Can We Be Engineers of Property Rights to Natural Resources? Some Evidence of Difficulties from the Rural Areas of Zimbabwe

M.K. LUCKERT

Abstract: The desire for research to be policy relevant has caused many social science studies to have "engineering" dimensions. With respect to the engineering of property rights, economic approaches indicate that we require knowledge regarding the makeup of current property rights structures, how changes to current structures affect the use and management of natural resources, and how property rights have evolved. In the case of rural areas of Zimbabwe, research has largely disclosed complexities involved in addressing these questions, but it has not yet provided sufficient information needed to pursue property rights engineering objectives. The difference between what we know and what we need to know provides the basis for a research agenda that will require some significant changes in the way that property rights are described and analyzed.

1. INTRODUCTION

Although we frequently fail to recognize it, a number of development projects have dimensions that may be characterized as the engineering of social structures. By engineering, I mean the intent to change elements of social institutions, such as property rights and organizations, presumably to increase the welfare of people. The focus of this paper is on the potential to engineer property rights to natural resource in order to improve livelihoods, and this focus will be pursued from an economic perspective, following the expertise of the author.[1]

Property rights have been defined in numerous ways by many disciplines. Indeed, we even find numerous definitions of property rights within the economics literature.[2] However, common to most economic definitions of property rights is the existence of a valuable good or service within the context of social conditions. These social conditions may include many different levels of rules, from federal legislation to local norms and customs. The rules may apply to individuals, households, villages, or even larger groups of people.[3] Furthermore, when applied to natural resources, we find that such complex sets of social conditions frequently vary across landscapes and types of natural resources.[4]

Martin "Marty" Luckert is a Professor of Forest and Natural Resources, Economics and Policy in the Department of Rural Economy, University of Alberta. A major thrust of his work has involved investigating how property rights to natural resources influence incentives of natural resource managers and the pursuit of policy objectives. Much of his earlier work was done in the context of Canadian Forest tenures, but over the past 10 years he has become increasingly involved in analyses in developing countries.

http://www.africa.ufl.edu/asq/v5/v5i3a5.pdf

ISSN: 2152-2448

To economists, these numerous types of social conditions represent complex incentive frameworks that influence the behavior of property rights holder and thereby influence the values that are derived from natural resources.[5] For example, practitioners frequently talk of changing rules within property right structures to enhance livelihood and/or to better facilitate the sustainable use of natural resources.[6] It is reasoned that if we change the incentives created by property rights, the resulting management behavior of local people will also change. Indeed, we seek "design principals" for structuring successful common property frameworks for natural resources management, much as a mechanical engineer would seek to obey physical laws for the construction of a bridge.[7] All of these objectives may involve significant changes to existing property rights structures, meaning that we are, in affect, aspiring to be engineers of property rights systems.

This desire to be engineers of property rights is quite understandable. We would like our research to be relevant to real problems, and we would therefore like to influence policy for beneficial change. However, counteracting this desire to be policy-relevant have been some ideas arising out of post-modernism that question whether we should attempt to engineer social systems. Post-modernism recognizes that those outside of the systems in question have largely attempted social analysis and engineering in developing countries, thereby decreasing their effectiveness. As such, there is an element of imperialism that has pervaded much research and subsequent recommendations.[8] Given this situation, a second argument emerges --that we simply do not know enough to be engineers of social systems.

The purpose of this paper is to consider this second argument by posing questions about what we need to know versus what we know for pursuing our engineering goals with regards to property rights in Zimbabwe. This paper will not consider the question of whether we should be engineers of property rights, even if we are capable of such. For the purposes of this paper, it will be assumed that there is sufficient demand for the engineering of property rights, from donor agencies at least, to warrant considering the second question. Furthermore, the literature cited below reveals that in Zimbabwe, local nationals, sometimes working with outside partners, are meeting much of this demand for research necessary to inform property right engineering attempts.[9] As such, fears of outside values dictating our knowledge base in Zimbabwe are hopefully minimal.

In this paper, three economic policy perspectives (none of which are mutually exclusive) on the need for the engineering of property rights will be presented. For each perspective, I will consider what we need to know with respect to property rights, in order to implement the ideas that each approach purports. I will then seek to generalize about what we know and do not know relative to what we need to know. Based on the gap that exists between our knowledge and our needs, conclusions are presented that discuss challenges to be faced with further research.

2. ECONOMIC POLICY PERSPECTIVES

The three economic policy perspectives presented below may be thought of as lying on a continuum. At one end, there is a "laissez faire" approach that calls for little, if any, property rights engineering. Economic processes, it is argued, will generally lead us toward improved

social welfare without the need for central planning. A corollary of this idea is that property rights to natural resources may evolve according to processes that improve their structures over time. At the other end of the spectrum, there is the belief that economic processes need some direction, calling for elements of property rights engineering. In such a case, it is thought that property rights may need to be adjusted because they will not evolve optimally on their own. Although it is useful to depict such a spectrum for comparing and contrasting ideas, it should be noted that few economists would likely characterize themselves as being at either endpoint. Accordingly, a merged perspective is presented that borrows from aspects of each extreme.

2.1. Perspective 1: Property Rights Engineering and Rational Firms

Economic perspectives on property rights engineering are based on the concept of rational firms. This concept recognizes that individuals, households, or larger groups make decisions for good reasons. These alternative decision-making bodies are referred to as firms, while rationality refers to consistency in making decisions towards desired objectives. Despite the potential for many different types of firms, for the sake of simplicity, the remainder of the paper will refer to households as the decision-making unit under consideration.[10]

Following this perspective, the actions of rational households are thought to be influenced by incentives that make up their decision-making environment. These incentives may be influenced by alternative structures of property rights.[11] For example, in Zimbabwe, it is hypothesized that conflicts between state and local rules have created incentives for local peoples to degrade woodland resources.[12]

The logic that falls out of linking property rights and rational households is straightforward. Property rights may influence the decisions and subsequent actions of households thereby influencing their livelihoods. Therefore, if we change the property rights we can change the behavior of households, and potentially stimulate sustainable resource use. In order to do this, we need to know two basic types of information: what is the structure of existing property rights, and how would changing the property rights change the behavior of rational households? Note that these two questions are implicitly connected in that it will be necessary to describe property rights in a way that enables us to link them to behavior.

2.2. Perspective 2: The Chicago School

The term "Chicago School" arises from several eminent scholars, many of whom are Nobel prize winners, that have emerged from the University of Chicago. In contrast to the property right engineering perspective, the Chicago School has pointed out that there may not be a need for engineering of property rights. In short, it is argued that market forces and transactions between rational households may cause property rights to evolve and fix potential problems.[13] For example, it may be argued that exclusive rights to communal woodlands in Zimbabwe will evolve when the values of the woodlands are great enough to support the costs of defining and enforcing the rights.[14]

If conditions are such that market transactions may fix problems, then it follows that there is no need for property rights engineering. Accordingly, if the Chicago School of thought is

followed, there is very little that must be known. Things will sort themselves out if you leave them alone. Despite this optimism, there are realizations, some within the Chicago School itself, that some situations may preclude the optimal evolution of property rights. Accordingly, this school of thought has spawned others to investigate more closely why and how property rights evolve.[15]

Although there are elements in the Chicago School thinking that suggest that markets do not always sort things out correctly, the question is frequently posed: even if markets do fail, do property right engineers (i.e. governments or other institutions) fail worse?[16] This line of thinking questions the property right engineering perspective that assumes that we can identify problems and change them with policies that change property rights. Proponents of these ideas frequently present examples that show how government policies may have been actually more harmful than the problem they were seeking to fix in the first place.

2.3. Perspective 3: Merged Perspectives

There is quite a bit of common ground between the two perspectives presented above. Both use rational as a concept and recognize property rights as being a crucial force in influencing rational behavior. The key difference lies in to what degree one believes that market forces can fix things, and whether property rights engineers or market forces are in a better position to fix problems. For example, in Zimbabwe, will local rules evolve to facilitate better management of woodland resources as they become increasingly scarce, or will governments (or NGOs) need to fix the problem through new property rights policies, despite historic conflicts between local and higher level rules that have been created through such efforts?

In combining these ideas into a merged perspective, we end up with a respect for the status quo and the underlying logic that has caused things to evolve to their present state, while recognizing that the present state may, nonetheless, be the product of flawed evolutionary processes. In the case of Zimbabwe, we recognize the complex hierarchies of local and state rules that have evolved over time, yet recognize that conflicts between state and local laws could undermine local resource use.[17] Following this line of thinking requires knowledge of the current state of property rights and how they influence behavior (perspective 1), plus information on how and why property rights evolve (perspective 2).

It follows from the above discussion that from an economic perspective, in order to be property rights engineers, we must know the current structures of property rights and how changes to these would affect behavior as well as how property rights evolve. In the following sections, each of these points is considered in turn in the context of rural areas of Zimbabwe.

3. CURRENT STRUCTURES OF PROPERTY RIGHTS IN RURAL ZIMBABWE

A number of village level case studies in Zimbabwe have shown that property rights to natural resources in rural areas come in many complex forms.[18] Similar to findings in other jurisdictions, several recognitions regarding the complexity of property rights have emerged.

First, property rights do not necessarily follow land boundary, but may be associated with specific resources or resource users. Accordingly, different types of resources and potential

users within one designated area may have different associated property rights.[19] Second, there are complex hierarchies of property rights. At the national level, Zimbabwe may be described as having three different kinds of property rights: state land, communal land, and commercial land.[20] However, in addition to the national level regulations that define such areas, there are also, regional and village level rules that govern the use of natural resources. Furthermore, at yet a more local level, there are customs, norms and courtesies between households that influence the use of natural resources.[21]

Given this complexity, there are a number of things that we do not know about existing property rights. To begin with, we have not described property rights in systematic ways that will enable us to compare and contrast important features of various property rights structures.[22] Descriptions of property rights, frequently conducted at the village level, have used a great variety of methods and concepts that make comparisons difficult. Furthermore, despite the fact that we know that village level rules exist, we do not know if household perceptions of these rules vary. Accordingly, although we may have some information about the de jure rules, there is little known about the de facto understanding of these rules by households who are using the resources. These observations apply to descriptions that have been made at the village level, without considering complex property rights conditions that exist above and below this level. Although we have a fair understanding of the legislative framework governing establishing property rights to natural resources above the village level, we know little of what is happening below this level.[23] That is, we have very little information on the extent and importance of inter-household rules, norms, and courtesies.

In trying to isolate out and link the effects of property rights to the behavior of households, it is not only necessary to understand property rights and resulting behavior, but also to have a grasp of what else is motivating household behavior.

3.1. Effects of Property Rights on Household Behavior

As discussed above, theory suggests that there is different behavior associated with different combinations of property rights. Empirical studies relating types of property rights to observed economic behavior in terms of management performance are scarce in Zimbabwe and in other jurisdictions. In Zimbabwe, to this writer's knowledge, there is only one such study where local norms are empirically related to fuelwood collection behavior.[24]

What we do not know much about, in Zimbabwe or elsewhere, is how individual characteristics of property rights, as part of complex property right packages, influence behavior. Very few have been able to empirically link specific characteristics of property rights to economic behavior.[25] With empirical work concentrating on significant differences in performance between complete packages of property rights, explanations as to why these results differ between property rights types have been largely conjectural with little or no empirical evidence. Problems arise because it is not clear how complex incentives created by property rights are influencing behavior or performance. Without information on the effects of specific attributes of property rights, policy has received little direction with respect to how property rights can be incrementally changed to alter management incentives. Furthermore, while we may have theories regarding individual characteristics of property rights, there has

been little progress made toward developing theories to explain behavior in the simultaneous presence of several inter-related property rights characteristics.

3.2. Other Factors Influencing Household Behavior other than Property Rights

With respect to behavioral aspects aside from property rights, we have substantial theory and empirical evidence that suggests that households, in general, do things for very good reasons. Indeed, a good portion of all empirical work published in microeconomics is based on this proposition. We also know that these reasons transcend effects of property rights to considerations of costs and returns to households, risks associated with alternative choices, and how costs and benefits are valued in different time periods (i.e. time preference).

Unfortunately, in the context of Zimbabwe, and frequently for developing countries in general, we know very little about what the costs and benefits to various household activities are. In Zimbabwe, there have been a number of economic studies investigating these types of values in the context of household behavior with respect to individual types of activities. For example, Hegan (2000) and Hatton MacDonald et al. (2001) have investigated fuelwood collection behavior, while Kuhndlande (2000) has looked at the selling behavior of livestock owners. In addition, Dzuda (2001) and Moyo (2001) have analyzed adoption behavior of water conservation and smallholder dairy activities, respectively. There have also been a few studies that have attempted to assess the behavior of households among multiple types of household activities.[26] With respect to risk and time preferences, there are only two studies that have been conducted. Hedden-Dunkhorst (1997) has conducted the only study on risks of small-holder farmers in Zimbabwe, with data derived from 4 villages.[27] Kundhlande (2000) has conducted the only study with respect to time preference of rural households in Zimbabwe.

Although the above studies have provided valuable insights into household behavior, we are a long way from a very complete understanding of why households do what they do in the rural areas of Zimbabwe. Therefore, we are not yet in a position to be able to say much about how property rights changes would influence household decisions and livelihoods.

3.3. Evolution of Property Rights in Zimbabwe

There have been a number of studies on the evolution of property rights in Zimbabwe. For example, at the more macro level, Moyo et al. (1991) describes how resettlement areas evolved within communal areas, while Bruce et al. (1993) explained how conflicts between "modern" and "traditional" property rights have influenced property rights transitions. Others have focused more specifically on the types of property rights structures that are being adopted locally within these areas.[28]

The studies cited above have been largely based on sociological approaches. Therefore, although there is significant knowledge about how and why property rights have evolved using sociological concepts, to the best of this writer's knowledge, there is only one study that has tested economic concepts on the theory of property rights evolution in Zimbabwe. In modeling property rights as endogenous considerations, Kundhlande (2000) has shown that there may be

current trends away from communal land rights to more individualized rights as economic firms respond to changes in technology and endowments.

Despite these studies, we have little information about whether economic processes of property right evolution, identified in other locations, are applicable to Zimbabwe. We also have little information on whether the evolution of property rights has lead to changes that improve or decrease the welfare of local peoples. Finally, given the complex processes and structures of existing property rights, we have little idea of how to introduce new property rights structures, or processes of change, within the complex existing situation.

4. CONCLUSION: CHALLENGES FACING RESEARCHERS

From the above discussions, we are left with an alarming situation: what we do know is little, and what we do not know is scary. In short, this writer does not believe that we are ready to be property rights engineers or even if we should be. Nonetheless, we are in a situation where we are forced, to some extent, to be property rights engineers by our desires (and those of our funding agencies) to implement beneficial change.

So, what do we do? First, it may help us to recognize that there are varying degrees associated with engineering property rights. At one extreme, we may wish to be able to go in and design property rights, while at the other extreme, we may simply wish to understand more about the property rights system. Somewhere in the middle of these two extremes, we may wish to pass along information to those who are active in the process of property rights evolution. It is hoped that this discussion has helped to define more clearly where we should perhaps be currently working. Given the complicated context within which we are working, this writer believes we are still at the end of the spectrum where we are just seeking to learn more about current systems, and perhaps position ourselves to pass some of this information along to those taking part in property rights evolutionary processes.

With regards to characterizing current structures of property rights, new ways of conceptualizing the complexities of property rights are needed that can systematically describe property rights for comparative purposes and provide a basis for linking property rights to behavior. This may involve going beyond labels such as "common property" to looking closer at key characteristics of property rights. Kundhlande and Luckert (1998) have started on this task by describing village level rules within a system of characteristics that are theorized to affect household behavior. Further challenges include examining these characteristics to see if they are sufficiently robust to capture the complexities above and below the village level. Also, while these characteristics have been designed for the purpose of linking property rights to behavior, they are not likely to serve well for investigating the evolution of property rights. New systems of property right characterization will be needed for varying research objectives.

By acknowledging the complexity of property rights, identifying empirical relationships between property rights and behavior becomes more difficult. A greater number of potential explanatory variables, in the midst of numerous necessary ecological and non-property rights socio-economic controls, can make it difficult to isolate cause and effect relationships. Solutions to such problems will likely come from searching for case studies where the majority of property right variables are held constant, such as within a given village, while variations in

individual property right characteristics may exist between households or individuals. For example, perceptions of household members regarding village level rules could vary resulting in varying behavior. Furthermore, this writer believes it is time to complement the plethora of case studies that have been undertaken in Zimbabwe with some cross-sectional studies, carefully chosen to find variation in key property rights characteristics. Not only would this allow us to link property rights to behavior better, but it would also give us insights into how representative our case studies are, and whether there are underlying processes that fit current theory, or may comprise new theory. Much of our current thinking seems to be dominated by n=1 or 2, case study empiricism. Cross-sectional studies could be used to test some of our current thinking.

To support our empirical efforts, we will require further refinements in theory. In the absence of theory, empirical research frequently resorts to the "hunt for correlation" which will inevitably be found if the data set is large enough, and the researcher is persistent enough. Further developments in theory may seek to combine the theory that has already been developed regarding individual property rights characteristics, into more complex incentive frameworks that reflect the reality of property rights in Zimbabwe. Using simulations to predict behavior appears to be a potentially promising approach to addressing such complexity.[29]

With respect to the evolution of property rights, we will have to conduct more studies on how property rights have evolved and attempt to relate these changes to subsequent effects on rural livelihoods. As was the situation with studies on existing property rights structures, a combination of case studies and cross-sectional studies would aid in identifying underlying evolutionary processes, which could then be compared to existing theory or used to derive an alternative theory. In analyzing the effectiveness of evolutionary processes, criteria will have to be explicitly and carefully chosen to assess whether evolutionary change has been beneficial. These efforts will be plagued by difficulties in isolating the impacts of property rights on changes in welfare, as other confounding factors, such as dynamics in weather patterns and populations, may be responsible for livelihood changes. In short, it is going to be difficult to determine whether the presence or absence of changes in property rights has lead to increased welfare.

In sum, the amount that we do not know bodes poorly for current property rights engineering efforts. However, it provides good direction for future research. In order to sustain these research efforts, it will be essential that we acknowledge the challenges that still need to be met and not over-promise what we can deliver. At the same time we will have to demonstrate steady progress in our ability to meet our property rights engineering objectives. Such progress will likely come from harnessing the expertise of local and international people as we try through trial and error and reassessment to improve our understanding of such complex systems.

Notes

1. We also talk of strengthening or creating organizations to accommodate such processes of change, and of empowering disadvantaged groups. Considerations regarding whether we are in a position to engineer such social systems are beyond the scope of this

paper. The disciplinary perspective and experience of the author will necessarily limit the content of this paper. Nonetheless, this paper relies heavily on political science, sociological, and anthropological studies. It is hoped that others better versed in these and other disciplines will also contribute to the following characterizations of our knowledge base and needs.

2. Dales 1968, Furubotn and Pejovich 1972, Dahlman 1980, Bromley 1991, Norton and Alwang 1993.
3. Bromley 1989, McKean 2000, Bruce and Fortmann 1988.
4. There are a number of approaches that have been developed to attempt to categorize these many types of complex social conditions into different typologies of property rights. For a review of some of these approaches see Ostrom 2000.
5. For a more comprehensive discussion on economic definitions and behavioral concepts of property rights see Haley and Luckert 1990.
6. Gibson et al. 2000.
7. Ostrom 1992, 1999.
8. Featherstone et al. 1995.
9. This author counts himself as an outsider who has been fortunate enough to have had the experience of working with several of the Zimbabwe authors listed in the references.
10. Note that, following the introductory information provided above, the choice of the type of firm will influence which sets of social conditions are relevant. Therefore, the property rights conditions that are functioning are dependent on which unit of analysis of a firm is chosen.
11. In the economics literature, this approach has historically been referred to as the "property rights approach" to economics (Furubotn and Pejovich 1972).
12. Sithole 1999.
13. Examples of key works that reflect this school of thought include Coase 1960, Alchian and Demsetz 1973.
14. Kundhlande 2000.
15. Scott 1983, North 1990, Sethi and Somanathan 1996, Balland and Platteau 1998.
16. Wolf 1988.
17. Campbell et al. 2001.
18. Bruce et al. 1993, Kundhlande and Luckert 1998, Mandondo 1997, Nhira and Fortmann 1993, Sithole 1997, Clarke 1994.
19. Murphree 1993, Bruce and Fortmann 1988, Kundhlande and Luckert 1998, Sithole 1997.
20. Moyo et al. 1991.
21. Mandando 1997.
22. Kundhlande and Luckert 1998.
23. Mandando 1998.
24. Hegan 2000. In other regions some examples are found in agriculture in a developing country context (e.g. Feder and Onchan 1987) and in forestry in a developed country context (e.g. Zhang 1996). We also have a fair bit of theory and conjecture about how individual characteristics of property rights affect behavior ceteris paribus. Haley and

Luckert (1990) provide a literature review of how a number of property right characteristics, considered individually, may influence economic behavior.

25. A notable exception to this trend of investigating impacts of discrete types of property rights are studies by Place (1995) that has begun to isolate out effects of individual characteristics in a cross-sectional case study of agroforestry management practices in several African countries. Futhermore, in a survey of two villages in Malawi, Hansen (1997) was able to link differences in the transferability of property rights, as influenced by inheritance and marriage patterns, to differences in tree planting behavior among men and women.
26. Mutamba 1999, Luckert et al. 2000, Cavendish 1997.
27. Further investigations into risk preferences and household decisions are underway by Chris Zindi, Department of Rural Economy, University of Alberta.
28. Sithole and Bradley 1995, Mangono 1994, Sithole 1999, Nemarundwe 2000.
29. For example, Luckert (1998) has developed theoretical models based on Monte Carlo simulations to explore the incentives for forest management performance in Canada provided by several characteristics of property rights, simultaneously.

References

Alchian, A. A. and Demsetz, Harold. "The Property Rights Paradigm." Journal of Economic History 3, no.1 (1973):16-27.

Baland, J.M. and J.P. Platteau. "Division of the Commons: A Partial Assessment of the New Institutional Economics of Land Rights" American Journal of Agriculture Economics 80 (1998): 644-650.

Bromley, D. W. "Testing for Common versus Private Property: Comment." Journal of Environmental Economics and Management 21 (1991): 92-96.

Bromley, D.W. Economic Interests and Institutions. Oxford: Blackwell, 1989.

Bruce, J. W. and L. Fortmann. Whose Trees? Proprietary Dimensions of Agroforestry. Colorado: Westview Press, 1988.

Bruce, J., L. Fortman, and C. Nhira. "Tenures in Transition, Tenures in Conflict: Examples from the Zimbabwe Social Forest." Rural Sociology 58 (1993): 626-642.

Campbell, B.M., de Jong, W., Luckert, M., Mandondo, A., Matose, F., Nemarundwe, N. and Sithole, B. "Challenges to Proponents of CPR systems: Despairing Voices from the Social Forests of Zimbabwe." World Development 29, no.4 (2001): 589-600.

Cavendish, W. The Economics of Natural Resource Utilisation by Communal Area Farmers of Zimbabwe. Ph.D. thesis, University of Oxford, 1997.

Cheung, S. "The Structure of a Contract and the Theory of a Non-Exclusive Resource." Journal of Law and Economics 13, no.1 (1970): 49-70.

Clarke, J. "Building on Indigenous Natural Resource Management: Forestry Practices in Zimbabwe's Communal Lands." Forestry Commission, Harare, Zimbabwe, 1994.

Coase, R. "The Problem of Social Cost." Journal of Law and Economics 3 (1960): 1-44.

Dahlman, C. The Open Field System and Beyond: A Property Rights Analysis of an Economic Institution. Cambridge University Press, 1980.

Dales J.H. Pollution Property and Prices. University of Toronto, 1968.

Dzuda. L. Adoption of Soil and Water Conservation Techniques in Zimbabwe: A Duration Analysis. M.Sc. Thesis. Department of Rural Economy, University of Alberta, 2001.

Gibson. C., M. McKean, and E. Ostrum, eds. People and Forests: Communities, Institutions and Governance. Cambridge, Massachusetts: MIT Press, 2000.

Featherstone, M., S. Lash and R. Robertson, eds. Global Modernities. London: Sage Publications, 1995.

Feder, G. and T. Onchan. "Land Ownership Security and Farm Investment in Thailand." American Journal of Agricultural Economics 69 (1987): 311-20.

Furubotn, E. and S. Pejovich. "Property Rights and Economic Theory: A Survey of Recent Literature." Journal of Economic Literature 10 (1972): 1137-1162.

Haley, D. and M. K. Luckert. Forest Tenures in Canada: A Framework for Policy Analysis. Ottawa: Forestry Canada, 1990.

Hansen, Jamie. Tree Planting under Customary Land and Tree Tenure Systems in Malawi: An Investigation into the Importance of Marriage and Inheritance Patterns. MSc. Thesis. Department of Rural Economy, University of Alberta, 1997.

Hatton MacDonald, D. Adamowicz, W.L. and M.K. Luckert. "Fuelwood Collection in Northeastern Zimbabwe: Valuation and Caloric Expenditures." Journal of Forest Economics 7, no.1 (2000): 29-52.

Hedden-Dunkhorst, B. "Estimating Smallholder's Risk Aversion: A Method to Improve Impact-Analyses of Potential Innovations, An Example from Zimbabwe's Semi-Arid Areas," in Franz Heidhues and Andrea Fadani, eds. Food Security and Innovations: Success and Lessons Learned. Frankfurt: Peter Lang Verlag, 1997.

Hegan. R.L. Is the Tragedy of the Commons Possible? Investigating Factors that Influence Common Pool Fuelwood Rents in Zimbabwe. M.Sc. Thesis. Department of Rural Economy, University of Alberta, 2000.

Kundhlande, G. and M.K. Luckert. "Towards an Analytical Framework for Assessing Property Rights to Natural Resources: A Case Study in the Communal Areas of Zimbabwe." Department of Rural Economy, Staff Paper, May 1998.

Kundhlande. G. Economic Behavior of Developing Country Farm-Households: Measures of Rates of Time Preference, the Use of Cattle as Buffer Stocks, and the Endogenous Evolution of Land Rights. Ph.D. Thesis. Department of Rural Economy. University of Alberta, 2000.

Luckert, M.K. "Efficiency Implications of Silvicultural Expenditures From Separating Ownership and Management on Forest Lands". Forest Science 44, no.3 (1998):365-378.

Luckert, M.K., Wilson, J., Adamowicz, V. and A.B. Cunningham. "Household Resource Allocations in Response to Risks and Returns in a Communal Area of Western Zimbabwe." Ecological Economics 33 (2000): 383-394.

Mandando, A. "Institutional Framework for Community Natural Resource Management in Zimbabwe." Harare: WWF Southern Africa Regional Programme Office, 1998.

Mandondo, A. "Trees and Spaces as Emotion and Norm-Laden Components of Local Ecosystems in Nyamaropa Communal Land, Nyanga District, Zimbabwe." Agriculture and Human Values 14 (1997): 353-372

Mangono, J.J. "Towards a National Biomass Energy Strategy for Zimbabwe: Some Suggestions for a National Policy." Report by the Department of Energy Resources and Development and the Ministry of Transport and Energy, Harare, Zimbabwe, 1994.

McKean. "Common Property: What is it, What is it good for, and What Makes it Work?" in Gibson. C., M. McKean, and E. Ostrum, eds. People and Forests: Communities, Institutions and Governance. Cambridge, Massachusetts: MIT Press, 2000.

Moyo, S. Discrete Choice Analysis of the Feed Technology Decisions of Smallholder Dairy Farmers in Zimbabwe. M.Sc. Thesis. Department of Rural Economy, University of Alberta, 2001.

Moyo, S., P. Robinson, Y. Katerere, S. Stevenson and D. Gumbo. Zimbabwe's Environmental Dilemma: Balancing Resource Inequities. Harare: ZERO, 1991.

Murphree, M.W. "Communities as Resource Management Institutions." International Institute for Environment and Development, London, 1993.

Mutamba. M. Household Resource Allocation in Agriculture Woodland Use in Chivi District: Impact of Agricultural Commodity Prices on Woodland Resource Utilization in Zimbabwe's Communal Areas. M.Sc. Thesis, Department of Agricultural Economics and Extension, University of Zimbabwe, 1999.

Nemarundwe, N. "Boundaries in Woodland Use," 2000 (forthcoming).

Nhira, C. and L. Fortmann. "Local Control and Management of Forests and Environmental Resources in Zimbabwe: Institutional Capacity." Background paper for the Zimbabwe Forest Sector Review. Washington, D.C. World Bank Technical Paper 210 (1993): 139-155.

North, D.C. Institutions, Institutional Change and Economic Performance. Cambridge University Press, 1990.

Norton, G.W. and J. Alwang. Introduction to Economics of Agricultural Development. New York: McGraw Hill, 1993.

Ostrom, E. "The Rudiments of a Theory of the Origins, Survival and Performance of Common Property Institutions," in Bromley, D., ed. Making the Commons Work. San Francisco: International Center for Self Governance, 1992.

Ostrom, E. 1999. "Self Governance and Forest Resources." CIFOR Occasional Paper 20 (1999). Bogor: Center for International Forestry Research.

Ostrum. E. Private and Common Property Rights. 2000 [online] http://www.indiana.edu/~iascp/general.html.

Place, F. "The Role of Land and Tree Tenure on the Adoption of Agroforestry Technologies in Zambia, Burundi, Uganda, and Malawi: A Summary and Synthesis." Land Tenure Center. University of Wisconsin-Madison, 1995.

Scott, A. D. "Property Rights and Property Wrongs." Canadian Journal of Economics. 16, no.4 (1983): 555-73.

Sethi R. and E. Somanathan. "The Evolution of Social Norms in Common Property Resource Use." The American Economic Review 86 (1996): 766-788.

Sithole, B. Access to and Use of Dambos in Communal Areas of Zimbabwe: Institutional Considerations. PhD Thesis, Centre for Applied Social Sciences, University of Zimbabwe, 1999.

Sithole, B. "The Institutional Framework for the Management and Use of Natural Resources in Communal Areas of Zimbabwe: Village Cases of Access to and Use of Dambos from Mutoko and Chiduku." Field Report to IDRC, CASS, University of Zimbabwe, 1997.

Sithole, B. and P. N. Bradley. Institutional Conflicts over the Management of Communal Resources in Zimbabwe. Stockholm: Stockholm Environmental Institute, 1995.

Wolf, C., Jr. Markets or Governments: Choosing between Imperfect Alternatives. Cambridge: MIT Press, 1988.

Zhang. D. "Forest Tenures and Land Value in British Columbia." Journal of Forest Economics 2, no.1 (1996): 7-30.

Reference Style: The following is the suggested format for referencing this article:
Luckert, M.K. "Can We Be Engineers of Property Rights to Natural Resources? Some Evidence of Difficulties from the Rural Areas of Zimbabwe." African Studies Quarterly 5, no.3: [online] URL: http://web.africa.ufl.edu/asq/v5/v5i3a5.htm