatisation in a western sense.

The case study area in Southern Mali has cotton as primary agricultural product. A traditional communal production unit consists of an extended family of up to 80-100 persons. Land is allocated for use by a headman or chief. Besides, the headman adjudicates disputes and negotiates on behalf of the community with others. Once allocated land is used freely. The concept of ownership is closely related to religion. A set of rules for land use is enforced. A process of "narrowing" of rights is ongoing in Southern Mali. In accordance with the evolutionary theory this is caused by commercialisation and by an increase in population. Besides, the political changes in Mali since 1991 have influenced land issues as well.

According to a law form 1935 the state owns all land that is not cultivated; including land lying fallow more then 5 years. Traditional land use was considered irrational. The forest administration enforced a set of rules according to which permissions were needed against payment of a fee for the use of trees. Offenders were liable to heavy fines. The forest administration was preoccupied with the police function although it should also provide advice. A shift in political regime abolished this system in 1991 and started to promote de-centralisation.

Recent policy on natural resource management builds on a strategy of village management. First the area of a village shall be mapped. Then use of each internal zone shall be planned for grazing, for cultivation and for firewood. A number of aid-financed programmes support the new village

management. Besides, some villages have on their own initiative formalised the common lands of the village as communally owned by the villagers. This initiative comes from villages where the pressure on the common extensive lands is great and where people in the village now feel that the use of some of these resources need be controlled. Besides, such initiative requires a certain consensus internally in the village or that it has strong headman.

In addition to these attempts to narrow access to the common lands there is a process of individualisation of the rights in the agricultural land. A process of fragmentation of the production units has been going on for some time. Whereas before they used to encompass 80-100 persons average is now about 17 persons. With the introduction of cash cropping and its increasing importance more men want to control their own production units instead of being subordinated a farther, an uncle or elder brother with differing economic preferences. Benjaminsen suggests with reference to other studies the term "incomplete privatisation" for this type of tenure. That is, an individualisation of access to land without a privatisation in a western sense.

A consequence of this trend has occurred in the form of increased tree planting in the zone of agricultural land. The farmers can now be sure to have the products of the trees. The primary purpose is to monument the boundaries. This happens without any external support. A peasant is quoted for saying "This tree is as valuable as any title with a stamp". This means that if one plants a tree one demonstrates ownership. If one is not a rightful owner of the land one will not be permitted to plant trees of people locally.

Benjaminsen concludes that Southern Mali is an example where communal land tenure has not been a barrier to agricultural development as the static view would hold. By contrast, the tenure regime has proved dynamic and adaptable. Changes in economic value of resources and population pressure have been primary driving forces and this fits nicely with the contention of evolutionary theory. Benjaminsen finally, finds that the problem with evolutionary theory is that it considers other forms that the western private property concept as ineffective and that scarce resources under pressure will transform into such form. But this seems not necessarily to be the case in an African context. There is, therefore, a need to revise the evolutionary theory to acknowledge that forms of communal ownership can be the most effective under certain circumstances.

A proposed PhD project by Broegaard questions conventional registration and looks for a broader perception of tenure security and for a more appropriate design of inputs to support the tenure, especially that of poor households. We quote from the introduction:

" … inquires into how claims to land are made, secured, or lost by households in developing countries. It specifically questions the often-held premise that land titles can be equated with secure land rights, as well as the conventional theory, which views land titles and secure land rights as being preconditions for farmers' investments in land and their sound management of natural resources … The conventional theory has led donors to focus on funding land titling activities and capacity building within the formal land titling and mapping institutions. These projects tend not to reflect the increasing attention that is being placed on the complex interweaving of the social, economic and political sources of land tenure security and insecurity… While secure property rights are undoubtedly important for creating a feeling of tenure security and for motivating investments in land, the conventional theory overlooks the fact that the assignment of rights is insufficient for creating the perception of tenure security, unless other resources (whether economic, political or social) are available for the use and enforcement of the assigned

rights. Furthermore, even when having a formal title, poor households tend to be vulnerable to loosing their land. Also, recent research in Nicaragua has shown that rather than viewing secure property rights as a precondition for making investments, farmers also undertake investments in land improvements *in order to strengthen* their tenure security ...". (Broegaard, 2001, p.1)

Taxation

The theme in Den Ny Verden, vol 3, 2001 is taxation. The volume consists of 8 articles covering the issue of taxation from such varying angles as taxation and democracy, corruption, the impact of aid upon taxation, the influence of donors, and public opinion and development policy in Denmark. The following is extracts from the introductory article by Olsen and Therkildsen (2001), which sets taxation in context of development assistance.

Absence of taxation may well have a number of unfortunate political consequences. Irrespective of how unpopular tax is taxation plays a critical role in in the formation of states and thereby for the creation of societies where features as cohesion and loyality are important ingredients. Taxation is also important for the relation between the holders of power and their subordinates. This is because taxpayers "claim" something in return for tax. "No taxation without representation" goes an old saying.

This may well constitute a problem for donors. Aid can be seen as a "work-free" income like revenue from oil. If such "free" income is considerable this may have unfortunate consequences. Leaders dependent on this may not be particularly dependent on their own citizens. This has dramatic consequences for the openness of the regime for needs and preferences of the citizens and, thereby, for the scope of democracy. This logic implies that flow of aid from rich – and democratic – countries may in fact reduce *the democratic potential in taxation*. So, while donors attached democratic conditions for aid perhaps, this very same policy eroded the possibilities to promote democratic governance?

The role of donors should be seen closely together with taxation. Typically, donors finance about half of the public expenses. As much as 70-90% of public investments and a good deal of recurrent costs are financed by donor money. It is most distressing that international aid to Africa since 1993 has been reduced as much as it has; for Europe as a whole by about 22%. Less aid can only mean one of two things: Either the African states must reduce their effort significantly or they must increase taxation. The continent is increasingly seen as an extremely difficult case. If that is so, that there is no political will to continue aid to Africa then there is only the option left to increase taxation.

One may object and hold that it is simply not possible to tax poor people in poor countries more than is already the case. However, the IMF and the World Bank have the position that a decrease in aid will be the motivation for African decision takers to seriously to start reform their own political and administrative systems. Less aid will also force them to set priorities in their areas of intervention. As it goes presently far too many development activities are initiated solely because donor money is "free" and because donors push.

Studies in taxation, taxation policy and administration are critical to the poverty orientation of development assistance. This is because future poverty and growth oriented development to be realistic will have to rely on an increased local financing, that is, more on tax and less on donor money. Increased local taxation raises a long list of complex problems. Some concern democracy

and human rights. Others are about economic development if taxation is increased: Will it slow down while at the same time governments become more responsible? (Ibid., pp. 5-9).

A study on taxation in Uganda (LGFC, 2000) gives an impression of the practical sides of taxation. The study embraces all forms of taxation. I quote only from the passages on land / property taxation.

District and urban councils have the ability to levy property tax on owners of land and buildings. But few obtain any significant proportion of their revenues from property taxation. This includes municipal councils for whom property tax is traditionally a major source of income. Estimates of potential yields from this source suggest a significant potential. The potential in land tax seems to exceed the amount presently collected through direct personal taxation with some indications coming close to twice the amount presently collected as personal taxation. The general finding of the study is that property tax potential is vastly under-utilised.

The major reasons given for lack of collection of property tax are the costs of valuation and the need to survey properties. The present legislation requires the Chief Government Valuer to carry out the valuations and his resources are at present scarce. There are less than 30 qualified valuers in the country of which less than 20 are available, either in public or private practice, to carry out this role for councils.

There is therefore a need for a simplified method of valuation that can be implemented by high level technical staff based at the district level. Rates can be fixed on the basis of usage (residential), size (square metres), and location (low density area) thus allowing speedy valuation to be carried out, with limited room for dispute. While there may be an element of inequity at either end of the value spectrum in a particular area, these are unlikely to be significant and the inclusion of a much larger number of properties in the tax base will allow the tax rate to be reduced.

There is an expressed need by councils for assistance in setting up the required administration and collection procedures for property tax. The obstacles include:

(1) Cost of valuation of properties
(2) Lack of surveyed properties both inside and outside urban areas
(3) Outdated valuations
(4) Lack of expertise in this form of tax
(5) Lack of current records

The recommendations arising from this study include: Initiate crash programme for re-valuation of property using simple methods. Extend the existing system of property tax/rates to cover appropriate housing outside municipal boundaries. (Ibid., sections on recommendations, action programme and on current performance)

Decentralisation

Den Ny Veden, vol. 3, 2001 is devoted to decentralisation and development. It reviews decentralisation in the development debate and analysis. Therkildsen (2000) reviews the contributions of this volume in an introductory article. The title “Democratic? Decentralisation?” signals that the whole volume considers the linkage between de-centralisation and democracy. Therkildsen

defines democratic decentralisation to mean *the delegation of powers and resources downwards to locally elected units with their own administrative capacity*.

Publications in recent years can be characterised as a collection of country specific case studies. Findings and debate raise many and often contradictory issues. For example, there are reasons to be sceptical about the democratic content in decentralisation because it may give more power to local elites. Also, decentralisation is often accompanied with a certain centralisation, that may be more or less democratic. It is also debated whether decentralisation contributes to poverty reduction. Some argue it as a pre-requisite. Others argue that those local elites that typically gain more power in decentralisation are much less interested in poverty reduction than national elites.

The drive behind the trend towards decentralisation in recent years is also debated. The reason is not just to bring the state closer to the citizen, to improve service provision and promote local democracy. The drive derives from many and often contradictory forces. The overall globalisation explains to some extent the tendency towards a broad consensus internationally on the desirable in democratic decentralisation. A pessimistic view is that globalisation exposes local economies for serious pressure which only few can cope with.

Therkildsen reflects whether it is the grass root levels and their political demands that drive the decentralisation tendencies? Perhaps, paradoxically this seems not be the case! Admittedly, there have been popular demands for increased self-determination but neither in strength nor in geographic extension have they assumed significance. Rather the issues have concerned national self-determination and not so much a demand for increased scope for local decision taking.

New forms of democracy may evolve in what we as western Europeans may be tempted to call marginal countries. The west should not necessarily be considered the centre of democracy. The pessimistic view is that democracy seems to have hardly any future with the appearance of gangster capitalism in the Eastern European countries, consolidation of dictatorships in Asia and the collapse of states in Africa. The optimistic view is that the recent years of democratisation can – after all – contribute to democratic innovation.

2.5 Contribution to development research

Danish development research does consider issues about land and land tenure. The research reports cases of insecure tenure, and tenure regimes in transition and proves the need for improved natural resource management, for land taxation and decentralisation. A general characterisation of these social science oriented contributions with respect to land tenure could be that their core activity is *description and analysis* of the social function of land tenure often with a view to policy formulation. The land registration professions by contrast have their core activities in *identification* and *intervention* at the level of individual rights. In general terms one can say that the social science disciplines deal with *what*- and *why* – questions whereas the land registration professions tackle the *how*-questions.

Danish Development Research associates formal or registered land registration with the classical "exclusive" and parcel based form of ownership. However, this appears only indirectly. Benjaminsen feels the need to argue for a more nuanced understanding that variants of communal ownership may be the best in some situations. Iuel, Odgaard,and Lund describe in their case studies tenure regimes where the private exclusive right would be highly inappropriate. The im-

plication is that private ownership / land registration is not exactly what is needed. Logically, therefore, Danish Research feels little need to go further into the practical aspects of land registration.

This *static* perception of formal land ownership – associating formal ownership with *a particular form* of ownership - is the principal barrier for a interdisciplinary dialogue. It explains why Danish development research is sceptical towards land registration and refrains from going into the practical sides of it.

The contribution in the introduction in chapters 4 to 12 is that it attempts to "mould" the static perception of land registration into a dynamic one. This is believed to be the key to a better inter-disciplinary dialogue. The contribution is listed under two headings: A contribution to theory on land tenure and a contribution to linking theory to application.

2.5.1 Contribution to theory of land tenure

Dynamic perception: Tenure form a dependent variable.

The research examples to which we refer implicitly sound warnings that formalisation into the classical private or "exclusive" rights would be inappropriate, not in line with actual needs for mobility and other forms of land use with degrees of communal ownership and shared land use. It lies implicit in these positions that formal land registration is associated with the classical parcel based and free market concept of land ownership. This is the "scepticism" towards land registration that we hold characterise the perception of land registration among the social science professions. Benjaminsen addresses the issue and argues the need for a more flexible perception of land tenure and to acknowledge that some form of communal tenure may be the best in some situations.

I offer two models both defining land tenure as a dependent variable: The model on technology transfer and the functional explanation. This is in line with the "evolutionary theory" as discussed by Benjaminsen. But the functional explanation goes further. It delivers a "revised evolutionary theory" that Benjaminsen asks for. It is free from the normative element as it does not hold any form of property relations better than others. It just states that "property relations" basically depend on "circumstances".

I present both models in an application-oriented way by combining the conceptual and the technical aspects. Both models present the dependent character of land tenure and follow up with the practical aspects of how actually to design, formalise and enforce them.

Conceptual stringency: Rights and powers.

Cohen sharpens the distinction between rights and powers. He spots the problem that common vocabulary confuses rights with powers. This "problem of legality" is that legal terms are commonly used to describe non-legal situations. His analysis of "the concept of a right" illuminates the matching of powers and rights. The legal character of a right derives from it being based on law and its matching powers coming from the backing by the state institutions.

The peasant quoted by Benjaminsen who believes more in trees than titles is in fact saying that he alone defends his "right" – he does not seem to have much faith in backing from official institutions. Broegaard has a similar observation, however, more from an economic view, that farmers also undertake investments in land improvements *in order to strengthen* their tenure security. In the stringent terms one can say that both examples concern "powers" rather than "rights".

This conceptual inconsistency underlies the differing views on formal land registration.

The role of land registration

The confusion of powers and rights overlooks the absence of "backing" by institutions. Danish development researchers are silent on the question on whether peoples de-facto land use, which they themselves defend through tree planting or investments should also be backed by institutions. In Benjaminsens case there are references to various state agencis, public policy on village management and donor support. But there is no reflexion on what role the state and or development assistance should take in supporting various forms of de-facto land use.

Broegaard addresses land registration directly. The formal land titling and mapping institutions tend not to reflect the complexity in real life, issuance of document-titles may not be economically sustainable and poor households may become vulnerable with formal title. Broegaard hints implicitly that one has to look for appropriate tenure alternatives beyond the formal land registration institutions. This is a common reaction of development advisors when confronted with the registration agencies: To want to avoid and by-pass them. As a professor in sociology admitted:

"I always used to think of The Surveyor General´s Office as a place where elephants go and die". (Chris Tapscott, 1993, Windhoek, Namibia. Quoted with permission).

I agree with the critique of the conventional land registration and title document-focused perception of tenure security. By contrast, however, I hold that there is in principle no conflict between formality and appropriateness. Any set of rights can enjoy formal recognition and backing from the registration agencies. These institutions are responsible for land registration nationwide; not just for certain more affluent social groups. Furthermore, it is the responsibility of the formal registration agencies to contribute to the innovation of tenure forms and their supporting administrative procedures including ongoing control functions / enforcement. I broaden the perception of land registration by including dispute resolution (chapter 7) and transition mechanisms (chapter 8).

It follows logically from the fact that bilateral assistance is a government-to-government cooperation that the appropriate government agencies participate. This may well mean setting requirements or conditions to delivery of appropriate tenure security as part of the target group and poverty alleviation objectives. This would develop the ability of formal tenure provision to respond to specific and urgent needs and – most importantly – to increase its capacity significantly.

The evolution of conventional land registration

The functional explanation of property relations implies that also land registration being a support function to property relations is a dependent variable. I argue that there are fundamentally different circumstances in present day developing countries rendering the conventional land registration approaches unsustainable. This is formulated in terms of information: Land registration has to shift from a paradigm of complete information to one of incomplete information. I challenge the ability of land registration systems to do so. If the conventional land registration systems fail to innovate and adapt to the different conditions in developing countries, they will gradually fade away. Innovative response to society's demand for stabilising property relations will then appear in other fora, beyond the land registration agencies.

Only study of ongoing trends can reveal the actual ability of land registration to respond to the circumstances in developing countries. I use functional explanation to set the challenge by drawing on the theories of Cohen and Stinchcombe. A discussion is, thereby, opened for possible other complementing or alternative models of explanation of land registration in which the fields of development research and land registration could join.

The concept of de-centralisation

The common concept of de-centralisation in development research and vocabulary has the broad social and international perspective and it always associates de-centralisation with democracy. Although – as Therkildsen shows – de-centralisation is not necessarily good for the target groups of development assistance, de-centralisation is, nonetheless, implicitly understood as something "intrinsically good".

The concept of decentralisation that I use stands out in sharp contrast: It is a concept of *informational* de-centralisation. This concept of de-centralisation reasons consistently from the *material* aspects of information gathering and processing: Practical considerations alone dictate that decisions be decentralised to the levels where that information lies on which those decisions shall be based. In practice this means shifting decisions to the field. By so restricting itself to the material aspects of information gathering and processing this reasoning is essentially *non-social*.

One aspect on which detailed information is only available locally is "preferences" of the people concerned. Another is the actual situation such as landscape, soils, and actual land use. This information lies in the knowledge of the people who live there. However, accessing that information by de-centralising decisions to people and their community is – *incidentally* – democratic.

One can say that precisely because de-centralisation is argued indispensable on a material basis *alone* the reasoning strengthens the general case for de-centralisation.

2.5.2 The information problem as linkage between theory and application

I illustrate theoretical propositions with practical cases. This links the what- and the how- aspects. By so showing the technique-side of land registration and discussing tenure forms it suggests technical solutions to be considered in more detail in specific contexts. However, there is no contribution in technical aspects; reference is only made to well known techniques in land registration. The contribution is to draw attention to the wide range of technical solutions now available, especially the potentials in combining the advanced modern methods with the classical

simple techniques. The scope is, therefore, wide for adapting land registration techniques to "circumstances".

A number of technical aspects of coping with the information problem as shown. The communication or dialogue aspect is that addressing the technique aspects of the information problem could be a good platform for an interdisciplinary dialogue. This is illustrated by the following examples:

Registration of communal tenure forms

Tenure forms with degrees of communal ownership may well be easier to geo-reference. The parcel level resolution is the most resource demanding. The so-called block strategy relies on geographical units larger than the conventional land parcel and it thereby requires less surveying. Village or community based land tenure, therefore, are quicker to register technically. The reduced information load at various levels of geographical resolution is illustrated by a simple example in chapter 6.

Remote sensing techniques

Photogrammetry is used for large scale mapping purposes for base mapping and often for particular environmental monitoring purposes. I draw attention to the potential in combining such data investments with land registration. For example, a pre-marking of village boundaries and particular reference points could be made. If such systematic recording of village areas and boundaries of local government was included in large scale mapping it would strengthen their status and the likelihood that their existence is taken into account in for example planning and allocation decisions. The trees in Benjaminsens case would be visible in the image and probably even the collective units he describes could be identified.

Spatial Data Infrastructure, SDI

I draw attention to the multipurpose dimmension of modern geo-data. Examples are given on the need for a shared model for data in order to exchange data and use the same information for various purposes. GIS technology is already applied in developing countries. The development of a common data format is important to avoid a conversion problem when later incompatible types of data are created. Land registration is important here because it defines geographical units at the finest level of resolution; namely the land parcels. A dialogue between environmentalist who sometimes trigger large scale surveys and the land registration people would be most relevant.

Land taxation

The Uganga taxation study identifies a number of obstacles directly linked to land registration and the information problem. It mentions examples of excessive requirements of information such as high qualification requirements to valuers and great detail in the valuation of taxable unit, for which reason there is inadequate coverage.

There is a need to simplify valuation criteria, permitting in turn, less formal qualification of valuers and there is a need to significantly expand the coverage of surveyed and registered land and, thereby, expanding the volume of the tax base. A larger coverage would permit a lower rate of taxation, make taxation more legitimate and collection less controversial and easier, and – yet – permit a total increase in revenue.

Relevant techniques include those mentioned, especially in chapter 6 and 9, Photogrammetry, GPS, point references and using the address as reference and key ID.

The point on "*democratic potential in taxation*" sets the potentials in these techniques in the broad social perspective. GPS, addresses, etc. may well be the technique side of the key to increased revenue to local government. By building the foundation for more legitimate and effective taxation these techniques could contribute to greater accountability and good governance. Again: A dialogue between development researchers and land registration profession would be most relevant.

2.6 Position and contribution in cadastral research

2.6.1 Context

The position of the thesis in perspective of cadastral research in Denmark an other Scandinavian countries can be established with reference to an international edition of the Norwegian Journal "Kart og Plan" (1999). This edition reviewed the history and leading issues in research and education in land administration in the four Scandinavian countries.

Generally, one can say about the land administration profession, notably land surveyors, that the profession and the related higher education and research can be seen as a response to society's need for a competent handling of property transactions. In some of the Scandinavian and western European countries cadastral issues have been taught for more than 100 years. As property relations are inherently legal in character there might be a temptation to conceive cadastral science a sub-discipline within law. This, however, would be misleading because the cadastral subject area includes substantial technical elements (Stubkjaer, 1999, p.267). It is an applied discipline oriented towards the creation of property, property transactions and the ongoing transformation of the property system. Education in the land registration disciplines is, therefore, of an applied character. It comprises surveying, law, economics, tenure systems, land use planning, land consolidation and so on. And the research has the same applied character. The actual professional activity tends to orient research to provide insights and knowledge for more efficient ways of doing things. (Sevatdal, 1999, p. 266).

The attention of the profession and of research and education has over the years reflected the requirements in the ongoing transformation of the property regime. More or less the same pattern occurred in the Scandinavian countries. Initially, the task was the dissolution of co-owned land, then land consolidation was on the agenda. Mattsson (1999) mentions that the first professorial chair in the discipline in Sweden established in 1932 was in land consolidation. Up until about the 1960s agricultural land development was the main attention. Then came the decades of urbanisation where new issues like urban renewal and urban planning and, generally, regulation of land use emerged. Nowadays planning issues, and the geo-data related issues like GIS, data-models, address systems complement the traditional issues of technical surveying and the core cadastral topics. The name of the discipline has been adjusted accordingly. The broad term

"Real Estate Planning" is now commonly used. But the applied character of the discipline remains. The prime concern of Real Estate Planning is with property units and the property systems connected with them, not with scientific methods. (Mattsson, Ibid, p. 257).

Land registration issues in developing countries have entered the scene in the course of the 1980s and 1990s. The Finnish University reports of a research project on real estate problems in the developing countries (Viitanen, 1999, p. 281). The Swedish KTH (Kungliga Tekniska Högskolan) has established a master of science programme in Land Management (1,5 years) for students from the former Sovjet union. The whole programme is devoted to property rights. At University of Aalborg, Denmark a few students have written their final masters thesis as a case study on land registration issues in developing countries. And Enemark published the review of land registration systems in a large number of different countries, (1997). The Norwegian real estate education does not offer course modules on land registration in developing countries, but students are introduced to international literature on the subject.

The international orientation has been facilitated through the FIG, which provides the international forum. Here professionals participate in conferences and in the FIG commissions on a wide range of specialised issues. The FIG is interesting from a point of view of development assistance because this forum has the active participation of land registration professionals from many developing countries. All papers presented are available through the FIG head office in Copenhagen.

Another aspect of internationalisation occurred up through the 1990s: Some of the major private firms became involved in tendering of larger international contract on mapping and land registration. Some projects were EU financed and concerned Eastern European Countries in the process of establishing property systems based on private ownership. Others were financed through the World Bank, Nordic Development Bank and similar lending institutions. This "discipline" of tendering, project management, implementation in other countries, etc. evolved in parallel to and without much impact upon the normal private land surveying business. Increasingly, there have been visits by delegations and course participants from other countries or group of professionals from the counterpart countries in larger projects. An increasing number of individual professionals have had short terms assignments in international projects on their particular specialisation.

2.6.2 Position and contribution

This thesis can be seen as yet another case where the international issues in land registration surfaces in the "domestic" professional environment. The particular feature of this thesis is that it is specifically, aimed at promoting land registration in Danish development assistance and in Danish development research. It seeks to promote inter-disciplinary dialogue part of which is to straighten out conceptual inconsistencies. It is of an applied character in that it seeks to introduce professionals to the shift in professional "environment". It is action oriented in the arguments for more field-based decisions.

It is a new aspect of cadastral research that the aim is to communicate the essence of land registration to other professions and to do this from a perspective of information. The aim is not " … to provide insights and knowledge for more efficient ways of doing things" in our own society but in developing countries. The contributions argued in relation to development research could be seen also as contributions to cadastral science.

Two aspects could be argued as contributions to cadastral research. Firstly, the definition of cadastral sustainability as a function of spatial resolution, (chapter 6.6). This concept draws attention to the fact that it may not be possible to "sustain" the conventional parcel based register. Perhaps only spatial divisions at a more crude level can be sustained. This means that the registration of rights in land may have to refer only to blocks with a number of individual households or land users. Indicators of sustainability are described and references is made to a number of experiments. An alternative option is to use a system of addresses; here the Danish address system is interesting.

Secondly, expanding the concept of "adjudication", (Chapter 7). A particular contribution is the broadening of the meaning of adjudication to mean dispute resolution and to be a way of coping with incomplete information. The classical definition from Lawrence "ascertainment of existing rights in land" is expanded to "… the resolution of a conflict by the application of pre-existing rules". Furthermore, the concept is made intervention oriented by phrasing it as "the ascertainment of the *new* rights including compensation". The concept of "pre-existing rules" from English law illuminates the urgent need for land law that defines the principles for practical handling of land issues / conflicts. This is a practical aspect of the general term " rule of law" much used in development objectives.

The theory on technology transfer and on functional explanation of property relations are used primarily to argue to the social science professions that associating formal land tenure with a particular form of ownership is a static perception. At the same time there is a message to the traditional cadastral approach that forms of ownership and their supporting survey and registration regulations are in the large perspective dependent variables subject to ongoing adjustments in response to changing "circumstances". Drawing on this the theory can also be seen as a contribution to cadastral science. Functional explanation illuminates the dynamic character of property relations and the supporting administrative procedures in the large perspective of social transformation. It explains how and why new property relations develop. This explanation is more general than the common cited immediate economic rationale: That secure property rights are good for economic development, create basis for credit, etc. The contention is wider: Human society needs property relations to stabilise those production relations that exist or are about to emerge. Besides, the concept of functional alternatives can be useful to understand the co-existence of a wide variety of cadastral systems world wide.

The statement of a paradigm shift may be seen as a contribution in the sense that it states in a blunt manner what many people have already experienced; that things are very different in developing countries. A bit of a surprise is waiting for those who have only known the "local" Danish land management environment with national coverage of registers, digital cadastral maps, continuous updating, planning control, etc. The crude message is: Be prepared for incomplete information and uncertainty in a much larger scale. And especially for the cadastral surveying aspect: Forget about full coverage of parcel based registration. On the technique side there is no contribution. All examples are well known.

2.7 Discussion of innovative potential of conventional land registration

The thesis contributes to the professional discussion by questioning the ability of land registration agencies in developing countries to respond to the need for innovation. The background for such a perhaps provoking challenge is that we feel there is in the land registration community an

implicit assumption of convergence towards the cadastral systems in the now rich countries. There may be different starting points in developing countries, there may be different local needs, but at the end of the day we shall all have full coverage of parcel based cadastre. I feel that this is not the way things will develop.

The difficulty with implicit assumptions is that one has to deduce them and sense them on some instinctive suspicion. Statements on such basis often appears simplistic and unfair. Nonetheless, we refer to some of the broad FIG statements.

The FIG, has issued a number of declarations on the importance of land registration. The statement of the Cadastre, (FIG,1995), The Boror Declaration (FIG 1996), The Bathurst Declaration (FIG, 1999). These declarations have the global perspective. Together they give a brief and yet coherent introduction to land registration, cadastral systems outlining the main components and purposes. For a summary of the preparatory activities see Oesterberg (1999). These declarations reflect and are indeed the result of an increasing co-operation between the international agencies such as the UN and the World Bank. The FIG declarations are aimed at decision takers, governments, donors and lending agencies. They seek to promote awareness of the importance of improved management of land-based resources in the light of increased population pressure, poverty, rapid urbanisation. They call for commitment and they indicate the measures that need urgent attention. At this global level the FIG declarations constitute "response" the urgent global need to stabilise, develop and secure property relations.

However, some passages rise an instinctive reservation. For example, the Statement of the Cadastre (FIG, 1995) list under performance indicators:

c) ***Timeliness:*** *The system should provide up-to-date information in a timely fashion. The system should also be complete; that is all parcels should be included in the system.*

g) ***Sustainability:*** *There must be mechanisms in place to ensure that the system is maintained over time.*

With the poor developing countries in mind such as those in Southern Africa one spontaneously wonders: Is that realistic to imagine cadastral system with full coverage at parcel level? And certainly, there should be resources to maintain systems over time. But what if there is not?

The Bathust Declaration calls for commitment to tenure provision given *" … that more than half the people in most developing countries currently do not have access to secure property rights in land and given the concerns about the sustainability of development around the globe and the growing urban crisis, …"*, including commitment to

4. ***Halving*** *the number of people around the world who do not have effective access to secure property rights in land by the year 2010.*

This is certainly most needed and should in fact be possible. One is just distracted by the practical aspects: How is it progressing? Do governments and the key agencies respond? Do the land administrations in each country respond to the challenge?

The Bathurst declaration states in it's summary:

" … Land administration institutions and infrastructures will have to evolve and adapt their often inadequate and narrow focus to meet a wide range of new needs and technology, and a continually changing institutional

environment. They also need to adapt continually to complex emerging humankind-land relationships at the same time as changing relationships between people and governments. These conditions should lead to improved systems of governance."

This is an accurate formulation of the challenge to land administrations. But are the land registration institutions capable of such innovation? The general evidence up through the 80s and 90s is that the performance of formal land management and within that formal land registration is poor in developing countries. Furthermore, that the role of formal land management is not only small but declining (see chapter 3 with notes). As argued in 8.5, the problem is that the cadastral profession is reported by for example World Bank reports (see chapter 3) as typically responding with "resistance to change". Grant and Roberge (2002) refer to "the historical reluctance of the legal profession to adopt change" and suggest bluntly that the legal presence be questioned. (p. 35). There may, therefore, sometimes be along way from the FIG declarations to the local land administration. The search for alternatives may therefore happen among other professions and beyond the formal system, for example, in a process of consolidation of informal structures.

It will take a review of country experiences to verify how the established land registration systems actually succeed in responding to new challenges. There certainly will be a wide range of experiences. The overall political regime is crucial and various greatly between countries. Also, the particular combination of persons and occasions may be decisive in each case. Nonetheless, we contend that a question for conventional land registration in developing countries is whether – in terms of functional selection - it will "flourish" or "perish".

Perhaps cadastral research will pay increased attention to the process of evolution and adaptation of land administration institutions in developing countries in response to the – by comparison to rich countries - radically different "circumstances"?

CHAPTER 3: METHODOLOGY

3.1 General features of methodology

Chapters 4 to 12 is the response to the problem statement. They are written as an introduction to land registration in developing countries.

The strategy in this introduction can be summarised as follows: It approaches land registration from a technical angle by going straight to the information problem. This is an essentially non-social problem but it is used as a platform to gradually expand the scope and establish linkages to law and to the organisational aspects of co-operation between communities and government agencies. Likewise resource requirements are shown to include the knowledge aspects and the challenge of applying modern technology. The argument that information requirements must be reduced significantly runs through all chapters. In the most general perspective this is held to be a decisive selective criterion for any approach to formal land registration that, in an analogy to evolution, stands a chance of survive until "*reproductive age*".

The presentation is aimed at Danish professionals in different fields who become involved in land issues at project level, and students who choose to specialise in issues concerning land tenure in developing countries. The intention is to communicate a broad perspective of land registration together with some practical notion of how actually to accomplish registration – without going too much into the details. Readers are assumed to be familiar with the substance of land planning and land tenure and to be ready for a few necessary simplifications to narrow the scope. Readers are also assumed and to be sufficiently familiar with land issues in developing countries to do without much description.

A general feature in the presentation is, therefore, that emphasis is on key concepts while description is kept to a minimum. This emphasis is based on the belief that an early focus on the conceptual aspects provides a more effective introduction to land management in developing countries than descriptive material. The important thing is to develop the ability to adapt to an entirely different situation and an instinct for spotting the key issues in particular situations. Each professional will naturally find his or her own favourite topics and obsessions.

The basic form of problem and argument used in this study materialised in the course of practical work. The role of theory has been to support the digestion of experiences and put them in a broader perspective. The choice of supporting theory has been an equally personal and inevitably biased search for generalised experience that would support the writer's own evolving but yet unclear propositions. Over the years there has been a zig-zag course between working experience and studies. Empirical data and impressions came equally from working experience. Some arguments put forward in this study originated in small experiences that were at the time hardly more than "incidences". The basic argument for reducing information load is a perspective to land surveying, planning and registration that evolved gradually inspired by various practical experiences.

3.2 Scope

The scope and presentation reflect three perspectives that greatly simplify the treatment. Firstly, the overall theme is "information" which all land management and land registration contexts have in common. Secondly, we apply the perspective of "transition", which is common to all de-

velopment assistance, namely to bring about a new situation. Thirdly, the critical issue for formal land management is to increase supply.

The presentation has a focus on key issues and concepts with a minimal use of descriptive material.

Information

The problem considered in almost all chapters is the great practical difficulties in handling of information. It will be proposed that a main problem in formal land management in developing countries is excessive requirements of information. This requirement is inherited from the conventional practices in land administration. The concern is how one might possibly reduce the information load on formal procedures for land planning and land registration.

We shall focus throughout on two classical ways of coping with large information problems: *decentralisation,* which means the splitting of the overall problem into smaller ones each of manageable size and *iteration,* which means a step-wise solution. Decentralisation and iteration in combination provide the key to reducing information load on land management procedures. All chapters play on variations of this proposition.

The strict limitation of scope to the material aspects of information management limits the meaning that can be given to the much-used term "decentralisation". In this text it means *informational decentralisation.* The term "decentralisation" will not carry the usual normative connotations of being intrinsically "good" and, as such, advocated to promote democracy.

Transition

Two leading objectives in Danish development assistance concern land. One is improved sustainability in the use of natural resources. The other is improved security of land tenure especially for target groups. These objectives are both embodied in the notion of *transition,* which changes an existing situation into a new one. The process of transition refers in this presentation to the land development process that affects land use, land ownership and layout.

Transition moves from an existing property situation to a new property situation and the process is only complete once the new property situation has been established. The last step in a transition therefore is defined as the *registration* of the new property situation in the land registry.

Danish bi-lateral development assistance is a government-to-government co-operation. The concept of transition is consequently associated with *government intervention* and involves a component of land *planning*.

The state has a fundamental responsibility to support land rights. This support is provided by state agencies of the cadastre and the land registry, which on behalf of the state identify and acknowledge land rights. Therefore, the state responsibility to manage beneficial change is linked to it´s responsibility to provide tenure security.

Supply

The pioneering research on land management in developing countries has been produced by planners who have understandably focused on planning and management. There is a tendency to overlook that land management in developing countries also involves land registration so that a fundamental re-thinking of land registration practices is just as important in improving the performance of formal land management in developing countries.

A key issue in this presentation is the need for a significant increase in the *supply capacity* of the formal land delivery system. The land development process is seen as including all the steps from the initial planning to the final delivery of new property units, – as illustrated by the familiar Danish subdivision process. The factors limiting delivery derive from information requirements, which are argued to be excessive in the conventional approaches. This is why the concern throughout this book is on information requirements in the land development process and how these may possibly be reduced.

3.3 General propositions

The methodology in chapters 4 to 12 is characterised by stating some crude propositions as a basis for an initial general perception of land registration. Each individual person is then free to refine the understanding, to disagree, to seek more nuanced knowledge on particular aspects according to personal preferences, needs in projects, etc. The point is, therefore, not only whether the main propositions are true but also whether they are useful as means of communication of a dynamic perception of land registration.

The following general propositions are advanced:

The practical task for land registration is *identification* of land rights. That is, identification of pieces of land, what rights are attached to each of them and who hold them. The largest practical task in land registration is, therefore, information gathering and processing. This takes the resources and the time. This information serves as basis for decisions to acknowledge each specific land rights, its location, its content and the holder. These are the decisions in the cadastre and the land registry. The need to identify defines *the information problem* for land registration. It is the ability of the land registration system to resolve its information problem that decides whether it succeeds or fails in performing its fundamental function.

Land registration is more than just a neutral registration of existing situation. Land registration is closely linked with the ongoing *transition* of land use. The challenge for the official land registration system is not only to keep up with the descriptive recording of land rights but – in cooperation with the formal planning system – to facilitate or accommodate those transitions of land use that are happening and those that are needed. Be it proclaimed reforms or inevitable developments.

The problem for both planning and registration is the implicit assumption of full information. This leads to the tendency to require excessive information for decisions – a bad habit inherited from the approaches developed in rich countries. Consequently, capacity of formal land management remains at an insufficient level where the supply capacity falls far behind demand. Excessive information requirements limit the scope of *government intervention* whether as particular projects or in guiding and promoting other actors in the land and housing development sector.

The challenge for land registration is to shift from a paradigm of complete to *a paradigm of incomplete information* as a basis for its decisions. The key to this lies in iteration and decentralisation, that is, to reorganise the decisions. The ultimate criterion of success is the supply capacity of the entire formal system. Its ability to respond to immediate demands for land of all kinds and to have some rational guidance impact on the way in which land based resources are used.

There is a need to re-invent pragmatic approaches that operate on incomplete information and which are clearly action oriented and not so easily distracted by temptations to hesitate and drift into in-action. The tendency to demand full or excessive information has accelerated as information technology has developed. Professionals in rich countries are gradually becoming more accustomed to work in the representation than taking decisions on the ground directly with the concerned people. The solution lies in shifting more decision taking to the field.

Land administration *experience world wide* displays numerous variants of field based decision taking. This is in fact how land administrations and land reforms have been handled before the expansion of public administration in the rich countries, and before the revolution in information technology. Many country experiences in dispute resolution and land consolidation show how practical methods to handle land issues have evolved under various circumstances. People were accustomed to handle land issues on site much more than today. They were less dependent on detailed descriptions like base mapping and updated cadastral maps and registers. A renaissance of these approaches is now needed and yet at the same time we must also explore all possibilities in the new technology.

Land registration must be understood also in *the broad social perspective*. Much of the lack of inter-disciplinary dialogue derives from failure to appreciate the fundamental function of land registration in human society. "Domestic" theory from land registration is not enough as a basis for an inter-disciplinary understanding. Two theories "external" to land registration are introduced. One concerns technology transfer. The other is functional explanation. Both are used to illustrate the essentially dependent character of property relations and, thereby, of land tenure and land registration in the broad perspective of social change.

3.4 Approach to information problem

The reasoning in the solution oriented chapters 6 to 9 applies a combination of propositions and simple graphical illustrations.

The idea in chapters 6 to 9 is to support the analysis of the information problem by a simple graphical image. Displaying the fundamental distinction in geo-data between representation and reality – and sometimes using the term that there is "a dotted line" between them to be passed in either direction.

Fig 3.1 The basic distinction in geodata between reality and representation.

This model is then used to illustrate the few crude categories “field decision”, and “office-decisions” and the information flows in formal land management. The case for informational de-centralisation is based on this model as apparent in figure 6.2 and 6.3.

The background for these categories and a crude illustration has been a growing awareness of the need for some rather simple and perhaps brutal way of communicating a simple but apparently overlooked problem: That excessive requirements of information drains costs and catalyses in-action.

It is the feeling that modern information technology encourages an increasing reliance on representations in maps, registers, GIS, etc. The younger generation is more familiar with the computer world than with the field. The perception of reality is unclear and so is the distinction between action and in-action.

Planning, surveys and other descriptive and analytical activities are subject to fewer external constraints than are the field implementation of land registration. A planning project can be successful without necessarily delivering material change on the ground. There are therefore incentives to avoid the confrontation in reality by redefining and inventing new information requirements, which in practices amounts to seeking refuge in data collection.

The concept of “the dotted line” between ”representation” and ”reality” symbolises in a therapy–like manner something to be crossed in order to achieve targets in land registration. It emphasises that the goods in land registration are delivered on the ground.
The categories of “office decisions” and “field decisions” allows us to emphasise that field procedures are fundamental in the handling of any practical issue concerning land rights. The message is: Do not be afraid of field decisions! Once this is established it is easier to see that insisting on bringing the complexity of actual land issues into the representations be it GIS systems or courtrooms – implies enormous information gathering and processing problems.

In this action-oriented vocabulary de-centralisation then becomes “shifting decisions to the right side of the dotted line” or “to the field”. Land consolidation and adjudication are presented – in subsequent chapters – as practical examples of how decisions can / need to be shifted to the field in practice.

3.5 Towards a dynamic perception of land registration

The static perception of land registration derives form conceptual inconsistency or even misunderstandings.

Five such conceptual misunderstandings are addressed, which we believe are common and make up a barrier for a dynamic or flexible perception of land registration. Chapters 4 to 12 communicate five statements intended to mould the common static perception of land registration into a more open-minded one.

These propositions are not addressed directly from the outset and they are not stated so bluntly in the text. They become more and more pronounced as the presentation proceeds and at progressively higher levels of generalisation. Referring to the illustration 3.2:

(5) Land registration as the last stage in the formal supply process is one of the messages in the review of the Danish procedure in chapter 4. It is repeated again in chapter 6.

(4) The essence of identification is to eliminate uncertainty – not the centimeter-obsession. This is in focus in chapter 7 on adjudication. Warren is quoted for his diagnosis of "the 0,01 syndrome".

(3) The example in chapter 9.3.1 from the proposed model in Namibia shows registration requirements as function of tenure form. Variants of communal tenure with "block" reference are shown to be far less information loaded in chapter 4 and an example is quantified in figure 6.4.

(2) Chapter 9 applies a technology-theory vocabulary to put this point. Tenure form is treated as a "product"- category, as a design parameter. More practical aspects such as surveying technique, geo-data, and learning continue the reasoning from previous chapters.

(1) This statement sets the function of land registration at the level of society. It states or argues the position of land registration as part of a society´s instituiuons. This is the basic argument for addressing formal land registration in a development co-operation – not avoiding it. The purpose of drawing on theory from Stinchcombe and Cohen is that they establish the fundamental need for property relations and their dependent character. And they have a stringent terminology to distinguish legal and non-legal situations.

It is the intention with this perception of and attitude to land registration to encourage also other professions to set requirements to the land registration agencies. They should not tolerate the common attitude in land registration agencies not to contribute to innovation of tenure forms and registration methods or even outright "resistance to change". Instead the full importance of land registration agencies must be acknowledged. They are in principle responsible for the entire society – not just for pockets of it. And if – at present – they are incapable to serve all layers of society by delivering tenure security to all forms of land use and all groups of land users – then they should be developed to do so.

(1) The essence of land registration is the backing of official sources of power. There are state agencies charged with the responsibility to do that. They are the cadastre and the land book and are in principle responsible for the entire society.	Not be confused by the fact that present land registration agencies are often poorly developed and only delivering formal tenure to pockets of society.
(2) The form of land rights is a dependent variable. It should reflect and support real-life needs. At project level land tenure form must be perceived as a flexible parameter - subject to design.	Not to be confused by the fact that conventional tenure forms usually are seen as “given” and new and adapted forms of tenure as “impossible” according to regulations.
(3) Registration requirements are identification requirements. They are a function of tenure form. Adapted tenure forms open for "feasible" registration procedures with less information requirements.	Not to be confused by the usual tendency to accept existing survey requirements and their accuracy requirements and specified survey procedures as “given”.
(4) The essence of land registration accuracy requirements is that they serve to eliminate uncertainty. Particular land rights need be unambiguously identified for practical use.	Not to be confused by the common narrow focus on geometrical “centimeter-accuracy”. One must be open to all possibilities on the ground and in modern information technology.
(5) Land registration is the last stage in formal land delivery process. Limitations in land registration constrain the overall supply of surveyed and planned land.	Not to be confused by common failure to distinguish between de-facto and de-jure access to land. The prevalence of informal development is due to insufficient supply legal and affordable land.

Fig 3.2 Five statements on land registration.

3.6 Empirical background

The first thing to say about the methodology is that it is very much personal. It comes out a passion for certain aspects of land, people and law. The contours of problem and arguments have materialised in the course of practical work. The drive in the writing of this thesis and of previous publications has been some strange need to put experiences into some theoretical “order”.

Over the years there has been a zig-zag course between working experience and studies. A review of the empirical background therefore has a self-biographical aspect.

A good deal of the early and formative experiences was in land surveying. In a way land surveying is always a trafic between reality and its representation. Either building the representation or the other way – as in demarcation or construction – building reality as decided in the representation. The accuracy problem is instructive: There is always some in-accuracy left. It was one of the first things I was taught as green student in private practice: Be aware of the purpose and judge how accurately is it necessary to measure. This logic flavours my approach to the information problem: How little can we get away with?

At Surveys & Lands, Botswana in the late 70s I worked almost two years with squatter upgrading. This was my encounter with the formalisation problem. It is evident from publications that this has remained on my professional mind ever since. The urge to get theoretical consolidation lead to a course in development studies in Cambridge, UK in the early 80s. Instead of giving a "tool box" in land reform it rather became an introduction to the theories of development, political economy of land reform, etc. and the ideological battles raging in that field. It was here that a series of lectures in history introduced Cohens book on historical materialism. Later I discovered Heals and Johansens books on economic planning and I knew that their exposition of the information problem and uncertainty was something I could use.

In 1993 I got a three months research grant from Danida and this lead to the first version of the thesis on incomplete information. Later this was revised into gradually more expanded versions, (1995) and (1996). During the 90s freelancing was combined with farming and teaching in land surveying. This was the time I experienced a land consolidation scheme as a landowner; from the receiving end. As a free lance consultant one is co-operating with other professions. I became increasingly aware of the perception that other professions more or less implicitly have of formal land registration and of land surveyors, nemely, what I now hold to be a static perception of land registration. I realised the absence of an inter-disciplinary dialogue.

A post graduate course on GIS at Aalborg University in the late 90s made me realise the enormous volumes of data that are now available in our national registers, being updated and exchanged in ever new ways. It occurred to me that the modern information technology tends to consolidate the paradigm of full information and that virtually all attention in information technology is directed towards rich country problems. The background in formalisation made me write the final thesis on the application of modern information technology in a context of informal settlements (1998). It occurred to me that a bit of a surprise is waiting if a Danish land surveyor accustomed to the modern geo-data environment gets a job in a developing country. The idea of writing an introduction to Danish surveyors and land surveying students gradually emerged.

An important empirical background has been my five years in the Division of Land Consolidation, Ministry of Food, Agriculture and Fisheries. It has been a great experience to learn into the operational detail how our particular national tradition functions. Hardly surprising, I am fascinated by the features of informational decentralisation in our Danish land consolidation procedure.

Initially, the plan was just to write an introduction of land registration in developing countries with the dual aim to conveying a broad perception of land registration and of the paradigm shift

from a Danish context to a chaotic land management situation. Later I was encouraged to develop into the shape of a PhD thesis.

Summing up one can say the following about the empirical background and choice of theory:

The contours of problem and arguments have materialised in the course of practical work. The role of theory has been to support the digestion of experiences. Choice of supporting theory has therefore been a *biased* search for generalised experience that would support my own evolving but yet unclear propositions. Field work and empirical data came from working experience. Some arguments originate in small experiences and were at the time hardly more than "incidences". Yet, some of them have proved powerful in shaping much wider perspectives.

The general argument in this thesis about reducing information load is such a perspective to the land surveying, planning and registration that has evolved gradually inspired by various practical experiences. One such early surveying experience that sparked off awareness of information flows in the land development process was this:

We are setting out a nice pre-made design of residential plots at the edge of a settlement. It turns out that part of the area has been used for digging gravel so what we saw in the field was a big hole in the ground. It then impresses young Haldrup how all the effort in designing the plan layout was wasted either because planners did not know at time what was going on or because reality since changed. Within the same week, in the same area we demarcated a group of plots next to the river. People called their councillor and pointed out that this was a flood area every year when the Shashe River is full of water in the rainy season. After these confrontations with the physical environment and the knowledge of the local community we adapted the plans. Gradually, demarcation became a more flexible interpretation of the intention of the plan than strictly following its pre-fixed geometrical details.

3.7 Theory – an overview

3.7.1 The information problem

The definition of the information problem and the stringent focus on the material aspects of information handling draws on Heal (1973, p. 65) who points out that decentralisation and iteration are features of procedures for solving large and complex decision taking (p. 65). This means the problem is split into a number of independent operations, each of manageable size, and each performed by some separate agency. The information available is never assembled in one place and the total information load on the procedure is reduced.

The vocabulary in this thesis in the phrasing of the information problem, the phrasing of the need to reduce information load on procedures, the proposition that the key to this is decentralisation and iteration in combination., etc. is almost exclusively borrowed from the quoted passages from Heal. That is, the design of chapter 6, the statement of the main problem. Then come the how-questions: How decentralisation and iteration can be practiced. The ways that this could possibly be done, are then proposed and argued. They are based on personal experience and very much on personal preferences for doing land surveying tasks, for negotiation and mediation tasks; namely, that the best thing is to decide your surveying strategy only after knowing the terrain and do negotiation and mediation on the ground together with the concerned parties. To put this short I coin the term "shift decisions to the field".

Heals term "informational decentralisation" has inspired the remark in the introduction that I do here focus strictly on the material information aspects. Decentralisation is not as is common seen as something intrinsically "good", as an aspect of democracy.

Heal observes that procedures can be assessed on the basis of many criteria and information transmission is only one. But I have chosen as a deliberate simplification to limit the focus to that of information flows and loads. And I carry the argument further in arguing that the ability to reduce information load is a or perhaps *the* most decisive criteria for land registration in developing countries.

Constrained maximisation

The logic in constrained maximisation is found useful because thinking in these terms promotes awareness of resource constraints. The frequent use of the terms "feasibility" and "resource constraints" is borroed from this theory.

The concept of feasibility bridges into the functional selection model, which is more general. One may say that thinking in terms of constrained maximisation applies at the level of projects. When it comes to the discussion about the performance of conventional land registration in society at large the reasoning shifts to that of functional explanation. The concept of operational feasibility is replaced by that of "flourish" or "perish" for the system as a whole.

Uncertainty

Johansen (1978) is the reference for the concept of uncertainty and the point that uncertainty is the normal situation in decision taking.

Due to the quoted passage (in 6.7) I began to see the professional universe around cadastral surveyors in rich countries as a world of its own where full information is possible; a special case. But as Johansen writes: a starting point for reformulation. And so the Danish subdivision process is used as a starting point in chapter 4. The phrasing of the thesis as different paradigms of full and incomplete information is borrowed from Johansen.

The blunt statement that conventional land registration is based on the assumption of perfect information (7.5) is directly inspired by Johansen (1978).

Uncertainty and adjudication

With the increased awareness of uncertainty the next step in the reasoning is the sequence: Uncertainty – dispute – adjudication. Uncertainty in land issues typically causes disputes. Dispute resolution then becomes a way of coping with uncertainty and incomplete information. This lead to the idea to expand the meaning of adjudication to be not only "the ascertainment of existing rights in land" for first registration but to a wider definition of "the resolution of a dispute by the application of pre-existing rules".

This reasoning was very much facilitated by the references Lawrence, Garner and Bailey. With his World Bank paper of 1985 Lawrence established the definition of adjudication. This paper has proved the benchmark in the recent literature on land registration. The focus of Garner and Bailey is much wider than just land administration. Here, land related disputes are only a special case. Their conceptual framework is used to give land adjudication the wider meaning of dispute resolution.

Garner makes the distinction between disputes between individuals and disputes between the administration and a citizen. The very definition and the quoted passages demonstrates the need to develop procedures to handle the resolutions of the latter category in order to have effective public intervention. It is at this point that I make a link to the Danish experience where the land courts have had the function to establish the consequences of a future event when a project will be implemented. The ordinary court by comparison establishes the consequences of events that have happened. The reference here is my old text-book in land law by Tolstrup.

The resulting proposition in this chapter links informational uncertainty and dispute resolution: To prevent uncertainty by provision of accurate id_data and to dispose of uncertainty by way of dispute resolution.

The efforts concerning adjudication originate in the definition of scope that explicitly include a "transition" that affects land use, land ownership and layout (see above). There is a need for a concept that embraces the complexity that is typically encountered in implementation. A number of references are drawn upon to expand the meaning of adjudication to be such transition-related concept.

There is a need for adjudication in the now classical sense as defined by Lawrence (1985) to ascertain existing rights in land. Disputes between individuals will be uncovered. Disputes between individuals and the administration will occur because the transition involves an element of government intervention, which is not assumed to be conflict-free nor compensation-free. Bailey et. al. (1992) and Garner (1985) are used as references on dispute resolution in this sense. Tolstrup (1970) is quoted for his intervention related observation that the task of the land courts was usually to assess the legal and material effects of an intended *future* change (see 7.3). The unpredictable and often considerable degree of uncertainty in implementation of land related interventions in developing countries inspires linkage to the vocabulary on the information problem.

3.7.2 Dynamic perception of land registration

The commonly cited economic rationale of land registration seems not to impress the social science people. Rather they take it as proof of their belief that land registration is all about primitive export of market based private property. And on the other side, case studies and other literature by town planners, economists, sociologists – if read by the land registration people – will often carry implicit message that land registration is not exactly what is needed. “Domestic” theory and publications from each camp is, therefore, insufficient as a basis for a new and open-minded communication.

To establish a common denominator – a shared basis for understanding – one has to find theory beyond the “domestic” theory of each “camp”. Two theoretical “universes” are drawn upon to

formulate critique and alternative perspectives. One is the theory of technology transfer. The other is the functional explanation of property relations in historical materialism.

Theory on technology transfer

The theory of technology transfer is used to see land registration as a special case of "technology" and for a while free from the details in procedure, geo-data, etc. Once the simple model with four technology components and a correlation principle is introduced we use it as a system of shelves and locate some of the classical land administration issues under the headings of the four technology components. Thereafter, examples of correlation are given. We use this model to continue the arguments from previous chapters. Besides, the model can be usefull to deduce sustainability requirements.

This way of seeing land registration makes it simple to see that land registration delivers a "product" and that this technology component is subject to design and constraints just as any other technology component. I have found this simple model useful at the level of project design. Mainly, because it supports an instinct for linkages and implicit assumptions. This is illustrated by an example from Botswana where the knowledge component in foreign assistance was entirely ignored (see annex 12.4.d). The concept of a carrier of technology can be useful to maintain attention to sustainability. One particular linkage supports the argument in earlier chapters:

Variations in the "product", that is, in the form of land tenure, imply variations in the information requirements in the registration process. This was earlier illustrated by the simple example from Kangengedi, Namibia, in section 6.5. It illustrates only what is intuitively obvious. Also Larsson (1991, p. 147) mentions this possibility to reduce the initial work of establishing a record system by just recording the blocks. But the Namibia example is one where the design parameter in the first place was the form of tenure. This is why I use the Namibian proposals of flexible tenure forms as an example of product design aimed at reducing knowledge requirements and – thereby – also information requirements. Furthermore, I deliberately start with the land tenure, the "product" component in 9.3.1. This linkage between form of tenure and information maintains focus on the possibility to combine desirable forms of land tenure with drastically reduced information requirements.

It may appear paradoxical that so much effort is needed to argue the flexibility tenure form. The reason is that I believe the static perception of the form of land tenure is very deep rooted. Changing it is instinctively resisted. The tactics of chapter 9 is to locate well-known things in a different but simple framework. The final point in chapter 9 emphasises land tenure as a dependent variable and this is the springboard to the following much broader social perspective in chapter 8.

Theory on functional causal explanation

The main references in this chapter are clearly Stichcombe and Cohen. Stinchcombe´s presentations use graphical illustrations of which only one is copied in fig 8.1. Stinchcombe illustrates the same functional logic as Cohen presents. Models of explanation of this kind are inevitably generalisations and it is always a matter for discussion how well they mirror reality. Besides, preferences for conceptual frameworks is a highly personal thing somewhat like music. Whether found usefull or not Stinchcombe and Cohen´s theories set a high standard for well-

found usefull or not Stinchcombe and Cohen´s theories set a high standard for well-stated alternatives.

Historical materialism is Karl Marx's theory of history. In the light of recent historical developments many people would think that marxism is now proved wrong as a theory and has failed in practice. Besides, marxism is widely associated with the oppressive regimes which it has served to legitimise. *"But marxism is not one theory, but a set of more or less related theories."* (Cohen, 1988, 155). Historical materialism is a set of ideas which does not depend on the marxian economics. Cohens four cases of tension between change and law are amazingly similar to Larssons (1993) illustration of the same tension in his conceptual introduction to land readjustment. Larssons illustration of quoted by Mattsson, (1999, p. 255).

Cohen´s presentation of historical materialism and his analysis of property relations in perspective of social change is one possible alternative conceptual basis – external to both camps – on which we argue that a common understanding of land registration could be build. The advantages of this theory can be listed as follows:

Firstly, this interpretation of history defines property relations - at the level of human society - as a dependent variable. I then say that land ownership falls in this category and that land registration is the mechanism that establishes land related property relations. It follows that the legal and technical procedures in land registration are also essentially of a variable and dependent character in the broad perspective of social change. This is the benchmark in a *flexible perception* of land tenure and of the supporting land registration.

Secondly, this theory offers an explanation why we have property relations at all and why they have the character they have. Historical materialism contends that human society demands superstructures to which property relations belong to confer stability upon relations of productions and to facilitate development of productive capacity. Relations of property flourish or perish as they succeed or fail to perform this fundamental social function. This form of explanation where a phenomenon is explained by its consequences is a *functional explanation*.

Thirdly, Cohen illuminates a critical issue to the understanding of property formalisation in developing countries: The distinction between de-facto and de-jure relations. That is, *the distinction between powers and rights*. Cohen demonstrates how a good deal of misunderstanding derives from in-sufficient vocabulary to describe power relations. So that legal terms are used to describe non-legal situations. His exposition of this difficulty allows us to pin-point what formalisation is about, namely, to establish consonance between rights and powers.

Fourthly, Cohen offers *four main types of transitions* where laws are adjusted to changing social circumstances. These are amazingly close to practical cases of tension in land (law) reform and – again – they are useful categories in which to locate different cases of formalisation.

Fifthly, functional causal theory offers the category of *functional alternatives*. Different systems of land registration in countries around the world make up an exhibition of functional alternatives. Each system has its particular historical and cultural background, each have their particular procedures and division of responsibilities between agencies. Yet, they all perform more or less the same function. Where one system materialised, which delivered the desired consequences the search for alternatives ceased and a process of reproduction occurred.

With this basis for dialogue it is believed that the social science oriented professions will agree that there is a need for super structures also in developing countries, that formalised property relations constitute a part of this – *in one form or the other*, and that the function of land registration is to deliver land related property relations and, thereafter, to protect or enforce them. The land registration professions – on their side – must admit that in the large perspective of social development particular forms of ownership and their specific techniques and procedures are only of a temporary nature.

The model of functional selection sets the historic challenge to conventional land registration in developing countries: If it fails to deliver to the society the needed impact – then it will fade away. I contend that this is what we are witnessing already. It is up to the system of conventional land registration to prove whether it can respond to the different circumstances in present day developing countries and – from within – innovate its mode of operation. Or whether over time functional alternatives will evolve otherwise.

The two references Stinchcombe and Cohen complement each other. I find Stinchcombe best to introduce the logic of functional explanation and his concepts on powers and legitimacy useful. And I borrow his simple graphical illustration. Thereafter we proceed to Cohens presentation of historical materialism and how the functional explanation is used to explain property relations. Finally, examples are given where forms of land tenure have been designed to "circumstances". Hopefully, these examples de-mystify an apparently theoretical discussion of flexible perception of forms of land tenure.

Historical materialism, which Cohen exposes, develops and defends is Karl Marx´s theory of history - as the title of his book informs. It is evident and well known that its form of explanation is identical to that in Darwin´s evolutionary theory; "survival of the fittest". Indeed, Marx wanted to dedicate the second volume of his "Capital" to Darwin who, however, politely rejected the offer. (Hobsbawn, 1977, p. 304). But functional selection is widely used as explanation without reference to either Marx or Darwin. A newspaper columnist made a sharp and witty illustration of functional selection in a quite different context. I let this stand as my final speculation on the nature and the mechanics of the transition of land registration systems in developing countries:

"Here´s some advice to people who still want to be technology entrepreneurs. First, embrace the unknown. In the late 1800s, there was thriving ice industry in this area. Bubba and Junior would cut blocks of ice from frozen lakes and ponds and sell them around the world.

These ice harvesters were put out of business by companies that created ice factories. It was no longer necessary to cut and ship ice, because companies could make it in any city and in any season.

These ice makers were put out of business by refrigerator companies. If it was convenient to make ice at a manufacturing plant, imagine how much better it was to make ice and create cold storage in people´s homes.

Interestingly, none of the companies made the transition from ice harvester to ice factory to refrigerator manufacturer, because they resisted the unknown and accepted the known, …" (Kawasaki,2000).

Illustration of supporting theory

As is evident, theory has been drawn from a variety of sources of which some are outside the field of land registration. This is, however, not unusual. Tophoej (1999, p. 18) notes that research in land management traditionally has been characterised by a practice of borrowing scientific elements from other sciences. It is the applied character of the discipline that creates the need for analytical tools from adjoining sciences.

See further discussion of use of theory in 3.9 below.

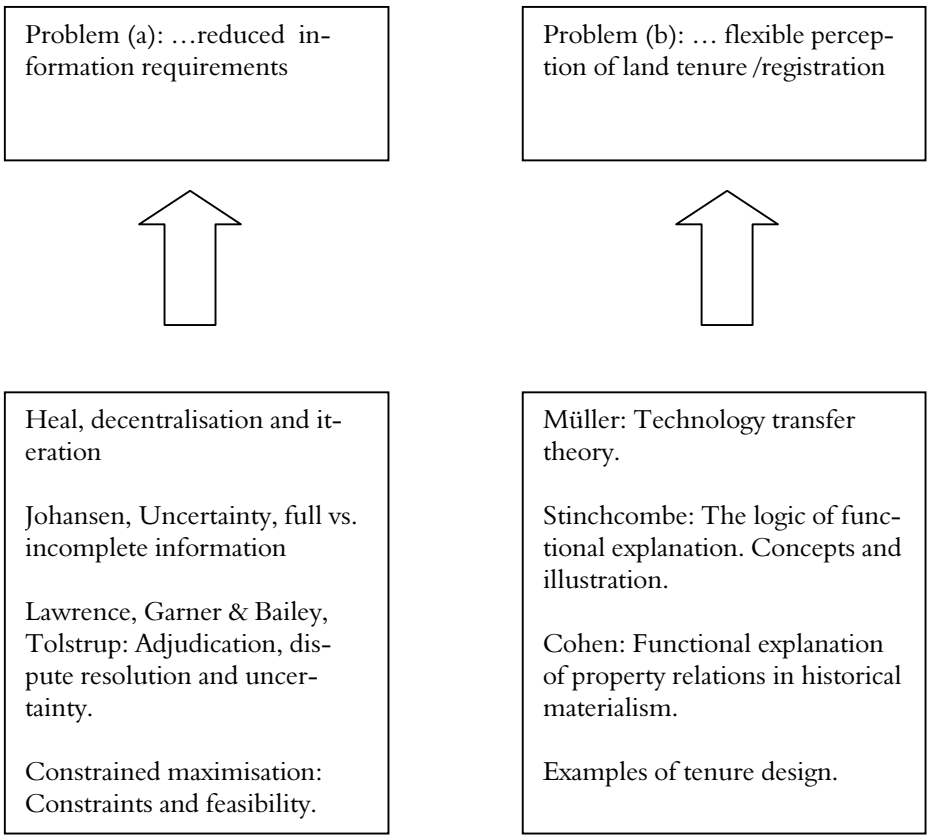

Fig. 3.1: Illustration of supporting theory.

3.8 Discussion of theoretical approach

The search for theory has been guided by the purpose of digestion of experinces and the need to support the formulation of yet unclear propositions. This may imply a number of limitations in the general scientific relevance of the outcome.

Firstly, it means that the scope has been narrowed by the specific purpose of generalising a range of personal and more or less incidental working experiences. Secondly, it means that the analysis is subject to "the confirmation bias", that is, " … the natural tendency to search for evidence that confirms rather than falsifies …" ones paradigm. (Shoup, 1994, p. 245). Thirdly, search for theory for a particular purpose involves an element of equifinality (see 10.2). That is, the tendency to stop or reduce search once useful theory has been found.

The findings may therefore have been equally well or better treated within a different and broader theoretical framework.

To assess the usefulness of the presented thesis a test could be whether - as an introduction - it facilitates for the reader a venue towards some of the central issues in the field. We take two examples.

Example 1: Information load as selective criterion for viable formal land registration.

The concept of information is in our reasoning seen from the side of formal land management. The concern is the practical task of collecting and processing information to accomplish provision of land and of secure tenure. The ability to reduce the information requirements is argued as decisive for the success of formal land management and in particular the formal land registration agencies to deliver their needed service to society. Information requirements are seen as closely related to costs and resource requirements, that is, efficiency on the side of the administration.

This is a narrow land related aspect of a larger issue in institutional theory that sees the creation property rights as depending on costs, however, seen from the side of the individual actors:

"As a first approximation we can say that property rights will be developed over resources and assets as a simple cost-benefit calculus of the costs of devising and enforcing such rights, as compared to the alternatives under the status quo. Changes in relative prices or relative scarcities of any kind lead to the creation of property rights when it becomes worthwhile to incur the cost of devising such rights. This simple model … looks on the development of property rights as a simple function of changes in economic costs and benefits." (North, 1990, p. 51).

Example 2: Relevance of the expanded concept of adjudication.

The analysis of the information problem proceeds to the legal aspect of adjudication leading to the argument for a two edged strategy of preventing and disposing of uncertainty. The resulting expanded concept of adjudication is illustrated in Fig. 7.2. It appears that the reasoning has arrived at a definition of adjudication that integrates the concepts of uncertainty, formal rules and the concept of enforcement. Attention is drawn to the need for development of land law.

This is a special case of a more general issue in institutional theory, namely, " … that complex contracting that would allow one to capture the gains from trade in a world of impersonal exchange must be accompanied by some kind of third-party enforcement." (North, 1990, p. 57). One of the problems is that contracts in reality inevitably involve incomplete information and thus uncertainty as to whether conditions will be met by the parties as agreed. North therefore stresses: "…that creating an institutional environment that induces credible commitment entails the complex institutional framework of formal rules, informal constraints, and enforcement that together make possible low-cost transacting." (Ibid., pp. 57-58).

Both examples illustrate that an analysis that departs form the information problem has the potential of leading from the micro level of the land surveyor to some of the important issues in institutional theory.

CHAPTER 4: THE DANISH SUBDIVISION PROCESS

4.1 Introduction

This chapter reviews how land based property rights are created in Denmark. We consider the simplified case of a subdivision. Danish law requires subdivisions to be processed by private surveyors who are "chartered", i.e. licensed by the state to carry out such changes in property. The law also allows a public authority to take the initiative in bringing about change in property by developing its own land. More dramatically, a public authority may implement infrastructure construction works and consequent expropriations and or land consolidations. The following review of *the subdivision process* reveals the actors, decisions and types of information requirements in cadastral change, which are essentially the same irrespective of the intervention. For more details and background see annex 12.1 and 12.2.

A few observations on terminology: The point of departure in Denmark is that all de facto use of land is in terms of registered property. Creation of new property, therefore, is as a process of change of existing property. Correspondingly, the registration of new property is a process of updating existing information in property registers. The Subdivision Act and its regulations define procedure and information requirements for this so-called *cadastral updating process* which not only creates new property units but which also updates the two basic property registers: the cadastre and the land book.

The driving force in the process is typically a change in land use as envisaged by the owner. Constraint on what can be implemented is that land use must be in accordance with planning regulations. The subdivision process ensures such conformity with land use planning through the system of plan approval. This requirement enables authorities to manage land use by way of approving of and influencing individual decisions. Using this perspective we shall sometimes refer to the process as *the formal land management process*. We will refer to *the land development process* when we need to use an even more general perspective in which the process is seen as developing land from an existing situation into a more intensively managed form.

The key actor in this process is the chartered surveyor in private practice. Most people associate the surveyor with the red and white ranging rods and the instrument on its tripod. However, surveyors perform a broad range of tasks like technical surveys in construction and consultancies in information systems. In the following we only consider the role of the surveyor in the creation of landed property.

4.2 Steps in subdivision

Let us look into the office of a private surveyor and follow what happens when a client has arrived to consult the surveyor about how a property might possibly be subdivided. The reader may think of a landowner who wishes to subdivide a property into – say – 10 smaller properties intended for subsequent development and sale for residential purposes.

1. Initiative

The owner wishes to subdivide a property into new units for a certain intended future use. The law on subdivision requires that a chartered land surveyor processes the case.

The land surveyor clarifies the purpose of the subdivision. In addition to relying on his experience and local knowledge, the land surveyor may need to obtain more information to assess whether the subdivision is possible at all. The information which he typically draws on and collates, includes updated cadastral maps from The National Survey and Cadastre local plans and property information giving area, parcel identification. He typically also needs valuation from the municipality and data on owner, collateral debt, and servitudes from the land book.

2. Subdivision plan

This stage involves two aspects: One is the physical or layout aspects of the subdivision. The other is how to obtain formal approval by the authorities. The land surveyor and the owner decide jointly how to tackle these issues.

The land surveyor may need to acquire more detailed information on physical circumstances and legal aspects both public and private. This might involve field surveys, examination of existing plans and possibly direct enquiries at public authorities. It may be necessary to investigate registered servitudes in detail.

If the land surveyor finds that there may be difficulties in obtaining approval of a subdivision from one or several public authorities he would normally apply for a approval "in principle" before investing too many resources in the case.

3. Pre-approval

The land surveyor negotiates with the relevant authorities over specific requirements on land use, size of properties, delimitation of area, etc. Approval may be needed from various public authorities and they may set specific conditions. For example public authorities may require, that a layout be adjusted, that a certain restriction be registered, that an amount of money be deposited as a guarantee for compliance with certain conditions. A characteristic feature of this procedure for cadastral change is that all communication goes through the chartered land surveyor – not the owner.

4. Cadastral survey

The land surveyor identifies existing boundaries on the ground based on survey records and cadastral maps and he may consult owners of neighbouring properties in the process. Existing buildings, hedges etc are surveyed and taken into account when the new boundaries are demarcated on the ground.

Thereafter, the new boundary situation is surveyed and tied to the national reference system. This is prescribed in detail in the subdivision Act (see chapter notes) and it's regulations. survey regulations. The main points are that the surveyor determines coordinates to the boundary points and areas of the new property units. An amended cadastral map is prepared as well as a specific map describing the geometry of the survey. Besides this, particular maps may be prepared for presentation in the applications to the authorities presenting subsequent design and particular needs.

5. Cadastral documentation

It is the task of the chartered surveyor to gather the information and to prepare whatever documentation necessary to register the subdivision in the cadastre. A number of regulations on subdivision instruct the surveyor in exactly which information and documents are required. The presentation is to a large extent standardised by forms and examples.

6. Plan approval

The law on subdivision states that a subdivision cannot take place if the declared future land use of the new property violates legislation on land use. In the first place, subdivision needs to be approved by the municipality. Depending on the circumstances, approval may also be needed from the county and other public authorities.

When the municipality approves a subdivision the new data on the new property unit is captured. Data on provisional area, parcel identification, and other data are entered into the municipal property register. The municipality allocates the new property unit an address, a property number and a road code. In most municipalities the new cadastral boundaries (which are at this stage not yet approved by The National Survey and Cadastre) are drawn on the municipal copy of the cadastral map as a potential property boundary. When the final approval is issued this is changed to an actual boundary.

Other authorities that become involved, also copy information from the case for their respective purposes in control and statistics.

In this way, the approval procedure becomes also an updating procedure.

7. Subdivision approval

Before the National Survey and Cadastre approves of the subdivision it ensures that the requirements in the legislation on subdivision are met. Otherwise, the case is returned to the land surveyor, unless a minor omission can be cleared through a telephone call.

The National Survey and Cadastre has an integrated register and case processing system. As information from the subdivision case is entered for updating of the cadastre there is an automatic generation of new cadastral parcel identification, draft letter of approval, calculation of fees, information for statistics, etc. Furthermore, the system performs a certain quality control over the new data. This includes checks against existing data in the cadastral registers.

The cadastral register contains data on each property unit including parcel identification, whether or not the land is "agricultural" (which implies a range of restrictions), date of last approved cadastral change as well as a range of administrative information. New boundaries and parcel identifications are captured. New reference points are registered, as are the survey records.

8. Communication of approval

The land surveyor, the municipality and the Registrar of Deeds (in Danish "tinglysningsdommer" who is a judge at the district court) are informed on any cadastral change by a letter of approval from the The National Survey and Cadastre. The content of the letter of approval is also electronically transmitted to the joint municipal database at "Kommunedata" which is a data base servicing all Denmark's 275 municipalities. Finally, all authorities that were involved in the process of cadastral change receive copies of the letter of approval.

9. Updating of municipal registers and maps

The updating of the property register at the municipality with the cadastral information happens semi-automatically as the information is transmitted from the National Survey and Cadastre (KMS) to the "Kommunedata" from where the official responsible for the register at the municipality can extract the information and compare it with the information in the letter of approval.

However, this process is undergoing radical change as decentralised data-bases are being established in municipalities with a range of options for on-line connections and overnight updating.

10. Updating the Land Book

The information from the letter of approval is entered into the Land Book. The Registrar does not examine and control the information in the letter of approval prior to registration.

As the Land Book becomes "digital" the cadastral information will more or less automatically be transferred and entered directly to the Land Book. The new property unit will then automatically be allocated a new registration identification number.

11. Completion of service to owner.

The land surveyor completes the case in relation to the owner, at which point it is ensured that he gets paid for his service by the landowner.

12. Registration in the Land Book

A separate registration "page" is opened in the Land Book for each new property unit. Information on owner, mortgage loans and easements are entered. Easements are distributed between the new and the original property on the basis of a statement from the chartered land surveyor. The Registrar signs the cadastral parcel map and it is delivered to the owner together with the registered deed.

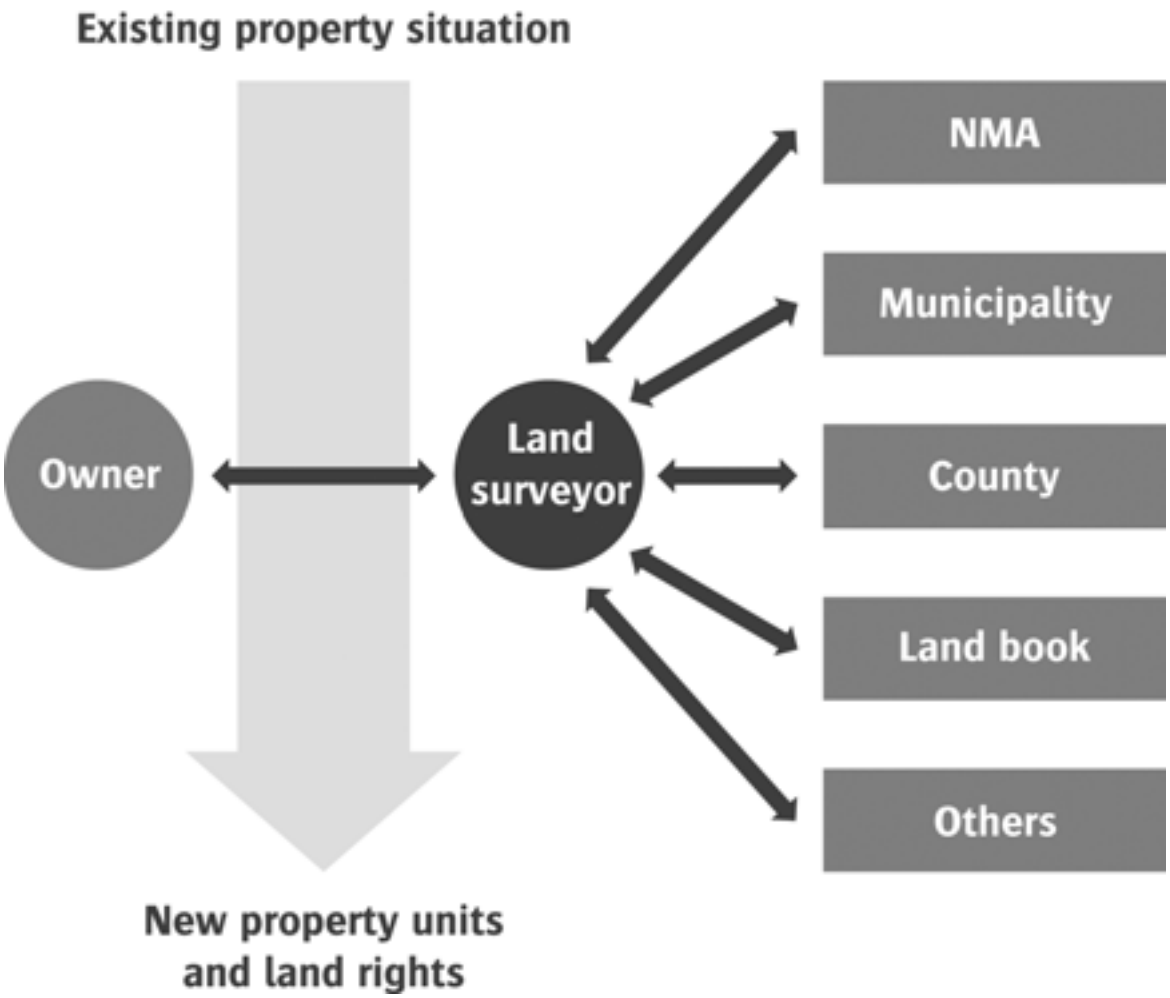

Fig 4.1: The structure of the subdivision process. All communication goes through the private surveyor. NMA refers to National Mapping Agency.

Observations:

The structure of the subdivision process used in Denmark is summarised in Figure 2.1. This figure emphasises the central role played in communication by the land surveyor. By means of this process, information on 2.1 million land parcels is maintained for a population of 5.25 million. In 1998 a total of 11388 subdivisions were approved using this process.

The ten new parcels in our imagined example do now exist as individual property units with the same owner and they are available for transactions such as leasing, sale and mortgaging.

The process of property change is therefore, only complete by step 12 when the new property units are registered and *thereby* brought into existence.

It appears that the subdivision process has two strategic functions: It ensures updating of the property registers and ensures that changes in landed property and land use are in accordance with planning regulations, which thereby are implemented.

4.3 Implicit assumptions

The cadastral map has now been entirely converted to digital form and as from 1998 survey plans have been in digital form. Furthermore, the cadastral processing system is being reformed so that the communication described above will take place in digital form via a server. These technological changes will radically change the form of communication in the cadastral process and affect its organisation. Nonetheless, certain fundamental principles and assumptions on formal land management remain unchanged. These include:

1. One property regime
All possession of land is officially identified and registered.

2. Planning control
Any change in property awaits approval from planning authorities.

3. Supply and demand
Supply of administrative services matches demand. Capacity and resources are sufficient for processing of the current case-load as well as implementation of technological innovation.

4. Complete information
Information in registers on property, topography, planning regulations constitute in combination an almost complete model of reality as it affects land ownership and land use.

5. Continuous updating
The cadastral process consistently updates property-related registers as changes occur.

6. Parcel based geographical units.
The basic geographical unit for land registration is the individually owned land parcel.

7. Use of the chartered surveyor
The state empowers and delegates land surveyors in private practice to perform certain administrative functions in land registration.

To summarise the point of this presentation we shall say that these basic features of the Danish land administration make up *a paradigm of complete information.* To land surveyors, this paradigm appears as "natural" in day-to-day work. Its implicit assumptions are taken for granted and are given hardly any attention. The efforts in daily work go instead into the actual tasks and into perfection of the system, particularly, the ongoing process of innovating the information technology. The land surveyor also needs to respond to changes in economic conditions and types of tasks.

It is when a Danish land surveyor accustomed to this working environment takes an assignment in a developing country that awareness of our own paradigm becomes more explicit. This is because as we shall see in the next chapter the assumptions listed above are typically not in place.

CHAPTER 5: THE LAND MANAGEMENT SITUATION IN DEVELOPING COUNTRIES

5.1 Introduction

We start this chapter with a series of "snap shot" case studies to give an impression of the land management situations in developing countries. These readings serve to support the proposition that land management in developing countries must be seen within a different paradigm to that applying to a rich country such as Denmark. These "snap shot" descriptions have been selected because they contain information that is relevant to a number of land registration issues and reference will be made to them in later chapters. For each of them selected passages have been paraphrased into one coherent text.

5.2 Snap shot case studies

Nepal:

Mattingly (1996) describes urban development in Nepal. He contrasts the impact of Government development schemes on the one hand with demand, a dramatic urban growth, the impact of private sector development and on the other hand, growth of squatter settlements.

"Only one scheme of less than 10 hectares had been completed by 1992. By contrast in Katmandu and Lalitpur alone, more than 1500 hectares of land were developed through private initiatives over the previous decade. The private sector – which is mainly individual landowners, plus a few development companies – carries out virtually all land development.

The pace of urban growth in Nepal has been rapid. In nine municipalities, the recent census found an annual growth rate of 4.5% or more. The expected scale of growth is also large. One estimate is that the urban population – about 1.7 million in the 1991 census – will reach 3.5 million in the year 2000. …(and) … that the squatter population of Katmandu will grow from an estimated 7400 in 1990 to approximately 48.000 by the year 2001.

The speed and scale of government efforts do not match this. … If and when they are completed, all of government schemes current in 1992 throughout Nepal will not together equal a reasonable estimate for the needs by 1996 of the single small town of Bharatpur (population 28000 in 1991).

Targeted beneficiaries are missed, and implementation is slowed, blocked or inadequate for a variety of reasons. Many of these are reasons that become clear during attempts to plan and implement schemes. Some of the problems that then emerge have no practical solutions as yet.

Schemes take substantial time and require substantial staff resources. For example, the Gongabu land pooling scheme required the services of an architect, an engineer, three surveyors,one other full-time employee and a few other technical staff on an occasional basis. This was for 318 plots on 14 hectares of land. In Bahktapur, after four years of implementing guided land development on three sites totalling 420 h, the Town Controller had opened up only ½ km of the 55 km of roads planned.

Land pooling and site-and-service schemes especially require very detailed layout planning of plot arrangements, roads and infrastructure networks. Guided land development cannot be done until accurate maps of existing plot boundaries and building and road surface locations are prepared. These necessities lie behind the enormous staff and time requirements. So do lengthy and complicated negotiations with landowners, which decide the redistribution of plots in a land pooling scheme or settle road boundaries in guided development.

Land acquisition causes grave problems for site- and-service schemes and for guided land development. It is nearly impossible because of the political sensitivity of the issues it raises. Not only does government pay less than market price, but also during the inevitable delays of bringing about action, market prices go up while the compensation remains fixed. Landowner's objections create political pressures that halt the implementation of schemes and block the initiation of new ones. Even were this not the case, the government is extremely unlikely to allocate funds sufficient for purchase at market prices that match the scale of future needs."

The official land development schemes, thus do not provide land for schools and open spaces and do not increase the supply of plots for the poor who are land less. Mattingly concludes: "Given the likely scale and speed of urban growth, the public resources directed at better land development will be even less effective in the future if the present course of action is continued."

Brazil

Denaldi´s paper (1997) on a new programme approach to support housing for low income groups in Sao Paulo, Brazil gives an impression of the size of problems in Brazil. Furthermore, the article shows that the evolution of new approaches to land management and participation is in no way a linear process. Even an approach that has proved successful in large scale can be set aside by a shift in political winds.

"Sao Paolo is a city full of contradictions. It is one of the biggest mega cities in the world, and the most important industrial and international service centre of the country. In spite of this, approximately half of its 10 million inhabitants are living in poor housing conditions. The access of low-income people to urban services and facilities has become increasingly restricted. Land has become very scarce, and it has become increasingly difficult for lower-income groups to satisfy their housing demands. The existing settlements have become more densely populated and the illegal settlements have grown spectacularly over the last few decades. The quality of the urban environment and overall living conditions has deteriorated a lot and large groups in the city are subject to conditions of non-citizenship and social exclusion. These conditions have been aggravated during the last few decades by housing policies that absolutely failed to reach the poorer segments of society.

At the same time, it is recognised that most groups, in one way or the other, had to secure their own flow of housing services. In a way, it can be said that the majority of housing is being supplied by self-help or even self-management. Up to the recent past, Brazilian policy-makers had some difficulties acknowledging this. Despite the increasing popularity of mutual-help and self-help programmes, before FUNACOM ("Municipal Programme to support Housing for Low Income Persons through Self-Management") no government had actually financed programmes through community self-management on a large-scale basis. In most of these programmes, policy makers continued to define standards, centralise resources and maintain administrative procedures not suitable for such alternative projects. Community participation was often thought of

as no more than just a way of utilising community labour within otherwise perfectly routine projects.

Besides this, many governments in Brazil argued that housing projects based on mutual-help were not successful in reducing the overall housing deficit. The official view was that such projects and programmes took a lot of time to implement, were difficult to manage and could not be transformed to a larger scale.

FUNACOM has shown the possibility of designing and implementing housing projects on a self managed basis, both with good results and on a large scale. The programme, set up from 1989 to 1992, can no longer be considered as another isolated experience of this kind of projects; it was the principal driving force behind the housing programme designed by the Municipality of Sao Paulo. Some 12.000 houses and another 120 slum areas were upgraded. The total number of interventions by the local government, directly or indirectly, affected some 90.000 households, 29.000 of which were related to building projects.

The outcomes of the local government elections in the Municipality of Sao Paulo in October 1992 adversely affected the continuation and the consolidation of the programme. The present administration has not been willing to invest in it."

South Africa

Hindson and McCarthy, et. al.(1994, pp. 1-29) gives a thorough presentation of informal settlements in Kwa-Zulu-Natal, South Africa. By 1992, 26% of the total population of the region of 9.27 millions lived in informal settlements. The following selected passages give an overall picture of the situation and the particular historical background.

"The main features are that the population of all areas is growing, but the rate of growth of urban areas is about three times that of rural areas. The growth of informal settlements far outstrips that of the formal areas. Informal areas make up just over a third of the total urban population and over half of the African urban population.

Of the total population in informal settlements, by far the largest number live within the metropolitan areas. However, a significant number of informal settlements exist in or near medium and small towns and in rural areas.

Not a great deal is known about informal settlements in rural areas, but the Urban Foundation has distinguished a category of 'dense rural settlements' in transition from rural to urban areas and estimated that about 17% of people living in informal settlements are located in these kinds of areas. It is, however, by no means clear where a rural area ends and a dense settlement begins.

Illegal squatting was never entirely eradicated under apartheid, but after being reduced to small hidden pockets in the 1960s it began to grow again in the 1970s, mainly in the form of clandestine illegal settlements near townships. Most settlement took the form of densification of privately owned Indian and African land, and also tribal areas abutting townships on the urban peripheries.

During the 1980s a number of factors combined to enable the mushrooming of informal settlements in metropolitan areas of Kwa-Zulu-Natal. These included popular mobilisation against,

and consequent weakening of, black local authorities, and the weakening of the power of tribal authorities and private Indian and African landowners, which resulted from the growth of new and assertive organisations among squatters and tenants.

Along with scale of settlement, the pattern of settlements changed in important ways. One change was the growing openness of informal settlement as administrative controls declined and communities reached a threshold of size. Most settlement was incremental, although some took the form of organised invasions entailing large numbers of settlers moving into an area and occupying it in a short space of time.

A major feature of the pattern of movement and settlement in the 1980s was the role of internecine violence within and between informal settlements, and between them and neighbouring formal townships. The violence resulted in massive movements of the urban population, much of it between different locations within the periphery, and some into the core city areas. In some areas the violence led to a reverse flow of population from the metropolitan fringe to semi-rural areas, and this may partially explain the densification of the far peripheries in the 1990s.
Much of the movement in the 1980s is associated with extreme insecurity resulting not only from violence but also from lack of tenure rights of informal settlement residents. A dominant pattern is for people to keep moving on, either to escape violence or the threat of violence or to find a more advantageous or secure foothold in a preferential location within the metropolitan area.

The trickle of core city squatting in the late 1980s turned into a substantial stream during the early 1990s. This was impelled by growing violence and instability on the peripheries and the increasing reluctance of municipal authorities to act against illegal settlement during a rapidly changing national political context and constitution negotiations."

Bolivia

Barnes (1994) approaches his study from the perspective of land information systems and registration - a discipline where the agenda is almost exclusively set by the needs and the prevailing property concepts in rich countries. Barnes sets the challenge of devising appropriate land information systems for different land tenure regimes by the following description of a rural community:

"There are 35 families in the community of San Pedro (pseudonym), ten of whom are landless. Juan Perez (pseudonym) informs us that he farms four hectares but that the land is titled in the name of his father who obtained it through the agrarian reform. The subdivision and transfer from farther to son was done informally. Land in the community is rented to the landless, sometimes even to families from other communities but land sales are strictly limited to members of the community. There is also a small area of communal pastureland. There are almost no boundary disputes in the community and members appear to have a high degree of tenure security. Juan paid taxes to the government until a few years ago when a prominent politician discouraged peasants from doing this. He never saw any return from the money he paid in taxes. Land holdings in the community are generally fragmented so that a family will have a parcel of land in each of several different micro-ecological zones. This is an important part of their food security system as it allows them to diversify their crops in attempts to reduce the risk of failure. Given the marginal soils in the highlands and the severe threat of frost, hail and drought, this

strategy may be pivotal to the long-term survival of the community. Juan tells us that this past year they lost their entire potato crop.

The community is administered internally by an elected Secretary-General (*Sindicato*) together with a traditional leader known as a *Jilakata*. These local officials take care of land and boundary disputes and the *Sindicato* also represents the community externally at the district level. Community meetings are held monthly and once a year the current Secretary-General, together with all the surviving ex-Secretaries-General, walks the community boundaries and restores any boundary markers that have been damaged. These communities therefore have a strong sense of community limits and the boundaries can be regarded as relatively permanent in the absence of natural disasters such as flooding. While there appears to be a strong communal feeling towards land administration in these highland communities, the attitude towards agricultural practice and land holding definitely favours an individual approach.

The community of San Pedro is a typical example of the kind of settlement and land tenure system that is found throughout the highlands of Bolivia (the most populous region of the country). Tenure and social security are founded in the cohesion of the community. If Juan Perez decides to spend two or three years in the city, his land rights will be protected by his family and respected by the rest of the community. The threat of reversion does not appear to exist. The sale of land is not restricted by the requirements of the Agrarian Reform Law but by the customary practice of limiting these to community members only. Likewise, subdivision and rent occur without any outside sanction.

The example described above clearly demonstrates that the de jure and the de facto land tenure systems are poles apart. Why would individuals like Juan Perez want to spend the money and wait many years for a title that does not appear to provide any benefits? What stake will the community have in a LIS project and what incentive do they have for participating? When one compares the formal and the informal tenure systems from the perspective of peasant farmers, the decision to stay with the latter seems quite rational."

World Bank studies:

The World Bank Urban Management Programme Working Paper 6 (1996) reflects the need to innovate and adapt land management methods to the circumstances in developing countries. The report reviews experiences from a large number of projects on infrastructure provision, re-planning and formalisation. Selected passages from pp. ix –xi are edited into one coherent text.

"The extent of irregular housing varies from country to country, comprising 20% to 80% of urban growth and affecting 15% to 70% of the urban population of developing countries (the average figure is 40%). Problems are most sharply felt in the larger metropolitan areas. Irregular housing restricts the social and economic integration of low-income urban households, making access to credit for housing more difficult and reducing people's capacity for productive activities.

The present research findings show that the diversification and the commercialisation of informal land delivery systems constitute a significant feature in all the countries observed over the last 20 years, marking the end of free or virtually free access to urban land as it existed up to mid-1970s. Since the 1980s many governments have tended to integrate the management of irregular settlements into their urban housing policies because of the increasing difficulties regarding urban land management. Large-scale regularisation operations are rarely carried out.

garding urban land management. Large-scale regularisation operations are rarely carried out. The last few years have seen the growing determination of public authorities to overcome this situation through the implementation of integration policies for irregular settlements. These combine the provision of infrastructure and services, re-blocking and the legal regularisation of settlements. This is a major breakthrough in land and housing policy for low-income households.

The experience of the last decade draws attention to a number of obstacles which can slow down or compromise regularisation programmes in all phases of the process. These obstacles fall into three categories: (i) obstacles which are the result of the expression of divergence or conflict among actors involved in the projects; (ii) legal, political or financial obstacles (long, complex, deterring procedures and unsuitable legal standards); (iii) resistance to change in state administrations (sustained by non-transparent and complex procedures for the recognition of occupant's rights as well as illicit practices). …

State control of land and urban planning is increasingly being called into question. Preventive land development is costly and politically and economically impracticable on a large scale. State control of land management fails due to the prevalent practices of irregular land subdivision. However, in the meantime, all case studies stress that no improvement takes place (or even a shift in trends) without the intervention of public authorities when the issue was left to free land market policy alone. Another model for intervention is taking shape, based on a new synergy. The objective is to find a method of intervention, which ensures the development of synergy between formal and informal land and housing delivery systems. This may come about by looking at the achievements of informal developers on the peripheries of major agglomerations. The point has been reached where the control and management of urban growth by traditional planning and regulatory measures is becoming less and less efficient.

This observation provokes a complete change of outlook in seeking new planning models for housing projects, based on the implementation of planning, services and facilities delivery, and the improvement of space which is already occupied. Emphasis now is on the redefinition of public land use policies, combining preventive actions with *á posteriori* intervention. It suggests that intervention must address all the dimensions of irregularity at once, in order to achieve the progressive integration of illegal settlements in the city."

5.3 Assumptions that often apply in developing countries.

The snap shots we have examined above reveal conditions for land administration that differ significantly from those in a country like Denmark. The assumptions that we identified as underlying the Danish land management system can now be compared with conditions in developing countries as they appear from the readings. We will not pretend to create a proof, but only to illustrate the proposition that land management in developing countries must be seen within a different paradigm. We delineate seven areas into which significant differences fall.

Area 1: The property regime.

There are typically parallel systems of provision of land, housing and tenure. The official or conventional system is only one among several. The *de-facto* and the *de-jure* situations are poles apart

in rural as well as urban areas. Furthermore, there are various and sometimes competing social structures, each conferring its own version of formality on land use and transactions.

Area 2: Planning control

By far the largest part of housing and land developments happens beyond the reach of conventional zoning, layout planning, subdivision control and housing development. The impact of official planning is not only small but also declining. The formal system is (in some cases) developing ways of responding to developments that are already taking place. We can regard this as an indirect method of administration.

Area 3: Supply and demand

The capacity of the formal land management system to supply planned and surveyed land generally lags far behind demand. There is a close linkage between this insufficient capacity and the insufficient impact of the formal system: The absence of access to legal and affordable land creates the need for alternative modes of supply, which is what the informal sector provides.

Area 4: Completeness of information

Existing settlement and land use is far from fully represented in official records and mapping. Furthermore, the informal developments expand rapidly. Building materials with short lifespans also lead to rapid changes in urban form For these reasons any recording of settlement pattern and density as well as the locations of individual constructions is quickly outdated. Existing information is thus in varying degrees incomplete.

Area 5: Updating

The informal developments are by definition not recorded. Also changes in registered property may go unrecorded. Due to such combination of incomplete coverage and updating the formal system is in a constant danger of being eroded by informal sector development.

Area 6. Parcel based geographical units.

Parcel based registration of land use is practically impossible in many situations in developing countries. In practice a wider perception of the “cadastral unit” applies. It may be a village area or the area for an urban informal settlement. Such “blocks” are relevant for registration. They require less information, are more stable and thus require less updating. The notion of full coverage of detailed parcel registration is irrelevant.

Area 7. Use of the chartered surveyor

Many developing countries have a Survey Act very much like the Danish Act, which also defines the role of private chartered surveyors. But the private sector in cadastral surveying is in some countries almost absent. In others the private surveyors do operate but mainly in the high income sector and in the construction sector. Partnership with the public land administration is

often poorly developed. The existence of a private sector ready and eager to perform the operations in land registration can, therefore, not be assumed.

We shall say that these general conditions for land management define a qualitatively different situation for land management. With particular focus on land information we shall denote this: *A paradigm of incomplete information.*

Having established a simplified model of the contrast between conditions for land management and especially land registration in developed and developing countries as contrasting paradigms of complete and of incomplete information respectively, we can state the following thesis:

5.4 Thesis

Land planning and land registration in developing countries must be perceived within a different paradigm of information management.

A key feature of any feasible approach and administrative procedure is the ability to operate on a significant degree of incomplete information. Decision taking in planning and registration must be able to cope with a large degree of uncertainty.

The vision or hope to improve living conditions, sustainable land use and social stability through formal land management requires a re-appraisal of traditional approaches and their re-design using the paradigm of incomplete information.

The following chapters attempt such a re-appraisal with particular focus on land rights, land information and the possible reorganisation of decisions.

5.5 Theoretical background

Readings that have influenced this presentation include first of all, Payne´s 1989 review on informal housing and land subdivisions in Third World cities. Payne illustrated the spectacular and increasing size of the informal sector in Third World urbanization and correspondingly the small and declining importance of the official planning system. Another general feature was the disintegration of the "traditional" systems of communal land tenure in which land was allocated according to needs within a tribe or community -Payne refers to this as "no cost land" - contrasting it with land that is increasingly traded as a commodity. This dramatic trend of increased *commodification* of land in combination with a decline in impact of formal land management came as "a shock to some and disappointment to others". This view was further supported by Alain Durand-Lasserve (1990) who found that this trend occurred throughout the Third World irrespective of the wide diversity of the developing countries.

According to Payne the sheer size of demand for urban land and the inability of the formal systems to supply planned and surveyed land changed the fundamental position and role of the formal land management system. Instead of official planning directing what happens with land, the role of planning in land management became one of "government response" which Payne characterises as ranging from outright "hostility", through "acceptance" to "support". This range

also characterises the general shift of official attitudes towards informal settlements over the last three decades. Planning officers, building inspectors, land surveyors and many other professionals are now in a process of adapting to a new situation for their particular discipline in which the public planning system is nothing more than a weak resource-starved actor. New modes of working are developed, new ways of approaching existing communities and dealing with their leaders, etc. and also new ways of using modern technology.

Many attempts have been made to adapt the formal system, to increase its supply capacity and to make it more responsive to very poor households. One argument has been that minimum standards should be abolished because they assume a certain minimum income level, which may exclude the very poor. Building standards also pre-suppose an administrative capacity, which is scarce. Innovative experiments have also been made with financing models for infrastructure improvements tailored to specific contexts. These models aim at introducing some direct taxation without evicting the poorest income group from the area. Generally, Payne holds that there has been a shift in strategy from the conventional approach of *direct* provision of land and housing towards increasingly pursuing *in-direct* methods such as so-called “guided squatting” and by imitating the informal sector by provision of bare land to settle on and then a gradual provision of services. The quotations illustrate how this occurs under very different circumstances in developing countries.

A particular methodological contribution came out of a network of advisors and researchers who shared experience in urban development from many different developing countries. (Baross and van der Linden, 1990). It was Baross who coined the phrase "reversed sequence" for informal settlement growth compared with the orthodox planning sequence. Baross demonstrated that the reverse sequence corresponds to stages in the economics of the informal settlement process which permits a phasing of expenses that makes it possible for even very poor people to settle and build. As the dealers in land in the informal markets operate beyond or partly outside the official system, they are not dependent on written permissions, adherence to building standards, minimum plot sizes, etc. and land is therefore, provided more quickly and cheaply.

Ward and Jones (1992) shift the focus from immediate solutions at project and policy level to methodology and implicit assumptions. Their book is a collection of contributions to a conference on Third World housing. A range of issues concerns land registration although they are seen from the perspective of economists, planners and sociologists. One hot issue concerns the increase in land prices in the course of urban development projects or “upgrading” of informal settlements. It is generally assumed that upgrading projects together with the land titling improves physical conditions as well as tenure security and thereby also create an increase in property values which is then available as a basis for credit for the owner and as a tax base for local government. Ward and Jones have tried to monitor such price changes and argue with reference to case studies that such price changes do not occur as expected - if at all - and they question whether in fact formalisation improves tenure security. Contrary to common belief, the economics of formalisation may in reality not constitute an improved revenue source for local authorities, and the formal land tenure may not establish increased security for poor households. This is because there will be new dangers especially around regular taxation. These dangers can be critical for poor households as there is no direct correlation between household income and the state of urban development. A clear challenge to the common assumptions under land registration and land taxation may be found on pages 232-234.

Re-thinking among planners and economists and others, thus, ranges from practical issues such as building standards, to overall policies of land tenure and land taxation.

CHAPTER 6: THE INFORMATION PROBLEM

6.1 Introduction

Land planning and land registration are about decisions in the land development process in other words what to do with land and about ownership. A crude distinction between land planning and registration is to say that whereas planning involves choice between alternative uses of land, decisions in land registration establish unambiguous answers to three fundamental questions: What rights? Who enjoys them? Where are they held? Both types of decisions require information. Planning to guess consequences. Registration to establish certainty.

> *The information problem is the practical task to provide such specific information, as a certain decision presupposes.*

The thesis in this chapter is, firstly, that the largest workload in land planning and registration concerns this information problem. That is, the gathering and processing of information. Secondly, that a fundamental challenge in designing viable procedures for land management in developing countries is to reduce the information load on procedures in land planning and registration and that this should be done by re-appraising *the organisation* of land management decisions and their information load. The Third thesis is that procedures needing less information should build on a combination of decentralisation and iteration. We will start by sketching how these principles can be applied in practical land planning and registration.

6.2 Representation and reality

The work of land planning and registration involves us in operating simultaneously in reality and in its representation. In reality, we are in the field, we see the terrain, fields and houses and we meet people and discuss their preferences. In the representation of that same reality we look at maps displaying topography, settlements patterns and property boundaries, etc. and we study statistics on population, production, property and so on. Decisions are taken in both domains.

Fig 6.1 The basic distinction in geodata between reality and representation.

The problem with conventional procedures is that they require costly representations of reality because they are designed for decision taking in the domain of representation. A private developer for example, needs to prepare a representation of his project perhaps not so much for his own decision-making but for the approval of the planning authority. At a larger scale, government intervention may produce costly representations as a basis for careful evaluation of consequences and detailed project design. An environmental impact assessment is as an example of a complex evaluation of consequences requiring nuanced representations and integration of dif-

ferent categories of information and the participation of a number of actors and a lot of paper for the reports.

The more complex the decision the more information needs to be integrated. The more actors or agencies involved the greater also the tendency to work in the representation. The more extensive and detailed the representation the more costly in terms of manpower, time, finance, equipment, and materials.

The enormous and expanding volume of information associated with modern information technology establishes a new situation in developed countries. The immediate need in many planning situations may not be so much to gather raw information from reality but rather to make use of specific information that is already gathered, formalised and updated. The preoccupation is then about exchange of data, integration of different data sets and purchase of data. Generally, there is a clear trend towards relying on an ever more refined representation of reality in decision taking.

Developments in information technology, therefore, consolidate the paradigm of complete information. It is this paradigm that is fundamentally irrelevant in developing countries where, as described in the previous chapter, developments are beyond planning control and, consequently, formalised information is often incomplete. Consequently the basis for decision taking using the representation domain is fragile. A key feature of feasible procedures under such circumstances is that they require far less formalised information.

In the argument below, we re-appraise the relation between decisions and information requirements in reality and representation respectively in a way that departs from the conventional approach.

In this illustration we replace the awkward term "reality" with the term "the field" or as surveyors sometimes refer to it, "scale 1:1". Instead of "representation" refer to the "office" because it is here that we typically take decisions while looking at maps or at computer screens, in meetings and in correspondence.

6.3 Decisions in the land development process

A "change" is envisaged, that is, an intervention into existing land use, which more or less dramatically alters layout, ownership and land use within an area at the initiative of some actor. It is assumed that the change adheres to existing land use planning and that its logical consequence is a change in the description of ownership in the cadastre and the land book. Such change may occur for example when a residential area is developed, when a new school is located and built, or in the context of agriculture, when a layout is made more convenient and ownership formalised and perhaps redistributed in a land reform. Perhaps a Danida-supported project or sector programme is involved.

Instead of representing the planning and implementation process as a linear sequence of activities illustration 6.1 separates out those procedures that are carried out in the domain of reality from those performed in its representation.

Fig 6.2: Decisions in the conventional land development process.

Observations:

Planning: Maps and text constitutes the information base for the planning decision, which takes place in the representational domain. The product of the planning decision is an approved plan which describes the desired future situation.

Detailed planning: This involves an elaboration of existing plan information, during its implementation. There will always be aspects which it was not possible to consider during the planning stage, for example, because no or only poor information was available. Or the planners did have correct information but reality has since changed. Taking an approved plan to the field, therefore, in principle always involves a measure of adapting its intentions to actual circumstances.

Cadastral surveying: As with detailed planning, demarcation of a plan and final survey involves iteration. It is typically during demarcation that the local population participates by voicing preferences and discussing plan details. Another cause of revision is the physical environment. All surveyors have experiences with "surprises" in the field. Cadastral surveying, therefore, is in practice involved with detailed planning.

Examination: This activity combining control and updating is performed in the administrative offices. By this means the quality of the cadastral survey is examined and finally approved. The cadastral data in map and text registers are updated with the new data. The signature by the Surveyor General reflects a decision whereby the state accepts to enforce the particular layout described geometrically by the cadastral survey records.

Registration: Registration reflects the Registrar's decision to register the particular rights in the Land Book. Registration assumes the cadastral map has been approved after examination. From the perspective of the land development process, registration is the event in the implementation process at which the plan becomes legally binding for the individual land users. This is a legal decision not a planning decision. This legal decision or ruling makes the land rights envisaged in the planning stage enforceable. It is the event at which the state recognises a land right: geographical extent as well as content.

The Danish subdivision process operates like this as explained in chapter 4. The availability of maps and other information permits a larger part of decisions in design, negotiation and approval to take place in the representational space.

The application of this conventional approach under conditions of poorly equipped and understaffed authorities with incomplete and outdated information, creates a serious information load. The crucial decisions are office decisions and when the information which they assume are not available the logic of the approach insists that this data be prepared. Consequently, land developments are delayed by resource-demanding and time consuming information gathering, as Mattingly reports from Nepal: "*… until accurate maps of existing plot boundaries and building and road surface locations are prepared. These necessities lie behind the enormous staff and time requirements.*"

Inappropriate planning practices are often identified as causes of poor performance of formal land management. Targeted practices include bureaucratic procedures, minimum standards and excessive detail. But what tends to be overlooked is that an equally critical constraint applies to cadastral surveying and examination (1). It is not unusual for these activities to accumulate backlogs even in times of routine land developments. There is, then, no spare capacity to cope with an increased workload during special campaigns of formalisation and land reform. Nor would a survey department in this situation have much surplus capacity to take the lead in organisational activities such as the coordination of national mapping, geo-data and spatial data infrastructure development.

It is a common experience that the solution to complex decision taking problems lies in a combination of decentralisation and iteration. The overall process of land planning and land registration is an example of such a large and complex procedure that can be split into smaller tasks each of manageable size. Some can be carried out locally and at the same time operations can be phased over time. The following sections sketch out how the overall information load in the land development process can be reduced in this way.

6.4 Decentralisation - Shifting decisions to the field

The conventional approach has a tendency to resolve the information problem by bringing decision and information together in the representation – in "the office". The logical alternative is to bring decision and information together in the field. This draws attention to field activities. The thesis is that by shifting decisions to the field one eliminates the need to gather the information for that decision and transmit it to the office and later to translate the office decision back to the field. We will discuss first planning decisions as shown in the upper half of the following figures 6.2 and 6.3. Later we will discuss what we call registration decisions (indicated in the lower half of the illustrations) because they concern the registration in cadastre and land registry.

The planning decisions

Planning and demarcation: By Shifting planning decisions to the field we reduce the need to represent reality and, thereafter, to translate the decision back to reality. Such aspects that can be considered in the field need then not be presented for consideration in maps and text. The information for such mapping and description then need not be gathered and processed. Certain levels of plan detail can be omitted. This reduces the information flow via the planning decision and increases the task of detailed planning in the field.

Adjudication: The typical situation involves co-existing shades of formality and informality so that land rights are typically not clearly defined in the initial situation. The startingpoint tenure situation from which the intervention departs therefore needs to be established. This activity is adjudication defined as "the ascertainment of existing rights in land". (See chapter 7). Adjudication is inevitably a field -based activity and it is needed when implementation is initiated on the ground and it becomes clear how implementation affects people differently according to their de-facto land use.

Community participation: The intervention that affects existing land use involves cooperation with the local community. This is especially so under conditions of informal development. Community participation concerns at least two types of information. One is information on particular conditions in the physical environment, for example, frequency of flooding and traditional land use. The other is information on the community's preferences. Both need to be taken into consideration in the adaptation of plan to local circumstances. A practical aspect is that it is always easier to grasp the consequences of a planned layout when it is provisionally demarcated on the ground. Land surveyors, when half-way into their cadastral demarcation, may therefore find themselves in the centre of discussions of plan details between community representatives and local officials.

To sum up: The shifting of planning decisions to the field requires the integration of adjudication, detailed planning and cadastral survey into one negotiation and decision-taking process in a continuous cooperation with the community. The scenario opens a wide scope for field-based planning. The approved plan – the office decision – would be limited to criteria; principles, standards, guidelines and would deliberately avoid decisions on local specifics. The office decision would thereby, require less information and consequently less time spent by scarce central planning staff. In short: gains would accrue in time, resources, and legitimacy.

This shift in planning decision to the field is illustrated in the model in Figure 6.3 by the first big arrow.

The registration decisions:

The cadastral examination and the registration of rights *does* require a representation of the resulting new situation. What can be re-organised is the moment in time – the *event* - when the new situation of land rights becomes effective.

The conventional procedure as illustrated in Fig 6.2 confers legal effect on the new land rights only as the last step in the process. However, we can make use of the fact that enforceable land rights need not in principle rest on a *representation* of reality. What is needed is a ruling by an appropriately empowered and informed agent. This is what land commissions, land tribunals, etc. perform in many countries. They consider land issues such as disputes by meetings in the field and with the assistance of available documentation. They come to an authoritative decision that disposes of uncertainty and establishes certainty as to existing rights in land. Such adjudication rulings may concern not only disputes but also interventions; as we will discuss in chapter 7.

The possibility, therefore, exists that an appropriately empowered actor such as a commission or committee might inspect the new situation as established on the ground. Evaluation criteria would include plan quality, objections including compensation, and possibly other issues that would be outlined in guidelines. Being satisfied that the plan is implemented in a sensible way the commission could rule it legally effective with immediate effect. Thereafter, a cadastral survey may be carried out, cadastral maps prepared, examination and registration take place. The new - already effective situation would then be correctly documented and finally registered in the relevant property registers.

This scenario shifts that particular decision which makes the new situation legally effective, from the office to the field. The advantage of making the new situation legally effective *prior to* cadastral survey, examination and registration in the land registry is a saving in time. The development activities such as infrastructure construction works, relocation and allocation of land and people, etc. can proceed without awaiting the as-built cadastral survey by the land surveyor, cadastral examination in the survey department and registration in the land book.

This scenario does not imply in principle, any information savings in the cadastral surveying. Yet, it may be that the as-built cadastral surveys can be carried out in more rational ways. For example, by coordinating a number of individual cadastral surveys in the area into a single more rational survey exercise. It may be possible to monument the new boundaries so as to be visible in aerial photos and to integrate the cadastral survey into a multipurpose mapping exercise.

Summing up: The effect of shifting registration decision to the field makes the new situation effective in principle as soon as it is established on the ground. This saves time by avoiding delay due to cadastral surveys and registration. The information load in documentation remains in principle the same. A potential advantage may lie in a wider scope in organising the subsequent cadastral surveys. This shifting of the registration ruling to the field is illustrated by the second big arrow in Fig 6.3.

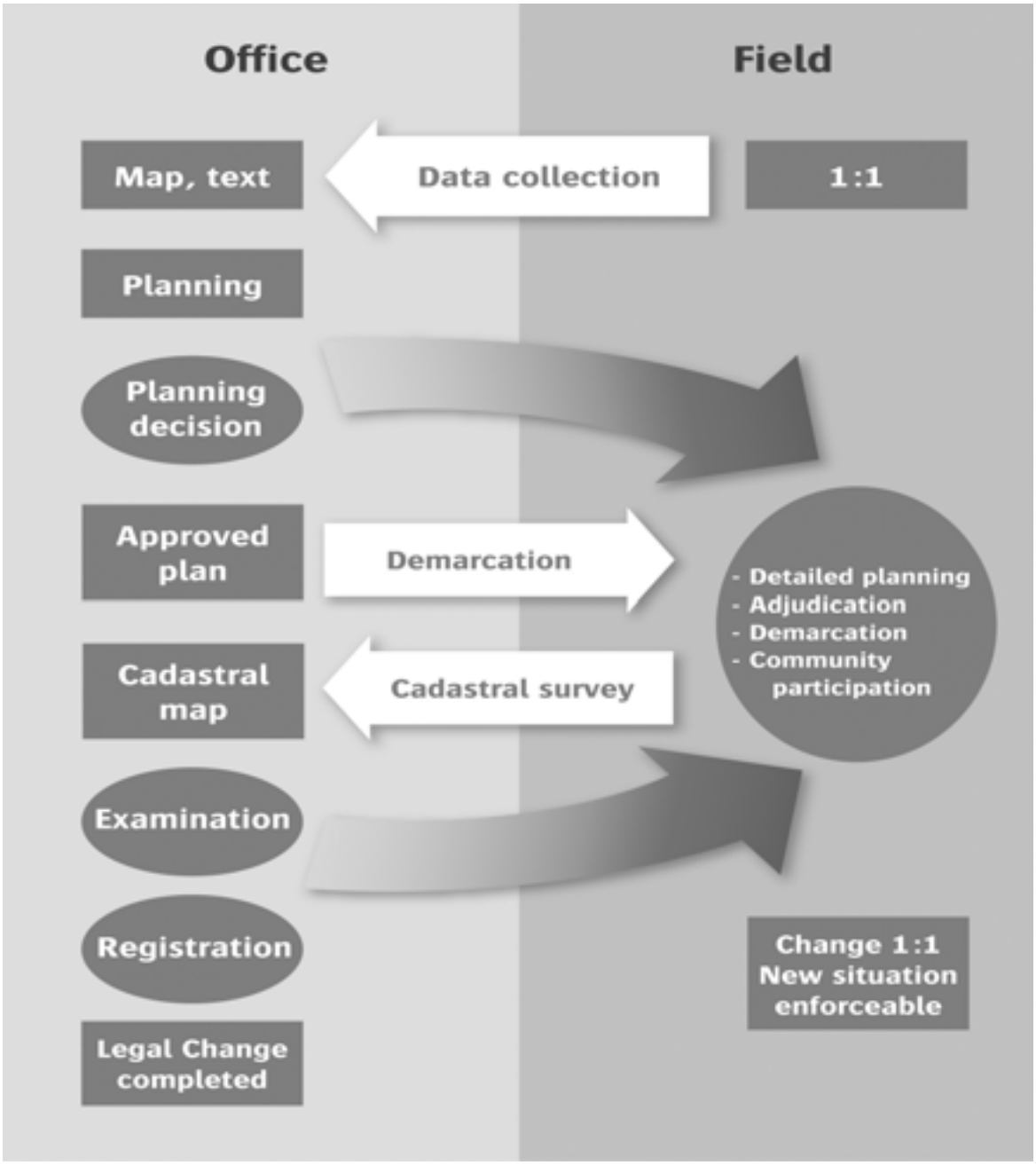

Fig 6.3: The proposition that planning and registration decisions be shifted to the field.

6.5 Iteration - Block strategy

The term *block strategy* is presented here as an iterative tactic of cadastral land surveying of a large area whereby at first the entire area is delimited and thereafter *polygonized* into smaller blocks which in turn may also be split into yet smaller units, and so on, down to the level of the individual land parcel (2). A block strategy thereby establishes a hierarchy of blocks of increased resolution. This would often provide a pragmatic approach to surveying in developing countries for several reasons as listed below. As argued in the next section, the resolution may need to be set at a level that reflects the land management capacity for depicting detail (3).

The hierarchy of blocks establishes levels of increased resolution to which correspond increasing volumes of information and resource requirements. The level of individual land parcels is the most expensive and contains the largest data volume. A simple example from a township in Namibia illustrates the case: Kanjengedi was an informal settlement that was formalised in three stages by having its outside boundary, its road network and finally the individual parcels demarcated and surveyed. This three-level hierarchy of blocks was mapped in three different map layers.

Rough indicators of overall information load at the various stages of the process are provided by the number of points and parcels and by the storage volume for the corresponding map layer. These proportions give a rough indication of resource requirements for cadastral surveying, for cadastral examination and for subsequent data maintenance.

Areas	No of parcels	No of points
Bloks	1	18
Roads	18	159
Plots	148	402

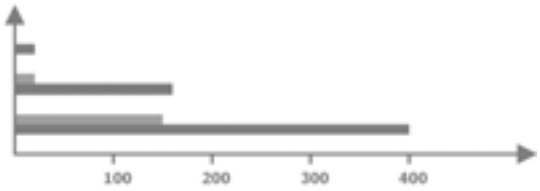

Fig 6.4: Information load at various stages. Example of block strategy in upgrading of informal urban settlement.

The principle of "working from the whole to the part" as implied in the block strategy has a range of advantages:

Survey control: The initial fixing of block boundaries prevents inaccuracies from local surveys within one block infecting other blocks. Sub-division within blocks can then take place using cheap and simple survey methods as and when they are required.

Administrative boundaries: A block strategy can be designed to establish unique spatial definitions and naming of administrative divisions in an early stage. At a lower level in the block hierarchy – that is at a higher resolution - block boundaries need be designed in accordance with for example the road net work, township boundaries, zoning within townships, registration divisions. At each level, boundaries should provide for further convenient subdivision into yet smaller blocks down to the individual parcel.

GIS: The administrative areas mentioned above are typically those to which statistical information refer. It is impossible to link such information to the corresponding geographical areas in GIS without a unique spatial referencing in a common reference system. A block strategy can support GIS technology by establishing those geographical entities to which interesting information is or will be attached.

Examination: Block strategy may also be a way of initiating land reform without overburdening the cadastral system, especially the examination section. The advantage is that the first level of blocks cover large areas with relatively few points. Secondly, levels above those of individual land holding (for example road network and zoning areas) are not subject to property transactions like transfers, private subdivisions, mortgaging etc, which occasion updating tasks for the registration system.

Group titles: Group titles are interesting from a perspective of cadastral information because a number of land users have rights within the same land parcel. This reduces the information load in the registration process. The rights of – say - 200 households residing within the same settlement can be formalised and geographically referenced by surveying only one parcel. This enables statistics on that settlement to be geo-referenced. The area may or may not be further subdivided into smaller blocks and individual parcels.

Block strategy introduces a new perspective on cadastral surveying. The process of establishing the hierarchy of blocks can be seen as a cadastral survey task as it is an authoritative definition of boundaries and their subsequent representation for common reference. However, the first level blocks are not land parcels in private ownership – they are baskets for carrying interesting information that may be gathered at an early stage or later. The block strategy provides a perspective that is, therefore, wider than just securing individual land tenure: It contributes to the building of the foundation for modern land information management (4).

6.6 Cadastral sustainability

Official land registration in a developing country is under constant threat from the informal sector (5). Informal development implies that changes in property go unrecorded and consequently, that information in the cadastre no longer mirrors what is on the ground. A strategic question in land registration is, therefore, whether and how the currency of cadastral information can be sustained. The finest resolution down to the level of the individual land parcel may not be "sustainable" in a particular context. It may be practically impossible to establish all individual land parcels on the ground, register them and subsequently control and update all changes in reality and representation.

We can define the notion of *cadastral sustainability* as *a level of resolution* of cadastral information *that can be sustained* in the long run. This definition of sustainability concerns the type of information and it's volume and the conditions for gathering and updating that information on a permanent basis.

Cadastral sustainability can be seen in perspective of a hierarchy of blocks. Perhaps only cadastral units at the level of townships or local communities can be sustained. Perhaps the finer resolution at the level of individual parcels will be possible and appropriate in future. Perhaps it never will.

A midpoint strategy might be a different strategy to strike a sustainable type and volume of cadastral information. Households could be geo-referenced only by one point and a range of information attached. "Such single-point data provides an address that can later be supplemented with boundary information, once that becomes appropriate". (Jackson, 2002).

A third variant to achieve a sustainable level of cadastral information could be to aim for addresses rather than parcels. The address builds on a sequence of "names" – not on coordinates. But it may conveniently be geo-referenced with a coordinate. The address has proved very powerful as a key-identifier linking different registers. In Denmark the address has become more important as key-identifier than the land parcel. A construction of a address register would be an important contribution to spatial data infrastructure. See (Lind, 2001).

The challenge is to assess sustainability in a particular context. One important and crude indicator of cadastral sustainability is the *supply capacity* of the formal land management system, which is - as illustrated in chapter 5 - the alternative to informal land developments. Two aspects are easily observed. Firstly, the capacity in the *cadastral examination and approval* procedure measured from the number of approvals, which is roughly the number of new property units. This measure needs to be considered along with the extent of backlog and possible spare capacity. In turn, these can be matched with estimates of urban growth, the rate and trend in informal development. Besides, various land policy and land reform objectives and the frequency of disputes in rural areas may imply future change in formalised property with implications for additional workload on the cadastral system.

The second measure of capacity of the formal land management system is the availability of *procedures for compulsory land acquisition*. It is critical to formal land supply that effective and legitimate procedures for land acquisition are available. It is, however, common that this is not the case, especially, that procedures for price setting and payment of fair compensation are absent. Under such circumstances public land acquisition becomes extremely controversial with resistance from landowners and understandable reluctance among planners, administrators and politicians to use this tool. See Mattingly in chapter 5 and discussion in section 7.6.

The importance of these two parameters can be explained as follows. If the cadastral system is already accumulating a backlog, and if at the same time there are no effective procedures for acquisition of land for development, then (1) the formal system cannot catch up with the informal land developments and (2) existing formal and registered property - especially in low-income areas - will experience informal developments. Both these happening imply that the conventional cadastre is irrelevant because it will only cover a limited part of the total property and because, increasingly, it will no longer represent reality. Its currency will be eroded.

The strategy adopted in a particular context will inevitably need adapt to the specific circumstances. To be sustainable there will very likely be a need to reduce the cadastral units, reduce volume of information, and reduce updating requirements. Features of block strategy, point references and address system may well be combined. The trouble with the conventional cadastral approach is that it aims directly and exclusively at the level of the individual land parcel, which is the level with the largest information load and resource requirements.

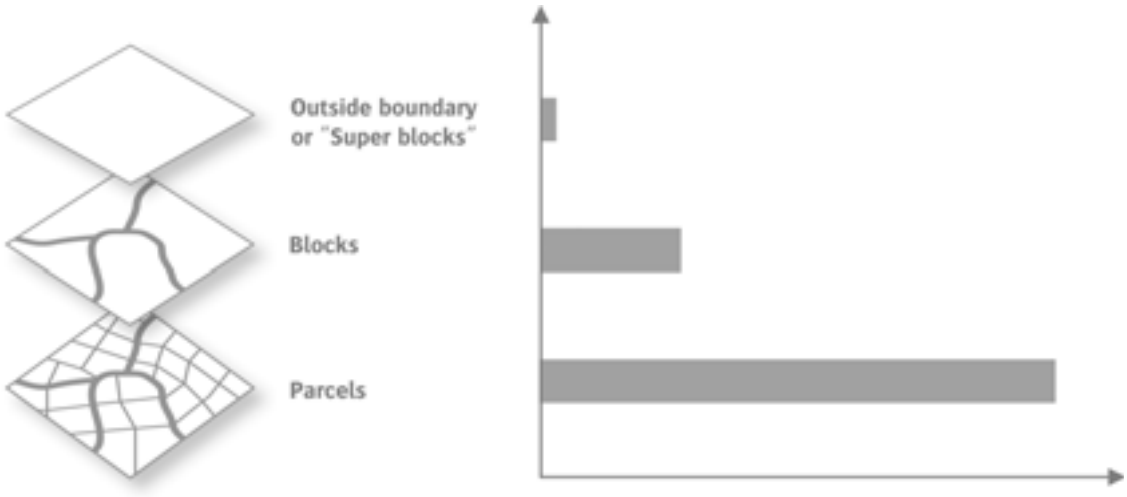

Fig. 6.5: Information load at various levels of resolution in a block strategy.

6.7 Theoretical background

Theory on the information problem

The theoretical background for the analysis in this chapter builds first of all on Heals general observations on planning procedures:

"In discussing the nature of planning processes, the first point to note is that any procedure for solving a large constrained maximisation problem is inevitably an iterative procedure – a procedure which finds the solution by taking successive approximations to it. Given arbitrary initial approximation to the solution, the procedure indicates how this must be modified in order to produce a better approximation. Successive applications of the modification procedure (known as an algorithm or routine) then lead to better and better approximation to the solution. The need for the solution process to be iterative is very clear: The problems concerned are too large to be solved `at one go´." (Heal, 1974, p. 65).

Heal mentions how iteration is widely used in the solution of numerical problems, in management sciences and in economics. He could equally well have mentioned land surveying and land planning. With the perspective of planning for a whole economy or sector he continues:

The second general point to note about the nature of planning processes, is that they involve some degree of what might loosely be called decentralisation: that is, the planning problem, instead of being solved entirely by the central board, is solved by co-operation between a number of different agencies, each responsible for some particular aspects of the problem.
…
The size of the problem gives rise to two major difficulties. One of these is that it is virtually impossible for the central planning board to gather in its offices all of the information needed to state the entire planning problem formally. This is partly because there is so much information, and partly because some of the people who have the best detailed information about particular processes may not be able to formalise this and communicate it to

the centre without introducing errors. They may well have a strong intuitive appreciation, based on years of experience, of the way the process works and of the constraints governing its operation, but may not be able to describe this in the form of a set of equations, as would be necessary if the problem were to be solved centrally by the central planning board. The second difficulty stemming from the size of the planning problem is that even if it were possible to amass the necessary amount of accurate information, it would almost certainly be beyond the planning boards ability to manipulate and process it in the manner required.

Considerations of the above type provide the main argument in favour of some form of decentralisation of the planning process. The exact meaning of `decentralisation´ is a source of contention, and is considered in detail below: for the time being it can be regarded as a way of breaking the planning problem down into a number of independent operations, each of manageable size, and each performed by some separate agency. (Ibid., pp. 66-67).

Planning procedures are therefore typically iterative and decentralised:

" … having the distinctive feature that the information about the economy available to the centre and the various firms is never pooled, never all assembled in one place. (Ibid.)

Heal then elaborates the decentralised model where agents act only upon the information about their own possibilities. This definition of decentralisation is inspired by the working of the competitive market and he uses the term *"informational decentralisation"*. (Ibid., pp. 68-69). This definition emphasises the strictly material aspects of the information management.

Theory on constrained maximisation

Besides, the reasoning is inspired by the logic of constrained maximisation. The mathematical language of this methodology concerns numerical problems and is of course not very useful in finding solutions to land registration. Yet, finding practical solutions to land registration can be seen as a problem of constrained maximisation: To find a way to achieve something specific in the best possible way within a range of difficulties or limitations and within a not too distant future. Also Krarup and Pruzan (1974) mention that the structure of optimisation problems can be useful in non-numerical problems. The concept of an optimal solution can function as a filter, where a large number of irrelevant decisions can be eliminated so that a few reasonable options are selected for further scrutiny. (Ibid., p. 13).

Heal presents the structure of a constrained maximisation problem in a mathematical vocabulary. There are "constraints". There are "resource constraints" in the form of finance and in the form of lack of knowledge. And there are "production constraints" that is limitations in the technical possibilities at least in the short term. Some constraints may be alleviated over time, for example, constraints in knowledge may be reduced as a result of deliberate training efforts. I add as category of constraints that there is also a constraint in the *time* factor: A pressure to act quickly in order to achieve some impact.

The concept of a "feasible" solution or approach is borrowed from the terminology constrained maximisation. It means a solution or approach that proves viable within prevailing constraints.

Theory on uncertainty

Another reference that has helped formulate the thesis is Johansen (1978). From the chapter on "Planning under uncertainty":

" … we have most of the time assumed away the problems created by uncertainty. However, for a realistic approach to economic planning uncertainty cannot be bypassed. Uncertainty makes itself felt in connection with most policy decisions and is sometimes a major consideration. For instance, in connection with macroeconomic stabilization policy in market economies there is often very much of uncertainty about the situation some months or a year ahead when the impacts of present decisions with regard to public expenditure, taxation, monetary policy, etc., will have their greatest impact on the development.
…
Other important examples of uncertainty refer to future developments on world markets of importance for exports and imports of a country, war or peace in different parts of the world, weather and harvests of important crops, questions about the possibilities of finding oil and other resources and about technological development with respect to exploitation of nuclear power, and so on. Uncertainty is not something which should be considered as a theoretically interesting refinement or extension of standard theory and methodology, but a central factor of eminently practical importance. Sometimes, uncertainty is itself the heart of the matter when decisions are to be taken.

When I stress the importance of uncertainty as I have done here, it may give the impression that the planning scheme and methods considered in the preceding chapters, which have usually assumed away uncertainty, are rendered rather worthless. This is not so. Procedures and models which are developed under assumptions about full information and certainty may often be a good starting point for reformulations and reinterpretations which take uncertainty into account, …." (Johansen, 1974, pp. 263-264).

This passage made it "click" that the concept of uncertainty is absent in the vocabulary of land registration. It is with the above passage in mind that we contend that cadastral surveying in particular assumes and requires full information. Seeing how text books in economics treat the issues of uncertainty, would it then not be logical that also cadastral surveying and all the other operations in formal land management adopted a methodical approach to uncertainty?

6.8 Notes

(1)
Concerning the critique of information requirements in the cadastral procedure an outstanding reference is former director of Overseas Surveys Warren (1978). In his famous article (1978) Warren identified the particular rigidity of the procedures in cadastral surveying, linked them with the costs and characterised conventional cadastral thinking as "the 0.01 syndrome". See also Dale and McLaughlin (1988) who with respect to accuracy standards state that these have " … often been determined by what is technically possible rather than what is necessary …". And with respect to survey regulations that specify precision standards:" These regulations may imply levels of precision where none is needed", which in turn can have significant influence on costs. (Ibid., p. 36).

(2)
Fourie (1994, pp. 26-27) argues the relevance of block strategy for the South African situation and refers to United Nations guidelines from 1990. Larsson (1991, pp. 145-153) explains the block strategy as a radical way of reducing the number of land units and as a possible first step in an upgrading and registration process. Bromley (1989) sees the relevance of block strategy for "the vast domain non-private land" in the

arid tropics. Arguing that individualised land ownership is inappropriate Bromley makes the additional point that costs of land administration is lower for the collectively managed public domain of the village.

(3)
A recent and interesting experience that links block strategy with group title is reported by Quiante and Borges (1998). A method for identification of the area of a village and its property rights has been developed in Guinea-Bissau. The village is registered as one unit and it is recognised as a land management authority. The process involves joint participation of the farmers and the traditional organisations of the village. Limits are identified in co-operation with adjoining villages. The limits are monumented and surveyed by GPS and satellite images.

(4)
The block strategy was recently introduced in Denmark. A reform in the EU agricultural policy changed subsidies from being per unit of product into fixed amounts per hectare with different rates for various crops. This created a need for control to prevent farmers from reporting areas that were too large. For this purpose a nation-wide network of blocks was established. These were defined according to permanent features in the landscape. The control mechanism is triggered when the total area for which farmers apply for subsidies within each block exceed the total area of the block. The so-called DMK-BLOK project was quite dramatic. It produced about 300.000 blocks for Denmark's 27.000sq.km agricultural land in about 4 months. The entire rural landscape was covered by an aerial survey for this purpose in one week in June 1995. (Buch and Jensen, 1996).

(5)
Fourie provides a consistent focus on the informal sector in many papers. One passage is particularly effective in delineating the fundamentally insecure situation of an official cadastre in a developing country: "Informal land delivery and settlement destroys land record currency. That is, the records under these conditions will no longer mirror what is on the ground and will therefore no longer be current." (Fourie, 1996, p.9). This provides the contrast to our conventional paradigm of land registration in Denmark where once a situation is surveyed and entered into the register the surveyor need not worry about unreported changes because all changes are processed by a well institutionalised procedure as described in chapter 4.

CHAPTER 7: ADJUDICATION

7.1 Introduction

Adjudication is most importantly associated with the first registration of land rights. A common difficulty that typically frustrates the implementation of even minor land developments is that the prevailing situation of land rights is not recorded or only partially recorded. It is therefore necessary to establish the existing situation as the starting point from which any change departs.

Lawrence (1985) gives a definition of adjudication as understood in most literature in English speaking countries as " *the process whereby all existing rights in a particular parcel of land are finally and authoritatively ascertained. …*".

Adjudication is inevitably linked with uncertainty and disputes. Conflicts over land rights are generated constantly in all societies. Factors that can contribute to the occurrence of land disputes include inefficient land administration or even an absence of institutions to regulate land allocation. "Land grabbing" is sometimes used to refer to unauthorised land occupations made possible by a virtual absence of regulation. Uncertainty and disputes may also derive from a change that is about to be implemented in the course of land reform and regulation of land use.

It is therefore important that adjudication is perceived not only as an impartial activity to record existing rights in land but also as one that will inevitably also involve a process of dispute resolution. Here lies the link to information management because a very common cause of disputes over land is uncertainty deriving from incomplete information.

7.2 Disputes and tribunals

The following concepts are defined with reference to English and Danish experience. Disputes are seen as consisting of two categories. Firstly, there are *disputes between individuals*. In many of these cases disputes arise between neighbours when a certain threshold of tolerance is exceeded. The causes and issue of such disputes include the position of the boundary, fences and hedges and the transgressing of boundaries by domestic animals. In fact disputes are generated in all aspects of land use. Secondly, there are *disputes between individual citizens and the administration*. These disputes are typically occasioned by the enactment of legislation.

"Such legislation is rarely sufficient in itself to achieve all its objects, and a series of decisions by administrative bodies, such as government departments and local authorities is often required. For example, ... in providing an educational service decisions have to be taken on the siting of new schools. Many of these decisions affect the rights of individual citizens, who may then object." (Bailey, et. al.,(1992) p. 66)).

Bailey et al (1992, p. 64) point out that disputes are resolved in terms of a body of pre-existing rules:

> "A proportion of the disputes generated in the field of administrative law can be resolved by the application of pre-existing rules. These rules vary in precision and in origin. The application of reasonably precise rules of law in the resolution of a dispute is a function typically performed by a court of law, although there are many examples of such processes being entrusted to other institutions.

A general redefinition of adjudication that places dispute resolution at its centre, can then be stated as:

> *A formal procedure for the resolution of a dispute by the application of pre-existing rules.*

This resolution of disputes is often performed by *tribunals*. Garner, et. al., (1985), pp. 230- 231) defines a tribunal as

" ... any statutory body which possesses most or all of the following characteristics:

> (a) It is independent of the administration and decides cases impartially as between the parties before it.
>
> (b) It reaches a binding decision to the cases heard.
>
> (c) Its decisions will usually be reached by a "panel" of tribunal members rather than by a lone adjudicator.
>
> (d) It will adopt a procedure akin to, though rather simpler and more flexible than, that of a court of law.
>
> (e) It will have a permanent existence, the tribunal having been established to deal with a particular type of case ..."

The tribunal is a widely used device to resolve disputes. One category of tribunals has been established to hear and determine a wide variety of disputes between citizens and the administration. Another category of tribunals has been established "... primarily to handle disputes which do not necessarily involve the administration. ... The reasons why they were established (e.g. desire for informal proceedings, specialist appreciation of subject-matter, economy, efficiency) have commonly been the same ..." (Garner 1985, p. 229).

7.3 English and Danish experiences

In the context of English administrative law the use of tribunals was brought about through a case of conflicting interests between a citizen and the administration over the compulsory purchase of land. A committee referred to as "The Franks Committee" (after its chairman) was established in 1955 to investigate administrative tribunals and inquiries and its report in 1957 marked a turning point in attitudes towards tribunals. The report of the Franks Committee stressed:

> "... the potential advantages, in terms of economy, informality, speed, and expert understanding, of tribunal hearings over ordinary court procedures for the handling of certain types of case" (Garner 1985, p. 233).

When Parliament drafted the Terms of Reference for the Committee, one of its basic considerations was that certain decisions should not be remitted to the ordinary courts, nor should they be reached in the normal course of administration. The issue is that the administration must

proceed "... with reasonable regard to the balance between the public interest which it promotes and the private interest which it disturbs." (Bailey (1992), p. 68). Such procedures should be characterised by the attributes of openness, fairness, and impartiality:

"... Take openness. If these procedures were wholly secret, the basis of confidence and acceptability would be lacking. Next take fairness. If the objector were not allowed to state his case, there would be nothing to stop oppression. Thirdly, there is impartiality. How can the citizen be satisfied unless he feels that those who decide his case come to their decision with open minds?" (Ibid, p. 69).

Adjudication by tribunal is now a widely used device to resolve disputes. Bailey lists 45 tribunals from English administrative law dealing with such diverse matters as land, data protection, banking, betting levy, misuse of drugs, plant varieties, social security, and wireless telegraphy. (Ibid., 81).

"*The motives for the establishment of the tribunals have, therefore not been uniform. Sometimes the aim has been to relieve the courts of the burden of cases not really suited for them; in other situations tribunals have been found to be convenient devices to provide an independent element in cases which would otherwise have remained for final decision with the administration.*" *(Garner (1985),p. 232).*

The Danish system of Land Courts evolved in the course of the reform of the Danish feudal land tenure system initiated in the 18th century. Their origin can be traced back to the official appointment of advising land commissioners by an order of 1761 concerning their dissolution of the communal regime of villages. The land commissioners were together with the District Commissioner made the first administrative level for the resolution of disputes on partition of land in the process of enclosure. Such issues were considered unsuitable for determination by the ordinary legal process. This arrangement developed into the Land Courts (Danish: Landvaesenskommissioner).

The Land Courts came to be used also in other land issues. The early legislation aimed primarily at resolving disputes between neighbours in the process of dissolving co-ownership in land. But gradually, a range of issues emerged that were of general concern to society. Problems relating to water became important. There were questions on maintenance and the sharing of costs. And there were questions on rights of way. A general principle was that even when landowners could agree on a solution they need apply for permission from authorities to change the existing situation. In practice most cases were brought before the land courts. (Tolstrup, 1970, p. 16, 25). In 1858 a revised set of regulations were issued and appeal courts were established (6). Later revisions followed in 1933 and 1949. Although these courts were abolished in 1970 except for a few limited functions such as an appeal route for fence disputes - they provide a useful example of a decentralised decision-taking agent. See also in sections 7.5 and 8.5 how a number of other land-related tribunals have emerged.

A Land Court at local level would typically be composed of two laymen and one permanent chairman who was a judge of a civil court within the county. They were paid only modest allowances and transportation costs.

Most cases heard before Land Courts began with an on-site session, at which the parties were given the opportunity to inform the court about their point of view. After this the court continued the case in a nearby office or courtroom. The sessions were public. As a general rule evidence was given orally allowing the parties themselves to express their opinion. As the parties often met without a lawyer the land commissioner needed to guide and instruct them.

The Danish Land Courts had a distinctive difference from the ordinary courts. Whereas the task of a civil court is typically to determine the legal consequences of events that have occurred, the task of the land courts was usually to assess the legal and material effects of an intended *future* change.

Many cases concerned the implementation of works such as drainage projects, regulation of rivers, and more recently waste water disposal. The involved agents would typically be in a general agreement but they would not have the mandate to implement the project on their own. In these cases the role of the land court was not so much to settle a dispute but rather to review the project in order to ensure that its implementation was generally justifiable to the rest of the community. See Tolstrup (1968) particularly pages 12-38. Before the court has a full overview of the plan and it's consequences the project should not be approved. The court should use it's provisions to require specific information, and agreements and ruling should specify all the issues mentioned so that it is not left to the client to fill in the decision. (Tolstrup, 1970, pp. 63-64).

This means that an implementing agency such as for example the local administration could only make its own project legally binding if it had the support of an impartial third party. Christensen (1958, page 452) points out that the land courts functioned in this way as a third party between a public authority charged with implementing a project and the affected interests.

This principle of legal oversight is still reflected in expropriation procedures and in land consolidation, as we will see in chapter 8. As we have mentioned, the system of Land Courts was abolished in 1970 following a major reform of local government. These reforms were part of a process of expansion of the municipal and county institutions. It is precisely because these decentralised courts were part of the institutional setting for land management when Denmark was at a less advanced stage of development, that their characteristics may be relevant for developing countries. The Land Courts proved feasible for various types of land reform, facilitating effective and legitimate decision making for almost 200 years (7).

7.4 Adjudication and intervention

The Land Courts should be seen as an aspect of the information technology in the 17th and 18th centuries. They demonstrated how it is possible to cope with a poor centralised information base through iterative and decentralised decision taking. By involving local laymen and women, important local knowledge was utilised which would otherwise have been inaccessible. The on-site court session, in particular, is interesting from the point of view of information systems.

Virtually all Danish land related tribunals still conduct an on-site session. Verbal presentation by the land users themselves of their claims and opinions on site and in an informal atmosphere is an effective way of conveying a type of information that it would otherwise be difficult to bring into a courtroom. For the members of the land tribunal the on-site session can be efficiently used to grasp the consequences of the decision they are about to take. Furthermore, at the on-site session landowners may question technical aspects of the project and bring forward specific information that may not have been considered during the planning phase. There are even recent cases where an Expropriation Commission after hearing the parties on-site, has ordered the implementing authority to re-design parts of its project.

The information base for planning in Denmark and other developed countries is nowadays so nearly perfect that implementation will encounter few "surprises". The on-site session and sub-

sequent negotiations, therefore, mainly concern assessment of compensation. However, in developing countries most projects will be planned on the basis of far more imperfect information and consequently implementation will encounter correspondingly more ”surprises”. Affected land users will also be more likely to volunteer information of importance to the project design, in particular concerning the physical environment, local practices and preferences.

The planning of intervention often involves resolution of the inherent dispute between public efficiency and private right. A participative planning process may to some extent reduce this contradiction but any change to existing land use is likely to cause material loss and inconvenience to some land users. It is fundamental to the legitimacy of public land management that approval of the change includes the assessment of fair compensation.

There is, therefore, a case for applying the concept in the Danish land courts so that a land tribunal would be used to make the plan in its final form legally binding. The final adjudication session could be delayed until final plan details were in place, when the land tribunal would approve the plan and make it legally binding. In the course of the adjudication process any dispute between the administration and individuals would be resolved including the determination of compensation.

Adjudication in this sense would have several functions: (1) to allow for iterative and participative planning decisions; (2) to resolve disputes between individuals and the administration; (3) to make the intervention legally binding. In the overall land management process, adjudication then is the critical point where discussion ends, and enforcement begins and material change proceeds. Adjudication becomes the process of *ascertaining the new rights* including compensation.

The information load of the land development process is reduced through iteration and decentralisation because the planning problem is split into (1): a planning decision based on broad criteria and finance ("office decision") and (2): a decentralised planning decision made legally effective by adjudication ("field decision") concerning the final and finer details. This split is illustrated in Figure 6.2.

7.5 Iteration and uncertainty

The essence of tenure security is "certainty". The fundamental information problem in land registration is to establish and maintain certainty in three questions: What rights? Who holds them? Where can these rights be exercised? Incorrect information in just one of these questions will cause uncertainty, which typically will take the form of a dispute. This is why the gathering and processing of correct information takes the largest work load in land registration.

Conventional land registration strategy is based on the implicit assumption of perfect information. The implicit strategy is to prevent uncertainty in the What-, Who-, Where-questions through the provision of correct information. However, this fundamental assumption cannot be assumed to be valid in developing countries. Correspondingly, procedures for identification and enforcement of land rights in developing countries need to be able to function under conditions of incomplete information. This, in turn, means that they must have in-built mechanisms for processing disputes. Adjudication procedures are such mechanisms. They sustain the stability of administrative systems by absorbing "noise" due to imperfections in the centrally-held information.

Adjudication as outlined above reflects a two edged approach to the uncertainty that is so antithetical to tenure security:

To prevent uncertainty through reliable information.

To dispose of uncertainty by way of a legal process.

The information problem in land registration can then be resolved through a technical process of data management and through a legal process of dispute resolution. The application of pre-existing rules restores a kind of predictability to a process based on uncertain information.

In practice the resolution of cadastral uncertainty is likely to be adjudicated by different tribunals. For example in Denmark, disputes that concern the position of the boundary are adjudicated by a chartered surveyor in the first instance (See annex 11.3, sections 35 and 38). Disputes on fencing and hedges are adjudicated by *fence-tribunals,* which are appointed in all 275 Danish municipalities. Disputes concerning economic loss caused by a land surveyor's errors or negligence are adjudicated by yet another tribunal. However, the essence is the same: adjudication procedures are in place to absorb the imperfections of the system, some of which derive from imperfect information.

Dispute resolution should be distinguished from *iteration*. Projects where land use and ownership are changed are often implemented in stages. The process of changing and formalising land rights then becomes equally iterative. Upgrading of an informal settlement may for example, grant formal rights by specifying terms of occupation with reference only to the settlement area. The task at this stage is to adjudicate the boundary of the settlement where it abuts on adjoining land use zones. A second stage would establish the layout of road network and internal land-use zones and also create the final design and demarcation of individual plot boundaries.

Each iterative level will have its specific information requirements and uncertainty and there will be predictable types of potential dispute. For example, the delimitation of the outside boundary of an informal settlement is very much a town planning consideration. Here the municipality will have its requirements for road reserves, adjoining residential and industrial areas and so on. The conflicting aim of the settlement residents is to have their area as large as possible.

In this decision making process there will be guidelines to town planning and rules for representation of the community. But translation of a plan into the field will always encounter special circumstances and surprises. Uncertainty and dispute in these situations derive from a combination of planning uncertainty, conflicting interests, and unclear or non-existent guidelines. This is the level of detail that is most practical to tackle by on-the-spot decisions. The challenge is to design pre-existing rules for such iterative approach.

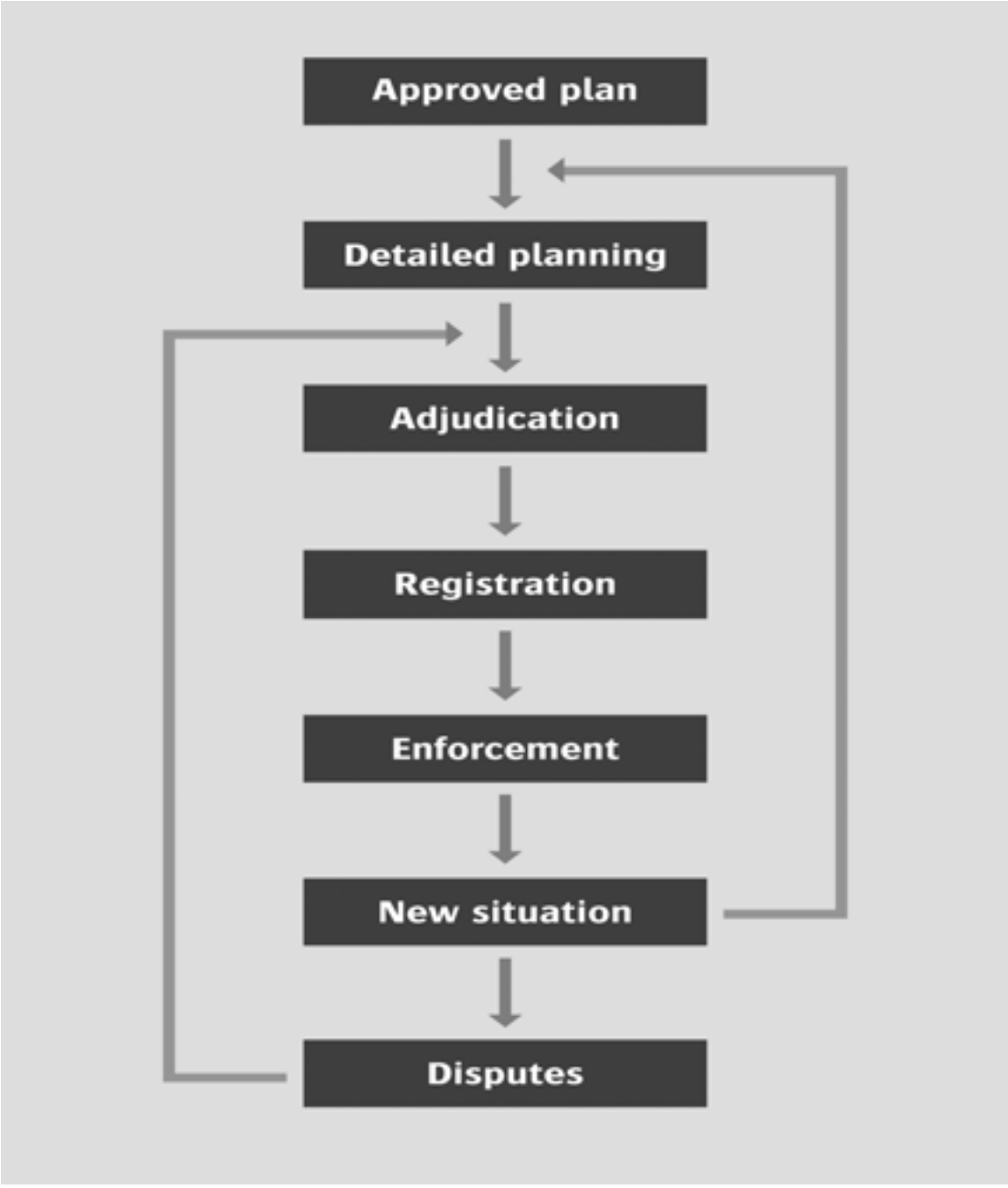

Fig 7.1 The iterative aspect of adjudication in project implementation and recurrent dispute resolution.

7.6 Discussion

The *impact of disputes* touches many aspects of life. An environment of unresolved disputes and general uncertainty is one in which weak social groups are likely to lose out in the ongoing struggle over land and this applies especially to women. Disputes and lack of efficient adjudication procedures pose a serious constraint on land management. In both urban and rural development such situations create a reluctance to initiate effective measures of change. This reluctance springs from lack of previous constructive experience with procedures for intervention, land acquisition and redistribution or with appropriate forms of compensation.

A particular effect of uncertainty in this situation is *indecision*. The absence of legitimate implementation and dispute resolution mechanisms makes land issues and potential interventions more controversial than they would otherwise be. This creates a temptation for administrators, consultants and others to seek refuge in data collection; which being essentially descriptive is relatively harmless. The modern information technology offers numerous opportunities for this syndrome: modern base mapping, GIS, satellite images and so on. The atmosphere of indecision, thereby, contributes to excessive information requirements (8).

Operational adjudication procedures need to match the specific nuances in prevailing legislative framework as well as the expectations and values of those affected. However, for the purpose of discussion we can make a very crude model of the important components of adjudication. In this simplified view, adjudication is treated as a device against uncertainty and disputes arising from it.

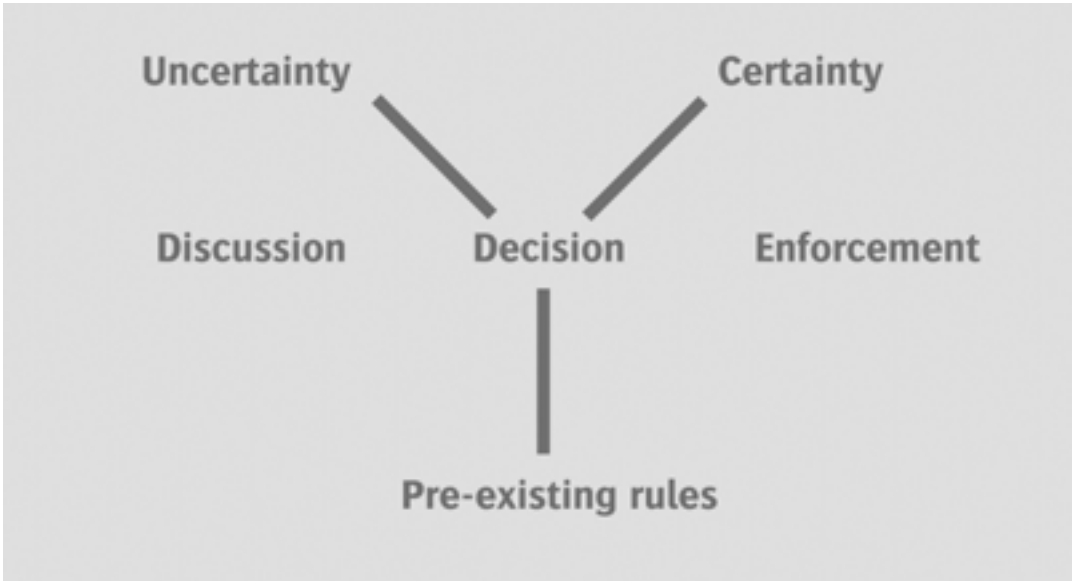

Fig 7.2: The components of adjudication..

Figure 7.2 can be interpreted as follows. Situations of uncertainty on land rights would often give rise to a dispute or at least a discussion. The adjudicator is officially empowered to dispose of the uncertainty by way of a decision that establishes "certainty" as to what existing rights are.

The initial discussion is replaced by potential enforcement. The uncertainty is adjudicated by the application of pre-existing rules..

Such adjudication or conflict resolution mechanisms evolve in all human societies over time. Their function is to provide stability. There are many examples of these mechanisms being more efficient in traditional institutions than in public administration. For example there is likely to be a co-operation between land administrations and chiefs and headmen, all depending of course on the issues at stake, the attitude of key persons and other circumstances.

The pre-existing rules are what constitute land law. It is a general problem that prevailing land-use practices are only to a very limited degree reflected in official law. There is a need to develop land law to match the urgent requirements in land management and dispute resolution, to build up case law and recurrently refine and develop procedures and criteria. However, it is not practically possible to formalise all customary law practices. Developing countries are huge by comparison with for example Denmark, they embrace many different communities and their rules change in dynamic response to ongoing changes in society. A way to get to information on prevailing local or customary practices could be to involve the local community-based organisation or authority in the adjudication. In other words, the adjudication procedures should be designed to draw on local knowledge by involving local authorities or representatives. Nonetheless, there is an enormous task in reducing the gap between the administered law and informal and customary practices, that is, to develop land law.

7.7 Theoretical background

The benchmark in contemporary references to adjudication is Lawrence´s paper from 1985. He uses the concept of adjudication, which serves the purpose of first registration. Lawrence insists that adjudication refers to the official registration of *existing* rights, and that adjudication, therefore, is not land reform. His underlying concern is that people should not lose rights in the process of registration. This definition is adopted by Dale and McLaughlin (1988) who develop the concept by establishing a link with dispute resolution. They suggest a strategy that combine prevention of boundary disputes by accurate surveys and the resolution of disputes by adjudication. See their pages 33 and 212-214. Larsson (1991) pages 101-111 presents a faithful summary of the essence in Lawrence´s paper. The perspective in Bailey and Garner (1992) is not primarily land administration but administrative law. They therefore consider adjudication as an institutional device and land issues appear as just a special case.

Tolstrup's textbook on land law not only gives the details on the legal framework for and operation of the land courts (Danish: "Landvaesensretter"). By reviewing how the various land related issues are regulated on each their legal basis it illustrates how also in Denmark specialised courts have proliferated to regulate and consider disputes on boundaries, on fences, on rights of way, on damage on crops caused by domestic animals, etc. Besides, it should be kept in mind that a separate body of legislation has been developed to govern ekspropriation. This was occasioned by the event of the railways in the mid 1840s.

Odgaards (1998) case study from Tanzania demonstrates the dynamics of customary law and its contrast with administered law, which she calls common law: "The important difference is that, while common law is documented in legislation and case law, customary law is unwritten and subject to reinterpretation and changes." (page 3). The customary rules regulating access to land and especially women's land rights reflect a historical continuity and at the same time flexibility

to adjust to changing circumstances. A most fundamental change concerning land is that whereas it was earlier a plentiful resource, it has become a scarce resource that is crucial to secure to the next generation. The flexibility and constant adaptation of the customary rules to changing circumstances makes it impossible simply to formalise customary law into written form. The conceptual implication is that "pre-existing rules" must be perceived as equally dynamic.

7.8 Notes

(6)
Ingerslev (1872) is written as a guide for the members of the local land commissions. As perhaps the first Danish textbook on land law it presents the institutions of the land courts, incl. composition, powers and procedure. He reviews the typical cases of about 130 years ago. They include the water-related cases with drainage, regulation and maintenance of streams, and use of water for irrigation. Other cases concerned construction of dikes "over other mans property", digging of gravel, sand and clay. Separate chapters instruct in enclosure of farm land, of forest and peat lots from communal tenure. Yet other chapters explain the rules for setting fences and resolving disputes on fencing and there was the problem with sand drifting. It is strange today to see a separate chapter on the allocation of lots for school teachers and midwifes.

(7)
The reform of local government in 1970 established the municipalities and the counties as authorties responsible for the rivers. The revised act on rivers ("vandloebsloven") empowered the land courts only as the second level appeal instance to rule on questions on compensation and distribution of costs when the parties could not agree. A review of the land courts (Justitsministeriet, 1990) listed 20 laws where the land courts had ended up in this function only as appeal instance, including the fences act, the hunting act, and the act on fresh water fishing. It was recommended to abolish the land courts and have the appeal and assessment court ("taksationskommissioner") under the public roads act perform these functions. This eventually happened in 2002.

In the large historical perspective it appears that the core area of the land courts changed over time. Initially, the courts settled disputes between individuals in the process of dissolution of feudal co-ownership to land. Then agricultural development needed a body to confer legal effect on infrastructure development of which much was related to drainage, new channels, maintenance, bridges and rights of way and cost sharing. When, thereafter, urbanisation set the agenda projects concerned waste water disposal and continued to concern maintenance issues of rivers. When the new local government structures emerged in the course of the 1970s they took over the functions of the land courts and a separate appeal court now considers appeals cases. Recently, since the mid 1990s, nature restoration projects restore lakes and meadows that were drained two or three generations ago. Here, the strategy is to implement these as land consolidation projects, see section 6.4.

(8)
It is no new observation that data collection can be a convenient evasion of effective reform. Lipton (1974, p. 273) lists cadastral surveying and registration of rights as activities, which may serve to evade rather than promote reform. A government may for example say that redistribution of land has to wait till registration etc. is complete; or that registration etc. is part of the reform, which is therefore under way.

CHAPTER 8: LAND CONSOLIDATION

8.1 Introduction

Land consolidation is a land development process. Numerous variants of land consolidation have been devised in societies worldwide. Their evolution has been associated with changes in production, land use and tenure regime. Land consolidations served to bring about change within prevailing power relations and public opinion in the local community. Methods for land consolidation took place within the constraints on resources and information of their times, which were often the days before modern mapping and land information technology. Although circumstances differed, procedures for land consolidation developed that involved decentralised decision taking and the handling of informational uncertainty. Consolidation methods also involved decentralised decision taking that combined negotiation, mediation and formal court rulings. Although in most cases land consolidation methods were founded generations ago, these basic features continue to characterise modern procedures.

The main purpose in land consolidation is to reorganise existing land use but in practice consolidation is often combined with a range of other land reform measures. Land consolidation should be distinguished from procedures such as expropriation and similar direct and often inflexible instruments. In contrast with these, land consolidation is a more open approach with a significant element of negotiation and throughout the process land consolidation involves the people who own and use the land. Consolidation should also be distinguished from the classical subdivision or resubdivision, which is a more narrow and technical process with the primary purpose of producing new property units out of property units typically owned by the same person.

A characteristic of land consolidation is that *several objectives* are pursued simultaneously. One common objective in agricultural land is a reduction of fragmentation. This is often combined with adjustment to relative size of holdings. Objectives of landscaping and nature conservation may also be pursued in the course of land consolidation.

Land consolidation is *a formal process* typically defined by a land consolidation law. Alteration of land rights takes place within the official land registration system. The changes in land use will need to conform to official planning while the new property situation, that results from a land consolidation is registered in the land book.

Land consolidation involves a significant degree of *participation* by landowners and others who are affected through their interests in the land. This is because landowners and land users will, in principle, remain the same before and after the change and the process is in this sense their business. In practice, however, this principle may be disturbed depending on the extent to which reorganisation is combined with other land reform objectives.

We naturally perceive land consolidation in terms of the *before and after* dichotomy typically displayed in the maps of the initial and of the final ownership situations. What happens in between these terminal states is that some land is received and some surrendered while land use practices are to some extent reformed. Technically, land consolidation can be seen as a number of simultaneous transfers of land and this number is sometimes large.

Land consolidation changes property rights through operations that in principle, constitute selling and buying. However, a particular operational system has been developed in the Danish land

consolidation system and probably also in others whereby all transfers and changes are performed simultaneously. This is practical because land parcels are often split in pieces when the area is re-planned and it is impractical to transfer ownership of these pieces of land through individual transactions. The notion of *simultaneousness* in transfers of land and finance is therefore fundamental.

Fig 8.1: Basic components in land consolidation.

This chapter argues the feasibility of the proposition in chapter 4 on the benefits of decentralised, iterative procedures. We will look at land consolidation as an example of a procedure that operates with a significant degree of field-based decisions and, *therefore*, is able to cope with incomplete information and uncertainty. The following section examines the Danish land consolidation process in detail as an example. It would take a similar degree of detail and patience to grasp the logic of approaches followed in other administrations, some of which we will examine in section 8.4 below.

8.2 Danish land consolidation – actors and institutional setting

Danish land consolidation practice concerns agricultural land. The legislative basis is the Land Consolidation Act. The institutional tasks are located within the Ministry of Food, Agriculture and Fisheries where a so-called Land Consolidation office (LCO) performs control functions and issues guidelines. The actors and their functions are as follows.

The Land Consolidation Office oversees land consolidation nation-wide. It ensures efficient processing as well as legality of the changes that take place in a land consolidation. A national budget allocation finances land consolidation, which is, therefore, provided free for farmers. The LCO approves of new schemes and ensures that the level of activity remains within the budget. The LCO has over the years accumulated expertise in the formal processing of land consolidation schemes for which reason it functions as secretariat for Denmark's 12 county land commissions in cases of land consolidation. The LCO prepares the required documentation for consideration by the commission and subsequently performs the operations that implement the commission's ruling. The LCO appoints the planner for each scheme either from its own staff or from amongst the private surveyors. The LCO issues general information on land consolidation as well as guidelines on procedure directed at farmers, agricultural extension officers and land consolidation planners. Senior persons in the LCO contribute to textbooks in land law.

Each county has a *land commission*, which enforces the rules on the use of agricultural land. Each commission consists of three members: A chairman who must have a degree in law and two politically appointed members representing the two farmer's organisations (the large and the small landholder's unions). The land commission performs two roles in land consolidation. Firstly, as it enforces regulations on land use, deviations from these regulations need to be negotiated with the commission during the planning stage. The land consolidation planner often consults the secretariat of the commission on specific issues. However, the necessary permissions are obtained through formal applications. Secondly, at the day of the ruling the commission approves the land consolidation plan. Thereafter the commission is chaired by *a judge* and it is this extended commission which confers legal effect upon the land consolidation plan. All its component transactions thereafter become effective on the specified day of exchange. The judge makes all transactions effective by one signature.

The land consolidation planner is the key person in the planning and negotiation process. His primary task is to negotiate agreements with the landowners, draft proposals on the map and ensure consistency in areas and values. The planner provides all property information and ensures that agreements are correctly drafted. The planner also negotiates with other authorities. All communication – formal and informal – goes via this actor. The planner comes to know all landowners and must be a person who is capable of being trusted and seen as impartial by all.

In the classical case it is *the landowners,* who take initiative to a land consolidation. They feel the need and they know that land consolidation – if approved – is free of charge. At least 10 interested landowners must sign a request to the LCO. The private surveyor in their area may help draft the request and promote the case by supplying required information. Initiative may also come from various *authorities* that implement infrastructure construction and nature conservation schemes. Such actors as The Ministry of Environment and The Directorate of Highways have finance for land consolidation in their budgets.

The Land Consolidation Act requires that a *committee of landowners* be elected. This committee is crucial because it represents the landowners' interests and because it has the requisite detailed local knowledge of people and land issues. Especially in large schemes a good deal of the creativity that leads to the solution originates in this forum. Committee members often make an invaluable effort in negotiation, mediation and meetings. It is up to the planner to strike the delicate balance between negotiating directly with landowners and approaching them via the committee.

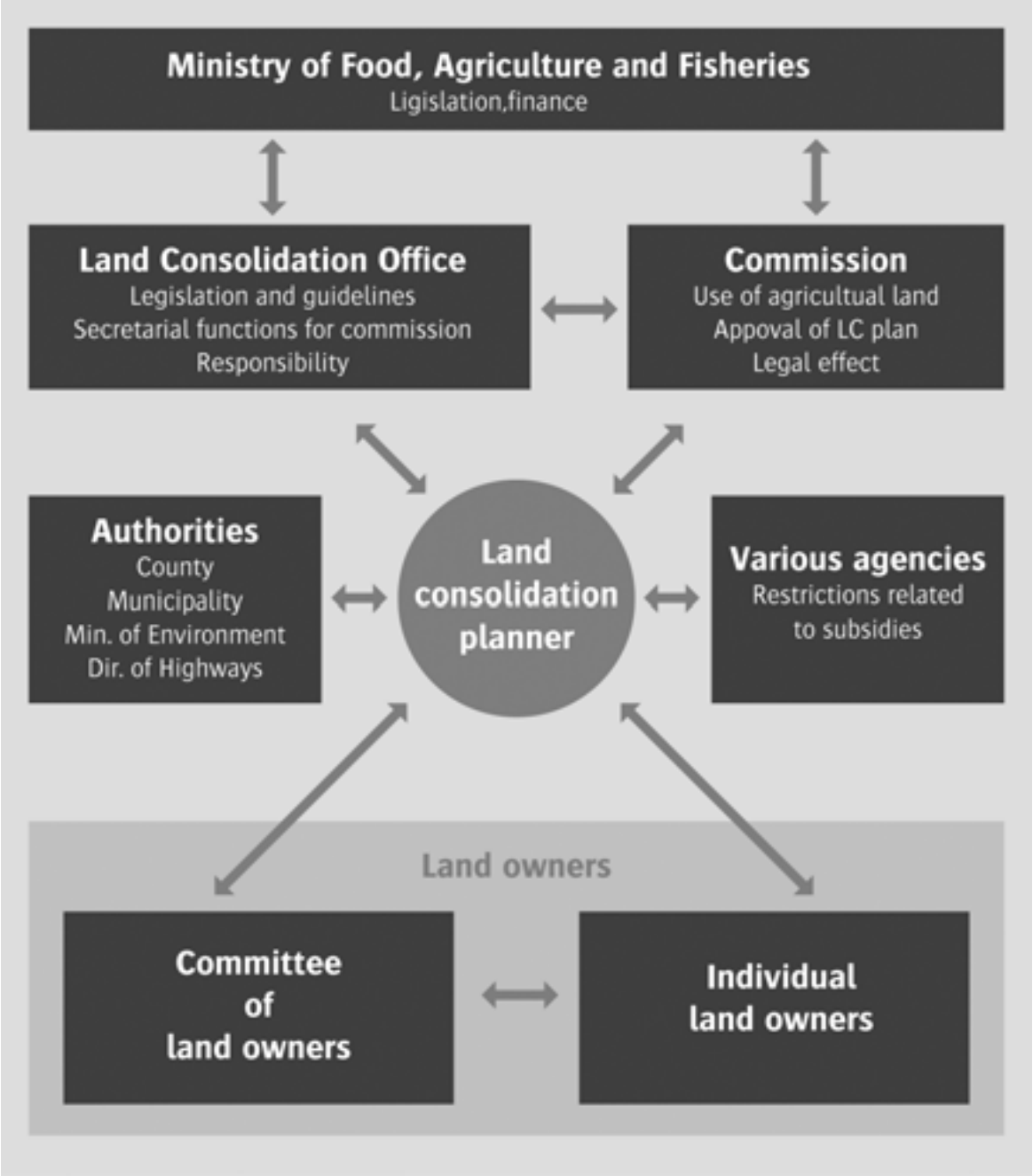

Fig 8.2: The institutional actors in a Danish land consolidation.

8.3 Danish land consolidation –decentralisation and iteration

It is necessary to follow the actual operations in land consolidation to see how informational uncertainty is handled and consensus eventually achieved.

Initiation
As we have seen, a classical Danish land consolidation is initiated by a decision by a group of at least 10 farmers who sign a request for land consolidation. The information underlying this request is primarily the farmer's knowledge of potential improvements in location of farmland. They have in many cases already discussed specific exchanges of land. The farmers are familiar with the land consolidation procedure and have the incentive that it is free of charge. They would normally consult either a private surveyor or a land consolidation planner from the LCO to assist in preparing their request.

The LCO performs no additional information gathering. It considers budget constraints and it compares the potentials in the proposed land consolidation scheme against those of others that may be current. When the LCO decides to consider a requested scheme it calls an official meeting for landowners in the area. At this event a representative from the LCO explains the rules and the practical procedure for land consolidation and discusses the proposed scheme directly with the farmers.

The Land Consolidation Act requires the formal election of a committee of landowners by a majority of those attending the meeting. It further requires that at this meeting a land consolidation planner be appointed, the area of the scheme be delimited and the date be fixed on which the exchanges will become simultaneously effective.

The weight of decisions thus lies at the decentralised level. The initial request comes of a decision by the farmers and the land surveyor. The final approval of the scheme by the LCO is also a decentralised decision in the sense that the representative from the LCO travels to the local meeting to discuss directly with farmers. The decision on a deadline is taken together with the farmers and it, thereby, reflects also their assessment. The election of the committee is also a decentralised decision. The centralised decisions concern budget and perhaps a preliminary comparison with cognate schemes. The essential information available to the central level at this stage is, therefore, the joint assessment of the farmers and the land surveyor that land consolidation is possible and worth while. The LCO relies on this judgement. It takes a risk. Uncertainties at this stage are considerable and include the question of how many other land owners may join at a later stage and the degree of willingness and flexibility that the farmers will display when it matters.

Planning the consolidation.

The appointed planner is responsible for all activities, which include several steps. He needs to establish the initial property situation based on registers and to represent all concerned properties on a map, the so-called *Plan 1*. He needs to perform the negotiation and ensure appropriate co-operation and linkages between all involved actors, especially between the committee, the individual landowners, and those institutions that need be consulted in the process. The planner is responsible for preparing the final solution, the so-called *Plan 2*. He needs to ensure that all intended property transactions are legally possible, that all documentation is prepared and delivered in due time before the deadline. All communication goes through this single person. It rests

with the planner to set the tactics and atmosphere for negotiation and co-operation with the committee.

Determining Prices for exchanged land

Where land of different quality and value is exchanged on a voluntary basis, agreement is needed on the relative prices of all involved land parcels. There are two ways of arriving at such values and achieving consensus on prices. One way is the systematic valuation: Two impartial agronomists together with the committee of land owners assess the *relative* value of all land parcels believed to be subject to exchange. The best field is given the value 100 and others assigned comparative value indexes. The committee later sets the price per hectare of the best field, which determines the prices for all other fields.

This method gives a systematic approach to a highly contentious issue. It draws on local knowledge. The two agronomists are drawn from the local extension service and know the area. The committee contributes with valuable knowledge as they often have years of experience with the various soil types and locations. Furthermore, the valuation exercise is public and each owner is free to attend not only the valuation of his own land but also that of the other fields. When land values are high differences in rating will imply considerable difference in prices. This contentious stage of public hearing and consideration of complaints over the valuation is consequently made a first stage in the negotiations.

The other way to discover effective prices is through a process of individual bargaining between sellers and buyers in each transaction. It depends on the character of the consolidation problem whether one or the other method is more convenient. The choice also depends on the preference of the land consolidation planner. Some prefer the systematic valuation early in the process. Others prefer that prices be negotiated throughout the planning process.

Common for these variants for price fixing is that they do not use the official valuation. In each scheme they assess what locally and amongst the participating landowners, what is seen as real price and as fair basis for exchange. This local knowledge is accessed by involving those very agents who have the detailed knowledge and who are going to experience the consequences. The individual bargaining is perhaps the most decentralised and iterative approach towards determining effective prices.

The role of individual preferences in consolidation.

The planner arranges individual interviews with landowners. In large schemes this may be organised systematically over one or several days with 15 minutes for each. Thereafter, the planner gradually comes to know each farmer and his particular type of production. Scope of potential change is revealed through discussion of possible solutions.

The preferences of individual farmers are to some degree a variable. The planner may come up with proposals for exchange of land, which the farmer did not think of or believe to be possible. More farmers may join in when they hear of progress. A farmer may decide to sell his entire farm or most of his land and this creates new possibilities for reorganising the layout. The committee of landowners performs a crucial role in this process and detects developments in preferences. In the best cases, it is the committee that comes up with the creative proposals and the

planner who supports technically. Preferences are, therefore, an aspect of local knowledge, which is accessed and influenced iteratively throughout the planning and negotiation process.

Individual agreements

It is the decision of each landowner to sign a land consolidation agreement. This document specifies for each holding, which pieces of land are to be surrendered and received and under what conditions. Three types of uncertainty are encountered when the individual agreements are prepared.. Firstly, agreements are made one by one as negotiation proceeds. It is, therefore, not necessarily certain that a parcel, which one participant agrees to buy will also be sold by its present owner, who may not yet have signed an agreement. Only when all agreements are signed will the entire plan for change be achieved. This uncertainty has lead to the design of an asymmetrical contract: It commits the landowner to specified changes within a period usually of 6 months. However, the LCO represented by the planner is not committed. Only if all other corresponding agreements materialise will the changes become effective. The signed land consolidation agreement is, therefore, in effect a binding offer that is effective only within the specified period.

The second uncertainty connected with individual contracts arises because the reorganisation of farmland will often imply a new layout that is, however, under negotiation and, therefore, not yet demarcated and surveyed. The area of the land parcels in question is therefore not accurately known. This uncertainty is handled by a passage in the agreement whereby the landowner accepts that areas are approximate and that deviations revealed by subsequent cadastral surveys shall not occasion additional claims. There is, however, a general rule that deviations exceeding 5% in area are adjusted. Other ways of coping with this uncertainty are to commit the landowner to a “fixed price”, to specify instructions for demarcations to the cadastral surveyor or to demarcate the new boundaries on the ground before settlement on prices.

A third recurrent uncertainty concerns planning permissions. It commonly occurs that a potential solution violates regulations for the use and allocation of agricultural land. A purchased field may lie further away than the prescribed maximum distance or may presuppose access across a road with heavy traffic. A farm may end up with a total area exceeding the prescribed ceiling and so on. The county land commission enforces these regulations. In such cases the planner applies to the commission for permission to vary compliance with the regulations. In cases where the land commission does not grant permissions a new solution needs be negotiated. Once a coherent plan is worked out it carries a weight that often makes the commission apply a wider scope for dispensations from land use regulations.

Other planning restrictions include nature conservation measures imposed on particular areas and objects such as ponds, hedges of historical value, which may not be removed in a process of reorganising farm layout. Furthermore, the farming subsidy regulations define a range of restrictions on land use and milk production, which need also be taken into account.

Plan 2

The result of the land consolidation is the sum of all changes in the individual agreements with landowners. All documentation is sent to the central land consolidation office, which now performs its secretarial function for the county land commission. The LCO ensures that property

identification is correct, that required financial guarantees are attached, etc. The LCO officer arranges the commission's session at which its ruling will be made, drafts this ruling and books a convenient room at a local inn or hotel as well as a small lunch for the occasion.

The commission's ruling session

The ruling session has two stages. Firstly, the land commission approves the plan. Secondly, a judge thereafter joins and chairs the commission, which then confers legal effect on the plan whereby it becomes effective on the specified date. The judge makes all transactions effective by signing the ruling drafted by the LCO. The ruling specifically ensures the interests of mortgagors that is, the money lenders who have security in the concerned properties.

Implementation of the consolidation plan.

Ownership changes, transfer of finance and all other conditions become effective simultaneously at the date of exchange. The LCO ensures that those particular operations, which implement the ruling, are performed. It ensures that information on the concerned properties is updated in all relevant registers, that the basis for assessment of land taxation is corrected and that the ruling is registered as a burden on the concerned properties. This latter measure ensures that the changes in property are not overlooked in subsequent transactions such as transfers or mortgages, even though updating of registers and land book is not yet completed. One aspect of the iterative character of the operation is that the cadastral survey is performed only after the ruling, that is, after the changes have become effective. This is why the individual agreements refer only to approximate areas. The cadastral survey is, therefore, an aspect of the updating process – not a prerequisite for the agreements. When the updating process is complete a final ruling takes place after which owners receive prints of the updated property information but not a new deed.

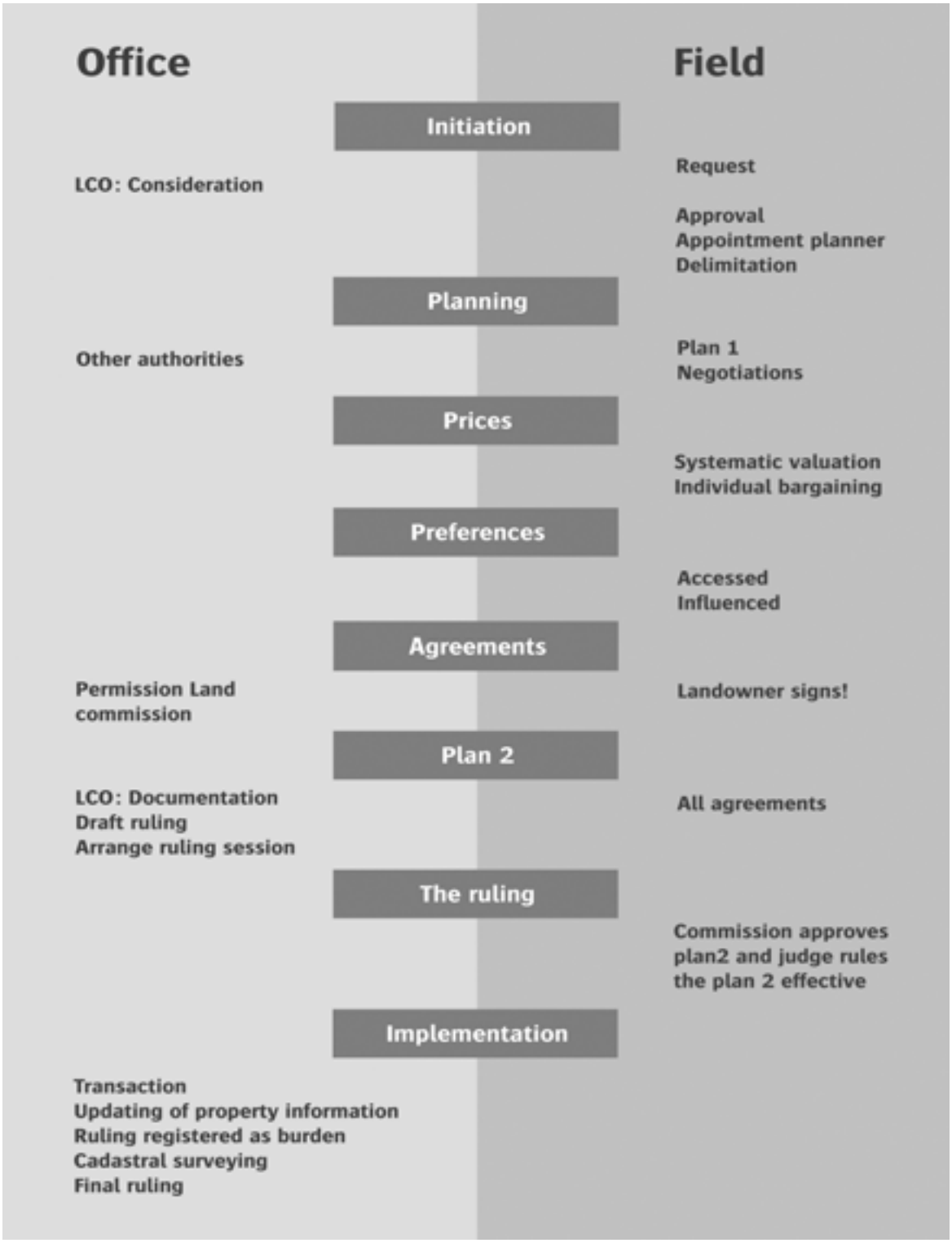

Fig 8.3: The weight of decisions and information sources in office and field in a Danish land consolidation.

Figure. 8.3 illustrates land consolidation as a decision-taking model in which decisions are shifted to the field as shown also in Figure 4.3. The above exposition has shown how this operates and how those decisions requiring complex and local information are consistently decentralised to the level where the information is. A similar detailed exposition of land consolidation approaches practised in other countries might well reveal the same feature of decentralised decision taking. This practical approach to implementing changes in land use and land ownership has similar features in many different countries, as we will see in section 6.5. Methods incorporating these principles are almost indispensable when it comes to implementing land reform in developing countries where centralised information is generally incomplete and furthermore there is a need for joint participation of official agencies, community based organisation, NGO´s, traditional authorities as well as individuals.

8.4 Combination of consolidation with other instruments and trends

The classical village-based land consolidation is often combined with other instruments and is increasingly used for other purposes than pure relocation of farm land. The land consolidation instrument is not a constant model but rather it is adjusted as required by changing circumstances.

Adjudication

Land consolidation and land readjustment operate on or manipulate all the land within a defined area. Objectives may target particular aspects like urbanisation and improved location of farmland but once in operation the planning exercise will often end up considering the totality of the area. One issue likely to be encountered is incomplete land registration. The Danish legislation has provisions that unregistered land can be included in the reallocation and ownership can be adjudicated as a part of the ruling. This rarely occurs in Denmark because virtually all land is registered and the register is kept up to date, as we have discussed in Chapter 2. Norway has a different situation, as we will discuss shortly in section 6.5 below. In developing countries where rural land rights are in many cases not systematically registered and considerable informal development takes place in urban areas, there will be a need to sort out and register land rights in the course of a land consolidation scheme. Land consolidation can in such cases be combined with adjudication and dispute resolution and thereby promote land registration. See notes on Vindeloev (1997) in chapter 9.

Consolidations arising from public interventions

Land consolidation is often used to “repair” the layout in farmland when new roads are constructed. In recent years the process has increasingly been used also to implement environmental interventions in land use such as nature conservation projects. The existing procedure defines a forum for decentralised planning and negotiation. A key issue is compensation. Redistribution and allocation of alternative land can be part of the compensation. Some interventions use the procedure from land consolidation for a rational and simultaneous processing of all property changes. Although interventions almost by definition have a more or less pronounced element of expropriation it is a general experience that negotiated solutions are perceived as fair if alternative land is offered as part of the compensation. Thus, the importance of land banking.

Land banking and land consolidation.
Economic incentives and tighter regulation of land use create a powerful trend towards concentration of land ownership into fewer holdings of ever-increasing size. The prospect of increasing his holding is, therefore, an important motivation for a farmer to participate in a land consolidation scheme. Land banking, in which the state or a regional land bank purchases land with the explicit aim of selling it in a land consolidation scheme, has proved very conducive to the implementation of various interventions. Such "strategic purchase" of land is particularly important for nature conservation projects, which may cover wide areas and reduce or even eliminate the productive basis for farmers. In Denmark the authority to actively purchase land is vested with the same agency as is responsible for land consolidation.

The impact of changing circumstances on procedures.

The rapid concentration of ownership and production in progressively fewer and larger holdings will inevitably impact on the land consolidation procedure. The days of the village-based scheme with its primary object of improved location for a large number of owners will soon be over. Increasingly, land consolidation is driven by public interventions in combination with the ongoing structural trend towards larger farm units.

8.5 International experience

Doebele (1982) and Larsson (1993) list numerous examples from such different countries as Japan, Germany, Sweden and Taiwan where land adjustment procedures have over time been invented to facilitate such reorganisation of land as was needed in the process of societal change. The terminology is far from uniform. These processes usually have their original name in the country's own language. The German process is called "Umlegung" or "Flurberegnigung", the Japanese process is known as "Kukasu-Seiri" abbreviated to KS and the slogan says "KS is the mother of our planning" (Larsson, p. 18). The Australians have an urbanisation method called "pooling", etc. Doebele suggests that the term land re-adjustment should be used in urban contexts and the term land consolidation for agricultural land.

Larsson (1993) creates a typology of "alteration processes" where land readjustment (and land consolidation) is characterised by owners remaining bye and large the same before and after the change. Larsson (1993) and Doebele (1982) argue the potentials of land readjustment to promote urban land developments. The traditional approach to urban development has been that one single developer acquires the land prior to subdivision and infrastructure provision. Often this developer would be a municipality or a land and housing development agency. Urban land development, therefore, presupposes land acquisition. Municipalities in developing countries in many cases lack not only the finance but also the legislative provisions for land acquisitions for urban development. Land readjustment may be a tool for converting rural and extensively settled land into more intensive forms of urban land use without necessarily involving a radical change of ownership. Land readjustment tools may thus be able to cope with the controversial issue of direct public acquisition of private land. Land readjustment may under certain circumstances also open the door to decentralising land management away from local government to landowners and thereby to some extent cope with resource and capacity constraints in the administration.

The institutional arrangement for land consolidation varies between countries. The process may be vested with a government agency with certain functions decentralised to owners. The Japanese model forms a property management association and the model can be operated on a more informal basis through private agreements. However, the aim is much the same as in Denmark: land ownership, layout and land use is changed whereas the owners or most of them remain the same. A general feature of the application of land readjustment has been the change from rural forms of land use into more intensive forms involving the construction of infrastructure such as roads and sewage systems. This is why the entire area is affected and why finance becomes a key issue. These investments are considerable but they are accompanied by an increase in land value deriving from new plots for sale and improved environment. The practices reviewed by Doebele (1982) and Larsson (1993) contain various models for sharing of costs and gains in land value.

Land consolidation has been practiced in the rural context for centuries. The Danish practice for example, originated more than 200 years ago. The dissolution or disintegration of the village-based communal tenure and production into individual farm holdings and the demarcation, or *enclosure*, of individual properties, was formally initiated in 1789 in Denmark. Many features of present-day procedures can be traced back to methods that evolved during the many years of " udskiftning" or "shifting out" the village lands, resolving conflicts and doing the planning. This was mentioned also in chapter 5.

The transformation from communal forms of land tenure to individual ownership was one of the historical circumstances that required mechanisms like land consolidation. Fragmentation is another common problem that requires relocation of land to rationalise farming and especially to reduce distances between the lands of one farmer. This is important to farm economics but increasingly also for the traffic on public roads where farm equipment causes delays and endangers traffic safety.

A Danish agronomist Kofoed participated as a senior co-ordinator in the reform of Russian village communities into individual agricultural holdings in the late 19th and early 20th century, thereby conveying the Danish experience. Kofoed's autobiography (1945) is most inspiring reading. He describes the transformation of Russian villages from a village-based communal tenure and production into individual farm holdings that was taking place at that time. Kofoed organised and supervised a large number of local surveyors who planned and carried out land consolidation of entire village communities. Communication and transport was by mail and horseback. An entertaining detail is his description of a valuation method invented in Latvian villages to determine the relative value of various soil types by way of public auction (Ibid., pp. 143-152).

Norwegian land consolidation or "jordskifte" differs in a number of aspects from the Danish. The Norwegian land consolidation agency is a specialised court. It is wide ranging in that it considers not only land consolidation, but also disputes over boundaries and other uncertainty concerning fishing and hunting rights and rights of way. The land consolidation court implements subsequent demarcation and surveys. The dissolution of communal use and ownership in land, forest and the higher mountain areas has been and still is a task for the Norwegian land consolidation courts. When reform of land use and ownership involves construction of infrastructure and related financing, the land consolidation court assumes overall responsibility and decides by court ruling on the contributions and or benefits of each affected land owner. In projects concerning roads and nature conservation the land consolidation court carries out valuation that forms the basis for compensation. The court seeks to negotiate solutions whereby owners are compensated with alternative land.

As a developed country Norway has an unusually high incidence of uncertainty and disputes over boundaries. This is partly because in the long period between 1845 up to about 1980, subdivisions in the villages were made by non- professionals. Often they made a poor job and the considerable number of boundary disputes still brought before the land consolidation court derive from previous amateurish ways that subdivisions were carried out. (Sevatdal, 1997, p.98). Another unusual feature of Norway's land tenure regime is that a huge part of the territory is still under communal tenure, mostly in the higher mountains above the timber-line. (Sevatdal, 1999, p.261). One could say that the *"jordskifteretten"* is an independent court that performs land-related adjudication. See also Floe (1999) and Sky (2002).

By contrast Denmark has a clarified property situation but the agencies in land administration display an ad-hoc culture with a proliferation of specialised "tribunals". For example, boundary disputes are handled in a procedure defined in the Subdivision Act. So-called state-expropriation is still carried out by the commissions established in the 1840s. The counties follow another procedure in their expropriations. And the Danish land consolidation Act is narrowly aimed at agricultural land and in practice relies on voluntary agreements. This approach is now applied increasingly in implementation of public interventions. The Norwegian concept does not assume voluntary agreements in contrast with the de-facto Danish practice. The Norwegian practice includes powers to rule and implement decisions on objecting parties. However, Rognes and Sky, (1999, p. 75) comment that " … mediation is a frequent activity. Many cases are settled through mediation rather than verdicts. …(this) … reduces conflicts even in those cases where the final decisions are made through verdicts." The Danish and Norwegian systems reflect different history, landscape and land use practices. In a way they can be seen as "functional alternatives", see section 8.2.

Despite differences in terminology between countries and between urban and rural contexts the practical reform processes described as land consolidation have important similarities. They involve the landowners and users in decision-making and they represent long experience in testing out what is practically possible and acceptable under given resource constraints and power relations. Organisationally, they are all variants of iterative and decentralised decision taking in a co-operation between public and various non-government actors. The Japanese model, for example, has a variant where a public authority assumes responsibility for the land readjustment scheme. Owners and leaseholders appoint a board which has an advisory and in some points a decision making function. In all cases, however, final approval of a plan must come from, a superior authority. (Larsson, 1993, p. 24). This is the aspect of formality. A similar arrangement exists with the Danish land consolidation office as authority and landowners represented through a committee. Another similarity concerns voluntary participation: The Japanese procedure is aimed at achieving voluntary agreements and a consensus as far as possible. There is great scope in the negotiation and planning process and projects may take as long as 7 to 10 years. (Ibid., p. 27). The Danish method is also based on voluntary participation, which, however, is far easier to practice in the rural context where schemes can be sporadic in the sense of omitting those land owners who for various reasons do not wish to participate. One difference is that the Danish procedure involves a deadline that is fixed early in the process whereas the Japanese model operates without one.

The planning involved in a land consolidation is quite complex. The solution must be found within such diverse constraints as personal preferences, financial limitations and planning regulations and this involves a good deal of negotiation and mediation. The Danish model places one person in the key role of co-ordinating all communication between persons and institutions. In such a "one-head-approach" it lies very much with this single person to set the style and tactics

for the negotiations. The literature does not pay much attention to this question of directorship. Most likely, most approaches do have such a key person who follows the entire process and ensures continuity and consistency. In systems with a tradition for narrow specialisation of routine tasks there may be no obvious candidate to assume the overall piloting of a land consolidation. The need for land consolidation as an element of land policy may then occasion a re-assessment of the profile of surveyors and others in the land administration and possibly some re-organisation of office functions.

The approach with negotiation and mediation in land consolidation appears relevant also for larger land reform schemes. Deninger (1999) "… describes a new type of negotiated land reform that relies on voluntary land transfers negotiated between buyers and sellers with the governments role restricted to establishing the necessary framework …" The approach is characterised by involvement of beneficiaries in the process for them to familiarise with the realities they are likely to confront. Organisationally, it is necessary with a decentralised and demand-driven implementation. (Ibid., Summary findings, p.1). These considerations concern large re-distributive land reforms. Yet, there are similarities in approach to for example a Danish land consolidation.

CHAPTER 9: TECHNOLOGY TRANSFER

9.1 Introduction

The power of technological change is amazing! Computers, word processing, telefax and e-mail penetrate into developing countries almost as fast as in developing countries. When first a new technology is discovered its wildfire spreading changes the way people everywhere work together, apply legislation and think about problems.

Why this is so -, is a different topic relating to the issues raised in Chapter 10. How it happens is easier to describe. The world as a market place is smaller than ever. Standard office equipment is the same in developed and developing countries. Moreover, the developed world is found next door in developing countries. Multinational companies, embassies, donor agencies, ministries, private firms, public utilities and at least the larger local authorities all purchase the same new information technology equipment.

The question is, therefore, not - whether the modern information technology is relevant and whether it should be applied in land registration in developing countries, because it is already there - but how its potentials can be realized under conditions with far less financial resources, far less skilled staff and with a chaotic land management situation.

The shift from the well-ordered and affluent Danish administrative set-up to a situation in a developing country is overwhelming. On the one hand there will be striking similarities in the professional environment such as the same computer soft ware, similar cadastral procedures, surveying traditions, and planning procedures. And there will be contrasts that certainly will include the extent of informal land developments, the relative weakness of public land management, the need for more trained staff, and the need for immediate action. How is one to structure impressions, similarities and differences, come to an analysis, develop ones understanding and then (sometimes with short notice) - translate this into proposals for action or projects?

In this chapter we will review a conceptual framework for technology transfer. The few simple concepts we introduce are illustrated by examples. We will refer to examples and issues presented in earlier chapters and a few more will be added. Variations on the theme of incomplete information and the need to reduce information requirements are continued. Throughout, focus is on two aspects. One is the existence of significant informal developments that coexists with and needs to be integrated with the official land administration. The second is the application of modern GIS technology.

We start by introducing a simple model with four technology components. Next, we draw on examples from previous chapters to illustrate the different components and, thirdly, we discuss linkages between technology components. The underlying thesis (in line with the thesis in section 1.3) is that although the technical requirements to the GIS technology such as systems and data compatibility is the same everywhere, yet the application of modern land information technology takes place under circumstances that are *fundamentally different* from those under which the same techniques are applied in rich countries. This problem of carrying out more or less the same function (land registration) using more or less the same technique in two fundamentally different situations can be seen as a problem of technology transfer.

Choice of methodology and preference for a particular conceptual framework are most personal things. The point is, therefore, not so much whether the model presented here is ”true” but

rather to show the technique of using a conceptual framework as an aid to digesting impressions, working out solutions and developing an instinct for the principal parameters and their linkages.

Numerous issues and references on technique, geo-data and organisation relate to this chapter. We have chosen to review them separately in annex 12.3

9.2 The four technology components

We consider Muller's (1980) model in which technology consists of four basic categories and one correlation principle:

Technique: The hard ware component.
Knowledge: The soft ware component - "know how".
Organisation: The ways that knowledge and technique are brought together.
Product: The result of the process.

The correlation principle says that change in one component causes changes in all the others and that the components can be considered in any order.

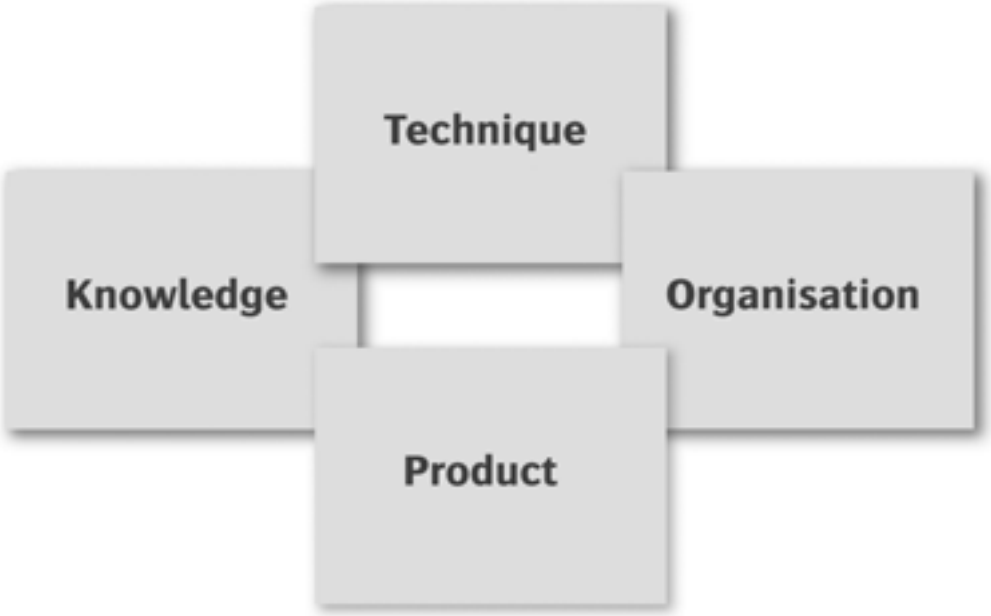

Fig. 9.1: The four technology components.

> "Consequently when we talk about, or - more importantly - when we analyse the choice, transfer, change or development of technology this involves analysing the choice, transfer, change or development of knowledge, organisation, technique and product. ..." (See Müller (1980), p. 25).

9.3 Examples of land registration technology components

This simple set of categories and their linkages may be helpful in developing a broad approach to land registration under different circumstances. It is a matter of personal preference whether the linkages should be developed in detail or whether the conceptual framework be used rather as a guide or general check-list. In this section we will use the model as a framework for further developing the reasoning in chapter 6.

9.3.1 The role of the technology component of Product

Sometimes technology is defined as consisting of three basic components: software, hardware and organisation. Müller's (1980) definition differs by including also the product as a fourth component. This is interesting in land registration where the ultimate product is the officially registered and backed land-right. Land registration professionals and other professionals commonly see the form of ownership as "a given", namely, the conventional parcel-based free hold where land serves as collateral in mortgaging, which in turn is taken as a pre-requisite for economic development.

If instead we view the product as a technology component it becomes more logical to consider the tenure form as subject to design *like any other technology component*. Crucially, flexibility in the "land tenure product" serves to accommodate particular land use practices and land policy objectives. Flexibility in tenure form also creates degrees of freedom in the other technology components. It is particularly relevant to information management that flexibility of tenure form and content impacts on information requirements.

Example of step-wise tenure formalisation

The following example of product specification in land tenure uses a strategy of step-wise formalisation. It was proposed in Namibia as a " Flexible land tenure system". This system was designed to cope with an urgent formalisation and land supply problem in the informal urban development and also with a lack of skilled surveyors. It proposes a three-step formalisation and a new type of surveyors, "the land measurers" to perform the practical planning and basic surveying. (MLRR, 1997.) The three tenure forms are the *starter title*, the *land-hold title* and *free-hold*.

1. The Starter title

The Starter title is a statutory form of tenure registered in respect of a block that may be owned by a local authority, a private sector developer, a community organisation, or a non-governmental organisation. The outside boundary is surveyed in accordance with existing survey regulations. The starter title involves a range of rights and obligations including:

- the right to reside on a site within the block,
- the right to transfer this right,
- the right to be relocated if a family has to move during re-planning,
- the restriction not to build permanent structures prior to planning.

The starter title thus formalises land tenure without specific reference to a land parcel.

The simplification in the starter title in terms of cadastral survey is that it requires only one parcel for the entire settlement. It does not challenge existing survey regulations nor does it ignite the contentious issue of general versus fixed boundaries. The restriction not to build permanent structures prior to planning is normally understood by residents and motivates participation in the re-planning process. It is important - especially for the urban administration - that it contains a right to be relocated because this implies an obligation on the part of the Town Council to provide planned and surveyed land elsewhere. (Ibid., pp. 83-85).

2. The land-hold title

The land-hold title can be issued when planning and revision of layout has taken place within the settlement and individual land parcels have been created. Land-hold title refers to a specified site and the holder is allowed to build permanent structures in accordance with planning and building regulations.

"Land hold title is based on a *cadastral map* which is prepared by a land measurer ... (as distinct from) the *general plan* prepared by a (chartered) land surveyor..." (Ibid., p. 91).

The content of the land-hold title is not fully individualised. Although individual land parcels are established on the ground, the land hold title "... would not have the effect of subdividing the underlying property. The owner of the underlying property would continue to be the owner of the underlying property and the cadastral map would "float" on top of the underlying property. The property would only be finally subdivided if land-hold title rights are upgraded to free-hold title." (Ibid., p. 90). Such individual tenure within the regime of one overall property "owner" can be compared to a Community Land Trust or a Danish "*boligforening*" and "*kolonihave selskab*". It assumes an internal organisational body performing internal administrative tasks.

3.Free-hold title

The free-hold title is the existing individual tenure form where chartered surveyors perform the cadastral identification according to existing survey requirements. Upgrading from land hold title involves a classical cadastral survey. (Ibid., p. 96).

Designing the tenure product

An option for a land tenure product relevant in a formalisation process could include - tenure without access by the individual to mortgage for example in the form of a community land trust. (see section 10.5). Another option is group-based title either as a permanent tenure for a group of land-users or as a first stage in a process of upgrading and formalisation. (see also sections 6.4 and 6.6).

The small Namibian example illustrates the iterative aspect, in its sequence of progressively finer "resolution" from a crude definition of formal tenure to more individualised and ressource-demanding tenure forms. The starter title is an example of an individualised title that is (not yet)

finally determined spatially. It is only defined ”within a block”; the geo-referencing is phased. The model shows that phasing of tenure forms and of information requirements is possible.

There is an increasing awareness of the need for community-based management of land and natural resources. Some countries enact new legislation that establish for example village development committees to decide on a range of local land use and allocation issues. This awareness may be expressed through a decentralisation policy in a reform of local government. Local decision-making raises the need to have the village area established as a land management unit and registered also as a cadastral unit. However, some countries continue to replicate colonial practices of granting concessions over land or for resource exploration, in complete disregard for local communities. The registration of villager's rights in some form of a group title would in such cases at least require a consultation and in the best cases lead to a negotiated consensus for new local initiatives.

Both rural informal and urban communities can face the threats of their whole area being allocated for other purposes. The rationale for tenure security in such situations goes beyond narrow individual land ownership, entrepreneurship, mortgaging, etc. Rather, the lack of recognition of and backing for de-facto access rights of whole communities assumes the proportions of a human rights issue.

The important human rights issues of land tenure can be satisfied by simple techniques in designing group titles and in recording them, as illustrated by the Namibian example.
We argue below that these simple techniques are compatible with building the spatial units for the spatial data infrastructure. The technical link lies in the block strategy. See section 9.3.3 below.

9.3.2 The role of the technology component of Organisation

In chapter 6 we argued that there are two features of any feasible formalisation process, decentralisation and iteration. These features are reviewed here as organisational technology components.

Decentralisation

The practical requirements of handling information require decentralisation: Decisions must be shifted from office to the field. Consequently, detailed planning, adjudication, demarcation and community representation become integrated in on-site work and decision taking.

Such decentralised handling of integrated decisions on the ground and at the level of an individual township or community, requires the presence of a key person who is familiar with all important aspects and who should be responsible for overseeing that all important aspects in the process are attended to. This person must be familiar with the planning procedures. He or she must liaise with relevant authorities to ensure that the ongoing participative planning conforms to planning objectives and regulations. The person must have surveying skills so as to do or supervise improvisation of layouts on paper and ground and ensure correct handling of property information and transactions. The ”work-shopping” of final plan details requires liaison and mediation between such actors as the community, the local government, planners, and perhaps others. This key person fits the broad profile of the land surveyor better than any other profes-

sional. However, it implies a significant extension of the organisational aspects of the surveyor's task, in this new role.

Iteration

Proceeding in steps is an important strategy for coping with constraints and uncertainties, as discussed in Sections 6.4 and 6.5. The iterative aspects of a formalisation process have several dimensions of which step-wise tenure formalisation is one example. The feature of iteration relates then to the design of the sequence of tenure forms discussed as the "product" component of technology. In the geometrical sense this iterative tactics materialises in the block strategy. Residents in the concerned community will experience the phasing as they are formally registered as residents, as the infrastructure improvements proceed, as their plots are modified in layout or they are offered alternative places to live, as restrictions against building permanent structures are lifted, etc.

9.3.3 The role of the technology component of Technique

It is almost paradoxical that the modern information technology, which characteristically handles huge volumes of data, can be of any use in a context of large informal land developments where there is little formalised information. However, the possibilities inherent in modern technological techniques are most relevant. We will illustrate this with photogrammetry, spatial data infrastructure and block strategy in combination. The option in using addresses as identifiers is briefly mentioned in section 6.6.

(a) The digital orthophoto and formalisation

The digital orthophoto is a recent achievement in photogrammetry with numerous well-known potentials including:

1. Simultaneous handling of raster and vector data is now possible. Formalised features can be mapped in vector format while the as-yet-unregistered and often rapidly changing developments can be captured by the orthophoto and used as background in a GIS.
2. Real time kinematic GPS in the plane minimises the need for ground control points. The orthophoto permits relative surveys on the ground that are less skill-demanding than are classical survey methods that connect to a grid system.
3. The orthophoto could be feasible in an updating strategy because once the 3D model is established in the first survey, the costs of subsequent surveys are reduced by about 1/3.
4. The orthophoto delivers cadastral accuracy in many circumstances.

The digital orthophoto was used in a pilot project on squatter upgrading in Namibia: Mapping was done directly on the analogue orthophoto. In some cases points surveyed by total station were plotted on the orthophoto. Relative surveys were used: "While carrying out the planning, the decisions were recorded on the copy of the orthophoto on which the road pegs were drawn (the field copy). …"(MLRR, 1996, pp. 9-10). The pilot project quantified costs of different methods thoroughly and found that: "The method where only an orthophoto and a

steel tape are used is by far the cheapest method, and it can be carried out without sophisticated equipment." (Ibid., p. 20).

The digital orthophoto is therefore a case where a technical innovation has wide ranging impact on the other technology sub-components.

(b) Spatial data-infrastructure

Formal land information will typically be digital, and exchange and multipurpose use of data presuppose a coordination expressed through a *spatial data infrastructure* or SDI. Aspects include a common data model, a unique parcel identifier, commonly agreed naming conventions for and delimitation of administrative areas, etc. A particular challenge is to avoid or reduce the conversion problem between users.

Ideally, a spatial data infrastructure should be established at an early stage and formalisation be implemented within it. There is also the need to manage the co-existence of data sets of different quality and degree of completeness. There are numerous possibilities for iterative tactics at the technical level: The SDI sets the framework for the accumulation of formal land information as land registration and the control of land developments progress. The quality of data can be indicated as an attribute and upgraded over time. Block strategy with small volumes of data and low incidence of change and updating requirements can be accommodated within a commonly agreed spatial data infrastructure, and so on.

Establishing a spatial data infrastructure is not just a technical issue. It is also a huge and resource-demanding organisational issue, as it requires the cooperation of the involved actors and a negotiated agreement on many technical issues.

(c) Block strategy

Block strategy is the geometrical expression of iteration in that it embodies the practical aspects of iteration on the ground. The initialisation of a block strategy can be combined with setting up of SDI and the gradual accumulation of formalised digital land information. The block strategy is relevant in formalisation even without GIS but the event of GIS has increased its strategic importance.

Blocks may be townships, which are administrative entities in which the interesting information is statistics on population, schools, health, etc. Combinations of blocks may make up constituencies for elections and districts for census data. Large blocks may be delimited by regional roads and regional boundaries. Smaller blocks – at local level – may delimit a community and form a basis for a group title.

The planning of a block strategy may be a constructive activity that helps promote coordination between different users and producers of geographic information. The Namibian pilot project in DCDB (Digital Cadastral Data Base) showed that consensus on unique definitions of administrative boundaries may need to be negotiated between various government departments. This "adjudication" of administrative boundaries may be an appropriate occasion to promote GIS-relevant discussions with "stakeholders" in geo-data and - with a bit of luck - improve coordination.

Once the geographical units are delimited each agency will produce and maintain its particular categories of information in terms of these blocks. We can think of consensus on block delimitation as just a means of facilitating future information exchange. Its organisation requires an eye for the future data exchange as well as for the practical aspects of cadastral surveying. A cadastral surveyor would be the obvious professional to define and represent the relevant spatial entities in the common reference system and so as to make further linkage to cadastral surveys convenient.

Block strategy introduces a radically new perspective on cadastral surveying. The overall objective is to prepare for future exchange of geographical information. The block strategy does demarcate pieces of land and survey them, not just as parcels in private ownership but also as carriers of interesting information at present and in the future.

9.3.4 The role of the technology component of Knowledge

The new land information technology requires a paradigm shift and re-education. This has been experienced in the rich countries and is also the case in poor ones. But in addition poor countries have to cope with the unresolved formalisation problem while also working within tight resource constraints including the shortage of skilled personnel and little money for seminars at nice hotels.

Any alternative to the rapid uncontrolled development will need to improvise creatively with available resources and act quickly. The time factor is therefore a powerful determinant in the knowledge aspect. The conventional notion that, people need first to be educated in three to four year courses and, then, they work – is overtaken by dramatic speed and size of Third World uncontrolled land development and the pressure for urgent action.

The implications for the ”knowledge-component” of land registration are here illustrated from two perspectives. The first considers the fact that all participating actors need to put their potential to work, adapting and developing their professional scope. The second shows how the new technology offers fresh possibilities and short cuts in the learning process.

(a) Continued Professional Development, CPD
Let us consider how the different service providers in land registration need to adapt and develop their professional scope

The land surveyor, if he is to oversee the land development process at the level of community, needs a far broader profile than the conventional engineering-like cadastral surveyor. The surveyor must be able to work creatively with the community, with lay people and technicians, with local administrations, and he will often liaise with engineering and mapping contracting companies. Working in this way is, as Fourie (1994) puts it, ”a skill and communication art”. Surveyors have seldom been given a formal education for this role. While some can operate from a talent and a liking for this sort of work, there is a general need for Continued Professional Development or CPD.

The technicians who carry out day-to-day tasks in a formalisation scheme must have unblinkered outlooks. They must have an overall understanding of the decision taking process in which they

participate, they must grasp the purpose and main issues in planning guidelines, they must know basic property concepts and they must be able to improvise layouts on paper and on-site. In day-to-day dealings with the communities they will be mediating in disputes and confrontations.

The urgency of formalisation requires that such technicians be produced at short notice. Short training programmes must be set up that deliver technicians with basic skills and a broad perspective on land development. A critical aspect is the follow-up supervision that ensures further in-service training and the consolidation of routine to give staff encouragement and confidence and ensure they are productive. Possibilities for further training and incentives for promotion must be provided. Adequate capacity in this knowledge component is decisive for short-term performance and long-term sustainability.

In administration, there are many signs of a trend towards decentralising broader tasks to project level and/or private-sector actors. For example the formalisation of a whole township or a rural land reform scheme may be farmed out, relieving the administration from the burden of routine tasks. This so-called "management approach" sets new knowledge requirements for the public administration. For example it may involve a shift away from routine tasks like drafting and examination controls towards management tasks like product specification and quality control. This challenges management to actively promote new training programmes and creatively involve private-sector professionals. This is part of the issue of determining appropriate respective roles for the private and public sectors. In theory, farming out of projects appears attractive but in practice it can be problematic. The administration, therefore, also has a need for continued professional development as an aspect of capacity building and re-organisation.

(b) Learning with new technology

A good mark in mathematics has been a classical selective criterion for land surveyors. This has frustrated the recruitment of surveyors in developing countries. Only a few students obtain a secondary school pass with good marks in the natural sciences and these students have often been attracted to more prestigious disciplines. The same criterion excluded many labourers who had gained practical experience and wanted further training: Try taking an A-level on a correspondence course in your spare time!

Modern technology has revolutionised this old paradigm for technical education. Equipment and software manufacturers make large investments to ensure their products are easy to use. Routine calculations and data observation are programmed in "user-friendly" software , where the practical user need not necessarily understand the underlying algorithms. Also mapping and GIS software relaxes the analytical requirements in practical operations.

The knowledge requirement for performing specific operations has been radically changed. The new technology does require advanced analytical skills but it also offers new possibilities for delegating routine tasks to people who have only limited formal education. One can say that the knowledge requirements have been re-organised. Let us briefly discuss how different new technologies require reorganisation.

(i) GPS: The system of satellites is operated by the US Department of Defense. Sophisticated programmes for receiving and processing the signals are installed in the receivers in the GPS instruments. Therefore, when it comes to fieldwork, operation is fairly simple. The average tech-

nician at a local council can learn to operate a GPS in less than a week. – But he needs to be trained and placed under qualified supervision.

(ii) *The digital orthophoto*: It is easy for lay people and technicians with only basic skills to interpret the image. It is easy to make surveys, re-planning and demarcation on basis of a print of the orthophoto. Relative surveys can be used for the details within blocks. This can be further explored with pre-marking of reference points and key features. – But these tasks require supervision. Furthermore, a strategy of digital orthophoto mapping and frequent updating requires advanced organisational capacity in the national surveying agency and coordination between agencies.

(iii) *The internet*: Distances are a big problem in developing countries. The internet now allows much closer daily supervision of remotely located technicians as well as distance education and in-service training. – But these require design of short introduction courses and follow up programmes of in-service training. Particularly crucial is the supervision that needs be organised and financed, by dedicated professionals with a high level of professional insight and a liking for teaching.

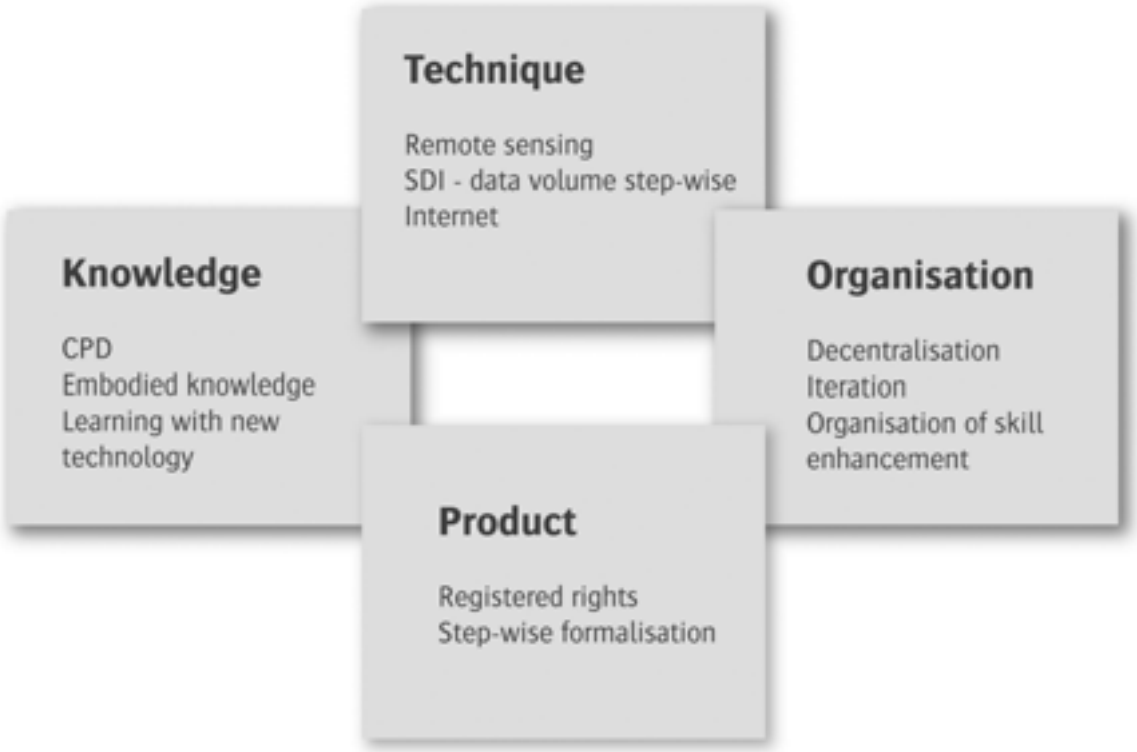

Fig. 9.2: Land registration technology components in a formalisation process - examples.

9.4 Linkages: The correlation principle

The correlation principle says that change in any one component of technology impacts on all the other three components. Some elements of each component are ”givens” and this impacts on the other components. These givens may arise from policy objectives, from the social and economic situation and from technological developments that make application of new technology more or less imperative. At project level the givens also arise as consequences of decisions on project strategy.

There is no pre-programmed system for deducing the impact of each technology components on the others. It depends on professional insight into the project matter and knowledge of general circumstances. The following is only a sketchy example. Let us suppose that the “given” element in this example is the requirement that land registration shall deliver: *Group based titles possibly in a process of step-wise formalisation.*

We can suppose that an urban informal settlement or a rural village is the place where this formalisation is to be implemented. We can expect that the project policy objectives will contain statements about ownership, it will address certain needs of the community and the organisational aspect will have the community as a determining actor: ”the community is the client”. Solutions are found in co-operation with the community and community members will participate in the work during implementation. Community institutions are also determining factors, notably the traditional land allocating authority. Besides, the role of the community may be strengthened by local government reform that decentralizes land administration powers. The formalisation will deliver a definition and official recognition of the land ownership of that community, ”a group title”. A feasible practical approach will need to be devised within prevailing resource constraints. It is in this co-operation with the community on a range of land-related issues that a key co-ordinating person is very important. Technique options are as discussed in section 9.3.3 and knowledge aspects in section 9.3.4. We can visualize the correlation in this simplified example as follows:

Fig. 9.3: Linkages between technology components in land registration – examples.

In figure 9.3, arrows 1 and 2 symbolise that the form of land tenure in any particular situation should be designed to meet the needs of the intended intervention or "transition" between tenure types within the constraints and possibilities of "circumstances" in the community. These two arrows symbolise the status of the form of land tenure in a reform situation as being in principle subject to design. Arrow 2 symbolises that it is rights of the community that are at stake. Arrow 3 symbolises that the technique required for land registration depends on the type of tenure – as discussed in section 9.3.3. Arrow 4 symbolises that such projects, which include a significant element of community cooperation and coordination with many government agencies, require a coordinating person, the broadly-profiled surveyor, see section 9.3.4. Arrow 5 reflects that new technology makes new training methods possible. Arrow 6 reflects that the given level of skills among community members defines what techniques they can apply.

One could continue to add linkages to the model shown in figure 9.3. For example, yet another arrow could be drawn from *technique* to *organisation*, illustrating that any choice of technique has organisational implications. There will be numerous aspects in a particular context in which such linkages can be nuanced. A graphical illustration may be full of arrows pointing all possible directions and thus lose its usefulness. The practical importance of such conceptual references should not be exaggerated. They are useful only in some aspects and some situations. They may provide a crude reference to linkages between main parameters, giving for example an awareness that an apparently simple technical solution relies on assumptions about organisation and knowledge. This can be most useful in project design where a particular art is to detect hidden invalid assumptions, the so-called "killer assumptions".

All we shall use in this presentation is the hierarchy illustrated by arrows 1,2 and 3 of figure 9.3. The logic is to consider the tenure form as subject to design and the supporting administrative procedures as dependent variables. At a first glance this may appear only simple common sense but in practice it challenges conventional thinking in land registration. This will provide the topic for the next chapter.

CHAPTER 10: LAND REGISTRATION AND SOCIAL CHANGE

10.1 Introduction

Land registration is a contentious issue in context of development assistance. There is a difference in orientation where on the one hand economists, sociologists and planners are inclined towards a social science approach while on the other hand surveyors, lawyers and conveyancers are oriented towards the administrative and practical issues. Furthermore, amongst those adopting the social science approaches there is a general scepticism towards land registration: a suspicion that formalisation of tenure may jeopardize rather than improve tenure security, and that formal title is associated with conventional private ownership, mortgaging and cumbersome procedures. In other words, land registration has a reputation for being insensitive to the specific social context. The contention underlying this chapter is that a creative interdisciplinary dialogue on land registration is frustrated by inconsistent conceptual reference and a failure to appreciate the fundamental function of land registration in society. The following can be seen as a ”back to basics” approach, an attempt to establish more clear and stringent definitions of the key concepts.

There is a general understanding that land registration creates property and secures rights. The cadastral process is at times referred to as "property-creation" (in Danish: "*ejendomsdannelse*"). This consensus permits that the term "property" can be used without definition. The situation in developing countries, however, disturbs this consensus on the concept of property. Here, the majority of ways in which people access land do not qualify as property in the classical sense. Nor does change in land use take place within the system of planning, also alterations in holdings go unrecorded and existing property registers are in constant danger of being eroded by informal sector development. Processes of land development based on prevailing power relations and sources of authority develop with varying participation of the administration. Yet, at the same time there are many attempts by governments, in spite of their limited capacity to bring land use under some form of rational management, to introduce new and more democratic principles in the regulation of access to land, for example by enacting new legislation on women’s rights.

These features of land administration in the Third World are not just a temporary deviation from the conventional practices that are bound to soon converge to some "normal" situation. Rather it is a question whether the often proclaimed objective of a nationwide and updated property register and coordinated overall land management will ever be achieved. The questionable prospects for the property register in large sections of third world countries requires a re-thinking of the concepts of property and of its supporting administration. With weak and resource-starved public land administrations up against powerful trends such as the dramatic urbanisation, the transformation of land tenure systems, competing authorities, etc – what is then property? What forms of public land registration and land administration may be sustainable under such radically different conditions? How may they be founded or evolve?

The understanding of land registration has a philosophical dimmension. This is about why we have land registration at all. Luitlen observes with respect to planning:

"Most of the literature on town planning is descriptive; it reports what planners do and what kind of problems they try to solve. There are few cogent accounts written by town planners themselves why we need town planning and what it functions are within the political economy of development. Professions tend to assume that without a genuine need they would not be there and are not unduly bothered to justify their existence." Luithlen (1997, p. 2).

A similar observation could be made with respect to land registration. Let us try to set land registration in a broad perspective where developments in the actual administrative practices are linked to overall social change as well as change in property regimes. Let us define a few basic concepts relating to property and sketch out a functionalist explanation of land registration is sketched. Perhaps the most important message is that, basically, the land registration system should be perceived as a dependent variable, that is, as something that is subject to design. This is contrary to common belief and practical experience, namely, that the land registration system is an inflexible institutional issue to deal with. It takes some patience to grasp, firstly, the complex nature of functional explanation, and thereafter the theory of social change that applies this kind of explanation.

Finally we will address two discussion points. The first raises the perhaps provocative question whether the conventional cadastre is a dying animal in the harsh environment in the Third World. The other uses examples to illustrate how formal tenure can be subject to design as circumstances may require.

10.2 Functional explanation

A functional explanation is defined by Stinchcombe, (1968, p. 80) as " ...one in which the *consequences* of some behaviour or social arrangement are essential elements of the *causes* of that behaviour. … When we use such an explanation, we expect that if one kind of behaviour does not have those consequences, a person will try another kind of behaviour. … Whenever we find *uniformity of the consequences* of action but *great variety of the behaviour causing those consequences*, a functionl explanation in which the consequence serves as a cause is suggested." The social phenomenon being explained might be behaviour by individuals or it may be a structural activity in a society. One of Stinchcombe´s examples of social phenomena is this:

"All organisations try to pursue their goals in the face of uncertainty and variability of the environment and try to reduce the uncertainty. But sometimes they do it by research on the uncertain factors, sometimes in flexibility in adapting to changing factors, sometimes by buying or conquering the organisation or country producing the uncertainty, and sometimes by levelling the uncertain factor by, for instance, keeping adequate inventories to even out fluctuating supply. Such an equifinal pattern suggests a functional explanation of organisational behaviour in terms of uncertainty reduction." (Ibid., p. 81).

By *equifinality*, Stinchcombe (Ibid.) refers to a pattern where various means are seen to lead to the same end, and the subject tries one of these after another until he reaches the end, after which he stops selecting trial behaviours.

A closely connected concept is that of *functional alternatives*. There may often be more than one behaviour or structural activity that might achieve a particular end. These activities are functional alternatives." … *which* of a set of functional alternatives is found in a particular society is generally determined by historical events. But once a functional alternative becomes established, it tends to eliminate the causes of the other alternatives and thus to regenerate itself. " (Ibid., p.105).

The logic in the functional explanation has four elements:

Firstly, *the consequence* or end, H, which tends to be maintained, which in turn functions indirectly as a cause of the behaviour or structure to be explained. The fundamental consequence or end pur-

sued in land registration is certainty or tenure security, which in the broad perspective is an aspect of social stability.

Secondly, *the structure* or behaviour, S, which has a causal impact on H. It is this structure that we seek to explain. The causal connection between S and H is that S tends to maintain H. Land registration is here the structural activity in a society that serves to promote and maintain certainty as to property rights, prevention of disputes, etc. within society.

Thirdly, *other causal forces*, T, which tend to upset H. For example dramatic urban development, social destabilisation, informal sector development, tight resource constraints are tensions that upset land registration.

Fourthly, *a causal process* which through evolution, competition etc. causes S (behaviour) maintaining H (end) to be selected or reinforced. The forces in this selective process become stronger when the consequence (end) is not maintained, thus increasing the activity of the structure (behaviour) or selecting for it more strongly. Since this force is stronger when H (end) is not naturally maintained (when T = other forces is higher) and decreases when H (end) is maintained, it is a causal force with negative direction from H to S. (Ibid., pp. 87-89).

The trends in innovation of tenure provision and land management can be seen as such selective activity in search of new models when present tenure provision mechanisms fail to perform their basic function.

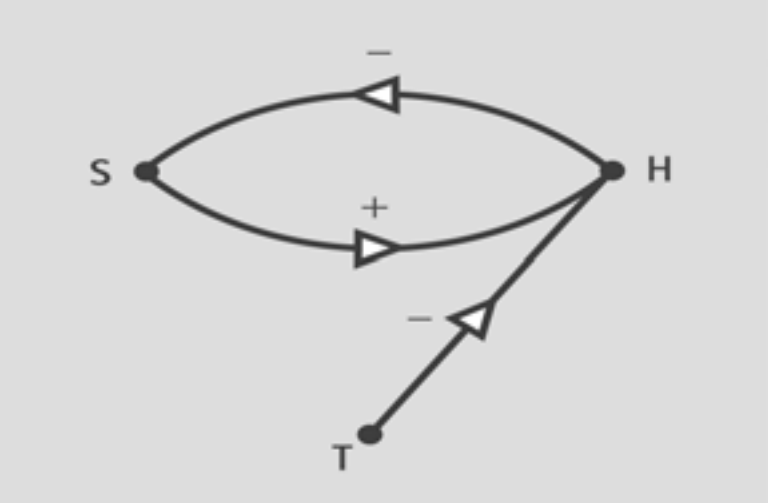

Fig 10.1: The elementary causal structure of a complete functional explanation. S stands for the structure, H for the end and T for other causal forces. (From Stinchcombe 1968, p. 89).

Enemark (1997) and Larsson (1991) describe many different land registration systems, each with their specific historical background. These can be seen as functional alternatives. For example, the French system was established by Napoleon, the Australian system by Torrens, and the Danish system evolved in it´s particular way. These various systems display a range of differences. Yet, they all serve the same end or consequence, namely security and stability in property identification and transactions. Once these systems were established they eliminated the reasons to search for their possible functional alternatives and instead a process of regenerating the system came into operation.

10.3 Property relations – rights and powers

A common misperception is the tendency to associate land registration with administrative procedures rather than with its basic social function. One way to overcome this is to reason from a definition of property. Property is closely related to power relations, if not based on them. It is therefore logical to define property concepts by reference to power concepts.

Power and legitimacy

Stinchcombe (1968) distinguishes between two main kinds of *power*, namely "control over resources" vs. "control over people". This distinction can also be described as "rights in things" vs. "rights in people" or simply "property" vs. "authority". Stability of power depends on *legitimacy*. This is because power created by naked force is, is in the long run precarious. "By analysing in a few cases *who* has to believe in the legitimacy of a power for it to be stable, we will see that the person *over whom power is exercised* is not usually as important as *other power-holders*. If the criminal does not believe his arrest is legitimate, he can, in the classic phrase, “tell it to the judge.” If the judge supports him rather than the policeman, the policeman’s power comes effectively to an end. A casual examination of policeman’s complaints about the inadequacy of their authority will show that they are much more worried about their legitimacy in front of judges than in front of criminals.” (Ibid., p. 150).

From Stinchcombe (1968): A power is legitimate to the degree that … the power-holder can call upon sufficient other centres of power … to make his power effective” (Ibid., p. 162). For example, “if a man’s power is interfered with, he can call on much greater powers in his defence only if he can show the holders of such powers that his claim is legitimate.” His use of his property might for example be interfered with by a neighbour. If the contingency reserve of his power does exist, that is if he really can call on other sources of power that is the state to stop the neighbour - it very likely will not be necessary because the neighbour “ … will know that he would lose in the long run.” (Ibid., p. 163).

Relating to land registration: A (registered) right is recognised by the state. Holders of such rights can call on the state to back their rights because the registration of the right is precisely what is needed to convince the relevant holders of state powers that the claim is legitimate.

Property and law

Property thus presupposes the legal system where procedures define how official sources of power are called upon. It is a defining characteristic of *property* that the courts provide potential backing is provided through the system of courts and according to criteria previously defined by *law*. The concept of a right per definition assumes this reference to law. It is common to emphasise this by referring to "legal rights" or "official rights" but strictly, that is not necessary. The broader term "formal" connotes this legal dimension of rights and administrative practices. Formal land management embraces both land registration and the planning system. By contrast, the informal sector is where control over land and resources in various shades is exercised with reference to other sources of power than the official ones. Such land use or control is conceptually not "rights" – but de-facto

control, however insecure and unstable it may be. This raises further issues on the problem of legality that we must now discuss.

The linkage between property and law has an operational aspect in land registration: The criteria by which a right is acknowledged or accepted by the state are laid down in survey regulations that govern cadastral surveys and in the legislation that instructs the judge in the land registry. These official rules and criteria ensure that the right is unambiguously defined in content and in space and that it does not violate rights the state has promised other people, for example in the form of planning regulations. The Danish version of this whole procedure of identification and recognition of a land right is described in detail in chapter 2. It basically answers three basic questions: What rights? Who holds them? and Where?

Taking stock: Property is control over resources (”things”) that is backed by official sources of power. A right is control that enjoys the potential backing of official sources of power. Control without legal backing is not a right but only de-facto control. Land registration is the process whereby rights are identified and which ends in an event whereby a particular right is officially recognised and, thereby, created. The geographic identification is provided by the cadastral survey that is accepted by the state when it is examined and accepted by The Surveyor General or similar institution after examination. The full set of rights and obligations becomes enforceable when accepted and entered into the land registry by the Registrar who is usually a judge. The fundamental social function of land registration is to confer stability on relations of land use (9).

The next section briefly reviews a theory of social change, which applies the concepts introduced in sections 10.2 and 10.3.

10.4 Historical materialism: Functional explanation of property systems

Historical materialism is a theory about how human society develops and it is "material" in that it claims that the fundamental engine of history is the development of the material basis for human existence. Its basic explanation is functional and it explains property relations and thereby their supporting administrative systems in a perspective of social change. Social changes in turn are seen as basically dependent on technological development and power relations. Although this theory of history is aimed at the large epochs in the history of human society it is interesting from a perspective of land registration because – as developed by Cohen (1978) – it is amazingly accurate in the analysis of property relations. As we shall see, what are used as standard cases in this general theory are close to situations experienced in day to day land administration.

Concepts and principles

Historical materialism builds on three fundamental categories.

The productive forces are those facilities and devices that are used to productive effect in the process of production: means of production on the one hand and labour power on the other. The means of production are: tools, machinery, raw materials, premises, and so forth. Labour power includes not only the strength of producers, but also their skills. Land belongs to the category of productive forces, which are essentially material and non-social. The development of the productive forces is largely a function of the development of productively useful science. (Cohen, 1988, p. 4).

"*Production relations* are relations of effective power over persons and productive forces not relations of legal ownership" (Ibid., p. 63.) Together, relations of production in a given society is said to constitute the economic structure of the society, which also sometimes is called - in relation to the superstructure - the basis, or base, or foundation. (Ibid., p.6).

The superstructure is what is commonly called institutions, notably the law and the state. (Cohen, 1978, p. 216). Despite the many controversies among philosophers and historians there is a general consensus that property law belongs to the superstructure.

The relevance of these crude categories to explain land registration and especially formalisation lies in the distinctions they allow between, on the one side, the material or the de- facto and, on the other side, the institutional or the de-jure levels of society.

The concept of a right

There is often an inconsistent use of the term "right". The informal land development context offers many such cases, for example, reference to actual land use as "existing land rights". This reflects a failure to distinguish between the de-facto and the de-jure situation. This so-called "problem of legality" is the conceptual difficulty that legal terms are used to describe non-legal relations. "The offending concept ... (being) ... the concept of a right." (Ibid., p. 219). The quote from Barnes in chapter 5 is an example that displays a consistent distinction between de-facto and de-jure situations.

Cohen shows what it takes to make a consistent distinction between rights and powers. Firstly, ownership is displayed as a matter of enjoying rights. Then, for each ownership right there is a `matching power'. "If *x* has power *p* and power *p* matches right *r*, we may say that, roughly speaking, the content of the power he has is the same as the content of right r, but we cannot infer that he also has right r. Possession of powers does not entail possession of the rights they match, nor does possession of rights entail possession of the powers matching them. Only possession of a *legitimate* power entails possession of the right it matches, and only possession of an *effective* right entails possession of its matching power. One might say that the power to ø is what you have *in addition to* the right to ø when your right to ø is effective, and that the right to ø is what you have *in addition to* the power to ø when your power to ø is legitimate." (Ibid., p. 219).

This - highly impractical – conceptual stringency illustrates how … "Ordinary language lacks a developed apparatus for describing production relations in a *rechtsfrei* manner. It does have a rich conceptual system for describing property relations, strictly so called. Given the poverty of the vocabulary of power, and the structural analogies of powers and rights, it is convenient to use rights-denoting terms with a special sense, for the sake of describing powers." (Ibid. p 224).

The fundamental function of land registration is the matching of rights and powers. Land registration does this by identifying the specific property units and the particular set of rights and obligations attached to each of them. The approval by the National Survey Agency and the registration in the Land Registry are those events that commit the state to back those rights, thereby providing legitimate powers. The potential backing of official sources of power makes the rights effective.

Land use control and updating ensure that legitimate rights do in fact match effective powers and continue to do so. The constant danger in which land registers in developing countries live is that

of being overtaken by informal developments, implying a return to the situation where there are no rights to match effective powers.

Functional explanation

Historical materialism suggests a functional explanation of why and how property relations occur in human society:

"The heart of historical materialism is the thesis that there is, throughout history's course, a tendency towards growth of human productive power, and that forms of society (or economic structures) rise and fall when and because they enable and promote, or frustrate and impede, that growth. ... They flourish to the extent that they help to raise the level of development of the productive forces, and they decline when they no longer do so." (Cohen, 1988, p. 155).

”Very simplified there is a two-stage determination: The productive forces tend to grow throughout history. New productive forces may require new material relations of production, which in turn require new social relations of production, new forms of authority, and distribution of rights." (Ibid., p. 166).

"The general explanatory thesis is that given property relations have the character they do because of the production relations property relations with that character support. Thus property relations change in order to facilitate, or ... to ratify, changes in production relations. The production relations change so that the productive forces can be properly used and/or developed, and the property relations change to allow for or to stabilize the required changes in production relations. Sometimes, ... the economic change precedes the legal; sometimes the reverse is true; and sometimes the changes proceed simultaneously. But in all cases, so historical materialism contends, the property relations change in the service of changes in production relations (which in turn reflect development of the productive forces).” (Cohen, 1978, p 226).

Cohen illustrates four main types:

I. At a certain time circumstances favour the formation of relations which are forbidden by the law. Nonetheless, the law is broken. At a later time the law is changed so that consonance between the effective relations of control and the institutions is restored.

II. As in I, conditions favour the formation of currently forbidden relations of control over resources. But in this case the legal system is too strong to allow relations in defiance of it. Accordingly, the law is sooner or later changed, so that the new relations can be established.

III. In this case new relations of control over resources form which violate no law, since no law forbids them. Fresh laws are nevertheless desirable to make the new relations more stable and they are consequently passed.

IV. Here certain forms of relations are legally allowed for but such relations are still only marginal in extent. If circumstances encourage more widespread development of such relations they can develop unimpeeded by the law and even facilitated by it. See Cohen (1978), pp. 226-227.

“History is full of examples of all four types and commonly there is a multiple patterning: in a complex transition we find that some new powers are exercised illegally, while others await a

change in the law. The same legal change typically both ratifies achieved powers and permits the formation of new ones …" (Cohen, 1978, pp. 227).

10.5 Discussion

The elements in a functional explanation of land registration are:

(1) That *characteristic feature of society* that it needs land administration to support economic relations via property relations.

(2) *A search and selection process* that operates so long as this need is not met. (Functional selection and equifinality, see section 10.2).

(3) *The secondary status of property* in the process of social change: When "circumstances" change, so do property relations and consequently their supporting system of land administration change as well.

(4) *Selective criteria,* which are the basis for functional selection and which allow us to speculate on the features of feasible systems.

Search and selection

The poor performance or absence of land registration in developing countries is evident. The functional explanation model predicts that this will cause increased activity to maintain the effects of land registration. But can such response be observed?

The Bogor Declaration (FIG, 1996) is an example of response at the level of international organisations. The declaration is a result of a joint UN-FIG initiative with the primary objective to set out desirable requirements and options for cadastral systems of developing countries. The declaration states the need for cadastral systems, and it outlines main features of feasible systems and reform options, and it considers a broad range of issues. The FIG Bathurst declaration is a follow-up and it:

" … calls for a commitment to provide effective legal security of tenure and access to property for all men and women, including indigenous peoples and those living in poverty or other disadvantaged groups. It identifies the need for the promotion of institutional reforms to facilitate sustainable development and for investing in the necessary land administration infrastructure. This gives people full and equal access to land-related economic opportunities. (FIG, 1999).

Another type of response is the increasing support from World Bank and other international lending agencies to large scale reform of land administration. "Currently the World Bank is supporting at least 13 implemented land titling and registration projects with a total loan value of about US$550million. This represents about 1% of total World Bank lending on an annual basis, which is significant. This compares with the decade of the 1980s when about US$150 million was lend for just three projects." (Holstein, 1996a).

These large land titling projects involve adjudication, registration, reorganisation, new technology, capacity building and legislation. One example is the cadastral development projects in several

provinces in Argentine where the cadastral reform is part of a major *Program for Financial Restructuring and Economic Development* initiated in 1990 and financed through a loan by the World Bank and the Inter-American Development Bank totalling US$ 600 million. Overall objectives include the streamlining of administration and an increase in provincial revenues from land taxation. See Georgiado, et al. (1997) for a description of dramatic change in the entire provincial administration in an Argentine province. One large project that has generated considerable experience and publications is the Thailand land-titling project. See Atthakorn, V., et.al. (1996). Ongoing projects can be searched on the web-sites of the bilateral and multilateral donors.

Numerous practical innovations are tested out at the level of individual projects and studies. Baross (1990), Payne (1989) and World Bank (1996) give a picture of many different experiments world wide, however, mainly in the urban context. To this comes the approaches that are developed on a more modest scale and not widely published where administrators are locked in a daily struggle with their constraints in finance and manpower to improvise practical approaches that may later become established models and at a yet later stage be adopted as official approaches. The FUNACOM case (see chapter 5), however, illustrates that there is along and dangerous way from the stage of individual experiment to the institutionalisation of a new approach.

Innovation, however, is a sore point for the cadastral professions. Few cases are reported where the land registration agency has taken the lead in experiments and pilot projects. The World Bank report quoted in chapter 5 listed as an obstacle for land registration "… resistance to change in state administrations (sustained by non-transparent and complex procedures for the recognition of occupant's rights …). The explanation lies partly in the legal character of land registration, which is tightly instructed by regulations. Amendment of these have traditionally encountered considerable inertia. The professional paradigm is typically one that assumes the parcel based individual free hold right. A particular feature is the pride that cadastral surveyors take in geometrical accuracy, sarcastically labelled by Warren (1978) as the "0,01 syndrome". There is a long way from the FIG declarations to the attitude in the local land register. Most innovation that fundamentally breaks with the conventional paradigm of land management seems to be initiated outside the established institutions for land registration and with little contribution from the cadastral profession or meeting outright "resistance to change". The institutional response to new approaches to property formalisation may therefore be that they are "not legal" and therefore "not possible". In other words, a case II pattern, where innovation of law comes forward with great delay – if at all.

In terms of functional logic: The behaviour of the cadastral system may not necessarily be one where it increases its search for alternatives more intensely when the "end" is not maintained. It may respond by resisting change. The search for functional alternatives may therefore happen in other spheres in society, among other professions like planners, sociologists and economists and, in parallel, beyond the formal system through the consolidation of informal structures. One may question whether the vision of a comprehensive information system, updated and multipurpose, and viable under Third World conditions will ever evolve out of the existing institutions, notably the cadastre. Rephrasing Cohen: Systems of land registration will accommodate themselves to the new circumstances. They rise when and because they enable and promote, and fall when they frustrate and impede the pursuance of social stability. They flourish to the extent that they help to stabilise prevailing relations of land use, develop new ones and promote general social stability, and they decline when they no longer do so. (Cohen, 1988, p. 155 quoted above).

In the crude terms of Darwinistic selection: Does the conventional land management paradigm from developed countries - which implicitly assumes complete information, abundance of financial and human resources and which is geared only to manage gradual change under conditions of social

stability, etc. - belong to the group of dying species in the harsh Third World environment of rapid change, weak state structures and tight resource constraints?

The secondary status of property relations

The functional explanation predicts that property relations will change to facilitate or to ratify changes occasioned by developments in technology, by the appearance of new opportunities in production, and by other social changes. In short, property relations are a dependent variable of social change. This has direct implication for a particular land reform situation, namely that property relations, reflected in the form of formal land tenure, is in principle a design parameter. Much scepticism in the development assistance community towards land registration derives from a failure to appreciate precisely this.

The diverging opinions on land registration are typically as follows: On the one hand advocates of land registration hold that formal tenure improves tenure security, promote economic development, provide a revenue base for government, rational resource management, etc. Critics on the other hand argue that land registration is likely to de-stabilize de-facto security for example through land taxation and by threatening or eliminating existing forms of land use. For example: "Attempts at regulation may expose the poor to costs that they did not have to face before …" (Jones and Ward, 1994, p. 17).

The problem is that planners, economists, and sociologists seem to accept the same paradigm as the traditional cadastral surveyor and land registrar, namely that those forms of tenure which are permitted in existing legislation and their corresponding administrative routines are the only possible forms. In other words, the concept of property relations is confused with particular forms of ownership and existing administrative instructions.

The following shows three aspects of land tenure that are subject to design.

Landed property as collateral

Real property is often used as security for payment. The money-lender has remedies to dispose of the property in case of default. This can be dangerous for everybody but especially for poor households who are most likely to default if, for example, they fail to pay service levies for supplied services such as water and electricity. There are cases where local Councils have threatened households with eviction to make them pay for services.

An interesting alternative is the "pre-paid concept" where people buy electricity with coded cards for meters installed in each house. The system reverses the sequence of certain steps in conventional service provision and the service-cost relation between occupier and the local authority is split from the land tenure relation. The system is widely used in South Africa and is being introduced in Namibia: " ... the use of pre-paid meters resolved budgeting and payment problems for both the supplier and the consumer. For the supplier the task of billing and collection have been eliminated, reducing administrative costs, bad debts and reconnection. The pre-paid concept also helped reduce the impact of consumer boycotts. The concept was, and indeed remains, supplier and consumer friendly." (May, et. al., 1994, p. 134).

The design in this solution is, firstly, to split the formal relation of cost recovery and that of land tenure. Secondly, the security of the supplier does *not assume the conventional collateral and potential*

foreclosure but is based on the ”pre-paid” concept. If there is no money to buy a new card there is no light but house and plot are not at stake.

The cash-flow problem:

Land taxation defines a similar problem. One of the good reasons for investing in land registration is that registered and valuated property constitutes a basis for land taxation and thereby for revenue, which normally goes to local government where it is much needed. This revenue aspect is an important aspect of the Argentine reform mentioned above.

But the fact that a poor household becomes the formal owner of plot and house and that these are set at market value in the register does not provide that household with the cash to pay a regular land tax. Nor does in subsequent years an increase in income come forward at the same time as prices go up. A successful formalisation programme may even expose its beneficiaries to land taxation as well as regular service levy. This so-called ”cash-flow problem” lies in the conventional mortgage and taxation arrangement in that it "ignores the ability to pay" (Shoup, 1994, p. 239). Shoup advocates the ”deferred special assessment” which permits the owner to defer payment until sale, that is until when the value is realised. The arrangement that defers payment until some future convenient occasion when there is ability to pay can be designed to finance infrastructure improvements and as a means to implement betterment taxation. The model assumes a source of finance for the ”outlay”. See, Shoup’s discussion of these matters (10).

Comunal tenure forms:

The need to accommodate forms of communal land use has been argued by many. This is part of a wide debate on the role of communal management of land and natural resources. Issues include grazing policy, land degradation, wildlife, and the role of traditional institutions. See for example Bromley (1989) (11). This debate is at times coloured by the implicit assumption that there is a conflict between communal tenure forms and official land registration. This is an unnecessary complication in the debate. All that land registration requires is, firstly, that the particular form of communal ownership is specified and recognised in the overall land policy as a form of ownership that the state will respect and support. Secondly, the practical registration requires that the three “What?, Who? and Where?” questions are answered unambiguously. A practical advantage in communal tenure is that it requires the identification of only one or few large parcels to geo-reference the rights. Furthermore, the survey of such large areas can be greatly supported by the remote sensing techniques where the resolution is constantly improved.

Take the community of San Pedro as discussed in chapter 5. All three questions are answered. And arrangements could be made to demarcate community boundaries so that they are visible in aerial photos and satellite images. Generally, the technology of remote sensing opens opportunities for very efficient mapping of such large community areas. In short, official registration of communal tenure is not only possible in principle and practice. It may also contribute to a rationalisation of registration and of multipurpose use of geo-data. (See also chapter 6 on block strategy).

10.6 A note on formality

One simplification is deliberately made throughout this presentation namely that formality refers to the state administration, its agencies and their activities and, in particular, that formal land management is associated with land planning and land registration based on common law. This notion of the state as one unity or identity is an inaccurate and in some cases misleading model of reality in developing countries. Here, government structures are often weak or in certain destabilised situations virtually non-existent and there are often parallel structures in society each with its social function, relations of power and formal status. This very much concern land issues.

The legitimacy of the (land) administration is fragile in developing countries. The situation is not necessarily as outlined by Stinchcombe, that the most important element of legitimacy of a claim is its acceptance in other centres of power. In such contexts as informal urban settlements and many cases of rural development a decisive factor may well be *"legitimacy among the people who must take the consequences"* of an intended intervention or of some ruled decision. What for Stinchcombe (1968) is an the exceptional case may, therefore, in some situations be more like the rule:

"One of the reserve sources of power is public opinion; another is the willing obedience of subordinates. If a right is popular, and if it is accepted by subordinates, the holder of the right will have much less reason to call on other centers of power to back him up. In some kinds of activity, such as learning, which require the active cooperation of the subordinate, the legitimacy of power among subordinates may be very important. But power based only on the shifting sands of public opinion and willing obedience is inherently unstable." (Ibid., p. 161).

This inherently unstable character of power of the administration is one of the reasons behind the modes of co-operation between agencies in the public administration and non-government organisations and community-based organisations. Nonetheless, the nuances in this are deliberately ignored in this chapter (12).

We shall finish this chapter with two snap-shot descriptions of such "inherently unstable" situations. Barry and Fourie (2002) report from an informal settlement case in South Africa: After protracted negotiations between the local authority, the land owner and the community leadership, an agreement was reached whereby all the 850 households would be given land nearby in a new housing estate. This was to be established under the government subsidy scheme. Parcels with fixed boundaries were to be delivered and allodial ownership was to be registered in the deeds office. Representatives of the local authority, the landowner and an NGO were outside agents who facilitated this change.

There were workshops on the new rules about mutual adherence to boundaries between neighbours and reporting of transactions. But there were at the same time indications that these rules were not followed and:

" … there was a great deal of conflict and turmoil within the community itself and distrust between the authorities and the community. For example, part of the agreement in 1994 whereby 850 households would be given land nearby was that no further settlement on the site would take place. However, an aerial survey of the settlement some four months after this agreement was finally struck indicated a total of close to 1300 shacks on the site. The community, or at least factions within the community, had allowed more people to settle, in spite of the agreement to the contrary with the authorities. Moreover, it appeared that more people had been allowed to move into the settlement while the negotiations were underway." (Ibid., pp. 485-486).

Roth (2002) reports from The National Land Tenure Conference in 2001. He specifies the meaning of land tenure security. It not only comprises the actual use rights but also enforcement of those rights against the claims of others and ownership over a sufficiently long time to recoup benefits of invested labour and capital. In this context of insecurity Roth introduces the concept of legitimacy as follows:

"From where do these rights draw their legitimacy? It is trust between individuals and groups that give land rights their weight and meaning. It is trust that enables a landholder in customary areas to rent out land to another because he or she has faith that the tenant will return the land at the end of the lease period. It is trust that persuades a landholder to make an investment in fruit trees because he or she has faith that the rewards of those investments will be reaped by him or her alone … In cases where trust has broken down – and there are many instances in both customary areas and on commercial farms where this is occurring – there is need for a strong central authority to enforce and protect rights in land and wealth". (Ibid., pp. 1-2)

South Africa's new land policy is to give the land to the people. Land can be given to communities as juristic persons. But the role of communal authorities is not in line with the notion of the state as a unity:

"Traditional authorities have asserted that they represent the community, and certain chiefs argue that their names, not the communities', should be placed on any title certificate. Furthermore, traditional authorities represent an important part of the governance structure in land, perhaps the only governance, given the lack of capacity and absence of a decentralised government. Yet, there are many accounts of traditional authorities being corrupt, operating in their own self-interest, not being held accountable, or operating outside the limits of the law. Women, in particular, appear to be disenfranchised under customary tenure arrangements.

At the Conference, the DLA (Note: The Department of Land Affairs) reasserted its position that land is being given to the people, not traditional leaders. Yet the Chair of the Congress of Traditional Leaders of South Africa (CONTRALESA) claims that this holds true only as long as traditional authorities do not experience a reduction in status. So to whom is land being given – the people or traditional authorities? And who is responsible for land administration in customary areas – Government, traditional authorities, or both?" (Ibid., p.2) (13).

10.7 Note on de Soto

In these years one can not write on land registration in developing countries without relating to Hernando de Soto. The following relates to his recent book The Mystery of Capital" (2001).

The large perspective in de Sotos analysis is *the role of formal property in economic development*. His main proposition is at the level of theory of history. He contends that formal property was the underlying reason that capitalism emerged as a new economic order and that it has proved able to expand and consolidate – in the West. It is the absence of formal property that explains why capitalism has failed everywhere else.

His fundamental distinction is between "assets" and "capital". Assets are the immediate material things like buildings and plots of land. As such these are only "dead capital". It is only when these assets besides their immediate, daily functions also facilitate further creation of value that they as-

sume the function as "capital". This pre-supposes that they are "represented" in a systematic and generally known, generally accessible and useful way so that this representation provides a basis for confidence among people when they make dealings between each other with these assets. In short: A formalised and all embracing official property system is needed for all the "dead capital" in developing countries to become "life capital" and serve as a dynamic basis for creation of wealth in these nations.

And there are huge amounts of dead capital in the so-called poor countries. He gives indications on the basis of country studies. But in rough terms 80% of the population is excluded from the formal property system. They live in the "extralegal sector". They are not poor. They:

" … posses more than anybody has ever understood. What they possess, are assets that can not be used to their fullest. The institutions that give life to capital – that allow you to secure the interests of third parties with your work and assets – do not exist here." (Ibid., p. 15).

However, the call for a formalised representation does not mean an unconditional approval of land titling in the conventional sense. He is critical of the formal system of property system in developing countries saying that they exist within a "bell jar". He sees the conventional registration agencies as obstacles to the inclusion of the extralegal sector in a formal property system that embraces and services the entire society. He devotes two separate sections to single out "lawyers" and "technicians" for critique (Ibid., pp.209-219). He criticises excessive focus on the technique side of mapping, computers, etc., and he gives examples of the numerous obstacles for people who try to enter the legal sector.

What is needed is to recognise what goes on in the informal sector and give it support, learn from the informal sector, learn from "the barking dogs", formalise the peoples law, learn from the actual practices established in every small community and their internal administration. Etc.

And learn from the way property systems were gradually established in the West. Discovering "the peoples law" is how the Western nations build their formal property systems. (Ibid., p. 171). He describes in detail how formal property system in the US evolved in a tension where extralegal developments came first and only with some delay and only after political battles were incorporated or ratified into the formal system. This is the process we are witnessing today in developing countries. What is relevant from developed countries is this experience that took over a 100 years; it is not so much the actual modern systems of today.

The position of the present thesis in relation to de Soto's position can be summarised as follows:

The thesis acknowledges the formalisation problem in developing countries but goes straight to the technical level. The contrast to rich countries is set at the technical level in terms of information: Full vs. in-complete information. The general proposition that information loads must be drastically reduced can be seen as a technical / practical aspect of de Soto´s general call for not being carried away by mapping and register techniques. Our arguments that the features of our Danish procedures as they evolved in the previous century are interesting fits nicely with de Sotos arguments. The doubt that we signal whether land registration agencies are actually able to respond to the formalisation challenge is a more diplomatic formulation than de Soto´s blunt criticisms of the "custodians of the bell jar". The functional explanation of why and how property relations emerge and their dependent nature is the dry model of what de Soto describes so lively with his examples form the American history. Generally, our thesis falls with its predominantly technical and more limited scope in line of de Sotos thinking.

It should be mentioned that some of our references, namely Payne, Baross and van der Linden published in the late 80s similar reasoning as does now de Soto with respect to the informal sector. Especially Baross has quite elaborate descriptions of the informal sector and its insecurity when people are without protection. They described the modes of operation in the informal sector and the need of the conventional administration to imitate them. They seem to have worked in parallel.

10.8 Notes

(9)
Lemel (1988) sets land registration in a broad perspective. He specifically challenges the narrow title document focused concept of formal tenure and argues the need for a perception of property as a broader social concept. Lemel also covers the concepts of backing, legitimacy, etc. with comparisons to various land reform experiences.

(10)
Shoup addresses a critical difficulty, which many upgrading projects have experienced, namely the lack of affordability among beneficiaries. The model with deferred special assessments has been tried out in the US and in Latin America. Although it is aimed at infrastructure improvements it applies equally to land taxation. The model resolves not only the cash flow problem for the individual but also to some extent for government. This is argued in detail by Shoup in various publications. One assumption in the model is that land registration system effectively identifies the property units, which are affected.

(11)
Bromley (1989) is concerned with *" … that vast domain of non-private land at the extensive economic margin on which millions of persons in Africa and South Asia depend …" (Ibid., p. 867)*. He argues the need to develop the various communal tenure forms rather than replace them by the conventional private free hold. These arguments are made in economics and they include the point that land registration may well be cheaper.

(12)
Hindson and McCarthy gives through a number of papers a most lively impression of how the informal settlements come into existence and how bargaining with the official authorities goes on. Numerous papers and case studies describe such relations between competing structures and thereby the "inherently unstable" character of the formal system.

(13)
Tenure form as a design parameter sounds simple. But in practice it is complex and all forms of ownership have their shortcomings. Roth (2002) offers an example in his review of problems in various tenure forms in South Africa: (1) Customary Tenure Systems: Overlapping claims, inability to transfer land freely, abuses by traditional authorities, … (2) Freehold: High costs of subdivision, survey and registration. People with influence and money often use formal registration processes to speculate in or grab land, while others become entrapped in debt and lose land to banks and unscrupulous moneylenders. … (3) Common property associations (CPAs) and Trusts: They give far too little economic incentive to individuals within the community or fail to adquately protect individual rights. Little attention has been given to exit/entry conditions, and there is the risk of these contracts being hijacked by traditional authorities. … Nonetheless, Roth is optimistic. Modifications should be possible on what is already a good body of legislation and machinery of land administration. (Ibid., p.3).

11. PERSPECTIVES

11.1 Introduction

One does at times reflect on how land registration might be integrated in development assistance and how it may complement other objectives in development assistance.

Firstly, I reflect on the impact of AIDS upon the approach to land registration. We believe that communities that are seriously affected can to an even lesser extent create and sustain land registration institutions of the conventional type. Formalised land tenure will need to maintained more on basis of social mobilisation locally than on a the type of land administration agencies we usually think of.

Another speculation is that land registration could be made a medium of primary edcation. The idea is inspired by the Life Science project, which developed an approach to base learning on practical experience in biology and related disciplines. Land registration could in the same way provide a basis of practical experience for teaching of mathematics, geography and general environmental awareness. By analogy such approach could be called "Land science".

A third perspective is that land related "interventions" or "projects" should be used as catalysts for land registration. Such projects are often donor supported and implementation requires pragmatic solutions on the land issues that come to the surface. This is a constructive context to test out viable approaches when – as is typically the case – there are no national policies or guidelines. Especially the issues of expropriation and compensation are crucial in good governance.

Fourthly, land registration is a field where there are possibilities to develop a division of tasks between the public and the private sector. Danida could access professional surveyors in recipient countries via the FIG. The Danish tradition where the private surveyor is a broad profiled profesisonal is most relevant. Such approach would be in line with a policy of private sector development.

A final perspective is that the technical aspects of land registration with surveying technique become less important than ability to work with communities, in-service training and control funcions. Specialised knowledge on land registration may then be acquired at a post graduate qualification.

11.2 Land registration and the impact of AIDS

The AIDS epidemic disrupts our image of capacity building. We like to think of younger staff starting with an initial training progressing through working experience and further education being at some stage able to contribute to creation and consolidation of knowledge and experience. Experience being passed on from senior staff to the next generation. But this image of gradual consolidation and continuous progress disintegrates when confronted with the impact of AIDS and this happens in all aspects of society. A Danida leaflet, *HIV/AIDS and Agriculture* (Danida, undated) describes the impact of AIDS on agriculture much of which apply equally to land issues and the prospects of formalising land rights.

"The grim reality is that AIDS will for many years continue to kill people infected by HIV" (Ibid.). The impact occurs as loss of staff, skill and knowledge and decline in productivity due to absence and

sickness. The loss of the parent generation leads to increasing number of juventile headed households. Systems of heritage disintegrate when a large part of a generation falls away. The problem with insecure rights for women is worsened as illustrated by the occurrence of a new type of land conflict "widow chasing" when a widow is evicted from a household. One of the most alarming consequences of the epidemic is the growing number of orphans. They are physically weaker and lack knowledge that used to be passed on to them from the parents. *"The responsibility to fight AIDS should not be left just to the health sector. It requires a multi-sectoral response"* (Ibid.). This means that we must also re-appraise our image of formalising procedures for land registration and strategies for capacity building.

AIDS means disintegration of institutions, weaker administrative agencies and an even more serious lack of experienced senior staff. We need therefore think not so much or only in terms of establishing a "bureacracy" or "system" in line with conventional land registration agencies; but more in terms of direct community organisation or social organisation. Perhaps one could say "mobilisation" rather than "administration". Those rules and daily control functions that sustain a regime of land tenure need rely more on internal organisation in the local community than on land administration agencies, local government and the private sector – as in the conventional model.

The capacity and potential of the community therefore becomes of primary concern in devising a sustainable approach to formalisation of land rights. In terms of technology components "organisation" becomes a prime parameter: The organisational potential of the particular community becomes important. Together with the level of "knowledge" in the community it will appear what "technique" can be applied and what "products" of tenure security can realistically be achieved. In yet other terms: In such situations where the usual land administration actors are seriously affected by the AIDS epidemic – besides the other resource constraints – the community becomes the primary "carrier" of the land registration technology. This implies a need for field based procedures, for techniques that in considerable measure can be performed by lay people and an overall strategy that maintains the tenure situation by means of ongoing control functions rather than representations in remote registers and abstract co-ordinate systems.

Shifting decisions and control functions to the field becomes a way of responding to the AIDS epidemic in the sphere of land administration.

11.3 Land registration and primary education - Land science

Land registration has an educational potential. Land use, land tenure, mapping and registration techniques could be a platform for a methodology to primary education in geography and mathematics. Teaching would relate to the local area. There would be good maps available and orto-photos in the school and the children would be assigned practical tasks in land registration. The combination of land registration with education could be a new methodology in primary education: *Land science*.

This methodology combining practical tasks in land administration with education responds to (a) The need to base land registration on increased degree of community organisation. (b) The need to improve basic education in especially mathematics. (c) The need for social organisation required by the aids epidemic.

The land registration dimmension: Land registration offers a range of recurrent activities that could be organised in a co-operation between the land registration agency and the school. The obvious example is the demarcation and maintenance of boundaries. These can be the boundaries of "blocks" such as village boundaries and main zoning within a village area. Boundaries may be demarcated by planting of certain trees in lines and corner points. Each terrain and vegetation offers possibilities like trees, stones, poles or hedges. Once demarcated and visible in the field such boundary has effect because a certain set of rules will be attached, for example, that it is not allowed to graze or collect wood in the neighbouring village area. To the set of rules follow control functions that enforce the rules in an ongoing process of information and control. By maintaining the boundaries and enforcing the rules the tenure regime is maintained by community activities on the ground: "live". It does not depend on a representation.

The educational dimmension: Knowledge of boundaries and terrain and ability to relate it to maps and aerial photos develops abstract thinking. Maps over well known localities are a good basis for gaining experience with conversion from scale on maps to real distances, calculate areas, etc. Simple survey techniques can be useful in grasping geometry. Provision of good maps and orto photos to the school gives an overall perception of mapping at national level of techniques including remote sensing. The abstact categories of "reality" and "representation" gains common sense. It is only in the conventional educational system that these issues are "difficult" and many school leavers are particularly weak in basic mathematics and unable to associate much with the class-room terminology in planning and mapping. The methodology of "land science" would develop the abstract perception on basis of personal field experience.

The social organisation dimmension: Maintaining a tenure situation without (necessarily) the support of a representation requires recurrent maintenance and control; this is a considerable work. Especially in areas and times with fast growth of vegetation. This defines a social activity for the children and the community. This could be organised as an activity within the geography education in a co-operation with land registration agencies and or private surveyors. In times of rapid loss of knowledge the direct involvement of children in land administration would rescue and create knowledge of land use, land tenure and environment. Actual demarcation of a village area and its major zoning is an efficient may of learning the limitation of land based resources and acknowledge the need to economise and ensure sustainable use. Assignment of responsibilities relating to land registration in their community is an example of a socially oriented activity that could help give some structure in daily life, especially for those children who have lost their parents.

The idea is not new. A methodology for primary education in the natural sciences was developed along this principle in Namibia (Ibis, 2001). The idea is to base the perception of abstract concepts on practical experiences. The approach was named "life science" and is now the methodology for primary education in Namibia. The so-called "Life science project" has been one of the largest NGO projects supported by Danida. It provides a huge experience in alternative education. Much of this would be readily applicable also to a possible "land science" approach. The differences is just, that land science in addition to it´s educational purpose would have a function in actually performing land registration at community level and in providing organised activity for children in a situation of social disintegration accelerated by the aids epidemic.

11.4 Interventions as catalysing events for land registration

Governments interventions in developing countries are often implemented with donor assistance in a government-to-government co-operation. Some of these "government interventions" concern land and they are ideal occasions to innovate land development and approaches to formalisation. In particular, land related interventions provide a good opportunity to develop transparent and fair procedures for expropriation.

Infrastructure construction almost inevitably trigger land issues. Existing settlement is typically unplanned. Construction requires re-planning of layout of reserves for the facilities like roads, channels and supply facilities. Such areas are typically already occupied by de-facto settlement, which then need to be relocated. Progress of construction requires clarification on issues such as what is the existing land tenure regime? and who is to be consulted? and with whom are tenure issues resolved? What tenure regime shall exist in future? Who qualifies for re-location to other plot or land and on what terms? These urgent questions raise the critical issues in planning and formalisation. The advantage with infrastructure projects is that they are urgently needed and clearly legitimate, and they require pragmatic solutions.

Agricultural development assistance typically concerns improvements in "primary production" Such improvements in the sphere of production may impact on ownership and or pre-suppose certain changes in ownership. Perhaps, improved combination of livestock with crop production might require or be helped by rearrangement of lands. Or improvement in production and marketing creates incentives to reduce fragmentation and related inconvenience with transport. Perhaps there are possibilities of redistributing land to particular producer groups. Or the target group of farmers may need their de-facto terms of land tenure clarified and secured by formalisation.

Environmental management projects may concern nature conservation projects, regulation of land use such as grazing practices, cutting of fire wood, tree planting schemes, etc. The intervention element may range from imposition of tight land use restrictions to awareness measures without regulation. Nonetheless, as also acknowledged in the Danida policy on environmental policy – the objective to alter existing land use will often raise the problem of compensation.

Generally, land related interventions tend to raise the classical issues of compensation, control functions and community co-operation in the detailed framing of the project and new rules. These are key elements in good governance with respect to landed property. There is a case for including expropriation as a target for development assistance in land related development projects or "interventions". Expropriation concerns the critical issues in "good governance" and "efficiency". Devising expropriation procedures with appropriate elements of mediation, fair compensation and speedy processing would be a important contribution o formal land management in many developing countries. External participation as in development project that tackle the issues of intervention and compensation could have a mediating effect. At the practical level projects require what in chapter 7 is defined as "pre-existing rules". At the general level this is an aspect of "rule of law".

The advantage with "interventions" is that - what ever the particular type – they require pragmatic solutions and in a short time without awaiting the formulation of national policies. Instead, the solutions that are devised and tested deliver practical experience as input to ongoing policy formulation at the same time as they facilitate project implementation. It is a simple test on sustainability than an approach proves able to resolve burning land issues in project implementation.

11.5 Private sector development and land registration

Danida recognises the public sector crisis. A "a non-performing public sector" has left a vacuum, which is not adequately filled by private sector entities and organisations in civil society … " (Danida, 1996, p. 23 quoted above in chapter M3). Danida also recognises *" … the generally poor quality, limited impact and high cost of government support services …"* (Ibid, p. 72). One of several concerns is:

" … whether an increase in private service provision weakens the likelihood of achieving sustainable systems for managing natural resources. There is no simple answer to this, but generally it can be said that efficient service supply, regardless of supplier, improves the prospects of sustainable production systems. Furthermore, separation of the supply and regulatory functions of government may result in more effective government regulation. However, sustainable natural ressource management is an area with many public good characteristics and externalities, and government must therefore continue to play a key role in the provision of services. (Ibid., pp. 74-75)

This analysis applies also to land registration and there are possibilities to develop land registration through a division of tasks between the public and the private sector. There is a tradition in land registration to delegate a range of responsibilities to the private sector functions, namely by "licensing" land surveyors to perform administrative and sometimes judicial functions. Chapter 2 illuminates how this model operates in Denmark. The system of licensing is well known in developing countries.

The sector of private surveyors in developing countries offers a potential in land related service provision. Development assistance could consider a joint assistance to the public and private sector in land registration – as outlined by the Danida guideline. There is urgent need for the kind of service normally delivered by private surveyors – as in chapter 4. See also discussion in annx 11.4, (b) on public and private sector and a qualitatively different meaning of "privatisation".

Practically, Danida could access the professional surveyors in the recipient countries via the FIG, which incidentally has its head office in Copenhagen. This network includes also the relevant university departments. The land surveying professions in developing countries have – as indicated by the FIG declaration quoted above – a need to innovate and update skills. The FIG has developed a strategy of Continued Professional Development, which is readily available as an already approved strategy and could be a framework for discussion. Danida could support this and thus strengthen land registration by a joint support to the public and private sector.

One problem in developing countries is that the professional tradition and "pride" is often a "narrow" almost engineering-like pre-occupation with the geometry and formalities related to the cadastral surveys. (See on the "0,01 syndrome" in chapter 7). There is little tradition for the broad profiled surveyor as an all round "key person" in the decentralised handling of land issues. The Danish tradition with a one-shop service with the private surveyor who sorts out everything for the client (see chapter 4) is most relevant. The context is different and the client may well be community or local government land office rather than a Danish landowner. And the service may well range from technical survey over training to mediation and conflict resolution. But the model is interesting in perspective of capacity building in developing countries.

11.6 Land registration – a post graduate specialisation?

At a conference arranged by the Danida research network (JUF, 19th of June 2001) one participant made an interesting contribution: That agricultural science perhaps in the future would become a post graduate specialisation. He had himself graduated first as a soil scientist and then later broadened the field. Instead, he contended, the youngsters nowadays increasingly tend to begin with communication and similar non-specialised focus. He speculated that perhaps the trend is that a classical discipline as agriculture will in future increasingly be chosen as a post graduate specialisation.

A similar reflection could be made with respect to cadastral science and education. The technical aspects that have traditionally taken up a large part of the attention and effort are becoming less and less problematic. Remote sensing techniques continue to refine resolution. The GPS technology becomes lay mans tool. Etc. At least for developing countries one can say that the main task lies in establishing on the ground those situations of land use and ownership that shall be recorded. The problem is not so much the technique side of identification. Focus thereby shifts from the conventional obsession with geometry to the capacity to guide land development and secure land tenure in other ways. Ability to work with the communities becomes more important than the land surveying technique. Ability to improvise in-service training and supervise community representatives or staff at local land office becomes more important than doing it yourself. Control functions may assume greater strategic importance than the potential backing based on cadastral maps in the Surveyor Generals office. Etc.

Is this a land surveyor? In South Africa they have started to use the term "land manager". The recruting criteria for such professionals need no longer be a liking for land surveying and good marks in mathematics. Persons with a background in community work, with an overall perception of planning and land issues and a talent for negotiation may well be the type who assume functions in land registration.

In perspective of Danish development assistance we have assumed in this thesis that land surveyors with Danish land registration experience will become involved in projects in Danish development assistance. Indeed chapters 4 to 12 are written for this target group. But this may not happen so much. This is because few would consider actually travelling to a developing country and stay there for several years. The younger candidates are quickly settled with family and mortgages and seem not to feel any urge to use their profession in a developing country.

It is only among those who are willing to travel and who are disposed to take a professional interest in developing countries that development assistance can recruit professionals. And there may not be many Danish land surveyors. The group of potential candidates will most likely have a different profile. Their entrance point to land registration may for example be that they find themselves in a land related development project and need specialised knowledge on land registration as the situation requires.

The challenge may, therefore, be not so much the aspect of introducing Danish land surveyors to the shift to developing countries. Instead, there may in future be an increasing need for courses and for forms of communication of "basics" or "key-knowledge" concerning land registration to persons who find themselves charged with land related issues in development projects. Some of them may catch an interest in land registration and develop this as a post graduate specialisation.

CHAPTER 12: ANNEXES

12.1 Annex on Danish legislation on subdivision

The bench mark in the legislative framework for the combined subdivision and land management process as outlined in chapter 4 is the Danish Subdivision Act, in references see under "Udstykningsloven". This law defines the agencies, actors and control functions ensuring continuous maintenance and updating of the cadastre. It defines what transactions or alterations are allowed and how in such cases the operations shall be performed.

The fundamental concept in Danish cadastral system is the "united real property" literally translated from Danish: "en samlet fast ejendom". A united property unit will often consist of a number of individual parcels with each their parcel identification with the registered requirement that they be maintained as one united property unit. The Subdivision Act defines that if land is taken out of one such united property or from several such property units to form a new property unit, then subdivision is required.

The Act offers a number of other options if land is just shifted from one property to another. This happens if a boundary between neighbouring properties is adjusted or in case of adverse possession. The Act carefully defines how various changes in property shall be registered. The temptation to evade official registration through lease arrangements is taken into account with the rule that use rights for more than 30 years may not be created. A general rule is that a property cannot be subdivided if the future cadastral situation and the intended future land use violate other legislation.

The Act defines that all operations with change of property shall be performed by a chartered land surveyor. With the exception of two major municipalities in the capital all cadastral work is performed by private and chartered surveyors. The Danish subdivision act thereby delegates a crucial function in the formal management system to the surveyors in the private sector who consequently have a monopoly on carrying out changes of landed property. This is why our client in the example went to a private, licensed land surveyor when he considered subdividing his property. There is no other way he could do it. This model, which delegates a key function in the maintenance of the public land register to a private profession is common also in developing countries. See extracts from the Act in annex 11.3.

The KMS established two working groups in the 1990s to investigate the cadastral procedures in order to reduce the processing time and make possible other improvements. They came out with the two reports KMS (1992) and KMS (1996).

Our exposition of the Danish subdivision process is copied from "The report of the working group on administration" (KMS, 1992). This report analyses the performance of the subdivision process and its possible improvement. The group was tasked to analyse the use of registers and the registration of property information in the subdivision process for purpose of improving performance. One recommendation was to create a larger scope for the private surveyor in data maintenance.

"The report of the working group on registers" (KMS, 1996) addresses a range of problems deriving from the fact that the Danish cadastral map is converted to digital form. The implication is that the exchange of information in the subdivision process - both map and text-based data - will gradually become digital. This working group proposed standards or guidelines for digital

survey data in the subdivision process. Its recommendations concerned co-operation between the involved institutional actors, namely the KMS, the municipalities and the private surveyors. The report also sketched a model for exchange of digital data in the subdivision process.

A system of cadastral information and updating has since been designed and tested. The model has been nick-named "MIA", which in Danish stands for "Det Matrikulaere Informations- og Ajourfoeringssystem". The evaluation report (KMS 2001) gives a brief description of this system. It is a windows-based program for preparation of cadastral documents. The programme links map-data and register-data on the basis of the land surveyor's identification of the involved areas and it generates hereafter automatically a list of the required cadastral adjustments. The complete case material is then send by electronic mail for processing in the municipality and for final approval in the KMS. (Ibid., p. 4).

For this presentation we shall only observe that the ongoing technological innovation has had profound implications for the private surveyors. It required a shift to digital technology in even the smallest firms. The concept of exchange of cadastral information on digital form and via a central server etc. is no less than a paradigm shift (See Huxhold, chapter 1). New knowledge requirements required employees in state administration and the private sector to undergo courses. Organisationally, the private firms were more or less voluntarily obliged to co-operate by sharing the computer facilities and specialised knowledge. In short, the technological change displays radical changes in all four technology components outlined in chapter 9.

The focus in chapter 4 is narrowly on the subdivision procedure. Enemark (2000) explains the overall role of the Danish cadastre as facilitating four functions related to landed property: (1) *Land tenure*, that is the registration and protection of various forms of land rights. Land rights and the actual use of land influence (2) *valuation* and taxation. The value is also influenced by the potential future use of the property a determined in (3) *planning* regulations. In turn, planning guides the future (4) *land development*, that is, building, construction, etc. By its unambiguous identification of a range of attributes of the individual property units the cadastre provides a service to these land related functions. (Ibid., p. 366).

A number of papers by Enemark explain the Danish cadastral system in perspective of systems from other countries where the historical background was different. The association of Danish Land Surveyors participates in the Federation International de Geometre, FIG. This is a world wide organisation of professions related to surveying and land administration. Most developing countries participate in the FIG, which happens to have the head office in Copenhagen. A number of brief papers under the heading of "The Danish Way" have recently been made to convey the essence of Danish land administration to an international audience. These can be found under FIG´s web site www.FIG.net

12.2 Annex with extracts from the Danish subdivision act.

"Udstykningsloven", (The Danish subdivision Act). *Bekendtgørelse af lov om udstykning og anden registrering i matriklen*. (Announcement of law on subdivision and other registration in the cadastre). LBK nr 265 af 10/04/2000 (Gaeldende).

..,.
Section 10.

The National Survey Agency (Kort- og Matrikelstyrelsen, KMS) is the cadastral authority outside the councils of Frederiksberg and Copenhagen.
…

Section 13.
Cadastral work shall only be performed by a licensed landsurveyor. Cadastral work includes the demarcation of boundaries and preparation of the documents needed for the necessary registration of cadastral changes, including the provision of the necessary documentation for compliance with sections 18-20 and sections 25-27.

13.2.
The National Survey Agency (KMS) can request detailed information on the implementation of cadastral work from a licensed land surveyor.
…

Section 16.
Use rights over an area can not be established for more than
1) 30 years, if the area is a part of a united real property
…

Section 18.
Subdivision, registration or transfer of area can not take place if thereby a united real property will be established or a seperately located area of such property, which has no access to public road.
…

Section 20.
Subdivision, registration, transfer of area or consolidation can not take place if thereby the cadastral change or the intended land use according to the information provided will imply circumstances that violate other legislation.
…

Section 21.
The parties in a legal transaction that assumes a cadastral change … shall within 3 months …request a licensed land surveyor to apply for registration in the cadastre of the necessary cadastral change. …
…

21.3. When ekspropriation or land consolidation ruling creates rights … the respective authority shall at the soonest possible time apply for registration in the cadastre of the necessary cadastral changes.

Section 22.
If application as mentioned in section 21 is not made or if the necessary registration in the cadastre is not possible … the cadastral authority can instruct that the transaction be cancelled.

…

Section 35.

Any person who believes to have an interest in having the correct location of a property boundary ascertained can request a licensed land surveyor to convene an adjudication. … The requesting person is obliged to pay the costs of adjudication.

…

Section 38.
Legal action can not be taken concerning the location of a boundary … before an adjudication has been held in accordance with the regulations in sections 35 and 36.

12.3 Annex to chapter 9 on technology transfer

This annex contains additional background and details to the issues raised in chapter 9.

(a) Technology transfer theory

The four components of technology belong to a conceptual framework for technology transfer that grew out of a debate over appropriate technology in rural Tanzania in the 1970s. It has since been further developed in the research programme *Technology Development and Planning* at University of Aalborg, Denmark and is used in some courses to introduce students to the international aspects of their particular specialisation.

The background was a debate over appropriate technology in small-scale industries. A key issue was to what extent technological change assumes changes in the adjoining local conditions, and the temptation to *" ... ignore the socio-political implications, some would say the political economy, of technological choice."* Muller (1980, p. 13) argues that the four component concept of technology is conducive to an understanding of crucial aspects of the relationship between technological change and development in the broader society.

An additional concept is that of a "carrier of technology". Technological change is brought about by "somebody". These actors who take the lead and implement innovation are the carriers of the change process. General characteristics have been defined for these potential carriers of technology, (Lorentzen, 1988, p. 31). The GIS literature often refers to such an actor as the "champion". This concept may be relevant in discussion of who are or may be the key actors in the implementation of a major innovation and thus a pre-requisite for the sustainability of new approaches. In land registration one needs to examine closely whether private surveyors as profession may champion or act as "carrier of" innovation of land registration methods.

(b) Public and private sector

The respective roles of the private and public sector require attention because in developing countries the public sector is weak in land management. Mattingly (1996) recommends a "management approach" as an alternative to existing practices in Nepal. By this he means a strategy in which the administration concentrates on setting policy and guidelines while decentralising a range of routine tasks to be performed by the private sector. Holstein (1996b) observes that the view in many countries is that the functions of land titling and registration can only be undertaken by officials from the public sector. However, it may also be problematic to build up a large

public land administration staff. In Thailand for example the land titling staff at about 13.000 implies costs of recruitment, training and competition for staff with other government agencies. Holstein questions whether this is sustainable in the long run. Reliance on such a large public staff may also make the government agency vulnerable in times of economic recession when cut-backs may be needed but are difficult to implement.

Increased use of the private sector, appears attractive where there is a capacity problem, as it is in theory a huge pool of resources. But in many developing countries there may not be a private sector that is "ready", there may be lack of expertise and of competition and use of the private sector may not be economically attractive in the short term. Furthermore, increased use of the private sector places new requirements on the public sector as it also:

" .... involves the public sector gearing up to undertake new roles - contract management, quality control, regulatory functions, facilitation of the private sector to get involved, and that of providing access to cadastral and title records becomes more critical. Moreover, most often there is no pricing policy for the formal supply of land registration information, coupled with a lack of willingness to supply this information." (Holstein, 1996b, p. 3).

It is the key person, whether - surveyor or land manager, negotiator or facilitator, in public or private employ - who is indispensable in ensuring the smooth implementation of formalisation schemes. This key actor is the effective "carrier" of a successful formalisation process. The private sector may also take the initiative and market an appropriate service for formalisation schemes, convincing Government or other agencies to pay the costs. Where this happens the private sector innovates the mode of co-operation between the public and private sector. It remains to be seen to which extent in developing countries, the common partnership of a private surveying sector and the public cadastre can succeed in setting up formalisation approaches that catch up with the formalisation back-log and radically increase the supply of land.

"Privatisation", therefore, assumes a different meaning in developing countries. In the countries that are now rich, certain operations were historically gradually developed within the public sector and then "privatised" to a private sector that was available, ready and eager to take over these tasks. In developing countries, the possible activities for private actors, which we discussed in connection with formalisation are not yet institutionalised, neither do they as yet exist within the public sector. The private sector may not be in a position to assume these new tasks or may not be interested. The challenge is that *if* activities are going to be established to any significant extent - *then* - forms of co-operation with private sector involvement need to be introduced from the very beginning.

(c) Spatial data infrastructure

It is hard to find references, which concern GIS under Third World conditions. Most refer to rich country situations. Few consider the fundamentally different context for application of GIS technology in a poor country. Grant (2000) gives a coherent review of the whole concept of spatial data infrastructure, (SDI). He presents the basic concepts and points to the role of governments in the development of SDI and he considers the knowledge requirements. He emphasises the organisational implications of the new information technology: *"Without complimentary policy and bureaucratic structural review, the significant advantages sought by developing countries, through the use of*

spatial development planning and a national land use policy approach, will be cosmetic, achieve no real momentum and lead to frustration and disappointment. " (p. 14).

Mbumwae(1999) reviews the Zambian situation with respect to spatial data infrastructure. A big problem is lack of coordination. There is a tendency for several organisations to collect the "same" data resulting in duplication of effort. Absence of meta standards impede the sharing of data. Lack of understanding of the need for standards defining formats and quality result in poor data quality and *" ... has created lot of digital spatial data sets within institutions but without use to external users …"(pp, 4-5)*.

The linkage between block strategy and SDI can be illustrated by a pilot project in Namibia that converted existing cadastral data into a new digital cadastral database. The project revealed that government agencies each used their own geographical delimitation of the same administrative areas. *"This brings out the necessity for standard naming conventions and delimitation of boundaries of townships, and other administrative regions, across all Government Departments … (recommending that) … custodians of regional boundaries publish and widely disseminate boundary and naming conventions for all their regions." (AusAID (1996) report 26, section 5.4).*

Williams-Wynn (1999) gives an example of block strategy applied in the upgrading of the registration of Townships in KwaZulu-Natal, South Africa. The identification of Townships by the earlier administration was done in ways that deviated from the Land Survey Act and land was held under forms of leasehold that could be amended or cancelled at will. In upgrading this situation one cadastral map (General Plan) was created for an entire Township. The full extent of the outside figure was determined. The Township was then split into Units, although some Townships do not have units, in which case they were retained as a whole. An unambigous geographical delimitation of Townships and their composite Units is now established.

Helden´s(1999) article reports on the first phase of an ongoing research project. It describes the result of the overview survey of all government organisations in South Africa on national, provincial and local level. Although SA may be lagging behind the developed countries, the survey shows that government organisations in South Africa have come a long way in GIS diffusion.

(d) Knowledge requirements

The FIG has promoted the concept of Continued Professional Development (CPD). A publication devoted to CPD (FIG, 1996) exposes the various aspects in which the surveying profession need to keep pace with the rapidly changing conditions. The need to innovate and especially the need to ensure adequate professional standards is further considered in Hoogsteden (et. al., 1999).

Manisa and Maphale (1999) reviews the introduction of the new information technology in the Botswana rural administrations, the so-called *Land Boards*. The paper also gives an introduction to the tenure forms in Botswana and the set-up for rural land administration. Again, problems with spatial infrastructure have been encountered. The experience with lack of attention to the knowledge-component of the new information technology deserves special attention:

"The procurement, design and implementation of the system was left to expatriate experts, no local technical staff was trained to assist in the project as such there was no continuity when the expatriate experts left. …. (The) management of spatial information from data collection through all the stages of utilisation and decision

support, are multidisciplinary technology and requires trained personnel with various specialisations. In the land boards such personnel was lacking and nothing was put into place to bring the land board personnel to the required level." (p. 11).

For more details on Botswana see Ezigbalike and Nkwae (1999).

Barnes and Macedo(1999) considers web-based education:

"Web technology effectively redefines the geographic boundaries of the traditional education and training provider (such as a university campus), expanding it beyond city, state and national boundaries. This approach offers new options for providing education and training in a more cost-effective, cohesive and comprehensive manner. Most importantly, it facilitates greater access to the existing knowledge base." (p. 2).

This passage reflects several points important to developing countries. They have an urgent need for training and for supervision and the large distances between administrative centres and sites are a big practical problem. Perhaps the user-friendly software of new technology might also help to overcome traditional frustrations in the learning process.

(e) Implications of informal sector dominance

The informal settlement situation defines a fundamentally new land management situation and in particular, a new relationship of bargaining and co-operation between community, local government and professionals such as surveyors and engineers. The community exists prior to planning, upgrading and registration and relations with the public administration may not necessarily be peaceful. Besides, informal vested interests with mafia-style connections and methods may be powerful. This general social context impacts on the day-to-day work in land registration.

The dominance of informal sector developments challenges the conventional concept of formality. Reflections on that are delayed to a short note in section 8.6. Instead the issue is approached from the practical side.

In a report for the South African Council of Surveyors in 1994 Fourie examined the implications for the surveying industry of the transition to post-apartheid South Africa. One of the scenarios was: *"What if communities become the land surveyor's clients and ... approval of work by the community becomes the norm?"*

"Both in the policies of the various major parties and from experience on the ground it seems that all "experts" will be expected to work with the community. Often at present (and always in the past) the surveyor obtained his/her brief from an outside body and went in to do the work without checking with the people on the ground about the brief. This is set to change." (Fourie, 1994, scenario 6).

She gives a lively illustration of how practical work is then likely to proceed in the South African context: The surveyor will have to liaise between the body awarding contracts and payment and the concerned community. Planners must workshop plans and pegs with the community rather than producing them in an office outside the community. The communities may have their own trained surveyors with whom the surveyor would then have to liaise creatively. Fourie sets the case for the surveyor as a key person in the formalisation process:

"Working with communities in this way is a skill and communication art. Surveyors need to be trained in these skills … If surveyors can communicate successfully with communities and their elected representatives it will place them in a useful position by comparison to other experts and/or professionals. It will mean that the surveyor could put himself at the beginning of the process instead of at the end, as at the present. ... " (Ibid.)

Fourie and Hillermann (1995) emphasise the need for a co-ordinating and mediating professional in the chaotic and tense informal development situation. This actor is sometimes referred to as a *land manager*. His function has similarities to that of the land consolidation planner described in Section 8.2.

However, relations between in-formal communities and the local administrations may be far from peaceful or consensus-based. Violence is becoming an increasingly serious issue in South Africa. A University of Natal student (Hutchison, 1999) wrote a final year thesis on the theme. "The impact of violent crime on land surveying" in which he interviewed a number of surveyors in the Durban area to document the extent of violent crime on land surveyors. The trend towards increased violence can be seen also in other countries arising out of – among other things - general political tension, desperate poverty and a lack of land-supply capacity of the public land management system.

The South African references are interesting because they are clearly inspired by a dramatic informal development. Furthermore, South Africa has at the same time significant application of modern GIS-based information management and strong initiatives in creating spatial data infrastructure, including a unique parcel identifier. Lester (2000) reviews how the 1999 general election became an important event in driving the change to digital land information and the introduction of spatial infrastructure. The task involved the capturing of 8 million land parcels, the delimitation of voting districts and combining a number of data sets all in less than 15 months.

The technical aspects of tenure formalisation tend to focus on land-surveying technique. Many efforts have been devoted to setting up practical methods of surveying that increase speed and reduce costs. One proposal is to georeference each household with just one point, a "mid point" of the plot leaving the boundary to be defined and demarcated on basis of agreement between neighbours. Possibly plot boundaries could be surveyed at a later stage. Jackson (1995) reviews the "mid-point debate". In his final thesis Jaarsveld (2000) further develops the mid-point idea. He suggests an alternative demarcation and registration approach with single point or non-parcel based data for the formal registration of rights. Jackson (2001) develops the idea of single point reference with a possible link to an address system. The technical proposal considers also it´s requirements to knowledge and organisation. See also Lind (2001) about the Danish address system. The fundamentally fragile situation for land registration in context of informal development is considered by Welter (2000) who points out that while it is easy enough to establish formal townships, the land rights will revert to informal because transfers do not take place through the formal deeds office system. He predicts that the AIDS epidemic in KwaZulu Natal will produce deepening poverty and death sufficient to reverse present gains made by the formalisation process.

(f) The product component of land registration

Only a few references are listed here that specifically address the "product specification" aspect of land registration. The issue is often treated in terms of broad policy objectives stating that increased tenure security is desirable, that community management of natural resources be pro-

moted, that access rights for particular target groups be improved, that women's rights be secured, etc. Sometimes, "what is needed" is formulated in terms of "problems".

The whole effort in Namibia on innovating tenure forms and surveying techniques in the 1990s is reviewed in Christensen et al. 1999. This excercise set out specifically to design other forms of tenure with less knowledge requirements.

The problem with land concessions to outsiders in disregard of long established use by local communities is acute in some developing countries. Mocambique offers examples. A film on the settlement of farmers from South Africa in the province of Lichinga in the late 1990s illustrates the conflicts that such approaches cause. (See reference to "White farmers - black land").

Borges and Biai (1999) give insight into the historical background of another context where concessions were offered. They argue how the village delimitation could be used in a revised approach and how such village areas would be conveniently considered in practice as cadastral units. Goodwin (1995) applies a broad perception of land registration with awareness of the social context. He analyses the pros and cons of various tenure options for communal land in Zimbabwe and analyses the technical options in demarcation and mapping of property boundaries. Both Borges and Goodwin discuss possible applications of the modern techniques of GPS and photogrammetry.

A survey of land access and tenure security in Northern Mocambique (Land Tenure Center, 2002) found that the smallholders do not have easy access to land as commonly assumed. Although there are conflicts with large agricultural companies and private concessions (Note: as displayed in the above mentioned film), nonetheless more than half of all disputes are between smallholders locally. Land access was found to be closely linked to key wellfare indicators such as income and calorie availability; a weak non-farm economy heightens the importance of land for the wellfare of rural families. The study also reveals the problem of walking distances to fields due to fragmentation and a high incidence of land conflicts and land insecurity was found. The authors state:

"A critical finding of this research is that 83%, or over four of five rural households sampled, perceive that land conflicts are a problem within their communities. .. We suggest … (… that with such concern about tenure insecurity …) an economic and social climate that will foster crucial agricultural investments is in jeopardy." (Ibid., p.21.)

The survey indicates need for all the classical elements in land registration like adjudication, land consolidation and stable control functions. A particular project context will further delimit what possible "products" should be aimed for.

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