

**Natural Resource Use in a Forest-Adjacent Village in Western Uganda:
Attitudes, Behaviors and the Links in Between**

by

Cristy A. Watkins

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
(Natural Resources and Environment)
in The University of Michigan
2009

Doctoral Committee:

Professor Bobbi S. Low
Professor Howard Stein
Associate Professor Arun Agrawal
Assistant Professor Rebecca D. Hardin

© Cristy Ann Watkins 2009

Dedication

For Celestino and Helen

Acknowledgments

I would like to acknowledge several people who have helped me pursue, stick with and complete this dissertation: To my mom and dad, whose advice has been constant and true: Do what makes you happy. To my sister, for being a role model in perseverance, persistence and honesty. To my committee chair, Bobbi Low, for mentoring and support extending above and beyond, and bordering on therapeutic. I am but one of many students who is incredibly lucky to have you! To my doctoral committee, Howard Stein, Rebecca Hardin and Arun Agrawal, for their genuine guidance, inspiring minds and willingness to engage in interdisciplinary discussion. To the current and past members of Bobbi Lab who have provided both academic support and academic relief! To Joseph Karamagi, my friend, my field assistant, my first and foremost link to Uganda. I am so grateful for your companionship, input, and dedication to this research. To my friends- now family- and colleagues in Uganda, and especially in Kibwona village, who have allowed me into their lives and as result changed mine. Thank you.

Preface

Attitudinal surveys are a common tool used in natural resource management, but their value rests on the assumption that attitudes predict behavior. The premise is simple: *if* attitudes predict behaviors, what behaviors can we predict when people express (or fail to express) concern for something? My work compares resource users' attitudes towards their local forest and resource availability with their actual use of natural resources in a forest-adjacent village in Masindi District, Western Uganda. Kibwona village is adjacent to Kasokwa Forest, comprised of a small Central Reserve owned by the National Forest Authority (NFA) and several contiguous community forests. Firewood, water and non-timber forest product (reeds, mushrooms, etc.) collection is legal and locals report using them.

In this case, the relationship between attitudes and behaviors is quite the opposite than what is conventionally assumed: attitudes and behaviors are in fact influenced by a complex array of factors. Further, these factors, whether demographic, socio-cultural, ecological, political, or institutional, and the pattern of influence they exhibit, are distinct for attitudes and behaviors. Although linked by a central research question, the chapters of this dissertation are written as independent articles, each embedded with their corresponding tables, figures, and bibliographies.

Chapter 1 introduces the multiple disciplines and theoretical perspectives in which my study is rooted. Chapter 2 provides a review of forest governance in Uganda, highlighting the transitions from pre-colonial systems, to colonial “decentralization,” to independence-era centralization, and back to “modern” decentralization. Much of this chapter will be placed within a broader discussion of the impact of structural adjustment and decentralization policies on natural resource management in Uganda, in a manuscript coauthored with fellow SNRE colleague, Ted Lawrence, and will be submitted to *Environment and Economic Development*.

Chapter 3 describes resource users' stated attitudes and knowledge concerning natural resources, both in and out of the forest. I predict and discuss the factors, categorized as demography-based, knowledge-based, and utility-based, that correlate with these attitudes and suggest that, despite a number of methodological and psychological limitations, attitudinal studies *can* benefit community based natural resource management programs at locale-specific levels, by endorsing community support and perceptions of resource importance. At the same time, I suggest that while attitudes are important, they may not predict actual resource use, and foreshadow the forthcoming chapter on actual resource use behavior.

Chapter 4, accepted for publication in the journal of *Human Ecology*, describes the actual resource use behaviors of women, the primary resource collectors, in Kibwona. I explain how what superficially appears to be a sustainable scenario is in fact quite unstable. Empirical observations of women's daily activity budgets and details of resource acquisition, storage, and consumption show that actual resource

collection, however, is minimal. On average, women spent less than 5% of the time collecting natural resources. This is true for resources both in and out of the forest. This may be simply because firewood within household compounds, gardens and woodland-bush areas is abundant, accessible, and closer than the (also close) forest. However, two additional reasons for this behavior that initially appear to support forest protection may, in fact, hinder long-term sustainability: (1) Many locals also plant trees for firewood, poles, and timber. Although eucalyptus (an increasingly desired tree to plant) is fast growing and makes good firewood, it is water-draining and hard on the soils- a high cost to subsistence farmers. (2) Fears of harassment by the NFA officials upon collecting firewood inhibit locals from even entering the forest. Management strategies must address the fact that people are afraid of NFA. Decentralized, collaborative forest management will not happen under such oppressive and fear-based relationships, nor can a sustainable firewood supply be based on eucalyptus.

Chapter 5, to be submitted to *Society and Natural Resources*, explores the weak correlation between attitudes and behaviors and argues that, independent of each other, attitudes and behaviors are influenced by a third set of variables, oft-unconsidered by behaviorist approaches, towards resource use: governance patterns and information sources. I compare resource users' attitudes towards their local forest (as described in chapter 3) and resource availability with their actual use of natural resources (as described in chapter 4). I found that a perceived importance of and need for the forest does not correlate with people's use of the forest; most respondents expressed extreme concern for the forest, yet most did *not* use the forest for resources. While there are several demographic correlations with expressed attitudes, there are very few correlations, demographic as well as attitudinal, with actual behavior. I explain this set of findings in light of (1) Uganda's historical governance transitions and its resulting instability, inefficiency and unreliability, and (2) the sometimes contradicting influence of natural resource management information via community-based organizations and other conservation institutions. My doctoral work calls for a recognition of institutions as a fundamental influence on the formation of and relationship between attitudes and behavior, particularly in areas where people are directly dependent on local resources on a daily basis.

Table of Contents

Dedication	ii
Acknowledgements	iii
Preface	iv
List of Tables	vii
List of Figures	viii
List of Appendices	ix
Chapter	
1. Introduction to research problem and theoretical perspectives	1
2. History of forest governance in Bunyoro region, Uganda	14
3. Can demography, knowledge, and proximity correlates to attitudes contribute to community-based resource management?	41
4. Natural resource use strategies in a forest-adjacent Ugandan village	66
5. Why care about natural resources you don't use? How institutions influence attitudes and behavior	96
Appendices	134

List of Tables

Chapter 2	
2.1 Structural adjustment components	31
2.2 Approximate area (ha) of (a) land cover types and (b) management of tree-covered area	32
Chapter 3	
3.1 Excerpt of interview questions excerpt	56
3.2 Factor analysis of attitude measures	57
3.3 Population descriptive statistics	58
3.4 Stated rules of the forest	59
3.5 Attitude-attitude correlation	60
3.6 Attitude-rules correlation	61
Chapter 4	
4.1 Self-reported behaviors	84
4.2 Firewood sources observed in households	85
4.3 Observed forest entry	86
Chapter 5	
5.1 Stated rules of the forest	126

List of Figures

Chapter 2	
2.1 Map of Masindi District, Uganda	33
2.2 Southern region of Budongo Forest: Kasokwa Central Forest Reserve and Kibwona Village	34
2.3 Map of Bunyoro Kingdom	35
2.4 Rapid vacillation of forest management policies between 1993-2003, from Banana et al 2007	36
Chapter 3	
3.1 Map of Kasokwa Central Forest Reserve, community forests and surrounding villages	62
Chapter 4	
4.1 Map of Kasokwa Central Forest Reserve, community forests and surrounding villages	87
4.2 Average percent of time spent on activities	88
4.3 Types of stoves	89
4.4 Domestic firewood	90
4.5 Harmful forest activities	91
Chapter 5	
5.1 5-tier Local Government Structure and land ownership	123
5.2 Map of Kasokwa Central Forest Reserve, community forests and surrounding villages	124
5.3 Correlation between attitudes and behavior	125

List of Appendices

A. Survey	135
B. IRB Approval	136

Chapter 1

Introduction to research question and theoretical perspectives

Introduction

I began this dissertation research with a broad interest in chimpanzee conservation and forest management and questions concerning the impact of human natural resource use on their survival. I wanted to challenge an underlying assumption of a common tool used in resource management studies: attitudinal surveys. I ask, *do* attitudes predict behaviors, even though we know that humans do not always say what we do, or do what we say? How do people in a forest-adjacent village perceive local natural resources, in terms of need, importance, abundance, and access? Is there a relationship between these perceptions and actual resource use behavior, and if so, under what conditions do perception and behaviors converge or diverge? How do forestry governance institutions, past and present, influence these attitudes and behaviors? Using semi-structured oral interviews (n=201) and focal-follow observations (n=69) collected in 2007, during which I lived in a forest-adjacent village, my research illustrates that very different factors correlate with what people *say* and actually *do*.

I ask this question in a rural village in Western Uganda which is adjacent to Kasokwa Central Forest Reserve (see Figure 3.1). The riverine forest is tiny (a mere 72

hectares) but is home to five primate species, including a group of 20 chimpanzees, and has thus garnered much conservation and community-based management attention to the area. The forest is one of many remnant forest patches thought to have once been contiguous with Budongo Forest (435 km²) to the north. Residents of Kibwona village (n~1000) are primarily subsistence farmers, although some have wage-earning jobs either as formal shop keepers in the village or the nearest town, or as employees of the nearby Kinyara sugarcane factory. Women are the primary resource collectors and users at the household level, although men may participate in activities (legal or otherwise) involving natural resources in the wider market economy. Thus, to understand resource consumption at the household level, I observe women's behaviors only.

Villagers are exposed to various sources of natural resource management information, via the National Forestry Authority, a suite of non-government and community-based organizations, newspapers and radio advertisements. I incorporate these modes of information dissemination into the larger analysis of institutional influences on attitudes and behavior and find that despite an abundance of information sources, there is a dearth of logistical, technical and financial capacity at the district level to assist villagers with tree management. As a result, villagers rely on *themselves*, each other, and to some extent a single, persisting community-based organization for their information on (although not necessarily technical or financial assistance with) resource management. Further, users primarily collect firewood and water *outside* of the forest, and their knowledge and active sustainable management of these resources is minimal as it is increasingly guided by the market-favored preferences (e.g. eucalyptus and pine) of the National Forestry Authority. I find that institutional ambiguity and instability has

resulted in confusion about what is right and in the minimal (in fact much less than what is legally allowed) use of the forest resources.

These findings were a result of the use of multiple disciplinary perspectives and the incorporation of multiple levels of explanation: From individual dynamics, to group dynamics and the community institutions that help shape them, to larger social, economic, and political institutions, which of course are all contingent upon national and global factors (Holmes 2003; Borgerhoff Mulder and Coppolillo 2005). In this dissertation I document attitudes, knowledge, self-reported and actual observed behavior and provide an interdisciplinary, multi-scaled analysis of the discrepancy between the two and the larger macro-level variables that shape this relationship.

The factors that may influence attitudes and behavior towards natural resources are many (Agrawal 2007); this variability highlights the importance of localized case studies and, as stressed by Gibson et al (2000), discredits the idea that there is a single blueprint solution to changing local resource users' attitudes towards (and assumed use of) natural resources. Understanding the costly and beneficial nature of these variables, as modified by each context, is what unifies and makes case studies useful. In the attempt to reconcile the natural sciences with the social sciences, my research can be seen as following some recent trends in applied research that address the complexities of natural resource management and conservation, human resource use, and the necessity for interdisciplinary research (e.g. Caro 1997; Cowlishaw and Dunbar 2000; Borgerhoff and Coppolillo 2005).

The behaviorist approach

To explore these issues, I began with a background in *human behavioral ecology* (HBE). Behavioral ecological theory, rooted in evolutionary and economic theory, suggests that attitudes are related to *individual* costs and benefits; that people behave in ways that maximize *individual* short term returns; and that conservation behavior occurs when these *individual* long-term benefits outweigh short-term costs (Smith 1992; Alvard 1998; Hill 1993; Penn 2003). Evolutionary theorists strive to understand the pay-offs behind thinking and feeling the way humans do, and argue that such mentalities are derived from past environments where they were most useful to their reproductive success. Evolutionary psychologists argue that humans possess an “evolved psychological disposition” for responding to risk and reward from resource collection, but that behavior is not always consciously conducted and nor directly linkable to attitudes (Tooby and Cosmides 1992).

Behavioral ecology research has shown that differences in individual reproductive interests (e.g. gender and reproductive status) correlate with how people value and use resources (Turke and Betzig 1985; Low and Heinen 1993; Hawkes 1996; Low 1996; Wilson et al 1998). This perspective is particularly useful in subsistence based populations where resources are constrained and, in contrast to developed countries, individuals’ reproductive decisions often favor “quantity over quality.” In these communities, individuals usually spend more time and energy accruing, processing and using local resources than do people in developed countries, the majority of whom utilize imported or processed natural resources. Further, resource accrual and use in *developed* countries is more inconspicuous; resources visible to others (including researchers) are

those that are socially desired and displayed, and often consist of non-local, usually non-natural, luxury items.

Perhaps the biggest implication of HBE studies in developing nations is that despite a plethora of cultural, economic and political variability, individuals generally do strive to maximize their resource accrual, *considering any costs of that behavior*. Therefore, a successful conservation initiative is likely to be one that considers the *tradeoffs* to be made and in which disruption of optimal resource accrual behaviors is minimized (FitzGibbon 1998; Borgerhoff Mulder and Coppolillo 2005).

Psychological dimensions

Psychological experimentation has shown that behavior is linked to attitude, perception, personality, and a range of other psychological characteristics (Eagly and Chaiken 1993). The *social cognitive perspective* argues that behavior depends greatly on our sociological conditioning, which encapsulates many experiences (nuclear family influences as well as the larger social, political and physical environment). Wallace et al (2005) suggest that behavior is “a function of the person and the environment,” while Azjen (1985) suggests that behavior is “a function of attitudes, subjective norms and perceived behavioral control.” *Classic environmental psychology and sociology* have focused on the effects of value systems, material incentives, and socio-cultural and institutional motivations of human resource-use behavior (Kellert et al 1996; Byers et al 2001). These psychological perspectives suggest that, even given these large group-level effects, attitudes reflect people’s perceived personal threat to either themselves and/or their fellow man (Hopper and Nielsen 1991; Baldassarre and Katz, 1992) and are formed as a result of expected costs and benefits of *having* those attitudes (Dolisca, et al 2007).

Human behavioral ecology recognizes that behavior is linked to an evolved psychological disposition, and thus is not in conflict with these psychological perspectives.

Recognition of macro-level complexities and contextual specificities

Clearly, the story of why people say what they say and do what they do is complex. Not only do past environments shape perceptions and behavior, so too does the current environment. Ethnographic methodology can effectively uncover contextual details and tease apart the intimate relationship between humans and their environment across time and space (Gupta and Ferguson 1992; Dove 2001). Further, many anthropologists emphasize the need for a social and historical view on biodiversity issues affecting, specifically, the African continent (Guyer and Richards 1996).

Thus, while resource use is, *in part*, driven by an evolved psychology of selfishness (Wilson et al 1998), there are also proximate social cues that can affect decision-making. Multiple social scientific disciplines and their theoretical perspectives are thus important to consider. Knowledge of the social and cultural system in which people live (as well as pervasive legacies of past social systems) can help resource management programs determine which types of benefits will be desired. Indeed, successful programs take such cultural motivations into account when incorporating local people into their programs (e.g. Mehta and Kellert 1998; Mehta and Heinen 2001; Landfried et al 1995; Savage et al 1996).

Given the interactions between local users, governance institutions and non-government information organizations, this study also considers *political ecology*, which explores the politics of human-environment interactions and environmental change, and in particular, the role that power, in its various forms and roles, and strengths, plays in

these processes (Rocheleau 2007; Robbins 1998). The lens of political ecology makes clear various social asymmetries and inequalities (e.g. gender, wealth, status, power), as well as the context-specific historical development in which they are imbedded, that mediate access to resources (Ribot and Peluso 2003; Borgerhoff Mulder and Copolillo 2005; Ribot 2008). Understanding the regional political processes- both past and present- which create and constrain locally expressed attitudes and behavior is imperative because it may shed light on latent impediments to both successful environmental conservation and human welfare policies.

Similarly, this study has benefitted from the inclusion of *institutional analysis*, which seeks to understand the formal and informal rules that constrain human behavior and shape human interaction (Eggertson 1996). Ostrom (2005) argues that institutions involve both implicit and explicit efforts to achieve order and predictability in a designated group of people; such efforts, in the form of rules, laws, regulations, sanctions, taboos, or customs, can be legal and written, self-consciously crafted or purely conversational; institutions are discrete and measurable, yet highly variable across time and space. Studying institutions as part of a resource management strategy can reveal ways in which groups of people's perceptions and behavior are influenced by their social surroundings.

Natural resource conservation strategies often fail precisely because state-level, centralized policies are too intrusive and frequently interfere with local institutions that may have previously succeeded in managing natural resources (Kajembe et al 2003). Moreover, state level institutions rarely have the capacity, whether financial or personnel, to enforce the rules they set; any rules that *are* created are usually modified by the local

institutions, anyway (Gibson et al 2000). In contrast, there are local institutions, such as cultural “codes of conduct,” taboos, rituals, and traditional forms of knowledge, which have traditionally been sustainable for generations (Pretty 1990). Many argue that local institutions can create and support social capital and promote collective action and effective rules (Fukuyama 1995; Gibson and Becker 2000). Local institutions increase the likelihood that simple and locally-devised rules and systems of monitoring, accountability and punitive measures exist (Pretty and Ward 2001; Agrawal 2003). Furthermore, locally created institutions promote ownership, ownership implies control and authorization to change, and many studies show that these components are major predictors of whether or not a person is likely to agree with and intends on participating in conservation programs (Parry and Campbell 1992; Songorwa 1999; Infield and Namara 2001; DeBoer and Baquete 1998).

Despite these claims for decentralized, local-level institutional management of natural resources, Twyman (1998) warns that although community-based projects are the “in” mode of conservation, they *assume* that strong, local communities and institutions exist. She argues that communities may be too new or too heterogenous to have created effective institutions. In these cases, “local-level” management and “community-based” projects may be more coercive and paternalistic than cooperative and participatory (much as colonial style legislation held “in-trust” land for indigenous users).

At the same time, because local-level institutions, by definition, are limited in scope and ability to govern situations at larger levels, a certain amount of overarching coordination may be needed. Centralized institutions, whether government based or foreign non-government organizations, have a responsibility to “assure legitimacy of

local users, introduce new technology and training where necessary, settle disputes that cannot be resolved locally, monitor resources at a broader scale than just the local project area, and buffer local common-property institutions from destabilizing events, such as market collapse, warfare or migration” (Borgerhoff and Coppolillo 2005: 153). Thus, a “nesting” strategy, incorporating both central and local management institutions, can create, protect and support community-level institutions while also imposing a common good and forging linkages between levels (Ostrom 2007). *This* study, however, with local councils acting as “middle men” between the central government and local resource users, illustrates the challenges, perhaps limitations, of nested institutions.

My research contribution

My research highlights the potential for a breakthrough in studies of natural resource managements in which multidisciplinary and multilevel approaches are embraced. In the end, the various fields of study are asking very similar questions about resource use and conservation behavior; they all want to know the conditions under which conservation programs can succeed, but each view the problem with a different lens and measures the problem with different units of analyses. They all want to know: When are humans most and least likely to use natural resources in a sustainable manner? What can be modified, in both the physical and social environment, at micro and macro-levels, to support ecologically and socially sustainable resource use?

Subsequent chapters of this dissertation describe empirical documentation of, and demographic and socioeconomic correlates to, attitudes (chapter 3) and behavior (chapter 4) in Kibwona, and how these disparate outcomes are, in part, a result of institutional unreliability and instability (chapter 5). Behavioral-ecology inspired hypotheses are

raised, tested and supported, but fall short of providing proximal explanations for why such patterns of behavior and attitudes occur. The dissertation culminates with a firm realization that much of the psychological phenomena and behavioral outcomes are a result of Uganda's institutional context, both past and present. Vacillating governance approaches combined with conflicting and confusing information sources leads to a particular combination of attitudes (those expressing need and concern) and behavior (little use of forest resources). The empirical findings are tremendously useful for current and future natural resource management projects in the area. For a complete picture of the story of natural resource use in Kibwona village, in the next chapter I provide a contextual description of the history of forestry management in Uganda, Bunyoro Region and Masindi District.

References

- Agrawal, A. (2003). Sustainable governance of common-pool resources: Context, methods, politics. *Annual Review of Anthropology* 32: 243-62
- Agrawal, A. (2007) Forests, governance, and sustainability: Common property theory and its contributions. *International Journal of the Commons* 1(1):111:136
- Alvard, M. (1998). Evolutionary ecology and resource conservation. *Evolutionary Anthropology* 7: 353-379
- Ajzen I. (1985). From intentions to actions: A theory of planned behavior. In: Kuhl J., and Beckmann J., eds. *Action-control: From Cognition to Behavior*. Heidelberg: Springer. p 11–39.
- Baldassare M, and Katz C. (1992). The personal threat of environmental problems as predictor of environmental practices. *Environment and Behavior* 24(5):602-616
- Borgerhoff Mulder, M. and P. Coppolillo (2005). *Conservation: Linking Ecology, Economics and Culture*, Princeton University Press
- Byers BA, Cunliffe RN, and Hudak AT. (2001). Linking the conservation of culture and nature: A case study of sacred forests in Zimbabwe. *Human Ecology* 29(2):187-218.
- Caro, T., Ed. (1997). *Behavioral Ecology and Conservation Biology*. Oxford, Oxford University Press
- Cowlshaw, G. and R. Dunbar (2000). *Primate Conservation Biology*. Chicago, University of Chicago Press
- Dolisca, F., D. Carter, et al. (2006). Factors influencing farmers' participation in forestry management programs: A case study from Haiti. *Forest Ecology and Management* 236(2-3): 324-331.
- Dove, M. (2001). Interdisciplinary borrowing in environmental anthropology and the critique of modern science. In: Crumley, C., ed. *New Directions in Anthropology and Environment*. Altamira Press
- Eagly, A. and Chaiken, S. (1993). *The Psychology of Attitudes*. Fort Worth, Harcourt Brace Jovanovich College Publishers.
- Eggertson, T. (1996). A note on the economics of institutions. In: Alston, L., Eggertson, T., and North, D. eds. *Empirical Studies in Institutional Change*, Cambridge University Press, Cambridge
- FitzGibbon, C. (1998). The management of subsistence harvesting. In: Caro, T. ed. *Behavioral Ecology and Conservation Biology*. Oxford, Oxford University Press

Fukuyama, F. (1995). *Trust: The Social Virtues and the Creation of Prosperity*, New York, Free Press

Gibson, C., M. McKean, et al. (2000). *People and Forests: Communities, Institutions and the Governance of Forests*. Cambridge, MIT Press

Gibson, C. and C. D. Becker (2000). Lack of institutional demand: Why a strong local community in western Ecuador fails to protect its forest. In: Gibson, Clark, Margaret McKean, and Elinor Ostrom, eds. *People and Forests: Communities, Institutions, and the Governance of Forests*, Cambridge, MA: MIT Press

Gupta, A. and J. Ferguson (1992). Beyond culture: Space, identity, and the politics of difference. *Cultural Anthropology* 7(1): 6-23

Guyer, J. and P. Richards (1996). The invention of biodiversity: social perspectives on the management of biological variety in Africa. *Africa: Journal of the International African Institute* 66(1): 1-13

Hill, K. (1993). Life history theory and evolutionary anthropology. *Evolutionary Anthropology* 2: 78-88

Hopper J, and J. Nielsen (1991). Recycling as altruistic behavior. *Environment and Behavior* 23(2):195-220

Irons, W. and L. Cronk (2000). Two decades of a new paradigm. In *Adaptation and Human Behavior*, Cronk, L., Chagnon, N., and Irons, W. (eds.) New York, Aldine de Gruyter

Infield, M. and A. Namara (2001). Community attitudes and behaviour towards conservation an assessment of a community conservation programme around Lake Mburo National Park, Uganda. *Oryx* 35: 48-60

Kajembe, G., E. Luoga, et al. (2003). The role of traditional institutions in the conservation of forest resources in East Usambara, Tanzania. *International Journal of Sustainable Development and World Ecology* 10(2): 101-107

Kellert S., M., Black M, et al. (1996). Human culture and large carnivore conservation in North America. *Conservation Biology* 10(4):977-990

Low, B. and J. T. Heinen (1993). Population, resources and environment: Implications of human behavioral ecology for conservation. *Population and Environment* 15(1): 7-41

Low, B. (1996). Behavioral ecology of conservation in traditional societies. *Human Nature-An Interdisciplinary Biosocial Perspective* 7(4): 353-379

Ostrom, E. (2005). *Understanding Institutional Diversity*, Princeton University Press, Princeton

- Ostrom E. (2007). A diagnostic approach for going beyond panaceas. *Proceedings of the National Academy of Sciences of the United States of America* 104(39):15181-15187.
- Parry, D. and B. Campbell (1992). Attitudes of rural communities to animal wildlife and its utilization in Chobe Enclave and Mababe Depression, Botswana. *Environmental Conservation* 19(3): 245-252
- Penn, D. (2003). The evolutionary roots of our environmental problems: Toward a Darwinian ecology. *The Quarterly Review of Biology* 78(3): 275-301
- Pretty, J. (1995). Participatory learning for sustainable agriculture. *World Development* 23(8): 1247-1263
- Pretty, J. and H. Ward (2001). Social capital and the environment. *World Development* 29(2): 209-227
- Ribot J, and Peluso N. (2003). A theory of access. *Rural Sociology* 68(2): 153-181
- Ribot J. (2008). Building local democracy through natural resource interventions: An environmentalist's responsibility. World Resources Institute
- Robbins P. (1998). Authority and environment: Institutional landscapes in Rajasthan, India. *Annals of the Association of American Geographers* 88(3): 410-435
- Rocheleau D. (2007). Rooted networks, relational webs and powers of connection: Rethinking human and political ecologies. *Geoforum* 38: 433-437
- Smith, E. (1992). Human behavioral ecology I. *Evolutionary Anthropology* 1: 20-25.
- Songorwa, A. (1999). Community-based wildlife management in Tanzania: Are the communities interested? *World Development* 27(12): 2061-2079
- Twyman, C. (1998). Rethinking community resource management: managing resources or managing people in western Botswana? *Third World Quarterly* 19(4): 745-770
- Uphoff, N. (1993). Grassroots Organizations and NGOs in Rural Development: Opportunities with Diminishing States and Expanding Markets. *World Development* 21(4): 607-622
- Wallace D., R., Paulson et al. (2005). Which behaviors do attitudes predict? Meta-analyzing the effects of social pressure and perceived difficulty. *Review Of General Psychology* 9(3):214-227

Chapter 2

History of forest governance in Bunyoro region, Uganda

Introduction

This chapter provides historical context in which to situate my dissertation research on attitudes towards and use of natural resources in Kibwona Village, Masindi District, western Uganda (Figures 2.1 and 2.2). In the following chapters, I argue that the stated attitudes and observed behaviors of rural resource users in Kibwona village are, in part, a result of historical flip-flopping between centralized and decentralized forest management policies, as the associated inefficiency and unreliability of governance structures. The present chapter explores these transitions in detail. I begin with Bunyoro Kingdom, the western region of Uganda as it was called before it and several other kingdoms in the region became a British protectorate and eventually an independent country.

Phase One: Bunyoro Kingdom

Prior to the 1850s, Budongo Forest, a moist semi-deciduous tropical forest of about 428 km² or 42,800 hectares in present-day western Uganda, was a sparsely inhabited and minimally used resource in the kingdom of Bunyoro (Figure 2.3). The

kingdom, in existence since the 16th century, was powerful and wealthy (Mwambutsya 1990). The kingdom had a centralized, hierarchical royal government presided by kings, but communities created and abided by locally devised institutional arrangements, particularly for natural resources (Turyhabwe and Banana 2008; Banana et al 2008). Regional dominance routinely shifted between Bunyoro and Buganda kingdoms (Doyle 2003). This rivalry was later amplified by colonialists who settled in Buganda kingdom, giving Buganda more power and spurning resentment that purportedly still exists today (Mugerwa 2008).

Bunyoro consisted mainly of horticulturalists and herding peoples who relied on the land to feed their cattle. Forest use, despite its extraordinary biodiversity and rich resource base, was minimal and management only existed as a means of controlling the tsetse fly. People practiced controlled burns around the perimeter of the forest to destroy savanna bush on which the fly breeds (Paterson 1991).

Phase Two: Bunyoro region in the British protectorate of Uganda

European exploration of the region began in 1858, and by 1894, the country of Uganda was officially a British Protectorate, pulling together dozens of ethnic groups, languages, and cultures (although the kingdom of Bunyoro resisted colonial control until 1901). European colonial management of Budongo Forest marked the end of cattle herding and controlled fires, and the beginning of disease invasion, wildlife depletion, and extensive forest modification (Paterson 1991).

Colonial forest managers ceded the practice of burning savannah bush, enabling the forest to expand. As they began systematically removing indigenous trees and planting prime timber species such as mahogany on the inside of the forest, the tsetse fly

flourished on the outside. Cattle began to die off by the thousands. In response, forest managers attempted to eradicate the fly by killing off its food source: bush pig, buffalo, and nearly all ungulates in the forest (Paterson 1991). Though the wildlife disappeared, the tsetse fly did not. It came back in the early 1900's and essentially killed off all remaining cattle herds, marking the "final blow" to the herding lifestyle of the Banyoro (Paterson 1991).

Concomitant with this change was the construction of transportation systems via roads, railways, and waterways. Sedentary agriculture, cash crops, capitalism and a link to world markets had reached Bunyoro. Banyoro people became wage-workers and "gradually embarked on a new, agricultural way of life in response to all of the changes introduced by European contact. The Banyoro lost their cattle, their families, and their political strength to repeated epidemics. The subsequent introduction of cash crops and a cash economy, with the added burden of taxation, shifted the remaining population toward a form of capitalism" (Paterson 1991: 184).

The Forestry Service was originally created in 1898 by the British colonial government; it became the Forest Department in 1927. Hamilton (1984: 46) writes, "the process of acquiring land by the Forest Department was gradual and to a degree unsystematic, and it was not until the 1940s that the boundaries of the forest estate, more or less as they now stand, became established." Large swaths of land were declared Crown land (e.g. the Bunyoro Agreement of 1933) but many smaller land blocks were kept as private land, owned and controlled by their respective kingdoms. Crown land included not only strict forest vegetation but savanna grassland and woodland areas as well. The use of any Crown land now required a permit (Hamilton 1984).

The first agricultural cash crop, mango, was planted in the kingdom in 1915. Coffee, tea, rubber and sugar followed. The timber industry officially took off in 1926, and with the introduction of a full-scale sawmill in Budongo Forest, forest management changed as well (Paterson 1991). Parasitic lianas and strangler figs, species considered “weed species” and “growth impeters” were removed with pesticides to allow for maximum timber species growth (Paterson 1991). Thus, while the timber industry flourished (by 1960, Budongo had the largest timber industry in Uganda) and job opportunities enticed immigration to the area, wildlife was poisoned and the composition of the forest was permanently altered.

The Forest Department encouraged tree planting and local tree plantations by 1930 (Hamilton 1984). *Eucalyptus*, introduced as early as 1912 (Karani 1972), and indigenous *Markhamia* sp. (Nile Tulip Tree or Siala) were primarily planted. In this decade, decentralized forest management, or the provision of local governmental and tribal control of forest resources- paradoxically *returning* power to locals- was provided (Turyahabwe et al 2007). A 1948 statement by the governor of Uganda announced as the main goal of the Forest Department: “to foster, by education, and propaganda, a real understanding among the people of Uganda of the value of forest to them and their descendants; to encourage and assist the practice of sound forestry by local authorities and private enterprise; and to educate selected African in technical forestry” (Anon 1948: 864). Although this devolution of management was limited to “minor reserves of purely local significance... the Governor may be congratulated on having formulated in his statement a true outline of what forest management plans for” (Anon 1948: 865). Apparently, these local forest reserves were expected “not to detract” from the value of

Central Forest Reserves (Hamilton 1984), suggesting that “sound” forestry meant managing forests for resource-value rather than cultural-value..

In retrospect, the term “decentralization” as it is currently used was hardly the case in colonial Uganda. Rather, the “returning of power” to locals was a perverse way of allowing colonial powers to exploit the country’s natural resources while declaring that they did not want total control of the people. Further, the language of the agreements bears a paternalistic tone of superficial graciousness, for having consideration for the rights of indigenous users: “Rural lands are being *held in trust* for the use and benefit of the African population... while the *Protectorate Government retains the forest rights*, the Governor may, at his discretion, and regard being had to the circumstances of each case, make an *ex gratia* payment to the African local government concerned of a portion of the income derived from Crown forest rights” (Stebbing 1953: 1060; italics added). Still, the majority of the actions (again, considered “sound forestry”) undertaken by the Forest Department were profit-driven and the British, not Ugandans, were the profiteers.

Phase Three: Uganda as an independent country

By 1952 there appeared early recognition of the limitations of centralized management: “Such knowledge [of forestry skill] is not possessed by the Civil authority, nor by village communities, and to apply it requires a greater authority than that of a [central government] Protectorate ranger” (Stebbing 1952: 1006). After Uganda gained its independence in 1962, there was a brief period of continued decentralization. At this time, the economy was thriving: coffee, tea, cotton, and tobacco formed the traditional export sector, and textiles, soap, sugar and cement production made up small but strong industries (Kayizzi-Mugerwa and Bigsten 1992). Then, in 1966, in order to maximize

exports, the newly independent Ugandan government immediately centralized control and gave ownership of many resource sectors to the state (Mugabi 2004). As part of an overall trend towards political centralization (for purported reasons of efficiency and cost-effectiveness), the Forest Act of 1967 revoked local decentralized power of forest reserves (Hamilton 1984; Turyahabwe et al 2007). Other than the fact that there was competition and disagreement between locals and the central government in regards to forestry control, little else is known as all forest records in the Buganda archives (Buganda being the capital region of the country) were destroyed in 1966 as a result of civil conflict (Hamilton 1984).

This lack of information continued into the 1970s (Hamilton 1984). Political unrest and civil war plagued the country, severely limiting forestry management and research. Still, Hamilton (1984: 59) suggests that in this decade and beyond there was “a serious reduction in the extent of forest in Uganda, a decline in the number of trees outside forests, and major erosion of the effectiveness of the Forest Department.” Hamilton cites reports by his own students suggesting that while Budongo Forest itself remained largely intact, the western side of the forest experienced increased immigrant settlement and thus encroachment. Further, he noted that two streams in Masindi District, including the river flowing within what is now Kasokwa Central Forest Reserve, were vulnerable to drying up due to adjacent cultivation.

The 1980s continued to see a decline in Forest Department effectiveness and an increase in deforestation. While Struhsaker (1987) argues that deforestation was a result of overpopulation, increased urban immigration, and skyrocketing fuel demands, Hamilton (1984) hones in on the Forest Department’s inefficiency, due in part to a

decision to increase investments in security issues rather than in public services. As a result of countrywide political chaos, corruption within the Forest Department skyrocketed and widespread mistrust of the entire government ensued; Hamilton cites poor supervision, poverty (even amongst paid personnel), and an adverse social climate as possible explanations for the decline of what once was, at least for the then in charge Protectorate government, an effective department.

Any research programs and management plans in place in the first decades of independence had now expired; reliable up-to-date information about the ecological conditions and human use of forests was absent (Struhsaker 1987). Hamilton concludes that forestry policy, as it stood in the 1980s, had two crucial changes to make: (1) turn its primary focus away from exploitation of forest resources for financial advancement to pure protection of forest resources, and (2) begin to view agriculture and forestry as complementary rather than opposing practices (indeed, this preference for uniform rather than patchwork landscapes is intimately associated with western conservation ideals, Lind and Cappon 2001). With rampant local encroachment of government owned forested land, extension services seem particularly important but almost impossible here, given the centralized management of forest resources and the mistrust of the centralized management regime itself.

Foreshadowing a strategy expanded on in the next millennium, both Hamilton (1984) and Struhsaker (1987) recommended privatized tree planting as the best means of protecting forests while providing resources for local users. Struhsaker (1987) reveals that exotic species such as *Pinus*, *Cupressus* and *Eucalyptus grandis* constituted the majority of species encouraged to plant. Thus, while indeed reducing the pressure on

forest, the resource base began, in effect, diminishing from hundreds of indigenous species to a handful of exotic species and an overreliance on monocropping.

Phase Four: Foreign aid, decentralization and agricultural complexities

By the 1980s, the combination of global economic downfall and country-specific political and civil unrest, declining exports and economic inflation led the country into crisis mode; Kayizzi-Mugerwa and Bigsten (1992) claim “the tension between economic pragmatism and political sustenance [was] a recurring element in the 1980s.” While President Milton Obote (1980-1985) did little to promote decentralization, in 1987, one year after becoming president, Yoweri Museveni instituted the Economic Recovery Program and a suite of decentralization focused legislation followed. The Local Governments Statute of 1987 which called for the formal election of official local governments and the re-installment of local governmental power.

Concomitant with these political changes was increased attention and support from the International Monetary Fund (IMF) and the World Bank in the form of Structural Adjustment Policies (SAPs). Although Uganda had joined the IMF in 1963 Uganda received its first SAP loan in 1994 (IMF, Press Release NO 95/61, November 29, 1995). Uganda received a substantial loan (20 million USD) from the World Bank in 1996 under the Agricultural Sector Management Project, but the project was cancelled 14 months later due to “the failure of the borrower to fulfill the conditions of effectiveness” required by the lender (World Bank, 2004). SAPs were designed to assist developing countries deal with distortions in the market that were supposedly prohibiting their growth (Owusu 1998). SAPs are comprised of a series of economic policies (Table 2.1) that have received severe criticism for their adherence to neoliberal economic

perspectives (e.g. Bauer 1972; Bretton Woods 2001; Stein 2008). Dijkstra and Van Donge (2001) argue that economic reforms were minimal and strict conditionalities were absent during the first period of major aid to Uganda (1987-1992), whereas the second phase (1992-1998) included major structural reforms and an obvious emphasis on privatization, decentralization and social service cutbacks. This time period also marks a period of particularly intense vacillation between decentralization and recentralization in forest management policies (Figure 2.4, from Banana et al 2007).

With substantial interest in the economic viability (as well as environmental sustainability) of the forestry sector, the World Bank, the United Nations, and the World Resources Institute created the Tropical Forest Action Plan in 1985. Five years after its inception, however, it was criticized for failing to challenge existing forest management regimes (WRI 2000; SAPRIN 2002). In 1991, the World Bank declared it would not support any commercial logging ventures in tropical forests. Furthermore, funding would serve to support sector programs rather than specific projects. Nonetheless, the World Bank's involvement in forestry sectors remains contentious for its lack of attention to poverty, inequity, local capacity, and issues of control and ownership of and access to forest resources (WRI 2000, Francis and James 2003; Stein 2008)

To address these criticisms, IMF and World Bank instituted a new initiative in 1998: Poverty Reduction Strategy Papers (PRSPs) and country-specific Poverty Eradication Action Plans (PEAPs). Uganda constructed their PEAP in 1997 which, after several rounds of revisions, was approved in 2000 (Uganda 2001). While the World Bank argues that these policies encourage decentralization and local government reform, like their predecessor they have faced major condemnation: "The PRSP process is simply

delivering repackaged structural adjustment policies (SAPs). It is not delivering poverty-focused development plans and it has failed to involve civil society and parliamentarians in economic policy discussions” (Bretton Woods Project 2001). Further, the so-called “country owned” document is formed in consultation with the Bank and IMF and the final paper must be approved by these institutions (Bretton Woods Project 2003). (Rowden and Nyamugasira 2002) find that the consultation period with the institutions is in fact *too short* to allow for productive and effective engagement of the borrowers.

Moreover, the agricultural practices and land policies that are intimately associated with these donor approaches have impeded sustainable land use (Morgan and Solarz 1994; Reardon et al 1997). Uganda’s traditional agricultural system is characterized by farming land for three or four years and then abandoning it (leaving it fallow) for about eight years (Muchena and Kiome 1995). As human populations continue to increase, however, leaving land fallow to promote soil recuperation, as well as simply expanding agricultural land area, is becoming less and less of an option (Ellis-Jones and Tenberg 2000). Poor agricultural practices to compensate for less available land, such as over-stocking of rangelands and cultivation on steep slopes, contribute to erosion and siltation of water bodies, thereby altering ecosystems, and the changing species composition of the country (EASD n.d.). These outcomes are exacerbated by structural adjustment policies which have limited funding for agricultural research and technical inputs such as fertilizer (Fontaine and Sindzingre 1991; Jayne et al 2003; Stein 2005). At the policy level, Uganda has done little to conduct soil research or evaluate land capabilities, particularly in terms of subsistence-only crops (Muchena and Kiome 1995).

The Food and Agricultural Organization identifies Uganda's agricultural sector as largely underdeveloped and characterized by "family labour, rudimentary technology, poor crop husbandry, lack of improved seed, lack of pesticides, lack of fertilizers, a land use policy and with a low rate of land use" (FAO 2001). Agricultural practices are directly linked to forestry in that together they have resulted in massive depletion of nutrients from the soil, with huge swathes of forests and woodlands being converted into agricultural farmland. Such land conversion, in addition to too much nutrient mining and little access to fertilizer (Esilaba et al 2005; Nkonya et al 2005) contributes to land erosion, environmental degradation, energy shortages, food shortages, and rural poverty in general (Country Studies 1990). The relationship between agricultural yield and forest loss is negative (Barbier and Burgess 1997). With unmet soil potential and thus agricultural productivity the agricultural sector has been "obliged to meet burgeoning commodity demands almost exclusively by using more land for farming and ranching" (Bashaasha 2001).

Therefore, agriculture activity has led to yet another environmentally and socially detrimental impact: heavy competition between the need for land for crops (both subsistence and cash) and the need for raw fuel (in the form of firewood and charcoal) and timber products. Uganda's forest export products include sawn timber, plywood, eucalyptus poles, bamboo and cane furniture, woodwork and handicrafts, while wood demand *within* the country is primarily in the form of fuelwood and charcoal. With an annual removal rate of 26 million m³ (Forests Monitor 2007), this exceeds "sustainable" output, estimated to be 15.6 million m³ (MNR 1994). Although most household energy needs are obtained from woodland sources, as opposed to primary forests, these resource

bases often overlap and both are subject to transformation to cropland and fuelwood depletion (Tabuti et al 2003; Kituyi et al 2001; Osei 1993).

Museveni's economic reform and decentralization policies continued into the 1990s with The Decentralization Statute of 1993 and the Local Government Act of 1997 which instituted a 5-tier system of government, from local villages up to the central government, further returning power to local officials. Although President Yoweri Museveni has received criticism for his extended length in office, his focus on the restoration of democratic governance and participatory politics has proved beneficial for his political regime (Oloka-Onyango 2004). Indeed, Oloka-Onyango (2004: 36) refers to Museveni as a "conundrum of paradoxes... a dictator with some democratic tendencies... a market-reformed Marxist" and argues that his type of leadership has been, in fact maintained by international donors- because he has deferred to western donor conditionalities, he "gets away" with other actions that would otherwise render him a ruthless dictator.

Phase Five: The age of the unknown: The forestry sector today

The decentralization efforts of the early 90s influenced natural resource management as well. In 1998, the Forest Department split its responsibilities between National Forestry Authority (NFA), responsible for Central Forest Reserves, and District Forest Services (DFS), responsible for Local Forest Reserves. This change was followed by a series of new policies outlining the responsibilities of NFA and DFS: National Forestry Policy of 2001, National Forest Plan of 2001, and the National Forestry and Tree Planting Act of 2003. These policies decree sustainable resource use and collaborative forest management between the NFA, local governments and local communities.

Today, seventy percent of the tree-covered area in Uganda is private or communal land. While most of this area is woodland, the largest part of tropical highland forest (38%) exists here. The remaining 30% is considered Permanent Forest Estate, primarily managed by NFA, with the exception of .3% which is considered Local Forest Reserve and managed by the District Forest Services at the local level (Table 2.2.; Kayanja and Byarugaba 2001). Reminiscent of colonial policy, the PFE is “held in trust” by the government for the people of Uganda. Forest reserves are further demarcated into strict nature reserves (20%), low-impact buffer zones (30%) and areas managed for sustainable extraction of forest products (50%) (Howard et al 2000). These demarcations are made specifically for each Forest Reserve.

The literature on global decentralization is vast and studies of Uganda’s progress are many. While it is true that Uganda is known as a model of development success (Cargill 2004), the title is deceptive- success is relative, and Uganda’s decentralization efforts are still plagued with challenges (Dijkstra and Van Donge 2001). For example, at the legislative level, the constitution clearly calls for reduced central government control and increased local discretionary powers, including creating new local laws and collecting revenues. Despite multiple legislative efforts, the central government, whether on purpose or not, *continues* to suppress local capacity in several ways (Mugabi 2004): local governments are funded by the central government, but grants must be used in ways deemed appropriate for the grantor, not grantee; local revenue (taxes) collection is uneven, sporadic and unreliable, especially in rural areas; external donor support often has the same restrictions that central government grants require; and the judicial system is weak when pertaining to formal laws and rules established to protect the resource,

making impotent any enforcement efforts on the part of the local communities or government. In fact, Hauser (1999) argues that the donor-recipient relationship, driven by the need to purposefully frame Uganda as an economic success story, has prohibited democratic growth, reinforced the single party system of governance, and neglected to give attention to the *political*, as opposed to institutional, ills that plague the country.

It should be noted that there is a distinction to be made being natural resource management and social services and infrastructure management (Kaimowicz and Ribot 2002). The latter have been particularly criticized as being faulty for very similar reasons, and specifically in Uganda: inadequate capacity, insufficient fiscal decentralization, and a lack of accountability to citizens (Johnson 2002; Francis and James 2003). While it has its challenges, decentralization of natural resources, in contrast, is still very much supported (Ostrom 2007; Larson and Soto 2008)

NFA has recognized that policing forests has been an ineffective management strategy and that the inclusion of local users may increase sustainable resource use (MWLE 2001). These initiatives, however, are intimately and inextricably linked to external NGOs and their respective CBOs, in addition to the efforts of local government. In effect, these non-government organizations act as funding incentives for local governments to participate in collaborative management: While 40% of profits made from revenues, licenses, and permits from the sale of Central Forest products are given to local government, this money makes up a mere 10% of the local government budget, with the other 90% coming from donors (Turyahabwe et al 2007). Turyahabwe et al (2007) identify several other limitations of collaborative forest management in Uganda: local organizations often lack technical and financial capacity to fully conduct management

activities; confusion over who owns what type of land leads to disinterest in investing in tree planting and overall land management; regular corruption and disrespect for formal laws undermines honest and legal attempts at collaborative management. In Uganda, about 6,500 hectares (less than 1% of the total tree-covered area in the country) are managed under collaborative initiatives (NFA 2008), suggesting this approach is still in its infancy, and may be limited without the fiscal and technical support of the District Forest Services at the local government level.

As a result of both colonial control and a period of “post-independence governmental adjustment,” decreased incentives to participate and increased risk of punitive measures has led to an overall lack of local participation in resource management (Banana and Ssembajjwe 2000). This is, in fact, one in a long string of explanations for the lack of real decentralization and collaboration despite so many policies and rhetoric about them. Turyahabwe et al (2007) conducted an extensive study on the role of local organizations in forest management and the extent to which the central government supports them, both fiscally and politically. In effect, they found that strong relationships across multiple levels and clear policy are lacking.

These inefficiencies are illustrated by the fact that the National Forest Authority whose mission is, in part, to "contribute to a sufficiently forested, ecologically stable and economically prosperous Uganda" (NFA n.d.) lacks the monetary means and man power to effectively monitor all of Uganda's forests, many of which are patchy and scattered; Years of Structural Adjustment policies that purport to increase local control yet reduce local funding have no doubt impeded the effectiveness of local forest departments, let alone meager village-level management capacity (Krishna et al 1996).

What is more, Mwenda and Tangri (2005: 451) argue that “donor reforms have reinforced rather than reduced the propensity of political leaders to use the state and its resources to maintain themselves in power...the prevailing government in Uganda is quasi-authoritarian... [aid has] conferred considerable discretionary power on top state officials to enable them to implement difficult reforms effectively.” At the same time, NFA also aims to “manage Central Forest Reserves on a sustainable basis and to supply high quality forestry-related products and services to government, local communities and the private sector.” In fact, NFA does the latter by supporting the selling and planting of market-favored species, eucalyptus and pine, rather than indigenous, and often locally preferred, species. The persistence of such reforms illustrates the lack of attention to the notion that democratic decentralization, or democracy in general, cannot be imposed from the top-down (Francis and James 2003; Ribot 2006)

Jagger (2008) finds widespread inequities in the distribution of forest product revenue; around Budongo Forest in particular, the wealthiest household benefited the most while the poorest households actually suffered a *decrease* in household income. She also suggests that enforcement and monitoring by the National Forestry Authority is disproportionately directed at these low-income households. Further, Turyahabwe et al (2007) report that in 2002/2003, only 1.1% of the Uganda’s total national budget was allocated for forestry services. Thus, the District Forest Services, who are responsible for the needs of local-level users (those who use 70% of the country’s land) legally manage a mere 5,000 hectares of local forest reserve resources in the sub-county region. Decentralization is more rhetoric than reality, as the central government continues to have much control over resource management:

The assumption is that the various layers of local government (District, Sub-county and Village Councils) with the technical assistance of the District Forest Office are effectively empowered to craft and enforce forest rules... In Uganda, the current five-tiered local administrative system of elected local councils (LCs) and executive committees provide such a forum that can respond to conflicts quickly and cheaply... [However] there is limited 'political will' by the elected councilors to implement the Decentralization Statute of 1987 in respect to forest management... The District Forest Office does not receive adequate budgetary support from the Central Government, since it (the government) considers forest resources to be decentralized. While District Forest Officers are employees of the Central Government, the District Local Councils supervise them. On the other hand, the technical staff that support the District Forest Officer (the Forest Rangers and the Forest Guards) are employees of the District Local Councils. Failure to transfer fully the management of forest resources to the local governments has led to confusion within the forestry sector. This confusion arises from the unclear chain of command for forestry personnel and contributes to unwillingness by the various tiers of local government to take budgetary responsibility for forest protection activities (Banana et al 2000: 2-3, 7-8).

The following two chapters diverge from much of this historical trajectory to describe the empirical data collected, primarily in 2007, concerning attitudes (chapter 3) and behavior (chapter 4) as independent phenomena that correlate with various (and mostly non-overlapping) demographic and socioeconomic variables as predicted by behavioral ecology and psychology disciplines. I return to this historical description of governance vacillations and ambiguities in chapter five where I link the empirical data to this historical context.

Table 2.1: Structural Adjustment Components

Definition:

A series of economic policies designed to reduce the role of government in an economy replacing government control with market incentives. The policies set conditions (conditionalities) for obtaining loans from IMF and World Bank, meaning additional political and economic reforms must take place before the loan can be acquired.

Components:

Privatization: Transferring ownership of public businesses to private entities

Deregulation: Reduction of government regulations, markets influences by market forces

Reduction of trade barriers: Reduced government restrictions on imports

Liberalization: Relaxation of government restrictions and regulations on the economy, to allow for foreign investment.

Austerity (macrostablization): Reduction of government spending (particularly on public services) to pay back creditors

Table 2.2: Approximate area (ha) of (a) land cover types and (b) management of tree-covered area

(a) Total Land Area	236,040,000
Tree covered area (24%)	50,000,000
- woodland (80%)	40,000,000
- highland forest (19%)	9,500,000
- plantation (1%)	500,000
(b) Tree Covered Area	50,000,000
Private, communal (70%)	35,000,000
Permanent Forest Estate (30%)	1,881,000
- Central Forest Reserve (60.9%)	1,145,000
- Local Forest Reserve (0.3%)	5000
- National Park, Wildlife Reserve (38.8%)	731,000

Figure 2.1: Map of Masindi District, Uganda
(from
[Hhttp://1...](http://1...))H



Figure 2.2: Southern region of Budongo Forest: Kasokwa Central Forest Reserve and Kibwona Village (from www.googleearth.com)

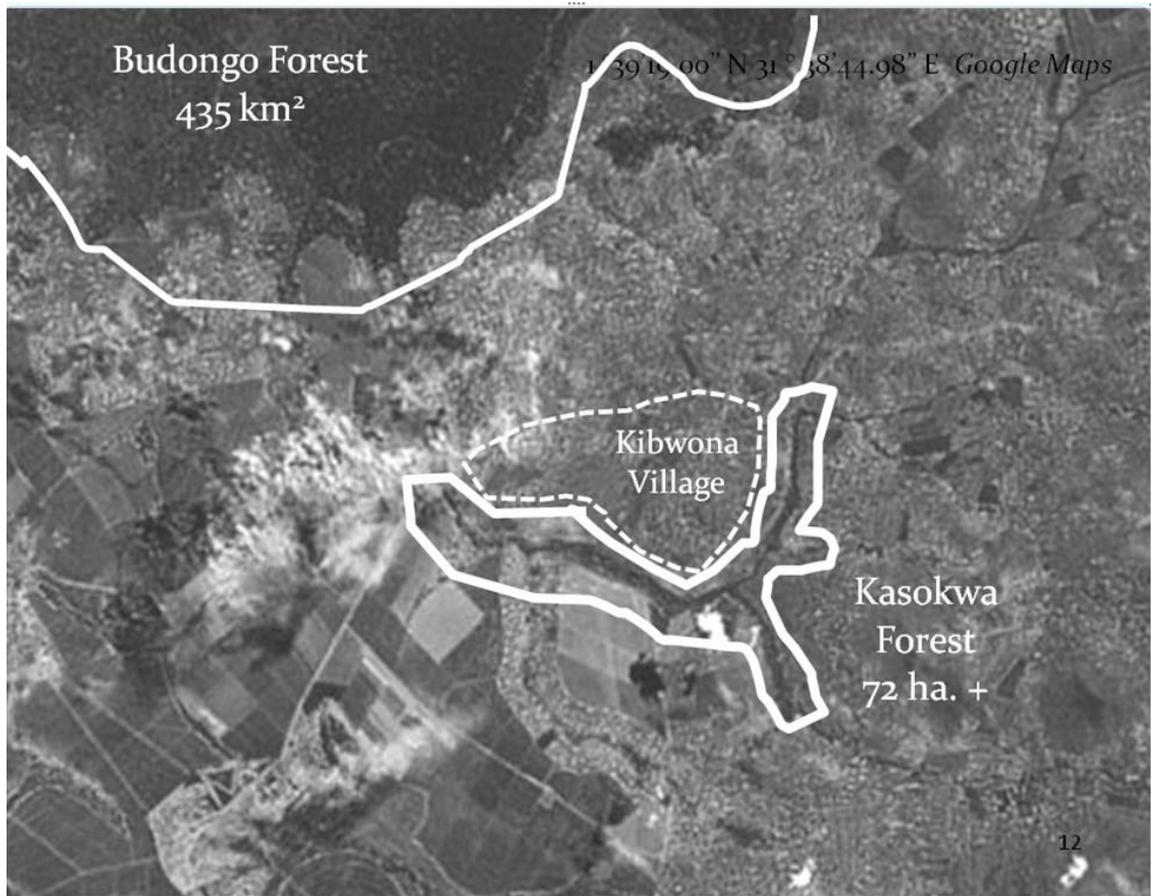
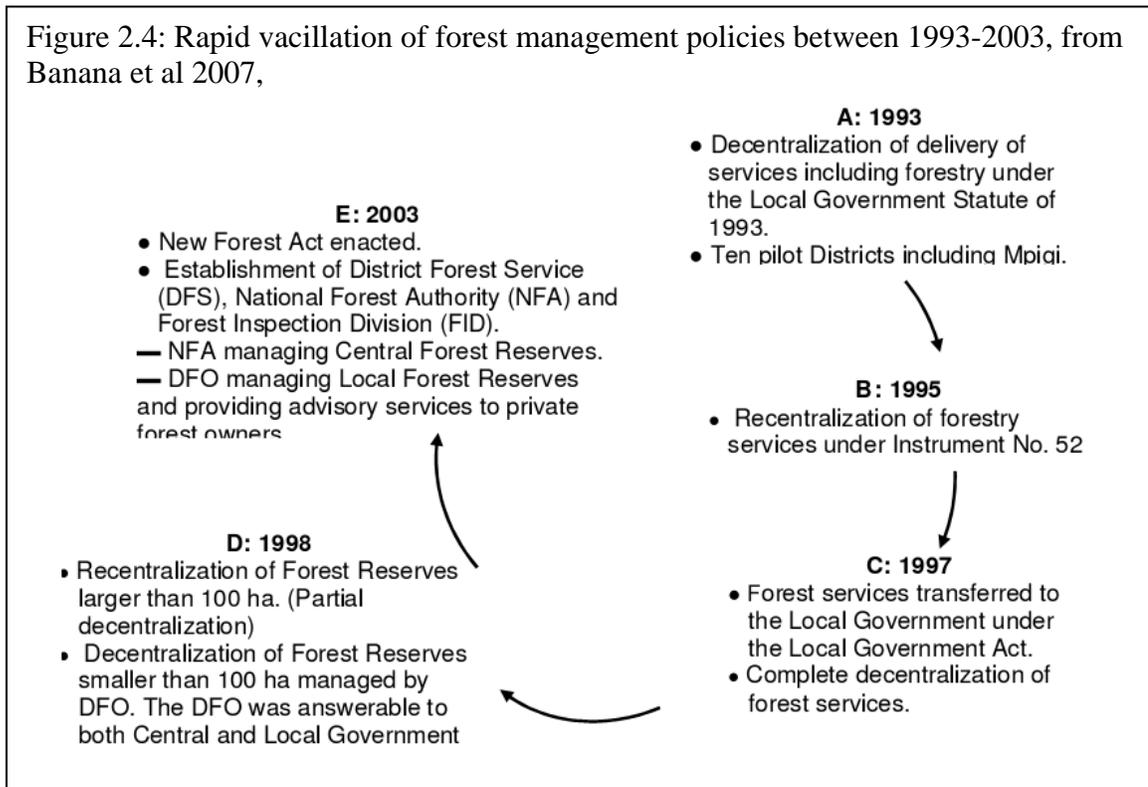


Figure 2.3: Map of Bunyoro Kingdom, from the Economist (July 2008)



Figure 2.4: Rapid vacillation of forest management policies between 1993-2003, from Banana et al 2007,



References

Anon. (1948). Forest policy in Uganda. *Nature* 162(4126): 864-864

Banana A, and W. Gombya-Ssembajjwe (2000). Successful forest management: The importance of security of tenure and rule enforcement in Ugandan forests. In: Gibson C, McKean M, and Ostrom E, editors. *People and forests: Communities, institutions, and governance*. Cambridge: MIT Press.

Banana, A., W., Gombya-Ssembajjwe, et al. (2002). Decentralization of Forestry Resources in Uganda: Realities or Rhetoric? Conference paper, Decentralization of Forestry Resources in Uganda: Realities or Rhetoric?, Victoria Falls, Zimbabwe Available at: <http://dlc.dlib.indiana.edu/archive/00000788/00/bananaa150502.pdf>

Banana A., N., Vogt, et al. (2007). Decentralized governance and ecological health: why local institutions fail to moderate deforestation in Mpigi district of Uganda. *Sci Res Essays* 2(10): 434-445

Barbier, E. and J. Burgess (1997). The economics of tropical forest land use. *Land Economics* 73: 174- 195.

Bashaasha, B., S. Kraybill, et al. (2001). Land use impacts of agricultural intensification and fuelwood taxation in Uganda, *Land Economics* 77 (2): 241- 249

Bauer, P. (1972). *Dissent on Development*, Harvard University Press.

Bretton Woods Project. (2001). PRSPs just PR say civil society groups. Available at: <http://www.brettonwoodsproject.org/art-15999>

Bretton Woods Project. (2003). Poverty Reduction Strategy Papers: A Rough Guide Available at: <http://www.brettonwoodsproject.org/topic/adjustment/PRSP%20rough%20guide/PRSP%20rough%20guide.htm>

Cargill T. (2004). Still the donors' darling. *World Today* 60(12):26-27.

Country Studies Area Handbook. (1990). countrystudies.us/uganda/ U.S. Library of Congress.

Dijkstra, A. and J. Van Donge (2001). What does the 'show case' show? Evidence of and lessons from Adjustment in Uganda. *World Development* 29: 841-863

- Doyle, S. (2003). The language of flowers: knowledge, power and ecology in precolonial Bunyoro. *History in Africa* 30: 107-116
- Economist (2008). A grumpy kingdom. *The Economist*, published July 24, 2008, The Economist Newspaper Limited
- Ellis, F. and G. Bahigwa (2003). Livelihoods and rural poverty reduction in Uganda. *World Development* 31: 997-1013
- Environmental Assessment: State of the Environment, Uganda (n.d.) Available at: www.easd.org.za/default.asp
- Esilaba, A., P., Nyende, et al. (2005). Resource flows and nutrient balances for crop and animal production in smallholder farming systems in eastern Uganda, *Agriculture, Ecosystems and Environment* 109:192–201
- Fontaine, F. and A. Sindzingre (1991). Macro-micro Linkages: Structural adjustment and fertilizer policy in Sub-Saharan Africa. OECD Development Centre Working Papers, paper number 49.
- Forest Monitor (2007). Timber trade and poverty alleviation in the great lakes region. Available at: <http://www.forestsmonitor.org/en/reports/556666>
- Francis P, and R. James (2003). Balancing rural poverty reduction and citizen participation: The contradictions of Uganda's decentralization program. *World Development* 31(2):325-337
- Hamilton A. (1984). *Deforestation in Uganda*. Nairobi: Oxford University Press
- Hauser, E. (1999). Ugandan relations with Western donors in the 1990s: what impact on democratisation? *The Journal of Modern African Studies* 37(4): 621-641
- Howard, P., T., Davenport, et al. (2000). Protected area planning in the tropics: Uganda's national system of forest nature reserves. *Conservation Biology* 14: 858-875
- Jagger, P. (2008) Forest income after Uganda's forest sector reform: Are the rural poor gaining? CAPRI Working Paper #92
- Jagger, P. (2008) Forest income after Uganda's forest sector reform: Are the rural poor gaining? CAPRI Working Paper #92
- Jayne, T., V. Kelly, et al. (2003). Fertilizer consumption trends in Sub-Saharan Africa. Policy Synthesis for Cooperating USAID Offices and Country Missions, Number 69
- Kayanja F., and D., Byarugaba (2001). Disappearing forests of Uganda: The way forward. *Current Science* 81(8): 936-947

Lind, J. and L. Cappon (2001). Realities or rhetoric? Revisiting decentralization of natural resources, management in Uganda and Zambia, Acts Press, African Centre for Technology Studies, Nairobi, Kenya

Ministry of Natural Resources (MNR) (1994). *State of the Energy Report for Uganda*.

Ministry of Water, Lands and Environment (2001). *The Uganda Forest Policy*. Republic of Uganda.

Morgan, W. and J. Solarz (1994). Agricultural crisis in Sub-Saharan Africa: Development constraints and policy problems. *The Geographical Journal* 160(1):57-73.

Mugabe, E. (2004). Uganda's decentralisation policy, legal framework, local government structure and service delivery. First Conference of the Regional Assemblies of Africa and Europe, Florence

Mugerwa, F. (2008). Uganda: Bunyoro Rejects Buganda Boundaries, *The Monitor*, Kampala

Mwambutsya, N. (1991). Pre-capitalist social formation: the case of the Banyankole of Southwestern Uganda. *Eastern Africa Social Science Research Review* 6: 78-95

Mwenda A, and R. Tangri (2005). Patronage, politics, donor reforms, and regime consolidation in Uganda. *African Affairs* 104(416):449-467.

National Forestry Authority, Uganda (n.d.) www.nfa.org.ug/

National Forestry Authority. (2008). Partnerships. Available at :
http://www.nfa.org.ug/content.php?submenu_id=3

Oloka-Onyango, J. (2004). "New breed" leadership, conflict, and reconstruction in the Great Lakes Region of Africa: A sociopolitical biography of Uganda's Yoweri Kaguta Museveni. *Africa Today* 50: 28-52

Owusu, J. (1998). Current convenience, desperate deforestation: Ghana's adjustment program and the forestry sector. *Professional Geographer* 50: 418-436

Reardon T, V. Kelly, et al. (1997). Promoting sustainable intensification and productivity growth in Sahel agriculture after macroeconomic policy reform *Food Policy* 22(4):317-327.

Ribot, J. (2006). Choose democracy: Environmentalists' socio-political responsibility. *Global Environmental Change- Human and Policy Dimensions* 16(2): 115-119

Rowden R., and Nyamugasira, W. (2002). Poverty reduction strategies and coherency of

loan conditions: do the new World Bank and IMF loans support countries poverty reduction goals? The case of Uganda. ActionAid US/ ActionAid Uganda

SAPRIN. (2002). The Policy Roots of Economic Crisis and Poverty. A Multi-Country Participatory Assessment of Structural Adjustment. Based on Results of the Joint World Bank/Civil Society/Government Structural Adjustment Participatory Review Initiative (SAPRI) and the Citizens' Assessment of Structural Adjustment (CASA). Available at: http://www.saprin.org/SAPRI_Findings.pdf

Stebbing E. (1953). Uganda Forest Department annual report for 1951. *Nature* 171(4363): 1060-1061

Stein H. (1995) CAAS 408 Lecture, November 29.

Stein H. (2008). *Beyond the world bank: An institutional approach to development*. Chicago: University of Chicago Press.

Struhsaker T. (1987). Forestry issues and conservation in Uganda. *Biological Conservation* 39: 209-234

Turyahabwe N., C. Geldenhuys et al. (2007). Local organisations and decentralised forest management in Uganda: roles, challenges and policy implications. *International Forestry Review* 9(2): 581-596

Uganda (2001). Poverty Eradication Action Plan (PEAP), 2000-2003. Kampala: Ministry of Finance Planning and Economic Development

World Resources Institute. (2000). The World Bank, Structural Adjustment, and Forest Policy Reform

World Bank (2004) Project Completion Note, Report No. 29414, October 14,2004 Available at: http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2004/10/20/000090341_20041020101744/Rendered/PDF/294140UG.pdf

Chapter 3

Can demography, knowledge and proximity correlates to attitudes contribute to community-based resource management?

Introduction

Community-based conservation (CBC) and community-based natural resource management (CBNRM) programs often use attitudinal surveys to measure community interest and potential involvement. Positive attitudes are thought to reflect support for planned and implemented natural resource management strategies and can thus increase their effectiveness. Knowledge of attitudes can help guide future management decisions in ways that minimize conflict for both wildlife and local resource users (Bazaara 2003; Dolisca et al 2007; Lepp 2007; Ormsby and Kaplin 2005; Sekhar 2003; Watkins 2006). Furthermore, the very process of collecting such micro-level data helps give underprivileged people a voice (Chokor 2004; Infield and Namara 2001). While the inclusion of people at the local level is crucial, there are simply still not enough micro-level, empirical studies (Gibson et al 2000). Continued local-level documentation of the ways in which resource users align themselves with their local natural resources and the institutions that manage them is warranted.

The results of attitudinal studies are as diverse as the case studies in which they are implemented and are influenced by both methodological and contextual factors. What might be considered highly valuable depends on the costs and benefits (Kaiser et al 1999; Power 1993). Thus, it is useful to group these costs and benefits into three categories: demography, knowledge, and proximity factors.

Demography: Portes (1971) and Dolisca et al (2006) argue that exactly what a user considers the “best value” stems from the socioeconomic and demographic conditions in which individuals are embedded. Ethnicity, age, wealth, and income level and type have been shown to correlate with attitudes (Fiallo and Jacobson 1995; Gelcich et al 2005). DeBoer and Baquete (1998), Dolisca et al (2007), Mehta and Heinen (2001) and Mehta and Kellert (1998) all found associations between attitude and gender.

Knowledge: An individual’s level of education may influence attitudes (Mehta and Heinen 2001). Johnson (1996) found that unawareness about one’s rights to their local forest resources led to inappropriate use, and suggests that “formal education enables people to see beyond the direct issue of subsistence.” Yet many suggest that, independent of formal education, community-based environmental education efforts- via information and benefits- are the best way to improve attitudes (Dolisca et al 2007; Holl et al 1995; Infield and Namara 2001; Mehta and Heinen 2001).

Proximity and perceived utility: How people perceive the costs and benefits of the forest may be related to their physical proximity (Parry and Campbell 1992). In their study, DeBoer and Baquete (1998) found an overall a positive attitude towards a local elephant reserve, but attitudes were specifically correlated with crop damage experiences, which were higher in households closer to the reserve. In contrast, Hill (1998) found that

prior experience with elephants did *not* influence attitudes; instead, the mere *perception* of danger influenced them, particularly for women.

The present study: Such variability in attitudinal formation highlights the importance of localized case studies and, as stressed by Gibson et al (2000), discredits the idea that there is a single blueprint solution to changing local resource users' attitudes towards (and assumed use of) local natural resources. Still, understanding how the costs and benefits of demography, knowledge, and utility-based correlates influence attitudes can provide insight into what can make community-based natural resource management initiatives successful in particular areas or for particular groups of resource users.

This study contributes to the ongoing discourse of community-based resource management in developing-world contexts. Uganda's incredibly rich biodiversity has prompted the formation of many natural resource and wildlife conservation initiatives and in comparison to other African countries Uganda is hailed as being relatively participatory in its programs (Saito 2000). While this may be true particularly in the western district of Masindi, the country and district continue to be plagued by bureaucratic inefficiencies and chronic donor dependency, limiting the success of such programs (Bazaara 2003; Muhereza 2003). We need a better understanding of what local "inclusion" really entails.

Study Area

Budongo Forest Reserve in Masindi District is one of a few remaining intact forests in the country. Surrounding Budongo are many smaller forest fragments, thought to have been previously contiguous with the large forest. Kasokwa Central Forest Reserve is one such fragment and is home to five primate species, including endangered

chimpanzees (Figure 3.1). While owned and managed by the National Forestry Authority (NFA), the 72 hectare forest's river is an important water source for local people and wildlife, as well as Kinyara Sugarcane Factory and its surrounding sugarcane plantations.

There have been numerous environmental NGOs within Masindi district and its villages (TRENCOP, Tree and Energy Conservation Program, a United Nations funded initiative; EMPAFORM, Empowering Participatory Forest Management, a CARE funded initiative; and one lasting community-based organization, NACOPRA, Nature Conservation and Promotion Association, funded by various NGOs and local members). At the time of this study, NACOPRA had written a draft of a community forestry plan for Kasokwa Forest which was under review by NFA. NACOPRA itself, however, was in the process of finding and electing new management. Although decentralization of natural resource management has been encouraged since the early 1990s, community-based natural resource management objectives are still tenuous in the district and much work still needs to be done to identify appropriate and effective natural resource management strategies.

Thus, the objectives of this paper are to:

- (1) Explore the myriad factors, categorized here as demography-based, knowledge-based, and proximity and perceived-utility factors, that correlate with local attitudes towards Kasokwa Central Forest Reserve and natural resource availability in Kibwona village, Masindi District, Uganda.
- (2) Analyze these associations in light of their potential to inform community-based natural resource management initiatives.

- (3) Reveal possible limitations of relying on attitudes as a measure of resource dependency.

Methods

Data were collected between January and July 2007, a period that included part of the dry season (January-March), the wet season (April-June), and a light rainy period (July). With the help of a local field assistant to translate, 201 semi-structured interviews (136 women and 65 men) were conducted. Each interview consisted of over 40 closed- and open-ended questions and lasted 30-60 minutes, depending on the interviewee's inclination to talk (Table 3.1). Extensive demographic, self-reported individual and household-level resource use and attitudinal data was collected. Respondents were randomly chosen via daily walks through the village at various times of the day. A map of the village roads was constructed and, because my field assistant knew the various clan areas and their approximate densities, we used a pictorial mapping system to keep track of our progress across the village. To determine proximity to the forest, respondents' houses (n =164) and the forest border were recorded using GPS.

Data analysis

To compare attitudes with individual demographic features, knowledge, and perceived natural resource utility, data were analyzed with a variety of correlation tests using SPSS. Factor analysis showed that the attitudes measured were different enough not to warrant aggregation: Factor 1 explained 31% of the variance and factor 2 explained only 23% of the variance (Table 3.2). Thus, attitudes were interpreted individually.

Results

Part 1 describes the demographic, knowledge, and proximity and perceived-utility factors found in Kibwona village. Part 2 describes the ways in which these factors are correlated with attitudes.

Part 1: Factors

Demography: Of the 65 men and 136 men interviewed, the average age is 38 and the majority of respondents are subsistence farmers. Household size averages 4.9 people and respondents have an average of 4 children (Table 3.3).

Knowledge: The average education level is six years of formal schooling. Fifteen percent of the sample had no education, 9% had between 1-3 years of education, 42% had between four-seven years of education, and 33% had more than 8 years of education. Thirty-four percent of respondents stated that they were a member of a non-religious community group (76.6% of respondents attended a religious service at least once a week and thus this was not included as a community group).

Seventy percent of respondents believe, correctly, that the government is responsible for Kasokwa forest. This is consistent with earlier studies in Kibwona (C. Watkins unpublished pilot study data), as well as for another nearby forest-adjacent village in Masindi District (Watkins 2006). This belief did not differ between men and women, but while women were more likely to say that the government is also responsible for village water sources, men were more likely to say locals ($X_2 = 11.303$, $df = 4$, $p = .023$). Respondents with more education were likely to say that the government was responsible for village water sources ($\rho = -.178$, $p = .012$); not surprisingly, respondents with less education simply did not know who was responsible ($\rho = -.234$, $p = .001$).

Thirty-three percent of respondents gave at least one incorrect rule for forest use (Table 3.4). Out of the 48 (24%) respondents who did not know (or at least state) any rules, 40 were women. 44 out of 52 respondents who stated, *incorrectly*, that that one of the rules was that they could not collect firewood were also women. In contrast, of the 53% of respondents who stated, correctly, that it was illegal to cut trees, most were men ($X_2 = 10.803$, $df = 2$, $p = .005$). Respondents involved with community groups were more likely to give the following, *correct*, rules: cannot cut trees ($X_2 = 6.935$, $df = 2$, $p = .031$); no charcoal burning ($X_2 = 5.988$, $df = 2$, $p = .050$); if you cut one tree, plant another ($X_2 = 6.566$, $df = 2$, $p = .038$); general ecological principles ($X_2 = 10.921$, $df = 2$, $p = .004$).

Seventy-six percent of respondents felt that the rules regarding forest use were adequate for maintaining it. Higher educated respondents are more likely to believe that the rules are adequate; less educated respondents are more likely to simply not know ($\rho = -.193$, $p = .006$). Although most respondents believe the rules are adequate, only 27.5% of respondents believed that there are actually enough trees in Kasokwa forest. This was significantly associated with respondent's education; higher educated respondents believed that there weren't enough trees, while uneducated respondents simply did not know ($\rho = -.162$, $p = .022$). While these correlations are conflicting, with educated respondents stating that rules are adequate yet that there are not enough trees, it reflects an important limitation, perhaps even a weakness, of attitudinal studies; respondents' desire to "say the right thing" is discussed later.

Utility: The majority of respondents (80%) reported that they had not entered the forest at all in the past week; many were quick to add that they had not gone into the forest for months, or that they went only in the dry season (December-February) for

wood. Seventeen per cent of respondents reported entering the forest at least once in the past week; only 2.5% reported entering every day of the past week, and often they were reportedly “just passing through” to villages or farmland on the other side of the forest. People reported collecting firewood from multiple areas: non-forest areas within the village (88.6%); own property (61%); Kasokwa forest (11%). Multiple sources of water collection were also reported: village wells (74.1%); village bore hole (20%); Kasokwa Forest river (20.9%). When asked what people, in general, get from the forest, 42% said wood, 19% said water, and 17% said non-timber forest products. These measures suggest that while there is some level of perceived dependency on forest resources (particularly by *other* people), people report minimal entry into and use of the forest *themselves*.

Factor covariance

A number of the above independent variables covary with each other. Age is negatively correlated with education ($\rho = -.367$, $p = .000$); that is, younger adults are more educated than older adults. Not surprisingly, age is positively correlated with the number of children a respondent has ($\rho = .316$, $p = .000$). Age is negatively correlated with how often respondent says s/he entered the forest within the last week ($\rho = -.181$, $p = .010$); older people enter the forest less than younger adults. Participation in a community group is positively correlated with education ($U = 3503.500$, $p = .001$) (but participation is *not* correlated with age or family size). These associations are difficult to tease apart but are important when considering how each factor correlates with attitudes.

Part 2: Attitudes

Almost 90% of respondents stated that they need the forest very much. Similarly, 87% see it as very important. Perceived importance does not change when asked about their children's future: 82.5% believe the forest will be very important for their children when they are grown. The majority of respondents are content with how they can use the forest: 56% of respondents said that they were very happy with how they are allowed to use the forest, 34% said that they were somewhat happy, and 23.5% said that they were not at all happy. The majority of respondents (56%) also worry very much about current resource availability. The level of worry about resource availability does not change when people think about their children's future; 57% worry very much about resource availability for their children. Respondents were not systematically asked *why* they responded the way they did (e.g. why do they need the forest so much); of the 50 people who elaborated on their attitudes, 28 gave "self-oriented" reasons, associated with consumption purposes such as firewood, water and timber resources, and 32 gave "ecology-oriented" reasons, associated with ecological services like rain, shade and protection from wildlife. This question would be included in future research.

Attitude covariance

A number of attitudes co-vary with each other (Table 3.5). Current and future importance are positively and strongly associated with each other and both are positively associated with perceived level of need and level of happiness. Current worry is positively associated with need and future worry.

Demographic correlates to attitude

Younger people feel they need the forest more than older people ($\rho = 0.187$, $p = .008$). It may be the case that these respondents either already have a family or are planning to have one, and therefore see the forest as a potential resource base for their expanding family. Interestingly, the more children a respondent already has, the less worried s/he is, both currently and for the future ($\rho = -.0174$, $p = .014$; $\rho = -0.239$, $p = .001$). In this case, worry may be reduced by the presence of helpers.

Multiple attitudes are influenced by the presence of a female young adult child (age 12-18): both current and future worry increase ($U = 2828.500$, $p = .01$; $U = 2941.500$, $p = .028$) as does one's level of perceived current importance ($U = 3231.000$, $p = .036$). Interestingly, one's level of happiness *decreases* ($U = 3005.000$, $p = .048$). Also, the presence of a male child (age 5-11) increases both current and future worry ($U = 3154.000$, $p = .042$; $U = 2659.000$, $p > .001$). These results may stem from the fact that female children are future resource collectors and, given their age, will soon have their own family, again with more mouths to feed. Perhaps respondents with male children are concerned about the ways in which their sons will make money and provide for their future families (albeit years away).

Knowledge-based correlates to attitude

There are significant associations between attitudes and specific rules given (Table 3.6). Respondents who stated rules (1, 3-7) are more likely to need the forest very much and perceive the forest as very important for their children in the future. In contrast, respondents who stated that it was illegal to collect firewood in the forest (2) were *less* likely to say that they need the forest very much or that it will be very

important to their children. Respondents who did not know (or give) *any* rules are also less likely to say that they need the forest very much and that the forest will be very important in the future.

In contrast to Johnson's 1996 findings, which suggested that lack of awareness about rules is associated with inappropriate resource use, this last result suggests that people *believe they can't* use the forest (as evidenced by their belief that firewood collection is illegal) because they *don't use* the forest (as evidenced by their perceived lack of need). In this case, people may in fact get along just fine without using the forest, so there is no cost to assuming they cannot use it. Without actual behavioral data, however, it cannot be verified whether these perceptions are driven by a true lack of necessity or by misinformation by the National Forestry Authority.

Formal and informal education are both correlated with attitudes. Perceived need for and future importance of the forest decreases with education ($\rho = -0.232$, $p = .001$; $\rho = -0.217$). This suggests that formal education increases awareness about the benefits received from the forest. Respondents who reported being involved in a community group more likely to need the forest very much ($U = 4135.500$, $p = .019$) and to worry more about future resource availability ($U = 3671.500$, $p = .011$). Although most community groups mentioned were not strictly environmental education-based, they still constitute important outlets of information. As many of the groups are agriculture and health-related, they are likely to deal with several environmental issues, such as water availability and purity, and health-related aspects of firewood use. Thus, that people involved in community groups have a high perceived need for the forest suggests these community groups are relaying information on natural resource status. The level of

expressed worry, however, suggests that there may be a lack of empowering information about alternative resource bases. Such worry may also suggest that while community groups make people aware of the current availability of forest resources, they also stress their potential to decline.

Proximity and perceived use-value correlates to attitude

Respondents living close to the forest (> 725 meters, n= 84) are more likely to report needing the forest more than those who live farther away (726- 1369 meters, n= 80) (U= .155, p = .048); those living in close proximity to the forest are also more likely to see the forest as more important for their children in the future (U= .170, p = .029). Given that accessing forest resources is logistically easier (in terms of the time needed to reach them) for people who live closer to the forest edge than those who live far, these attitudes make sense: for these villagers, the forest is a tangible, discernable resource.

Respondents who stated that wood is a resource generally obtained from the forest (*not* that they themselves routinely collect there), are more likely to need the forest very much (U= 4472.500, p= .022) and consider it very important, both currently and in the future (U= 4322.000, p= .008; U= 4093.000, p= .001). There was no association between self-reported forest-resource use and attitude. Respondents who reported that they have enough trees are more likely to say that the forest will *not* be too important to their children in the future (U= 3734.000, p =.04), and the level of worry for their children (but *not current* worry) decreased (U= 3076.500, p= .013). These findings provide strong support for tree-planting initiatives, which aim to relieve pressure on the forest and reduce reliance on the trees for firewood.

Co-variation among independent and dependent variables

As shown above, age and education, which are positively correlated with each other, are both positively correlated with one's perceived need of resources. Further, community group participation and education level, which are positively associated with each other, are also both positively correlated with perceived need of resources. Additional statistical analysis possibilities are limited: Because data (particularly age and education) are coarsely categorized, OLS regression is inappropriate, and because the data are severely skewed (with 186 out of 201 respondents saying they need the forest "very much"), the results of multinomial logistic regression (conducted in SPSS) suggest that the validity of the model fit is uncertain. Nonetheless, this lack of statistical output points to the importance of a broader contextual explanation for the ways in which people responded to the attitudinal questions, as discussed below.

Discussion

This study supports the proposition that demography (age, household composition), knowledge (formal education, knowledge of rules, and community group participation), and utility (proximity) are important predictors of attitudes towards natural resources. For programs wanting to include local in resource management, these correlates are critical and may help reduce the amount of "participatory" rhetoric in forest management regimes (Soto et al 2001). Knowledge of these attitude associations has the potential to inform community-based natural resource management initiatives may increase local inclusion by:

- Providing correct and reliable information about sustainable resource alternatives, both forest and non-forest based.

- Incorporating the needs of families at both early stages (young parents may need to know where and how to get resources) and later stages (older parents may need support in assisting their young adult female children *learn* where and how to obtain resources)
- Paying specific attention to women who do not know their full rights to forest usage and legal firewood collection areas.
- Increasing funding for tree planting programs.

That a quarter of respondents stated that they could *not* collect firewood is discouraging. The NFA representatives I spoke with vehemently said that locals are welcome to collect firewood in the forest, as long as no trees or branches are cut. My data suggest that the NFA has not provided adequate information to villagers. This is not surprising, however, given that there is *one* forest officer for the entire district (as well as a personal conversation with him where he nearly threw up his hands and suggested his job was worthless). Further, a gender-sensitive education (and empowerment) campaign is needed, illustrated by the number women who stated that they did not know any rules of the forest.

Another implication of this study is that, independent of respondents' demographic traits, knowledge base, proximity, and perceived utility of the forest, it is possible that respondents may be giving a "normatively right" response, or simply the response that he/she believes the researcher wants to hear (Embree and Whitehead 1993; Stocke and Hunker 2007). Indeed, Ross and Mirowsky (1983) warn that such biased responses are much more than an artifact of methodology; they claim that the tendency to give normatively right answers is much more prevalent among under-voiced and

powerless groups, a characteristic befitting of poor, rural villagers in Uganda. This is, in fact, a serious methodological issue that must be recognized within conservation research, so much of which is conducted in underprivileged communities. Still, as Chokor (2004) stresses, voicing personal concerns is critical, particularly in developing-world contexts, in creating empowered local resource-users and decision-makers.

Conclusion

These results suggest that there are demography-based, knowledge-based, and proximity and perceived-utility factors associated with attitudes of Kibwona villagers, and that these factors can be used to increase local inclusion in natural resource management efforts. What these results *do not* suggest is the extent to which individuals with these traits will actually *behave* in ways that are positive for natural resource conservation. Thus, while attitudinal studies are a useful tool for gauging perceived need of resources, assuming that perception equals real behavior is naïve; indeed, often humans do not do what they say, nor say what they do (Eagly and Chaiken 1993; Ehrlich 1973). This is a major assumption underlying attitudinal research, and may be dangerous, particularly when people are directly dependent on their local natural resources. Attitudinal studies have limited usefulness for determining *actual dependency* on the forest for tangible resource items. Actual behavioral data should be collected to complement these attitudinal data.

Table 3.1: Excerpt of interview questions

Name, gender, age, clan
Are you married?
How many children do you have (age, gender)?
How much schooling have you had?
Are you involved in any community groups?
What is your job? Do you have other sources of income?
Do you own your own land?
What resources are used from the forest?
What do you use from the forest?
What are the rules of the forest? Are they adequate for taking care of the forest? Are there enough trees in Kasokwa Forest?
How happy are you with how much you are allowed to use the forest?
How much do you need the forest?
How important is the forest to you and your family right now?
How important will the forest be your children when they are grown?
How worried are you about resource availability for your family right now?
How worried are you about resource availability for your children when they are grown?
POSSIBLE ANSWERS: Very Much, somewhat, not at all

Table 3.2: Factor analysis of attitude measures

Current importance	0.4641349	-0.1524468
Need	0.8130935	-0.201598
Future importance	0.4366232	-0.24209771
Current worry	0.4407747	0.774481982
Future worry	0.1805277	0.332596716

Extraction Method: Principal Axis Factoring

Table 3.3: Population descriptive statistics

<u>Gender</u>	<u>Total kids</u>	<u>Family composition</u>
Men n=65 (32.3%)	0 n= 26 (12.9%)	% households with at least 1:
Women n=136 (67.7%)	1-3 n=79 (39.3%)	Infant (> 1 year)
	4-6 n=53 (26.4%)	Male 8%
	7+ n=42 (20.9%)	Female 6.5%
<u>Age</u>		
18-26 n=57 (28.4%)		Toddler (1-4 years)
27-39 n=72 (35.8%)	<u>Household Size</u>	Male 26.4%
40-49 n=23 (11.4%)	1-4 n=93 (46.3%)	Female 23.9%
	5-8 n= 84 (41.8%)	
	9+ n= 23 (11.4%)	
<u>Job</u>		
Farmer n=145 (72.1%)		Children (5-11 years)
Informal n= 22 (10.9%)	<u>Religion</u>	Male 25.4%
Formal n =33 (16.4%)	Catholic n=100 (49.8%)	Female 37.8%
	Protestant n=79 (39.3%)	
	Pentecostal n=11 (5.5%)	
	Muslim n=10 (5%)	Young adult (12-18 years)
		Male 19.9%
		Female 23.4%

Table 3.4: Stated rules of the forest

	% of sample
Incorrect rules	
1. Can't enter forest	2%
2. Can't collect firewood	26%
Correct rules	
3. Can't cut trees	54%
4. Can't hunt	12%
5. Provides ecological benefits	8%
6. Can't burn charcoal in forest	7%
7. If cut a tree, plant another	14%

Table 3.5: Attitude-attitude correlation

		Current importance	Need	Future importance	Current worry	Future worry
Happy	<i>Corr. coeff.</i>	.209		.240	(-).203	
	<i>Significance</i>	.003		.001	.004	
Current importance			.413 .000	0.461 .000		
Need				.487 .000	.160 .023	
Current worry						.500 .000

Table 3.6: Attitude-rules correlation

	% of sample	Need	Future Importance	Future Worry
INCORRECT RULES				
1. Can't enter forest	2%	U= 7.917 df=2 p=.019	U= 9.451 df=2 p = .009	
2. Can't collect firewood		U= 8.254 df=2 p=.012	U= 11.907 df=2 p=.003	
	26%			
CORRECT RULES				
3. Can't cut trees	54%	U= 8.328 df=2 p=.016	U= 9.640 df= 2 p=.008	
4. Can't hunt	12%	U= 7.795 df= 2 p=.020	U= 11.907 df= 2 p=.010	
5. Provides ecological benefits		U= 8.291 df= 2 p=.016	U= 9.168 df= 2 p=.010	
6. Can't burn charcoal in forest	8%	U= 8.254 df= 2 p=.016	U= 9.268 df= 2 p = .010	
7. If cut a tree, plant another	7%	U= 8.218 df= 2 p=.016	U= 9.168 df= 2 p=.006	U= 6.464 df= 2 p=.039
	14%	U= 3225.000 df= 2 p=.005	U= 3024.000 df= 2 p= .003	
Did not know any rules	24%			

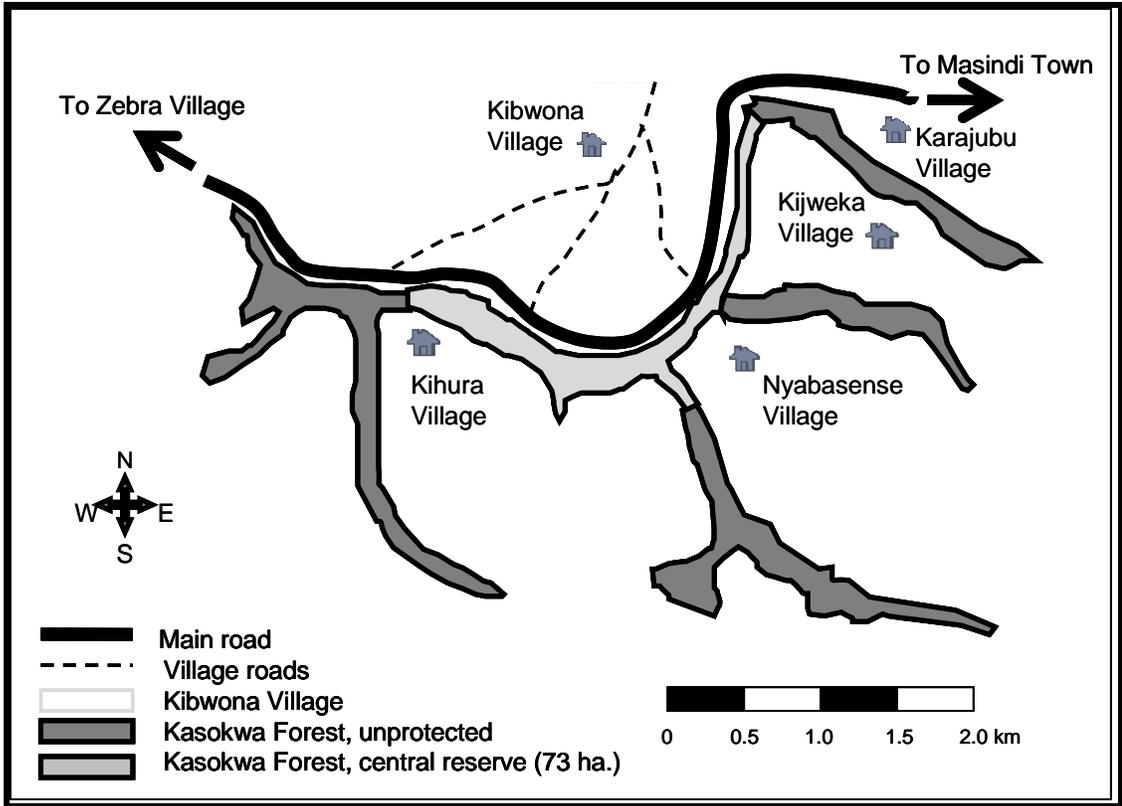


Figure 3.1: Map of Kasokwa Central Forest Reserve, community forests and surrounding villages

References

- Bazaara, N. (2003). Decentralization, Politics and Environment in Uganda. *Environmental Governance in Africa Working Papers: WP #7* eds. J. Ribot. and J. Lind. Washington D.C., World Resource Institute.
- Chokor, B. (2004). Perception and response to the challenge of poverty and environmental resource degradation in rural Nigeria: Case study from the Niger Delta. *Journal of Environmental Psychology* 24: 305-318.
- De Boer, W. and Baquete, D. (1998). Natural resource use and attitudes of the local population around the Maputo Elephant Reserve, Mozambique. *Environmental Conservation* 25(3): 208-218.
- Dolisca, F., Carter, D., et al. (2006). Factors influencing farmers' participation in forestry management programs: A case study from Haiti. *Forest Ecology and Management* 236(2-3): 324-331.
- Dolisca, F., McDaniel, J., et al. (2007). Farmers' perceptions towards forests: A case study from Haiti. *Forest Policy and Economics* 9(6): 704-712.
- Eagly, A. and Chaiken, S. (1993). *The Psychology of Attitudes*. Fort Worth, Harcourt Brace Jovanovich College Publishers.
- Embree, B. and Whitehead, P. (1993). Validity and reliability of self-reported drinking behavior: Dealing with the problem of response bias. *Journal of Studies on Alcohol* 54(3): 334-44.
- Ehrlich, H. (1973). Attitudes, behavior, and the intervening variables. In: *What We Say/What We Do. Sentiments and Acts*. Ed. I. Deutscher. Glenview, Foresman and Company.
- Fiallo, E. and Jacobson, S. (1995). Local communities and protected areas: attitudes of rural residents towards conservation and Machalilla National Park, Ecuador. *Environmental Conservation* 22: 241-249.
- Gelcich, S., et al. (2005). Importance of attitudinal differences among artisanal fishers toward co-management and conservation of marine resources. *Conservation Biology* 19(3): 865-875.
- Gibson, C., et al. (2000). *People and Forests: Communities, Institutions and the Governance of Forests*. Cambridge, MIT Press.
- Hill, C. (1998). Conflicting attitudes towards elephants around the Budongo Forest Reserve, Uganda. *Environmental Conservation* 25(3): 244-250.

- Holl, K., et al. (1995). Knowledge and perceptions in Costa Rica regarding environment, population, and biodiversity issues. *Conservation Biology* 9(6): 1548-1558.
- Infield, M. and Namara, A. (2001). Community attitudes and behavior towards conservation: An assessment of a community conservation program around Lake Mburo National Park, Uganda. *Oryx* 35(1): 48-60.
- Johnson, K. (1996) Hunting in Budongo Forest, Uganda. *SWARA* Jan-Feb: 24-26.
- Kaiser, F., Wolfing, S. and Fuhrer, U. (1999). Environmental attitude and ecological behaviour. *Journal of Environmental Psychology* 19: 1-19.
- Lepp, A. (2007). Residents' attitudes towards tourism in Bigodi village, Uganda. *Tourism Management* 28: 876-885.
- Mehta, J. and Heinen, J. (2001) Does community-based conservation shape favorable attitudes among locals? An empirical study from Nepal. *Environmental Management* 28(2): 165-177
- Mehta, J. and Kellert, S. (1998). Local attitudes toward community-based conservation policy and programmes in Nepal: A case study in the Makalu-Barun Conservation Area. *Environmental Conservation* 25(4): 320-333
- Muhereza, F. (2003). Commerce, Kings and Local Government in Uganda: Decentralizing Natural Resources to Consolidate the Central State. *Environmental Governance in Africa Working Papers: WP #8*. Eds. J. Ribot and J. Lind. Washington D.C., World Resource Institute
- Ormsby, A. and Kaplin, B. (2005). A framework for understanding community resident perceptions of Masoala National Park, Madagascar. *Environmental Conservation* 32(2): 156-164
- Parry, D. and Campbell, B. (1992). Attitudes of rural communities to animal wildlife and its utilization in Chobe Enclave and Mababe Depression, Botswana. *Environmental Conservation* 19(3): 245-252
- Portes, A. (1971). Political primitivism, differential socialization and lower-class radicalism. *American Sociological Review* 36(5): 820-835
- Power, S. (1993). Indigenous views of nature. *Journal of Environmental Psychology* 13: 263-266
- Reynolds, V., et al. (2003). Fragments, sugar and chimpanzees in Masindi District, western Uganda. In: *Primates In Fragments: Ecology and Conservation*. Ed. L. Marsh, Kluwer Academic/Plenum Publishers
- Ross, C. and Mirowsky, J. (1983). The worst place and the best face. *Social Forces* 62(2): 529-536

Saito, F. (2000). Decentralization in Uganda: Challenges for the 21 Century. Kampala, Center for Basic Research

Sekhar, N. (2003). Local people's attitudes towards conservation and wildlife tourism around Sariska Tiger Reserve, India. *Journal of Environmental Management* 69: 339-347

Soto, B., et al. (2001). Perceptions of the forestry and wildlife policy by the local communities living in the Maputo Elephant Reserve, Mozambique. *Biodiversity and Conservation* 10: 1723-1738

Stocke, V. and Hunkler, C. (2007). Measures of desirability beliefs and their validity as indicators for socially desirable responding. *Field Methods* 19(3): 313-336

Watkins, C. (2006). Local ecological perceptions of chimpanzees and forest resources: A case study near Budongo Forest, Uganda. In: *Primates of Western Uganda*. Eds. N. Newton-Fisher, H. Notman, J. Paterson, and V. Reynolds. London, Kluwer

Chapter 4

Natural resource use strategies in a forest-adjacent Ugandan village

Abstract

This study documents natural resource use in a forest-adjacent western Ugandan village, and explains how what superficially appears to be a sustainable scenario is in fact quite unstable. Kibwona village is adjacent to Kasokwa Forest, comprised of a small Central Reserve owned by the National Forest Authority (NFA) and several contiguous community forests. Firewood and water collection is legal and locals report using them. Empirical observations of women's daily activity budgets and details of resource acquisition, storage, and consumption show that actual resource collection, however, is minimal. On average, women spent less than 5% of the time collecting natural resources (firewood, water, plant materials for cooking, etc). This is true for resources both in and out of the forest. This may be simply because firewood within household compounds, gardens and woodland-bush areas is abundant, accessible, and closer than the (also close) forest. However, two additional reasons for this behavior that initially appear to support forest protection may, in fact, hinder long-term sustainability: (1) Many locals also plant trees for firewood, poles, and timber. Although eucalyptus (an increasingly desired tree to plant) is fast growing and makes good firewood, it is water-draining and hard on the

soils- a high cost to subsistence farmers. (2) Fears of harassment by the NFA officials upon collecting firewood inhibit locals from even entering the forest. We must address the fact that people are afraid of NFA. Decentralized, collaborative forest management will not happen under such oppressive and fear-based relationships, nor can a sustainable firewood supply be based on eucalyptus.

Key words: Forest, Uganda, firewood and water, observed behavior

Introduction

The global importance of forests

Forest degradation is touted as one of the most urgent issues threatening global biodiversity today. In the east African country of Uganda, 24% of the land area is considered to be forested (Kayanja and Byarugaba 2001). Further, while it comprises only 2% of the world's total surface area, Uganda has over 11% and 7% of the world's known bird and mammal species, respectively (EASD 1996). In sum, Uganda is one of the most biodiverse countries in all of Africa, and the majority of this biodiversity is located in forested areas (Pain 2005). Budongo Forest Reserve, in the western region, is particularly rich in tree biodiversity (Eilu et al 2004). Even forest fragments that were once connected to larger forests are considered extremely important in terms of biodiversity conservation (Chapman et al 2007).

People, particularly those living in poor, rural areas, often rely directly on forest ecosystems for resources. Forest degradation negatively affects those who are unable to participate in and benefit from the larger global market economy (Sunderlin et al 2005). Thus, those individuals instead rely entirely on local natural resources for their

livelihoods, using fuelwood, medicine, water, timber, and non-timber products such as grasses and herbs. Fuelwood is *the* primary source of energy in Uganda, and indeed across much of Africa (Brouwer and Faclao 2004; Tabuti et al 2003; Marufu et al 1999; Kersten, et al 1998; Benjaminsen 1997). This reliance is said to be one of the major causes of both deforestation and fuelwood scarcity (Benjaminsen 1997; Cooke et al 2008).

Ugandan firewood and forest dependency

Uganda's Ministry of Water, Lands and Environment considers woodlands (including savanna, bush and even grassland landscapes) as "open forests" (MWLE 2002) and this definition is accepted in most research (e.g. Kayanja and Byarugaba 2001). It has been shown, however, that ecological surveys conducted by the National Forestry Authority (NFA) in and around Budongo Forest do *not* take woodland areas into account when creating forest management policies (Nangendo et al 2005). Further, the majority of Uganda's 'woodland vegetation' is unprotected and is not under any institutionalized management framework (Namaalwa et al 2007). While it is recognized that 'forest' is notoriously undefined (Chokkalingham and De Jong 2001; Geores 2003; McElhinny et al 2005) this lack of definition incites the need for a clearer understanding of just where people are collecting their resources.

Case study

Kasokwa Forest, a forest fragment once contiguous with Budongo Forest, is home to five primate species, including endangered chimpanzees. The forest is composed of a 72 hectare Central Reserve, owned and managed by NFA and contiguous unprotected forest fingers (various sizes, >100 hectares) that are either privately-owned or

communally-owned (e.g. by a clan) (Figure 5.1). The riverine habitat within the forest is an important water source for the people and wildlife, as well as the nearby sugarcane factory (Reynolds et al 2003). There is no doubt that effective forest management is important in this area. There exist ongoing efforts to gain joint-ownership between the National Forestry Authority (NFA) and local community groups (a proposal was under review, at the time of this study, and was still under review in August 2008).

Although people living around Kasokwa cannot cut trees in the forest reserve or sell any forest resources collected from it, they have free and legal access to firewood and non-timber products, including water, herbs, grasses and fibers for basket weaving. These rules, and who made them, are fairly well understood and respected in Kibwona, a village of about 1000 people bordering the northern side of Kasokwa. Compared to men, however, women tend to either not know the rules, be hesitant to voice their knowledge of them or simply misunderstand them (see chapter 3; Watkins, unpublished dissertation data). Further, there are accounts of individuals, mostly women, being harassed by NFA officials while they were in the forest collecting wood.

Villagers in Kibwona say that there used to be more forest tree species in the village but they have since been cut and used. Some land owners on the southern side of the forest have maintained forest trees in the contiguous forest “fingers” that are not part of the formal reserve. Others have converted their land into subsistence crops, still others have bought into the sugarcane outgrower schema offered by Kinyara Sugarworks as a promising means of income enhancement. While two or three Kibwona residents do grow sugarcane, it is predominantly found on the southwestern side of the forest, around and beyond Kihura village and leading directly to Kinyara Sugarworks estate and factory

to the west. This change in land use has decreased the amount of available subsistence farmland, and increased antagonistic perceptions of chimpanzees and baboons (whose crop-raiding behaviors are well documented around Budongo Forest, although not empirically in Kasokwa) (Reynolds et al 2003). Land-use changes may also contribute to a decrease in firewood availability.

Research Goal

In this rural forest-adjacent village, there are high stakes for both human resource needs and biodiversity preservation. Understanding resource use strategies of forest-adjacent people will lead to relevant and sustainable natural resource management. Thus, I ask, to what extent are forest-adjacent locals dependent on forest resources? I describe self-reported and observed resource use in Kibwona village and analyze them in light of various demographic, socio-economic, environmental, and institutional variables.

Methods

In order to test for season effects, data were collected between January and July 2007, a period including part of the dry season (January-March), the wet season (April-June), and a light rainy period (July). With the help of my long-time field assistant, Joseph Karamagi, I conducted 201 semi-structured interviews (136 women and 65 men). Each interview consisted of over 40 closed- and open-ended questions and lasted 30-60 minutes, depending on the interviewee's inclination to talk. To test their correlation with observed resource use, I collected extensive demographic (age, gender, number and gender of children, overall household size) and socio-economic data (income type(s), house type, ownership of land and livestock) as well as self-reported individual and

household-level resource use. GPS data on house location and distance to the forest were also recorded.

Given their role as the primary resource users in the domestic setting, I chose to observe the behaviors of women only. After each interview with a woman, I requested permission to return in the near future for an “informal household visit.” Efforts were made to make this as vague and informal as possible; a return visit was not guaranteed. After 10-15 interviews, I randomly selected a woman from this interview set to observe within the next 4-5 days. For approximately 6 daytime hours, I used focal and continuous sampling methods to measure all activities conducted by the focal women¹. I conducted 69 observation sessions. Interview and observation data were recorded by hand on a data collection sheet and later coded and entered into SPSS.

Seven categories of behaviors were recorded. ‘*Self-maintenance*’ included bathing and sleeping. ‘*Food processing*’ included washing, peeling, drying, cutting, arranging and cooking all food items. It also included overseeing a cooking meal and managing the fire. ‘*Household maintenance*’ included sweeping. ‘*Working in garden*’ was recorded for crop preparation and harvesting in the household’s subsistence crop area. ‘*Socializing*’ was recorded for interactions with both adults and children. If a woman was, for example, peeling cassava while conversing with a neighbor, food processing was recorded, not socializing. ‘*Resource collection, non-forest*’ included natural resource

¹ Although preparing food for guests is an important Ugandan tradition, upon arrival to the chosen household, all household members were told *not* to cook food for us and to simply go about their usual routine. Of course, we had some women sneakily bring us food which, at that point, we could not refuse. We partook in conversation with women if it ‘felt’ (to us) like it would not interfere with their activity. Although we brought binoculars and a bird book to busy ourselves and appear as if we were not solely watching the woman’s activities, our presence undoubtedly had some affect on the women’s chosen activities. In terms of resource use and collection, however, daily activities can not be avoided- there are children and husbands to feed and household compounds to keep tidy.

accrual on one's own land, in surrounding woodland-bush areas (boundaries between neighbors' land), well areas, and private and communal Eucalyptus tree lots. '*Resource collection, forest*' was recorded when someone entered Kasokwa Forest and returned with a natural resource like wood or water. Other information such as how long the cooking fire burned, and any help obtained from children or other adults was also recorded.

These data complement information on actual forest entry that was collected July-August, 2006. This information was collected by my field assistant, Karamagi, who posted himself at each of the 6 forest entries on the Kibwona-side of the forest for 6 days a week, 8 hours a day. He recorded the time, gender and age category (adult or child) of all individuals going in to and coming out of the forest, what they brought in and what they took out. No names were asked or recorded. He also recorded primate activity around the entries which helped divert unnecessary worry about his activities.

Results

Descriptive Statistics

Sixty five men and 136 women were interviewed; 69 of the women interviewed were observed. The age range of respondents was 18 – 49 years old. Although seventy two percent of respondents considered their primary job to be farming, 11% of respondents had “informal” jobs, e.g. ran a shop, provided tailor services or conducted day labor. Sixteen percent of respondents had formal jobs, primarily working at Kinyara Sugarcane Factory. Forty six percent of households consisted of between 1-4 people; 42% consisted of 5-8, and 11% consisted of 9 or more members. Forty-nine percent of

respondents were Catholic; 39% were Protestant, 6% were Pentecostal, and 5% were Muslim. Nearly every respondent attended a religious service at least once a week.

Self-Reported Resource-Related Behaviors

Self-reported resource use did not differ significantly between men and women. The majority of respondents reported never having entered the forest in the last week and that firewood was collected from their own property. About 20% of respondents stated that they collected firewood from non-forest areas in the village. Kasokwa Forest was the least-reported location of firewood collection. When the question was rephrased, however, to “What *do people in general* use from the forest?” 41% said that they use wood from the forest. This suggests that while respondents may not actually use the forest as a firewood source, they acknowledge it as a *potential* resource base (Table 4.1).

About half of the women stated that they use 3-5 twenty-liter jerry cans of water each day. The majority of respondents, both men and women, stated that they collect their water from the village wells. Twenty percent of all respondents, and 25% of the 69 women eventually observed, however, did report collecting water from the forest (from both the river and spring wells within the forest).

Sixty-seven percent of people said that they had planted trees in their compound. *Eucalyptus sp.* (28%), *Markhamia lutea* (26%), and *Maesopsis eminii* (26%) were the three dominant choices, with *Acacia sp.* (19%) and *Pinus sp.* (11%) following. Forty-seven percent said that they planted the trees to use the wood as firewood, timber, and/or land markers, 10.9% said that they planted trees specifically to sell the wood, and 12.9%

said that the trees were planted to assist with rain production, create shade, and block wind.

Observed Behaviors

On average, over 32% of time was spent being idle, bathing, sleeping or socializing. Twenty-two percent of time was spent maintaining the home (Figure 4.2). (It is possible that our presence may have inflated the time spent on these activities). About 25% of the time was spent processing food and only 5.5% of the time was spent in the garden (those who did go to the garden spent an average of 30% of their time there). Time spent in the garden was *not* significantly correlated with seasonality.

Given the amount of time spent processing food, it is no surprise that women had a fire burning almost 50% of the time- only 10% of the observed women never lit a fire. These data suggest that women multi-task; they monitor the fire over which food is cooking but also move around and conduct other activities. Most homes (85%) had traditional 3-stone open fire pits. Only four women used fuel-efficient, 'modern' stoves and five used charcoal stoves (Figure 4.3).

The average amount of time women spent collecting natural resources was 4.8% (29% of women), and from the actual forest, a mere 0.7% (3% of women). While almost 80% of the observed women accumulated up to two twenty-liter jerry cans of water (one or two cans *less* than they stated they usually collect), most water was actually collected by one or more of her children. Help from children, mothers, mother-in-laws, sisters, neighbors, etc. was observed in 38% of the sample.

Twenty-four firewood types, including trees, plants and crop residues, were stored at the home (Table 4.2). The number of *tree* species stored, in particular, is much greater than the number of tree species actually planted (suggesting non-planted, naturally occurring species are still available, accessible, and used). It is interesting to note, in light of the trees *planted*, that the top three species are *mangifera indica*, *markhamia lutea*, and *celtis mildbraedii*, a crop species, a woodland-bush species, and a forest species, respectively (although the forest species may not have necessarily been collected from the forest proper). The amount of wood stored was substantial but variable: 40% said that it would last them up to 1 week, 17% said it would last up to 1 month, 16% said it would last only that day, and 14% said that they had enough to last them over a month (Figure 4.4). Although maize is a staple crop (78% of respondents had it in their gardens), only a handful of women had dried cobs (without kernels) stored for future use or were observed actually using them as supplementary fuel. Women said that cobs were not a primary fuel source but simply a means of starting a quick and hot fire.

Observed Forest Entry Data

Between July-August, 2006, 560 individuals were recorded entering Kasokwa Central Forest Reserve (Table 4.3). Overwhelmingly more females entered than males, and more (female) children entered than (male or female) adults. Individuals spent a very short amount of time in the forest, with the primary activity being water collection (as evidenced by jerry cans brought in). Only 8% came out with wood.

Variation in Behavior: What Matters?

Age, education level and participation in community groups were not significantly correlated with any observed or self-reported behaviors. The less a woman

said she entered the forest, the shorter her woodpile was said to last ($\rho=0.357$, $p=0.004$), and the shorter she burned her fire ($\rho=0.267$, $p=0.027$). The farther a woman lived from the forest, the shorter she said her woodpile would last ($\rho = -0.360$, $p=0.011$). This suggests that while women do not routinely go into the forest to collect firewood, they are also not stockpiling fuelwood from non-forest areas, as it is plentiful and easily accessible. Women who spent a longer amount of time in the garden were more likely to say that they collected their firewood from non-forest areas ($U= 284.000$, $p=0.027$). Conversely, those that spent little time in the garden were more likely to say that they buy their firewood ($U=280.000$, $p=0.023$). This simply suggests that the movement between the homestead and the garden easily allows for wood gathering along the way.

Proximity to the forest was not significantly correlated with daily time allocation. Household composition was, however: the more children a woman had, the less time she spent on self-maintenance ($\rho = -0.275$, $p= 0.024$). In terms of resource use, larger households had longer burning fires ($\rho=.243$, $p=.044$) and were more likely to plant trees than smaller households ($X_2= 4.858$, $df=2$, $p=0.088$), probably simply because they were cooking more food. Large households are more likely to plant eucalyptus ($X_2= 10.513$, $df= 2$, $p=0.005$) and *Markhamia lutea* ($X_2= 6.013$, $df=2$, $p=0.049$). Bigger families were also more likely to own their own land than were small families ($X_2= 8.614$, $df= 2$, $p=0.013$). Because larger families also have land, these data do not necessarily suggest that bigger families are actually *planning ahead* and planting trees for the *future*. Rather, they have more resources (land, maybe human capital, etc.) so they do not *need* to rely on the forest. That they are planting eucalyptus is both important and troublesome (see below).

Most villagers in Kibwona own their land, but those who do not use resources differently. Individuals not owning land are more likely to spend *less* time food processing (U=160.000, p=0.043) and were not observed collecting *any* natural resources (U= 180.000, p=0.041). These individuals may lack support, in the form of land, money and the physical help of nearby family members.

Discussion

Resource use and pressure on Kasokwa Forest: Are resources scarce?

These data clearly show that despite close proximity to the forest, knowledge of forest resources and their usefulness, and reported use of those resources, women do *not* rely on the forest for their daily natural resources. Instead, they rely on woodland-bush areas where ‘forest-type’ trees occur, their own planted trees and, to some extent, crop species and exotic tree plantations. Women spend little time collecting firewood and water and do not store large amounts of either resource. Wood that is stored is often only for ‘emergency purposes’ and consists of logs, stumps, and wet wood. People reported only collecting wood in the forest as a last resort, when they have wet, unusable wood or no wood at all. People said that these trips were said to occur only every couple of months or once or twice a year during the dry season (Dec-Feb) when a bounty of dry wood could be found in the forest. Further, while anecdotal information suggests that people (i.e. mothers and grandmothers) used to collect from the forest, they could be referring to a time when the main road was not there or when there were simply more forest-type tree species growing in the village.

The reduction of forest-type tree species is not only a cause for concern for the wildlife within the forest, but it may also be a sign of impending resource scarcity for the

surrounding people. During this study, however, women appeared to collect natural resources with ease, both in terms of distance and perceived acceptability. Informal firewood collection rules primarily included forbidding collection in well areas, and while people clearly did collect in these areas, there is minimal outright monitoring of firewood sources. People said it was acceptable to collect in the open areas between households, and even on someone else's land. For example, one person had recently cleared an area to prepare to plant sugarcane, and over the course of two weeks I witnessed women collecting wood from the area, undisturbed. The two or three village eucalyptus plantations were also open for firewood collection, although this may have been limited to clan members. Even though some people store their firewood inside, I was told that this was more to keep it dry than safe from thieves. Thus, these results suggest that, at this time, there is no scarcity of firewood for local domestic users in Kibwona.

In their study of the impacts of fuelwood use on biodiversity in a southwestern Ugandan forest, Naughton-Treves et al (2007) found that domestic consumers of firewood are the most sustainable users in the area because they use fast-growing species from surrounding fallow garden areas: Only 1.6% of people in their sample extracted wood from Kibale National Park and only 13.1% extracted wood from nearby forest patches on the perimeter of the park. In contrast, 10% of local gin distillers extracted from the national park and 80% used local forest patches. Other studies across Africa also find that while the rural population does rely on fuelwood for their daily energy needs, the wood is either (1) extracted from highland forest areas at a continuous but low

level and/or (2) collected from private or communal non-forested areas (Tabuti et al 2003; Kituyi et al 2001; Osei 1993).

Self-reported use of the forest is not completely congruent with actual use

People say that they generally do not use the forest and, for the most part, this is true. When asked about *people in general* (including themselves) use from the forest, however, people primarily mentioned wood, even though observations show water is the primary resource obtained from the forest. This illustrates the limitations of oral interviews for actual resource use information, but not in the way one might expect. Instead of minimizing a stigmatized activity, people *inflated* use of one resource (wood) and deflated the use of another (water) in their survey answers.

Three important factors explain this discrepancy. First, there is a huge *potential* benefit in the forest: wood as fuel, building poles, timber (even if the women themselves do not directly participate in the timber industry, they indirectly benefit via house building materials or monetary income brought in by their husbands). Second, water is abundant, particularly compared to other nearby villages where water shortages are known to occur annually. Water is a resource taken for granted, and people in Kibwona may feel lucky to have it and satisfied with their access to it. There is no cost to overestimating the amount of water used on a daily basis, as compared to firewood which may be more limiting. Finally, and perhaps most importantly, there may be a very real pressure to give the “normatively-correct” answer (Embree and Whitehead 1993; Stocke and Hunkler 2007), especially given the rural, undervoiced nature of the population (Ross

and Mirowsky 1983). In Kibwona, locals knew I was studying resource use, and by giving me an affirmative response, they may have believed they were effectively participating in the research. The importance of recognizing this phenomenon is often underestimated; as a result, policies and rules may inaccurately reflect the true behaviors of local resource users.

Fuelwood management strategies

Eucalyptus is fast-growing and is thus a desirable source for building poles and boundary markers and, while not as efficient as many indigenous species, fuelwood. Eucalyptus, however, is water-demanding and hard on the soil (Ong 2007) (this is not unique to exotics like Eucalyptus- there are indigenous species that are equally water demanding, for example *Cordia millenii*; Katende et al 1995). For subsistence agriculturalists that rely on natural rainfall to sustain their food crops, this species presents a conflict. Only individuals with plenty of land can afford to plant a sustainable eucalyptus woodlot; yet the NFA advertises the species as a viable alternative to indigenous species and even refers to eucalyptus woodlots as “forests” (NFA Range Manager, pers. comm.). It may be that eucalyptus, and pine for that matter, are seen as novel and “modern” species and are therefore more desired than indigenous species that, up until recently, have never needed to be artificially planted. Some countries are now, in fact, coming to realize the limitations of this particular species as the solution to deforestation and resource scarcity (Gahigana 2006).

Uganda is just one of many countries, however, to promote the planting of eucalyptus (e.g. India: Puri and Nair 2004; Thailand: Niskanen 1998; Chile: Lanfranco and Dungey 2001; Nicaragua: van den Broek et al 2000; South Africa: Gardner 2007;

Tanzania: Makundi and Okitingati 1995). It has been suggested that, in Kenya, competition for fuelwood from exotic tree lots (presumably due to population increases) might actually lead to a *return* to the use of forest species (Kituyi et al 2001). Given the high –and rising– price of fuels like kerosene, one potential alternative fuel, as well as parallel population growth issues in Uganda, the broader issue should be on how to ensure access to firewood for local populations through the management of potentially renewable resource bases, *including* woodland-bush areas. Thus, the findings of this paper are important because they represent a fundamental problem within the field of international forest conservation: An ever-growing firewood demand and the search for locally profitable and desirable solutions that are both sustainable and supportive of indigenous ecology.

Illegal activity in the forest does exist

Although there is neither frequent nor intense resource use by women, human activity in and around the forest does include sporadic and pronounced forest degrading activities. These activities are all illegal and include: logging, which opens up gaps in an already weak forest ecosystem; alcohol brewing near the forest river, leading to a polluted water source; and occasional hunting for small game that occasionally leads to accidental maiming and death of chimpanzees (Figure 4.5; Coombs 2007). Further, while legal if on private land, cutting down trees close to the forest border (to make room for agricultural crops and increasingly, sugarcane crops) is not only detrimental to the forest, but the close crops may exacerbate wildlife crop raiding events and even wildlife attacks on humans, although no empirical observations or measurements in the Kasokwa forest area have been documented (Reynolds 2005).

What can be done, then, to protect biodiversity and human livelihoods successfully? There is a need to recognize multiple resource user groups- individual domestic users are usually not to blame for most forest degradation. More effective monitoring and fair punishment are needed. Further, the National Forestry Authority's monitoring system is not only inadequate and under-funded (Turyahabwe et al 2007), it allegedly includes inappropriate intimidation of local and legal resource users. Far out of the scope of this paper but worth mentioning here is a reliance on international aid, particularly an ever-increasing tendency to depend on non-government organizations (NGOs) and other international funding institutions to create localized resource management systems in place of government responsibility (Schroeder 1999). This, in effect, takes the responsibility away from the central (and in this case, even the local) government to manage resources in an equitable way.

Conclusion

The methodology employed in this study (empirical observations of behavior) reveal a case in which locals have, in effect, begun to "take control" over their natural resource futures. They have done so despite their self-reported reliance on forest resources. In Kibwona, people are opting to plant their *own* trees for their resource needs rather than to use government owned resources, and they are doing so even when firewood is still nearby, abundant, and diverse. Is the situation too good to be true? It appears that not only is the forest being protected (for the most part), people are propagating their own resource base. Two points arise that suggest this may be a short term strategy, susceptible to collapse. First, the prevalence of eucalyptus is on the rise, and there remains debate about its sustainability in non-native environments, particularly

where subsistence farmers are dependent on fertile soils and water availability. While there is a need to commend this community's foresight and initiative to promote their own resource bases, there may also be a need for a broader management policy that incorporates private and communal woodland areas. Second, one reason people may not be using the forest is that they are, in fact, avoiding the risk of harassment. In conclusion, a system of resource management based on an exotic, soil-depleting tree and government persecution is neither equitable nor sustainable. A long-term, sustainable resource management plan should include indigenous trees that complement, rather than compete with, subsistence crops, as well as a relationship between government officials and locals that is based in trust and collaboration.

Table 4.1. Self-Reported Behaviors (n=201)

	Total
How often do you enter the forest?	
Never	78.6%
1-2x/week	7.1%
3-5x/week	10.0%
>6x/week	4.3%
Where do you get your firewood?	
Own property	61.4%
Non-forest woodland areas	19.4%
Buy it	12.9%
Forest	11.4%
None (use charcoal)	4.0%
Where do you get your water?	
Village wells	74.1%
Forest river and wells	20.9%
Village borehole	19.9%
Village tanks	3.5%
What do you use from the forest?	
Wood	41.3%
Water	15.9%
Non-timber products	10.9%

Table 4.2. Firewood Sources Observed in Households (n=69)

Species	Local Name	% Households	Type
<i>Mangifera indica</i>	muyembe	13	Crop
<i>Markhamia lutea</i>	musambia	10.3	Bush
<i>Celtis mildbraedii</i>	murongo	7.2	Forest
<i>Vernonia amygdalina</i>	ekibirisi	5.8	Forest/bush
<i>Lantana camara</i>		5.8	Exotic
<i>Cynometra alexandrii</i>	muhimbi	5.8	Forest
<i>Spathodea campanulata</i>	munyara	4.3	Forest/savannah
<i>Artocarpus heterophyllus</i>	ffene	4.3	Crop
<i>Ficus exasperata</i>	musomoro	4.3	Forest
<i>Psuedospondias microcarpa</i>	mukora	4.3	Forest
<i>Eucalyptus sp.</i>	kalituns	13	Exotic
<i>Blighia unijugata</i>	mwatibale	2.9	Bush
<i>Chrysophyllum albidum</i>	mululu	2.9	Forest
<i>Ficus mucuso</i>	mukomakoma	2.9	Bush
<i>Ficus natalensis</i>	mutoma	2.9	Forest
<i>Maesopsis eminii</i>	musizi	2.9	Forest/savannah
<i>Acanthus</i>	amatojo	2.9	Forest transition
<i>Combretum collinum</i>	murama	1.4	woodland
<i>Entada abyssinica</i>	mwiyora	1.4	Forest/savannah
<i>Lannea barteri</i>	mobengeya	1.4	Bush
<i>Sapium ellipticum</i>	mususa	1.4	Forest/woodland
<i>Stereospermum kunthianum</i>	mulemangundu	1.4	Forest/woodland
<i>Manihot esculenta</i>	mihogo	1.4	Crop
unknown		4.3	

Table 4.3. Observed Forest Entry (n=560)

	#	Total
Gender		
<i>Male</i>	81	15%
<i>Female</i>	260	46%
<i>Not recorded</i>	219	15%
Age		
<i>Child (<18 years)</i>	143	26%
<i>Adult</i>	76	14%
Time Spent		
<i><10 minutes</i>	503	90%
<i>11-30 minutes</i>	37	7%
<i>> 30 minutes</i>	3	1%
<i>Unknown</i>	16	3%

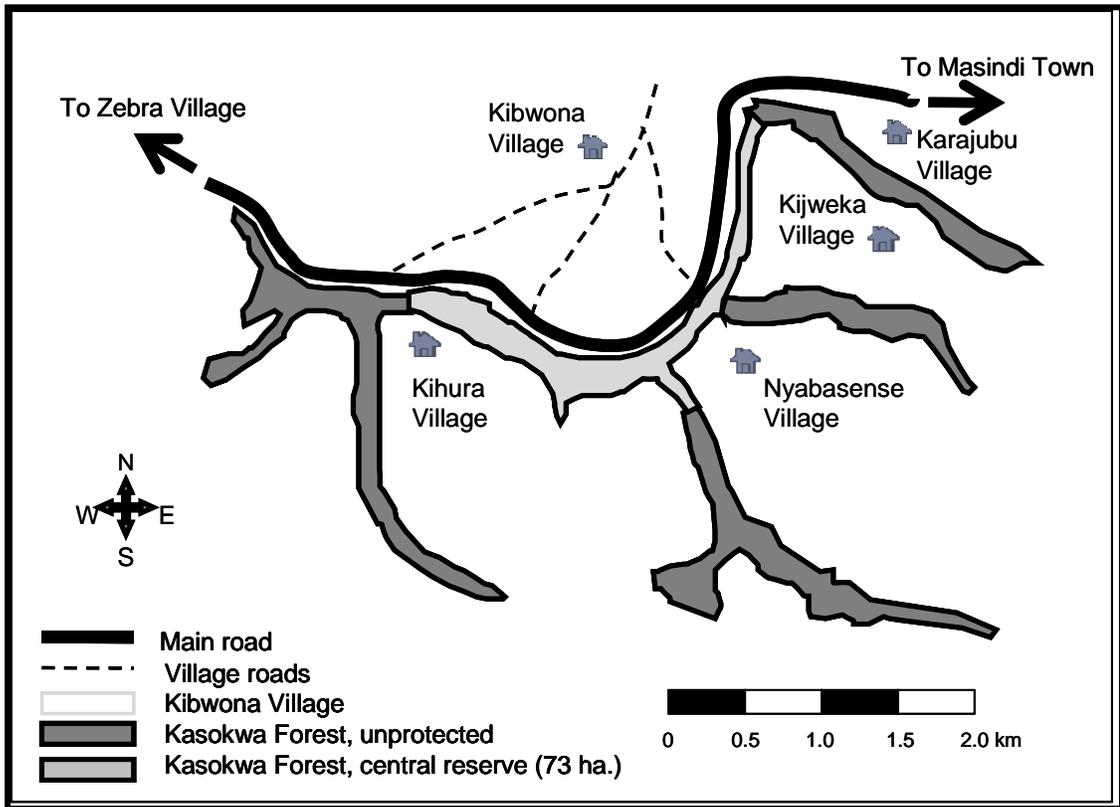


Figure 4.1 Map of Kasokwa Forest and Kibwona village (adapted from a map courtesy of Richard Kyamanywa).

Figure 4.2. Average percent of time spent on activities

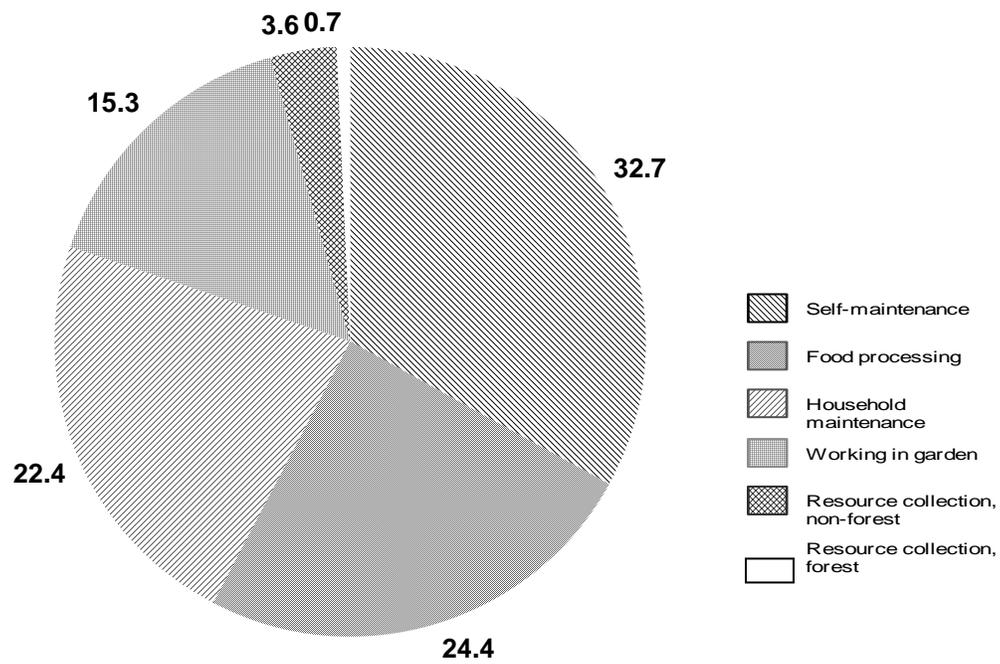


Figure 4.3: *Types of stoves* (from left): Modern fuel-efficient stove, charcoal stove, traditional 3-stone stove, paraffin stove.



Figure 4.4: Domestic Firewood.

Collection is minimal, storage is basic and dependency is high.



Figure 4.5: Harmful Forest Activities.

Top: A single illegal logging event produces substantial damage to the forest ecosystem.

Bottom: Unmonitored alcohol brewing at the edges of the forest river results in polluted residue seeping into the river.



Acknowledgements Accepted for publication in *Human Ecology*. As always, thank you to Joseph Karamagi, trusted field assistant and friend. My gratitude to Bobbi Low, Arun Agrawal, Howard Stein, Rebecca Hardin, the Bobbi Lab group, and two anonymous reviewers for useful comments throughout the writing of this paper. This research was funded in part by the Rackham Graduate School, the School of Natural Resources and Environment, and The Society for the Psychological Study of Social Issues.

References

- Benjaminsen, T. A. (1997). Natural resource management, paradigm shifts, and the decentralization reform in Mali. *Human Ecology* 25(1): 121-143
- Brouwer, I., L. Nederveen, et al. (1989). Nutritional impacts of an increasing fuelwood shortage in rural household in developing countries. *Progress in Food and Nutrition Science* 13: 349-361
- Chapman, C. A., L. Naughton-Treves, et al. (2007). Population declines of colobus in Western Uganda and conservation value of forest fragments. *International Journal of Primatology* 28(3): 513-528
- Chokkalingham, U. and W. De Jong. (2001). Secondary forest: a working definition and typology. *International Forestry Review* 3(1): 19-26
- Cooke, P., G. Kohlin, et al. (2008). Fuelwood, forests and community management - evidence from household studies. *Environment and Development Economics* 13: 103-135
- Coombs Wallace, A. (2007) Kasokwa Forest Project, Kasokwa Corner. *Budongo Conservation Field Station News* 8(3): 14-15
- Embree, B., Whitehead, P. (1993). Validity and reliability of self-reported drinking behavior: Dealing with the problem of response bias. *Journal of Studies on Alcohol* 54: 334-344
- EASD (1996). State of the environment report, Uganda, *Empowerment for African Sustainable Development*, Available at: http://easd.org.za?download.asp?path=Uganda_soe_1996.pdf&Is=File.
- Eilu, G., D. Hafashimana, et al. (2004). Density and species diversity of trees in four tropical forests of the Albertine rift, western Uganda. *Diversity and Distributions* 10: 303-312

- Gardner, R. (2007). Investigating the environmental adaptability of promising subtropical and cold-tolerant eucalypt species in the warm temperate climate zone of KwaZulu-Natal, South Africa. *Southern Hemisphere Forestry Journal* 69(1): 27-38
- Gahigana, I. (2006). No more eucalyptus trees, says official. *AllAfrica.com* 27 Sept Available at: <http://www.worldagroforestrycenter.org/af1/index.php?id=242&NewsID=A5693D35-1D9D-4197-A543-115948BD18C4>
- Geores, M. (2003). The relationship between resource definition and scale: Considering the forest. In *The Commons in the New Millennium: Challenges and Adaptation*. N. Dolsak, B. J. McCay and E. Elinor Ostrom, MIT Press: 77-98
- Gladwin, C. H., A. M. Thomson, et al. (2001). Addressing food security in Africa via multiple livelihood strategies of women farmers. *Food Policy* 26(2): 177-207
- Howard, P., T. Davenport, et al. (2000). Protected area planning in the tropics: Uganda's national system of forest nature reserves. *Conservation Biology* 14(3): 858-875
- Kayanja, F. I. B. and D. Byarugaba (2001). Disappearing forests of Uganda: The way forward. *Current Science* 81(8): 936-947
- Katende, A., et al. (1995). Useful trees and shrubs for Uganda: identification, propagation and management for agricultural and pastoral communities. *Technical Handbook-Regional Soil Conservation Unit, RSCU (Kenya)*, no. 10
- Kituyi, E., L. Marufu, et al. (2001). Biofuel availability and domestic use patterns in Kenya. *Biomass & Bioenergy* 20(2): 71-82
- Kersten, I., et al. (1998) Urban and rural fuelwood situation in the tropical rain-forest area of south-west Nigeria. *Energy* 23(10): 887-898
- Lanfranco, D. and H. Dungey (2001). Insect damage in Eucalyptus: A review of plantations in Chile *Austral Ecology* 26(5): 477-481
- Makundi, W. and A. Okitingati (1995). Carbon flows and economic evaluation of mitigation options in Tanzania's forest sector. *Biomass and Bioenergy* 8(5): 381-393
- Marufu, L., J. Ludwig, et al. (1999). Spatial and temporal variation in domestic biofuel consumption rates and patterns in Zimbabwe: implications for atmospheric trace gas emission. *Biomass & Bioenergy* 16(5): 311-332
- Mertz, O., R. L. Wadley, et al. (2005). Local land use strategies in a globalizing world: Subsistence farming, cash crops and income diversification. *Agricultural Systems* 85(3): 209-215

- MWLE (2002). National Biomass Study Technical Report of 1996–2002, Ministry of Water, Lands and Environment (MWLE), Uganda
- Namaalwa, J., P. L. Sankhayan, et al. (2007). A dynamic bio-economic model for analyzing deforestation and degradation: An application to woodlands in Uganda. *Forest Policy And Economics* 9(5): 479-495
- Nangendo, G., H. Ter Steege, et al. (2006). Composition of woody species in a dynamic forest-woodland-savannah mosaic in Uganda: Implications for conservation and management. *Biodiversity and Conservation* 15(4): 1467-1495
- Naughton-Treves, L., D. M. Kammen, et al. (2007). Burning biodiversity: Woody biomass use by commercial and subsistence groups in western Uganda's forests. *Biological Conservation* 134(2): 232-241
- Niskanen, A. (1998). Financial and economic profitability of reforestation in Thailand. *Forest Ecology And Management* 104(1-3): 57-68
- Ong, C. (2007). How much water do trees take? A new technology to measure trees water uptake has been unveiled. *Technews Africa* July: 22-23
- Osei, W. Y. (1993). Woodfuel and deforestation- Answers for a sustainable environment. *Journal of Environmental Management* 37(1): 51-62
- Pain, D. J., L. Fishpool, et al. (2005). Biodiversity representation in Uganda's forest IBAs. *Biological Conservation* 125(1): 133-138
- Puri, S. and P. Nair (2004). Agroforestry research for development in India: 25 years of experience of a national program. *Agroforestry Systems* 61: 437-452
- Reynolds, V., J. Wallis, et al. (2003). Fragments, sugar and chimpanzees in Masindi District, western Uganda. *Primates in Fragments: Ecology and Conservation*. L. Marsh, Kluwer Academic/Plenum Publishers
- Reynolds, V. (2005). *The Chimpanzees of Budongo Forest: Ecology, Behavior and Conservation*. Oxford, Oxford University Press
- Ross, C. and J. Mirowsky (1983). The Worst place and the best face. *Social Forces* 62: 529-536
- Stocke, V. & Hunkler, C. (2007). Measures of desirability beliefs and their validity as indicators for socially desirable responding. *Field Methods* 19: 313-336
- Schroeder, R. (1999). Community, forestry and conditionality in the Gambia. *Africa* 69(1): 1-22

Sunderlin, W. D. (2005). Special issue - Livelihoods, forests, and conservation. *World Development* 33(9): 1379-1381

Howard Stein (2003). Rethinking African development. In Ha-Joon Chang (Ed.) *Rethinking Development Economics*. London: Anthem Press

Tabuti, J., et al. (2003). Firewood use in Bulamogi County, Uganda: species selection, harvesting and consumption patterns. *Biomass & Bioenergy* 25(6): 581-596

Terry, A. and M. Ryder (2007). Improving food security in Swaziland: The transition from subsistence to communally managed cash cropping. *Natural Resources Forum* 31(4): 263-272

Turyahabwe, N., C. J. Geldenhuys, et al. (2007). Local organisations and decentralised forest management in Uganda: roles, challenges and policy implications. *International Forestry Review* 9(2): 581-596

van den Broek, R., T. ven den Burg, et al. (2000). Electricity generation from eucalyptus and bagasse by sugar mills in Nicaragua: A comparison with fuel oil electricity generation on the basis of costs, macro-economic impacts and environmental emissions. *Biomass and Bioenergy* 19(5): 311-335

Watkins, C. (unpublished data) *Attitudes towards Natural Resources in Uganda*, Dissertation Chapter

Whyte, M. A. and D. Kyaddondo (2006). "We are not eating our own food here": Food security and the cash economy in eastern Uganda. *Land Degradation & Development* 17(2): 173-182

Chapter 5

Why care about natural resources you don't use? How institutions influence attitudes and behavior

Abstract

A common tool in natural resource management is attitudinal surveys. They are seen as a mechanism of inclusion in management programs, as well as a predictor of actual resource use behavior. My work questions these arguments, suggesting rather that *independent of each other*, attitudes and behaviors are influenced by a third set of often-considered variables: Governance patterns and institutions. I compare resource users' attitudes towards their local forest and resource availability with their actual use of natural resources in a forest-adjacent village in western Uganda. I found that people's perceived "importance of" and "need for" the forest does not correlate with people's use of the forest; most respondents expressed extreme concern for the forest, yet most did *not* use the forest for resources. While there are several demographic correlations with expressed attitudes, there are very few patterns, demographic or attitudinal, with actual behavior. I explain this set of findings in light of (1) Uganda's historical governance transitions and the resulting instability, inefficiency and unreliability, and (2) the sometimes contradicting influence of natural resource management information via

community-based organizations and other conservation institutions. My work calls for a recognition of institutions as a fundamental influence on the formation of both attitudes and behavior, particularly in areas where people are directly dependent on local resources on a daily basis.

Introduction

Because natural resource conservation requires the involvement of local people, efforts often aim to inform people about desired conservation and management goals (Clad 1981; Adams and McShane 1992). Attitudinal surveys are a commonly used tool; they are thought to assess the effectiveness of such information campaigns, as well as to reveal support (or lack thereof) for management regimes, and to include people into programs (DeBoer and Baquete 1998; Dolisca et al 2006; Allendorf et al 2007). Underprivileged and under-voiced people, in particular, are believed to benefit from this inclusion (Chokor 2004). Clearly, surveys are useful for assessing local knowledge and for getting local resource users talking and involved, but the question remains: do stated attitudes correlate with actual behavior?

This study has two goals: To (1) explore how attitudes towards and knowledge of forest rules and resource availability compare to how people actually use the forest and natural resources, and (2) show how historical governance transitions and contemporary resource institutions influence both attitudes and behavior, in unique ways.

The study is important in several ways. First, social psychologists have experimentally shown that the relationship between attitudes and behavior is complex, often inconsistent and highly dependent on situational contexts (Eagly and Chaiken

1993). To understand resource use patterns, it is critical to determine expressed values and knowledge and actual behavior, but we also need to understand the external (social, political, etc) forces that influence what people say (or don't say) and what they do (or don't do). Second, we need to understand variable in context-specific ways; "blueprint solutions" to resource management issues have been discredited (Gibson et al 2000). This study of a forest-adjacent village consisting primarily of subsistence farmers, illustrates how historical governance transformations and various natural resource information sources can influence knowledge and psychological tendencies, in the form of expressed attitudes, and resource-use decisions, such that people are unsure what the current rules of the forest really are. In consequence, they rely on themselves and each other for resources and informational support.

Attitude Construction

The disciplines of psychology, economics and evolutionary theory, as well as the field of environmental studies concur that attitudes form as a result of perceived costs and benefits that result from material incentives and socio-cultural and institutional motivations (Power 1993; Kellert et al 1996; Kaiser et al 1999; Byers et al 2001). Evolutionary psychologists argue that humans possess an "evolved psychological disposition" for responding to risk and reward from resource collection, but that behavior is not always consciously conducted nor directly linked to attitudes (Tooby and Cosmides 1992; *see also* Kahneman and Tversky 1979).

The environmental studies literature suggests that, more often than not, people hold positive attitudes towards their environment, its resources, and current or impending management measures (Ramos et al 2007; Bouton and Fredrick 2003; Mehta and Kellert

1998; DeBoer and Baquete 1998; Johnson 1996). Individual self-interests, however, must be met for conservation to be successful (Parry and Campbell 1992; Ramos et al 2007). Often “self-interests” are dictated by socioeconomic and demographic characteristics (Portes 1971; Napier et al 1986; Dolisca et al 2006). Gender (Hill 1998; Mehta and Kellert 1998, DeBoer and Baquete 1998; Mehta and Heinen 2001; Dolisca et al 2007) ethnicity, age, wealth, and income level (Fiallo and Jacobson 1995), type(s) of income (e.g. formal versus informal, single versus multiple income sources) (Gelcich et al 2005), and proximity to a resource (Parry and Campbell 1992; DeBoer and Baquete 1998) have been shown to correlate, positively in some cases and negatively in others, with attitudes. The most effective routes to attitude change include formal education (Johnson 1996; Mehta and Heinen 2001); informal community-based environmental information efforts (Holl et al 1995; Infield and Namara 2001; Mehta and Heinen 2001); and direct participation in community groups, particularly those offering tangible benefits and support in addition to information (Infield and Namara 2001; Holmes 2003; Dolisca et al 2007).

Linking Attitude and Behavior

Given the variation of attitudinal influences, how do attitudes relate to actual behavior? This is a long-standing concern. One prominent theory is the theory of planned behavior, or the theory of reasoned action (Ajzen and Fishbein 1972; Ajzen 1985, 1991). It has been applied to a multitude of “intended behavior” studies: smoking (Rise et al 2008), exercise (Hamilton and White 2008), food choices (Bagozzi et al 2000), driving behaviors (Elliot et al 2005), condom use (Albarracin et al 2001), and alcohol abuse (Ocallaghan et al 1997). It has been applied to environmental behavior, but mostly

in the developed world and principally in relation to optional activities such as recycling (Do Valle 2005), water conservation (Trumbo and O’Keefe 2005), and waste management (Barr et al 2005). Overwhelmingly, this theory has been used to justify the position that attitudes predict behavior in developed country contexts for non-“survival-dependent” behaviors.

A limitation of this theory is that it focuses simply of self-reported behavior. Even in Plies and Shmidt’s (1996) study purporting to compare intention with actual behavior, “actual” behavior is not observed but rather collected via a self-reported survey of behavior supposedly conducted after the first survey. For research on resource use to be effective, we need data on actual behavior; Watkins (forthcoming) showed that self-reported subsistence-based resource use is often exaggerated when compared to actual observed use. If it is behavior we wish to influence, we need to better understand the relationships between attitudes, self-reported behavior, and actual behavior. Further, psychologists are increasingly questioning what an attitude even is (Gawronski 2007) and just how stable it is (Smith and Conrey 2007; Schwarz 2007).

We also must consider the converse: whether behavior can predict attitudes. In 1973 Sen described two very different ways that the attitude (or preference)-behavior link can be interpreted: “From the point of view of introspection of the person in question, the process runs from his preference to his choice, but from the point of view of the scientific observer the arrow runs in the opposite direction: choices are observed first and preferences are then presumed from these observations” (Sen 1973: 241). Further, he argues that “people may be induced by social codes of behaviour to act as if they have different preferences from what they really have” (258). Sen’s paper essentially

demonstrates that relying on behavior as a guide to internal preferences is as misguided as assuming preferences predict behaviors: Humans are not always rational thinkers, invariably guided by their own conscious self-interests (Kahneman and Tversky 1979).

Nonetheless, much research focuses on inferring a direct link between attitudes and behavior, rather than examining *additional*, and external, variables that may influence attitude and behavior individually and in contrasting ways. Behaviors and attitudes are constrained by exogenous, often uncontrollable, forces. An understanding of these constraints may help clarify such questions as: Why is it that so many studies find “positive” attitudes toward resource management? How do people “decide” which attitudes and behaviors are costly and which are beneficial? Further, to what extent do people have *control* over these costs and benefits? Additional theoretical perspectives and methodologies are needed to address attitudes and behavior.

The power of Power

The study site is an impoverished rural community directly dependent on local natural resources that are affected by from external rules and ideologies. Thus, there are some political ecology issues to address: the politics of human-environment interactions and environmental change, and in particular, the role that power, in its various forms plays in these processes (Rocheleau 2007; Robbins 1998). Power is to the *ability*, not simply the right, to gain and maintain access to resources (Ribot and Peluso 2003). In this study, as in others, there are clear social asymmetries and inequalities (e.g. gender, wealth, status), imbedded in context-specific history, that mediate access to resources (e.g. Borgerhoff Mulder and Copolillo 2005; Schelhaas and Pfeffer 2005; Ribot 2008).

Studying institutions is one important way to identify and measure power. Institutions involve both implicit and explicit efforts to constrain human behavior, shape human interaction, and achieve order and predictability in a particular group of people; such efforts include rules, laws, regulations, sanctions, taboos, and customs, and can be legal and written, self-consciously crafted, and/or purely conversational (Ostrom 2005; Eggertson 1996). Institutions can shape norms which then shape behavior.

Natural resource conservation strategies often fail precisely because state-level, centralized policies are too intrusive and interfere with local institutions that may previously have succeeded in managing natural resources (Kajembe et al 2003). Moreover, state level institutions rarely have the financial, technical, or logistical capacity to enforce the rules they set; any rules that *are* created are usually modified by the local institutions (Gibson et al 2000). At the same time, while local institutions and community-based projects are the “in” mode of conservation, they assume that strong, local communities and institutions *exist*, and as a result such projects can be coercive and paternalistic (Twyman 1998).

Thus, a potential compromise between absolute centralized and absolute decentralized institutional control of natural resources is to develop centralized institutions whose priority it is to ensure coordination between local level institutions (Ostrom 2007). Although it assumes that strong communities exist, this “nesting” strategy allows local governance to continue and provides a stabilizing, overarching structure with a broader regional reach.

Major Influences on Resource Use and Attitudes

Here I explore attitudes, behaviors and institutions in a rural, forest-adjacent village in Masindi District, western Uganda. Uganda's rich biodiversity has prompted the formation of many natural resource and wildlife conservation initiatives and, in comparison to other African countries, is hailed as being relatively participatory in its programs (Saito 2000). Still, the country, including Masindi District, continues to be plagued by bureaucratic inefficiencies and chronic donor dependency, limiting the success of such programs (Bazaara 2003; Muhereza 2003). Uganda has experienced multiple governmental transformations that have greatly affected natural resource management- beginning most dramatically at colonization (1894) and continuing through the country's independence in 1962. Uganda is joining many countries in the global tendency to decentralize natural resource management, by shifting managerial power to local level governments and users. Such a shift often begins with the simple transfer of information via non-government and community-based organizations. From a political ecological perspective, this history is important in the explanation of the people's expressed attitudes and behavior, particularly towards natural resources upon which they depend.

History of Forest Governance

Uganda, like so many other African countries, has experienced a wave of governmental and political change- before, during, and after colonial rule. After the country became a British protectorate in 1894, it experienced what was, arguably, a perverse version of decentralization of power: The protectorate "gave back" some control, including over natural resources, to local governments and chiefs (Turyahabwe et

al 2007). When Uganda gained independence in 1962, there were intentions to advance decentralization in order to promote democracy and return power to the people (Turyahabwe et al 2007). In 1966, however, under the control of President Milton Obote, the country centralized power; this move having more to do, apparently, with Obote's own declining political popularity (Mazrui 1970), than with an eye towards effective management.

The Central Forest Department was deemed responsible for much of the control and management of forest resources in the country, which continued throughout the 1970s and early 1980s as the country experienced political upheaval and civil war. As a result of countrywide political chaos, corruption within the Forest Department skyrocketed and widespread mistrust of the entire government ensued; Hamilton (1984) cites poor supervision, poverty (even amongst paid personnel), and an adverse social climate as possible explanations for the decline of what once was, at least for the then in charge Protectorate government, an effective department.

Yoweri Museveni became president in 1986 and immediately undertook economic reforms that attempted, once again, to decentralize governance. The Economic Recovery Programme, supported in full by the IMF/World Bank's loan program and Structural Adjustment policies, was designed not only to support Uganda's economic development but also to bolster Museveni's political party, the National Resistance Movement (NRM) (Mwenda and Tangri 2005). While outside of the scope of this paper, it bears mentioning that in contrast to their purported goals, these policies have arguably impeded successful devolution of power by minimizing state capacity to support local governance institutions (Belshaw et al 1999; Dijkstra and van Donge 2001; Stein 2008).

Local governments are no longer financially linked to the central government, yet local tax collection is uneven and sporadic and thus unreliable.

Uganda's major decentralization efforts include a 5-tier local governance structure, whereby, power increases from the village to the district level (Figure 5.1). This system is, arguably, a viable means to achieve inter-institutional collaboration (Turyahabwe et al 2007). In addition, the Forestry Policy of 2001 and the Forest Plan of 2002 encourage collaborative forest management between locals and the National Forest Authority (formally the Central Forest Department). While Uganda has oft been regarded as a model of relatively successful decentralization, many studies have detailed the ways in which true decentralization has been limited, in particular by the central government's inefficient, yet continued, involvement in natural resource ownership and control (e.g. Wunsch 2001; Ribot 2002; Ribot et al. 2006; Turyahabwe et al 2007; Banana et al 2007).

Today, the central government controls 30% of the country's land, as National Parks and Forest and Wildlife Reserves while 70% is customarily, communally or privately owned. While this appears to support local control, to be legally recognized all land must be registered with the central government; there are no registered community lands in Uganda (Kiiza Moses pers. comm.). As registering land not only requires time and money that many rural users may not have, there is also the issue of women losing access to and control of the communal land on which they farm, as land titles will most likely be given to the head (male) of family (Adoko 1997). It is thus safer to continue using unregistered land that, although not recognized by the central government, maintains customary ownership status at the local level.

Natural Resource Management Information Outlets

While District Forest Services at the sub-county level can, at least on paper, formulate, plan, and implement natural resource management policies, their technical, logistical and financial capacities are severely limited (Turyahabwe et al 2007). At the time of this study, the Karajubu-Sub County District Forest Officer had a phone but no motorcycle and told me that he “felt useless” (pers. comm.).

Non-governmental information sources can also influence attitudes and behaviors. There have been numerous environmental non-government organizations within Masindi district that have essentially taken the place of the central government in terms of information and extension service support (e.g. TRENCOP, Tree and Energy Conservation Program, a United Nations funded initiative; EMPAFORM, Empowering Participatory Forest Management, a CARE funded initiative; and one lasting community-based organization (CBO), NACOPRA, Nature Conservation and Promotion Association). At the time of this study, NACOPRA, which was created in 2000, had written a draft of a community forestry plan for Kasokwa Forest which was under review by NFA. NACOPRA itself, however, was in the process of being revised and “revived.”

Radio announcements and newspapers also bring environmental information to the many rural people outside of towns. While NACORPA has, in the past, conducted information dissemination radio shows, one woman in Kibwona said “a radio announcement says, ‘don’t go in the forest.’” Newspaper stories and headlines, for those who are literate, suggests the importance of local level tree planting: “*The Community Can Promote Tree-Planting*” (New Vision Nov. 2 2008); “*The Poor Need Incentives to Invest in Tree Planting*” (New Vision Nov. 10 2008); “*Trees of Wealth*” (The Monitor

Oct 26 2008). At the same time, headlines may instill fear and even mistrust of the National Forestry Authority: “*Mabira forest causing chaos in Kampala*” (African Press April 16 2007); “*Forestry staff held over murder*” (The Monitor March 15 2009); “*NFA blamed for forests disappearance*” (Monitor March 2 2009).

Methods

Kibwona village borders Kasokwa Central Forest Reserve, a small (72 ha) government-owned forest fragment thought to be connected once to Budongo Forest Reserve (793 km²) in Masindi District. The Central Reserve, which is owned by the National Forest Authority (NFA) is surrounded by contiguous community forests, however the “border” of the reserve is invisible, with no markers or guards to indicate where ownership and rules change (Figure 5.2). The forest (both the Central Reserve and the community forests) is home to five primate species, including a group of 20 endangered chimpanzees who have attracted researchers and ecotourism prospects. It is a water source for Kinyara Sugarcane Factory and its surrounding cane plantations. Local people, the majority of whom are indigenous Banyoro and either subsistence farmers or employed by informal means (small shops, day laborers, etc.), can enter the forest and legally collect water, firewood (from the ground-cutting of any sort is not allowed), fibers and other non-timber forest products in subsistence quantities only. Given these diverse interests, and the possibility of co-management of the forest between the Ugandan National Forestry Authority (NFA) and local villages, it is important to understand the relationship locals have with the forest in terms of their attitudes and actual use, and how these attitudes and behaviors have been shaped by local and state-level institutions.

Date Collection

Data about people's attitudes and behaviors were collected between January and July 2007. With the help of a local field assistant to translate, I conducted 201 semi-structured interviews (136 women and 65 men). The field assistant, Joseph Karamagi, has worked with me since 2001 and is an esteemed member of the community, serving on NACOPRA's board as well as participating in the village football team. Each interview (conducted in private) consisted of over 40 closed- and open-ended questions and lasted 30-60 minutes, depending on the interviewee's inclination to talk¹. Extensive demographic, self-reported individual and household-level resource use data were collected. Attitudes were assessed with closed-ended questions, e.g. "How important is the forest to you?" with available answers being "very much" "a little" and "not at all." About 25% of respondents were asked to elaborate on their chosen answers.

Respondents were randomly chosen via daily walks through the village at various times of the day. A map of the village roads was constructed and, because my field assistant knew the clan areas and their approximate densities, we used a pictorial mapping system to keep track of our progress across the village. To determine proximity to the forest, respondents' houses (n =164) and the forest border were recorded using GPS. As women are the primary resource collectors and users, 69 women interviewees were randomly chosen for 6-hour household visits (between 8 am - 5 pm) for observation. While our presence is likely to have biased women's activities to some

¹ Although I had spent two months living in the village the previous year to introduce myself and my impending project, and lived at the village's technical school for this study, there was undoubtedly a power asymmetry between myself, and even between my field assistant, and the respondents. While this is an important field methodology issue, such asymmetries are, to some extent, unavoidable. In discussing the results, I use several perspectives from political ecology and psychology which help to not only explain the attitudinal outcomes but place them within the larger social, political, and historical context.

extent, firewood and water use is a daily requirement and no one would have gone hungry in our presence. A more extensive discussion of this influence and a complete description of the behavioral data, methods and findings can be found in Chapter 4 (*see also* Watkins, forthcoming).

Statistical correlation tests were conducted, using SPSS, to reveal the relationship between a variety of independent variables (age, gender, education level, community group participation) and dependent variables (individual expressed attitudes and observed behaviors), as well as the relationship between the attitudes and behaviors themselves.

Results

Knowledge and Attitudes

Seventy percent of respondents believe, correctly, that the government is responsible for Kasokwa forest. This is consistent with earlier studies in Kibwona (C. Watkins unpublished data), as well as for another nearby forest-adjacent village (Watkins 2006). This belief did not differ between men and women, but while women were more likely to say that the government is also responsible for village water sources, men were more likely to say locals were responsible ($X^2= 11.303$, $df= 4$, $p= .023$). Seventy seven percent of respondents knew at least one correct forest law (Table 6.1) and 76% of respondents felt that the laws were adequate for maintaining it. When asked whom they would go to if they had a “natural resource problem,” respondents overwhelmingly said their family and neighbors, with NACOPRA as a distant second choice.

People believe that the forest is currently “very important” (87%) and will continue to be “very important” to them (83%). Similarly, 90% of respondents surveyed said that they need the forest “very much.” Fifty six percent and 57% reported being

“very” worried about natural resource availability now and for the future. Of the 50 people who elaborated on their attitudes, 28 gave “self-oriented” reasons, associated with consumption purposes such as firewood, water and timber resources, and 32 gave “ecology-oriented” reasons, associated with ecological services like rain, shade and protection from wildlife.

Demographic Associations

There are some notable demographic correlations to both knowledge and attitudes: Despite being the primary resource collectors, 40 of the 48 respondents who did not know *any* forest laws were women ($X^2= 8.104$, $df= 1$, $p= .004$). Forty four of the 52 respondents who stated, incorrectly, that they could not collect firewood, were also women ($X^2 24.298$, $df= 2$, $p< .001$). In contrast, of the 53% of respondents who stated, correctly, that it was illegal to cut trees, most were men ($X^2= 10.803$, $df= 2$, $p=.005$). Further, women who did not know any correct laws are more likely to say that they do not need the forest at all. Thus, women are underestimating their forest user rights.

Both current and future worry about resources decrease with family size ($\rho= -.0174$, $p=.014$; $\rho = -0.239$, $p= .001$). People’s perceived need for the forest declines with age ($\rho= 0.187$, $p= .008$). Although older users may perceive a greater abundance of resources in years past (“*When I was younger, we could freely collect firewood from the forest. There were never issues of scarcity*”), younger family members are likely to be in charge of finding and collecting firewood, thus reducing perceived need.

Perceived need for, and future importance of, the forest increased with formal education ($\rho= -0.232$, $p =.001$; $\rho= -0.217$). Formal education was also positively associated with the belief that there aren’t enough trees in the forest ($\rho = -.162$, $p= .022$).

Education also, however, increased the belief that the rules of the forest are adequate ($\rho = -.193$, $p = .006$). Community group participation increased people's knowledge of the correct rules: cannot cut trees ($X^2 = 6.935$, $df = 2$, $p = .031$); no charcoal burning ($X^2 = 5.988$, $df = 2$, $p = .050$); general ecological principles ($X^2 = 10.921$, $df = 2$, $p = .004$). While community group participants were more likely to express need for the forest very much ($U = 4135.500$, $p = .019$) they were also more likely to worry more about future resource availability ($U = 3671.500$, $p = .011$) than non-participants.

Behavior

Understanding what influences knowledge of and attitudes towards forest resources matters is important because it can be used to incorporate the *perceived* needs of local resource users. But how do knowledge and attitudes compare to actual use of resources? Again, because women were the primary resource collectors and users at the household level, only women were observed. Watkins (forthcoming) reports that while 42% of respondents stated that wood is a resource that people in general can get from the forest, 54% said that they collect from their own property, 24% said that they collect from their neighbors land, and only 11% said that they themselves collect from the forest (men and women's self-reports did not differ significantly). Further, people reported collecting water from village wells (77%) and the village borehole (15%), but 24% of women also reported collecting water from the forest.

In contrast to these reports, women actually rely on forest resources for their daily household needs much less than they reported. Women collected natural resources less than 5% of the observed time, and less than 1% of these collections took place in the forest (Watkins, forthcoming). Women report yearly trips to the forest to collect wood

during the dry season, but only in groups. Women did consume wood and water, however, as evidenced by cooking -on traditional 3-stone stoves using firewood- almost half of the observed time (Watkins, forthcoming). Water is indeed collected from the forest on a daily basis by some households, but children are generally charged with this responsibility.

No statistically significant correlations were found for natural resource collection behavior. This may be due to the small percentage of time collection was observed. The only significant pattern found for any observed behavior was unsurprising: the amount of time the household fire was observed burning was positively associated with family size ($\rho=.243$, $p=.044$).

Hearsay and fear

Additional qualitative information suggests that fear and insecurity may underlie women's decisions about forest use. One woman said, "*Forest managers tell us we can't collect anything.... A radio [announcement] says "Don't go into the forest" ... people with guns will threaten us.*" Another woman said that she "*stopped collecting firewood [in the forest] because a guard took my panga.*" Yet another suggested that "*you have to answer why you are in the forest if you are found there.*" There was also an unsubstantiated report that a forest official took a woman's firewood and burned it in front of her. At the same time, these impressions are countered with people (men and women) reporting that there is no problem with sharing firewood *within* the village: "*There is a small forest [nearby] owned by a clan, but anyone can use it, no problem.*"

As expressed attitudes may reflect perceived personal threats (Hopper and Nielsen 1991; Baldassarre and Katz 1992) and may form as a result of expected costs and benefits

of simply *holding* them (Dolisca et al 2007), these anecdotes lead to the interpretation that the forest resource collection strategies employed (collecting in groups and by children) may allow women to avoid the risk of harassment while still occasionally benefiting from forest resources. Whether or not these reports are true is difficult to know, but in general, both my field assistant and I felt as if people did not want to elaborate much more on their experiences in the forest, good or bad. Further, Jagger (2008) reports that around Budongo Forest Reserve, monitoring and enforcement is disproportionately directed at the poorest households, while the wealthiest households are, in fact, disproportionately benefiting by forest resources. This may, in fact, warrant people's suspicion of forestry officials.

Do attitudes and behavior correlate?

Intuitively, the disparity between these attitudes towards (high concern) and behavior in (low use) Kasokwa Forest and its associated natural resources is obvious. Statistically, only two relationships were significant. First, the longer women's fire burned (that is, the more wood women used), the less likely they were to worry about current resource availability ($\rho = -.363$, $p = .002$). This makes sense in terms of resource consumption; the more resources women have to consume the less they need to worry about their immediate availability. However, why is expressed "importance" or "need" not significantly related to this behavior? These results may reflect the subtleties of attitude formation and association; what constitutes need, importance and worry may differ between individuals in a way that cannot be understood in a natural experiment like this one.

Second, the longer women stated their firewood pile would last (that is, the more wood they gathered for future use) the less likely they were to report needing the forest very much ($\rho = -.251$, $p = .045$). This relationship is interesting in that they actually do need firewood, as evidenced by their collecting large amounts. This relationship does *not* signify resource scarcity, given the small amount of time women take to collect resources, and the amount (and variety) of wood stored; it suggests that they rely on other sources, such as the woodland areas in the village. This self-reported measurement, however, is not significantly associated in my observations with time spent collecting firewood or water. These women may have collected their larger stores of firewood intensively but not during my field seasons. Thus, women following different collection strategies express their concerns differently, as reflected by this individual time frame difference.

These two relationships differ in a number of ways. While the first correlation concerns an observed behavior, the second correlation concerns a self-reported estimate of wood storage. I have already shown that reported estimates of resource use differ from observed usage, so estimation of stored firewood may not accurately reflect the true amount used (Chapter 4; Watkins, forthcoming). The relationships also differ with respect to the demographic, knowledge, and utility-based factors that are associated with the attitudes and behavior (Figure 5.3).

While there are correlations between these factors and either attitude or behavior, proximity to the forest is the only factor that is associated with both attitude and behavior (and in fact, the behavior is the self-reported measure of stated forest entry, not an observed behavior). Proximity to resources has, in fact, been recognized as a particularly

important predictor of resource use, in that those living closer to resources may be able to bypass rules and regulations, whereas those living farther away may contest use arrangements and thus be more motivated to actively create institutional arrangements for fairer resource access (Varughese and Ostrom 2001). Kibwona villagers living closer to the forest, with increased access (at least in terms of distance) perceive the forest as more important to them than do those living farther away; they also report having more stored firewood. These perceptions may stem from the users' ability to bypass locally-held fears about entering the forest and assumptions about access which then alter their perceptions and behavioral strategies. As compared to these villagers, users living farther away are more likely to state that they need the forest only somewhat or not at all. This may indicate a contestation of the current management system in which they perceive limited access to the forest.

The *lack* of relationship between knowledge and behavior is also important. For example, there is no relationship between stating the rule "if you cut one tree plant another" and having planted trees on one's land. Although this assumes that people actually cut trees at some point, the lack of correlation supports the notion that one's ideas of what one should do not necessarily translate into action.

Discussion

My results emphasize the importance of understanding the institutions (local and state-level, formal and informal) that create, maintain and/or eliminate both actual and perceived access to resources (Becker and Ostrom 1995; Ostrom 2005). Despite Chokor's (2004) conviction that attitudinal surveys help include locals in environmental management projects, it is possible that expressed attitudes may simply be normatively-

correct responses (Embree and Whitehead 1993; Stocke and Hunkler 2007), a phenomenon particularly prevalent in under-voiced, less powerful groups (Ross and Mirowsky 1983; 1984) and in studies where sensitive or stigmatized activities are questioned (e.g. AIDS, Miller et al 2001; Mensch et al 2003). Another way to interpret expressed attitudes is that people use memes (Dawkins 1976) or “verbal molecules,” which are prepackaged or jargon-filled ideas that follow the expected norm but may not lead to the predicted corresponding behavior (Strauss 1997; Schelhas and Pfeffer 2008). Indeed, Obregon-Salido and Corral-Verdugo (1997) found that normative statements concerning the value of recycling lacked any correlation to actual recycling behaviors.

It is important to understand the underlying motivations, often driven by power inequalities, for what people say versus what they actually do. In Kibwona, normative responses are influenced by a variety of institutionalized information outlets, including external conservation organizations as well as state and local government bodies. Similar to Schelhas and Pfeffer’s findings (“*the forest is a lung*” and “*without forests future generations won’t be able to recognize wildlife*”), I found repeated axioms in Kibwona. When people were asked about the laws of the forest, they often said, “*If you cut one tree, plant another,*” an idea given by forestry education messages in the media, but not meant to suggest doing so in *government-owned forest reserves*. People also referenced their children’s inability to recognize wildlife if it weren’t for environmental educational programs, as if such recognition were absent prior to conservation education schemas. Yet, observed behavior (Watkins, forthcoming) suggests the forest is not an integral part of the villager’s resource base.

Norms and expected attitudes

We live in an age in which conservation rhetoric abounds, and in which for any given societal or environmental ill it seems that there exists an NGO or grassroots campaign to tackle it. Information, therefore, about what is (or what “should” be) important, should be easy to learn and, if necessary, recite. For natural resource management and conservation, it is sometimes difficult to decide what the “right” attitude even is. There is a tendency to be overly optimistic about human behavior and the possibility of natural resource use constraint. In fact, while the ecologically noble savage hypothesis (Redford 1991) has been refuted numerous times (Alvard 1993; Ruttan and Borgerhoff Mulder 1999; Smith and Wishnie 2000; Bolyanatz 2005), the sentiment lingers between the lines of applied conservation initiatives, as lamented by Buege (1996) and Hames (2007).

Expressed attitudes may be the result of individual-based, rationally self-interested, although not necessarily conscious, motivations. If so, we expect to see normatively-correct verbal molecules in which outwardly expressed attitudes match the attitude *expected* by those creating the norm, especially when the “situation” allows.

So, is “needing the forest very much” positive or negative for sustainable resource management (SRM)? For Kibwona village, the answer depends on why the forest is deemed important, and who or what is affected. For example, if a person’s perceived need stems from the desire to use firewood from the forest or cut trees to use as timber, this may be considered negative for SRM. In contrast, if need is derived from a recognition of ecological services such as fresh air and rain attraction, it may be considered positive for SRM. I did not ask this question systematically asked in this

study; I would include it in future studies. Still, there are multiple problems with this distinction. What if people need the forest for both reasons? What if someone desires timber and expresses a need for timber but does not actually collect timber from the forest? The issue of normative responses exists here, as well. These complications arise from the presence of multiple stakeholders in a given area, each with their own management agenda and interests.

I suggest that much of the apparent disconnect between attitudes (extreme valuation) and behavior (minimal use) towards this forest resource base comes from the fluctuations in governance that color the country's history and even today's forest governance institutions. Repeatedly shifting ownership of and rules for the use of the forest have led people to be unsure about what the current rules really are and the extent to which they may be enforced. At the same time, NGOs and CBOs provide information that may only be valid as long as the organization exists and the laws match. Thus, people rely on themselves and each other for knowledge about and actual access to natural resources. The strong indications that people, particularly women, may be harassed or are simply fearful of potential harassment by forest "officials"(authentic or not), as well as their tendency to either only enter the forest in groups or send their children in, suggests a lack of trust of the National Forestry Authority, the governing body currently in charge of the forest.

Villagers have internalized these norms and base their behavior on them. People are using the forest less than legally allowed neither because they think it is unimportant or not useful, *nor* because they think it *is* important and thus should be conserved. Rather, they are influenced by multiple, distinct and perhaps even contradicting

institutions: responsibility-inducing CBOs and oppressive government tactics. Tree-planting and alternative livelihood programs, supported by various national and international NGOs and CBOs, are abundant, and people have responded positively to them by planting their own trees (Chapter 4; Watkins forthcoming). In part, people are empowered to take responsibility for their own resource procurement, although there is likely a huge gender disparity in buying, planting, using and owning trees; this is an issue for continued investigation, particularly given women's lack of expressed knowledge about their forest resource rights and their (seemingly unwarranted) fears of sanctions. Further, people tend to plant exotic species, which has important implications for both sustainability and for ecological integrity (Chapter 4; Watkins forthcoming).

Central government institutions (i.e. NFA), in contrast, have not yet achieved their goals of collaborative management (less than 1% of tree-covered area is under collaborative management). This progress may, however, be perfectly in line with the decentralization process, which does not simply mean turning over all power to local governments all at once, but rather could include power transfer to other governing bodies such as customary authorities, NGOs and CBOs (Ribot et al 2008). Indeed, some argue that a combination of, or nested arrangements between, varying levels of institutional control is frequently the most effective system (Andersson and Ostrom 2008). Banana et al (2007) describe the District Forest Officer as playing a critical role in linking local and central levels of governance in the management of Uganda's natural resources; this capacity is clearly absent in Masindi District.

Furthermore, successful and relatively robust institutions often have several defining elements, which serve as "design principles" rather than blue-print solutions

(Ostrom 1990). Most of these are missing for Kibwona village: there are *not* clearly defined resource boundaries, any balance of benefits and costs of using the forest is unclear, and the resource use arrangements (e.g. laws) are not made by local users. On the other hand, while monitoring barely exists, the *fear* of sanctions does. Further locals are trying to devise, via NACOPRA's community outreach capability, conflict resolution mechanisms and collaborative co-management programs, and they possess desire to have their rights recognized by the central government.

The weak institutional arrangements described above, combined with the unreliability of the DFO and with environmental messages over the radio, in newspapers and from CBO and NGO programs and personnel, has created a situation in which locals internalize messages of how they *should* feel, while not necessarily leading to the associated behavior (e.g. the law says they can use the forest, but they don't). Like Turyahabwe et al (2007), I would predict that people surrounding Kasokwa Forest will be hesitant to participate in government-led co-management initiatives, even including reforestation efforts, given that investment, ownership and, perhaps most immediately, institutional credibility are lacking.

Conclusion

I have shown that the costs outweigh the benefits associated with actual forest use, and that this leads to decreased use of the forest. I have also shown that the benefits outweigh the costs of perceived importance of forest and that this leads to increased stated concern for and need of the forest. Together, this leads to a strategy in which Kibwona villagers are repeating the advertised messages of expected resource use and valuation, and then actually *using* resources in ways that are not only convenient but

minimize perceived stigma and risk of harassment. I argue that this outcome is in part a result of two governance issues: (1) the historical trajectory of governance “flip-flopping” in which forests were decentralized, then centralized, then decentralized once again, and (2) continued governance inefficiency in which land rights and resource access and rules are complex, confusing and inadequate means that decentralized institutions at the county and sub-county level simply cannot provide adequate information and extension services for local resource users. The psychological considerations of normatively-right answers and verbal molecules are undoubtedly influenced by these instable and unreliable governance institutions. Taken together, these conditions lead to insecurities, misperceptions, and particular resource strategies.

We should note that this Ugandan case is not unique. Humans routinely value resources that they do not use- although many times we find this relationship when resources are distant and it costs us nothing to declare the need to protect them (e.g. American’s unrelenting support of Amazonian rainforest protection). The same can be said for power asymmetries. The point here is that neither relying solely on attitudes to predict behavior, nor relying on behavior alone, is empirically justified. Multiple disciplinary approaches allowed me to make sense of: (1) attitudes as attitudes (and recognize psychological tendencies such as normatively correct responses); (2) behavior as behavior (and recognize the various strategies that women use to obtain the necessary resources; (3) the links (or lack of) between attitudes and behavior (and see value in this outcome!), and; (4) the larger institutional environment- both past and present- in which attitudes and behaviors are played out (and recognize that there are major inequalities in the governance structure and an overload of often confusing information).

Acknowledgements

This paper has been submitted to *Society and Natural Resources*. I thank Bobbi Low for her mentorship, support, and encouragement; Joseph Karamagi, my field assistant, friend and an invaluable partner in this research; and Bobbi Lab members, Arun Agrawal and John Shelhas for comments on this paper. Funding for this research was provided by the Rackham Graduate School, the School of Natural Resources and Environment, and The Society for the Psychological Study of Social Issues.

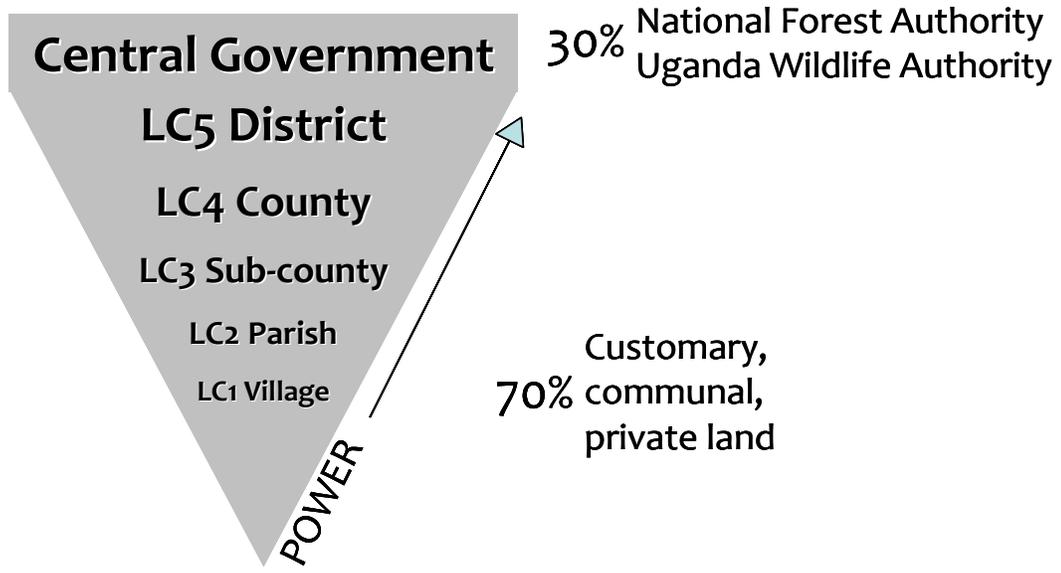


Figure 5.1: 5-tier Local Government Structure and land ownership

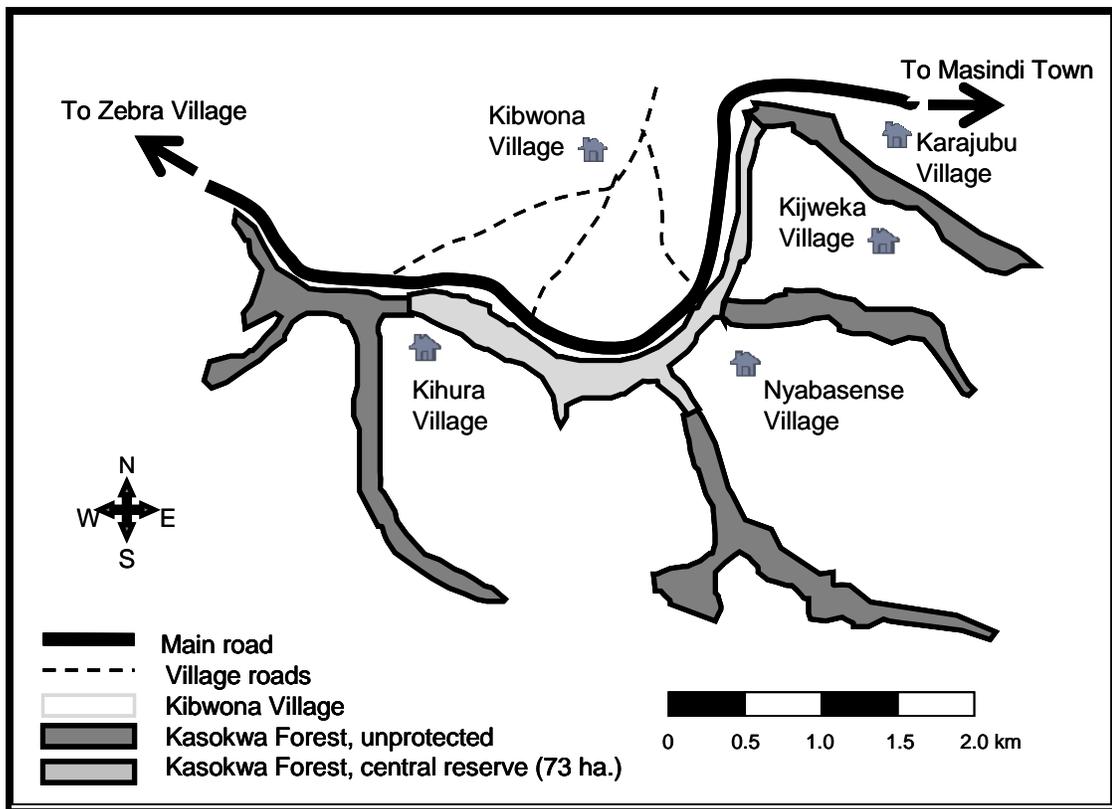


Figure 5.2: Map of Kasokwa Central Forest Reserve, community forests and surrounding villages

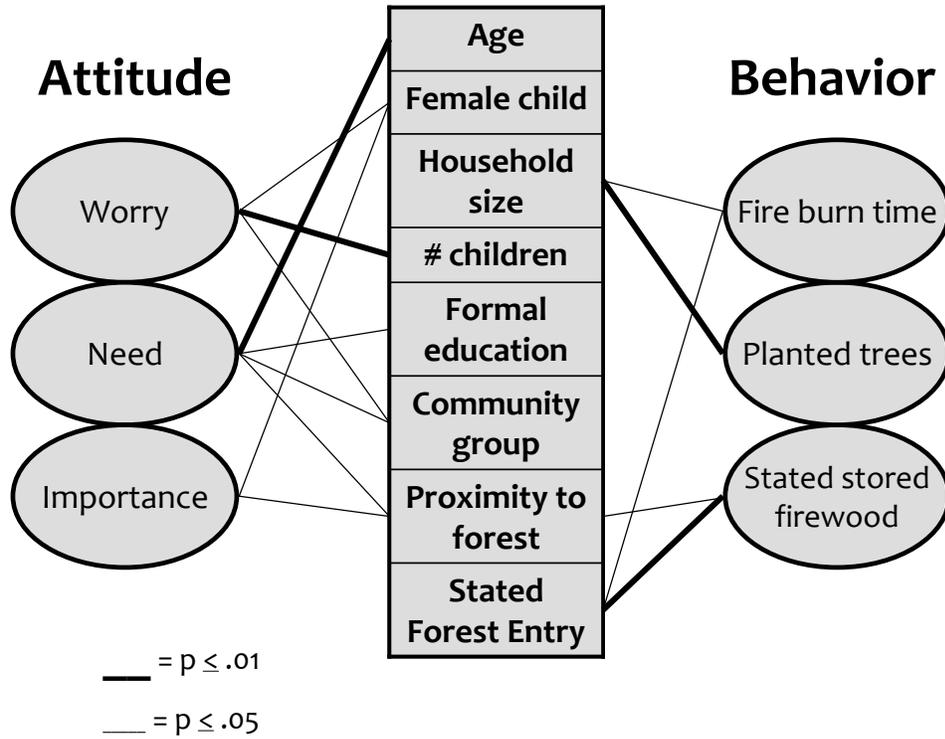


Figure 5.3: Correlation between attitudes and behavior: Attitudes and behaviors are significantly correlated with different variables. Proximity is the only variable significantly correlated with both an attitude and a behavior.

	% of sample
Incorrect rules	
1. Can't enter forest	2%
2. Can't collect firewood	26%
Correct rules	
3. Can't cut trees	54%
4. Can't hunt	12%
5. Provides ecological benefits	8%
6. Can't burn charcoal in forest	7%
7. If cut a tree, plant another	14%

Table 5.1 Stated rules of the forest.

References

- Adams, J. and T. McShane. (1992). *The myth of wild Africa: conservation without illusion*. W.W. Norton and Co., New York- London.
- Adoko, J. (2004). Uganda Land Alliance. Did the constitution mean to legalize customary tenure or to lay foundation for the demise of customary tenure? Paper presented at Karamoja Wildlife workshop, organized by the Uganda Wildlife Authority, November 2007.
- Ajzen I. (1985). From intentions to actions: A theory of planned behavior. In: Kuhl J, and Beckmann J, editors. *Action-control: From cognition to behavior*. Heidelberg: Springer. p 11–39.
- Ajzen I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes* 50(2):179-211.
- Ajzen I, and Fishbein M. (1972). Attitudes and normative beliefs as factors influencing behavioral intentions. *Journal of Personality and Social Psychology* 21(1):1-&.
- Albarracin, D., B.T. Johnson, M. Fishbein, and P.A. Muellerleile. (2001). Theories of reasoned action and planned behavior as models of condom use: A meta-analysis. *Psychol. Bull.* 127: 142-161
- Allendorf, T. (2007). Residents attitudes towards three protected areas in southwestern Nepal. *Biodiv. Conserv.* 16: 2087-2102.
- Alvard, M.S. (1993). Testing The Ecologically Noble Savage Hypothesis - Interspecific Prey Choice By Piro Hunters Of Amazonian Peru. *Hum. Ecol.* 21: 355-387
- Andersson, K. and E. Ostrom. (2008). Analyzing decentralized resource regimes from a polycentric perspective. *Policy Sci* 41:71-93
- Bagozzi R. (1992). The self-regulation of attitudes, intentions and behavior. *Social Psychology Quarterly* 55(2):178-204
- Baldassare M, and Katz C. (1992). The personal threat of environmental problems as predictor of environmental practices. *Environment and Behavior* 24(5):602-616
- Banana A.Y, N.D. Vogt, J. Bahati and W. Gombya-Ssembajjwe. (2007). Decentralized governance and ecological health: why local institutions fail to moderate deforestation in Mpigi district of Uganda. *Sci Res Essays* 2(10):434-445
- Barr S, Gilg A, and Ford N.)2005). Defining the multi-dimensional aspects of household waste management: A study of reported behavior in Devon. *Resources, Conservation and Recycling* 45(2):172-192

- Becker C, and Ostrom E. (1995). Human ecology and resource sustainability: The importance of institutional diversity. *Annual Review of Ecology and Systematics* 26:113-133
- Belshaw, D., P. Lawrence, and M. Hubbard. (1999). Agricultural tradables and economic recovery in Uganda: The limitations of structural adjustment in practice. *World Development* 27: 673-690
- Bolyanatz, A.H. 2005. The myth of the noble savage. *J. Roy. Anthropol. Inst.* 11: 591-591
- Borgerhoff Mulder M, and Coppolillo P. (2005). *Conservation: Linking Ecology, Economics and Culture*. Princeton University Press
- Bouton SN, and Frederick PC. (2003). Stakeholders' perceptions of a wading bird colony as a community resource in the Brazilian Pantanal. *Conservation Biology* 17(1):297-306.
- Buege, D.J. (1996). The ecologically noble savage revisited. *Environ. Ethics* 18: 71-88.
- Byers BA, Cunliffe RN, and Hudak AT. (2001). Linking the conservation of culture and nature: A case study of sacred forests in Zimbabwe. *Human Ecology* 29(2):187-218.
- Chokor, B. (2004). Perception and response to the challenge of poverty and environmental resource degradation in rural Nigeria: Case study from the Niger Delta. *J. Environ. Psychol.* 24: 305-318
- Clad, J. (1981). Conservation and indigenous peoples: A study of convergent interests. *Cult. Surviv. Q.* 8: 68-73.
- Dawkins, R. (1976). *The Selfish Gene*. Oxford University Press.
- De Boer, W.F. and D. Baquete. (1998). Natural resource use and attitudes of the local population around the Maputo Elephant Reserve, Mozambique. *Environ. Conservat.* 25: 208-218
- Dijkstra, A.G and J.K. van Donge, 2001. What does the 'show case' show? Evidence of and lessons from Adjustment in Uganda. *World Development* 29: 841-863
- Do Valle PO. (2005). Combining behavioral theories to predict recycling involvement. *Environment and Behavior* 37(3):364-396
- Dolisca, F., D.R. Carter, J.M. McDaniel, D.A. Shannon, and C.A. Jolly. (2006). Factors influencing farmers' participation in forestry management programs: A case study from Haiti. *Forest Ecol. Manag.* 236: 324-331.

- Dolisca F, McDaniel JM, and Teeter LD. (2007). Farmers' perceptions towards forests: A case study from Haiti. *Forest Policy and Economics* 9(6):704-712.
- Eggertson T. (1996). A note on the economics of institutions. In: Alston L, Eggertson T, and North D, editors. *Empirical Studies in Institutional Change*. Cambridge: Cambridge University Press.
- Elliott, M., C. Armitage and C. Baughan. (2005). Exploring the beliefs underpinning drivers intentions to comply with speed limits. *Transport. Res.* 8: 459-479
- Embree, B. and P. Whitehead. (1993). Validity and reliability of self-reported drinking behavior: Dealing with the problem of response bias. *J. Stud. Alcohol.* 54: 334-344
- Fiallo EA, and Jacobson SK. (1995). Local communities and protected areas: attitudes of rural residents towards conservation and Machalilla National Park, Ecuador. *Environmental Conservation* 22: 241-249.
- Gawronski, B. (2007.) Attitudes can be measured! But what is an attitude? *Soc. Cognit.* 25: 573-581
- Gelcich S, Edwards-Jones G, and M K. (2005). Importance of attitudinal differences among artisanal fishers toward co-management and conservation of marine resources. *Conservation Biology* 19(3):865-875
- Hames, R. (2007). The ecologically noble savage debate. *Annu. Rev. Anthropol.* 36: 177-190
- Hamilton K, and White KM. (2008). Extending the theory of planned behavior: The role of self and social influences in predicting adolescent regular moderateto-vigorous physical activity. *Journal of Sport & Exercise Psychology* 30(1):56-74
- Hill CM. (1998). Conflicting attitudes towards elephants around the Budongo Forest Reserve, Uganda. *Environmental Conservation* 25(3): 244-250
- Holl K, Daily G, and Ehrlich P. (1995). Knowledge and perceptions in Costa Rica regarding environment, population, and biodiversity issues. *Conservation Biology* 9(6): 1548-1558
- Holmes C. (2003). The influence of protected area outreach on conservation attitudes and resource use patterns: a case study from western Tanzania. *Oryx* 37(3):305-315
- Hopper J, and Nielsen J. (1991). Recycling as altruistic behavior. *Environment and Behavior* 23(2):195-220

- Infield M, and Namara A. (2001). Community attitudes and behavior towards conservation: an assessment of a community conservation program around Lake Mburo National Park, Uganda. *Oryx* 35(1):48-60
- Johnson K. (1996). Local attitudes towards the Budongo Forest. *Indigenous Knowledge and Development Monitor* 4(3):31
- Kaiser FG, Wolfing S, and Fuhrer U. (1999). Environmental attitude and ecological behaviour. *Journal of Environmental Psychology* 19(1):1-19
- Kellert SR, Black M, Rush CR, and Bath AJ. (1996). Human culture and large carnivore conservation in North America. *Conservation Biology* 10(4):977-990
- Mazrui A.A. (1970). Leadership in Africa- Obote of Uganda. *Int J* 25(3):538-564
- Mehta JN, and Kellert SR. (1998). Local attitudes toward community-based conservation policy and programmes in Nepal: a case study in the Makalu-Barun Conservation Area. *Environmental Conservation* 25(4):320-333
- Mehta JN, and Heinen JT. (2001). Does community-based conservation shape favorable attitudes among locals? An empirical study from Nepal. *Environmental Management* 28(2):165-177
- Mensch, B., Hewett, P. and Eruklar, A. (2003). The reporting of sensitive behavior by adolescents: A methodological experiment in Kenya. *Demography* 40(2): 247-268.
- Miller, K., Zulu, E. and Watkins, S. (2001). Husband-wife survey responses in Malawi. *Studies in Family Planning* 32(2): 161- 174.
- Mwenda, A. and R. Tangri. (2005). Patronage, politics, donor reforms, and regime consolidation in Uganda. *African Affairs* 104:449-467.
- Napier T, Carter M, and Bryant E. (1986). Local perceptions of reservoir impacts: a test of vested interests. *American Journal of Community Psychology* 14(1).
- Obregon-Salido FJ, and Corral-Verdugo V. (1997). Systems of beliefs and environmental conservation behavior in a Mexican community. *Environment and Behavior* 29(2):213-235
- Ocallaghan FV, Chant DC, Callan VJ, and Baglioni A. (1997). Models of alcohol use by young adults: An examination of various attitude-behavior theories. *Journal of Studies on Alcohol* 58(5): 502-507.
- Ostrom E. (1990). *Governing the Commons*. New York: Cambridge University Press.

- Ostrom E. (2005). *Understanding Institutional Diversity*. Princeton: Princeton University Press.
- Ostrom E. (2007). A diagnostic approach for going beyond panaceas. *Proceedings of the National Academy of Sciences of the United States of America* 104(39):15181-15187.
- Parry D, and Campbell B. (1992). Attitudes of rural communities to animal wildlife and its utilization in Chobe Enclave and Mababe Depression, Botswana. *Environmental Conservation* 19(3):245-252
- Plies K, and Schmidt P. (1996). Intention=Behavior? A representative panel-study to test the theory of planned behavior in the context of AIDS-prevention. *Zeitschrift Fur Sozialpsychologie* 27(1):70-80
- Power S. (1993). Indigenous views of nature. *Journal of Environmental Psychology* 13:263-266
- Portes A. (1971). Political primitivism, differential socialization and lower-class radicalism. *American Sociological Review* 36(5):820-835
- Ramos J, Santos M, Whitemarsh D, and Monteiro C. (2007). Stakeholder perceptions regarding the environmental and socio-economic impacts of the Algarve artificial reefs. *Hydrobiologia* 580:181-191
- Redford, K. (1991). The ecologically noble savage. *Cult. Surviv. Q.* 15: 46-48
- Ribot, J. (2002). Democratic decentralization of natural resources: Institutionalizing popular participation. World Resources Institute.
- Ribot J, and Peluso N. (2003). A theory of access. *Rural Sociology* 68(2):153-181.
- Ribot, J., A. Agrawal and A. Larson. (2006). Recentralizing while decentralizing: How national governments reappropriate forest resources. *World Development* 34: 1864-1886
- Ribot J. (2008). Building local democracy through natural resource interventions: An environmentalist's responsibility. World Resources Institute
- Rise J, Kovac V, Kraft P, and Moan IS. (2008). Predicting the intention to quit smoking and quitting behaviour: Extending the theory of planned behaviour. *British Journal of Health Psychology* 13:291-310
- Robbins P. (1998). Authority and environment: Institutional landscapes in Rajasthan, India. *Annals of the Association of American Geographers* 88(3):410-435
- Rocheleau D. (2007). Rooted networks, relational webs and powers of connection: Rethinking human and political ecologies. *Geoforum* 38: 433-437

- Ross, C.E. (1983). The worst place and the best face. *Social Forces* 62: 529-536
- Ruttan, L. and M. Borgerhoff Mulder. (1999). Are East African pastoralists truly conservationists? *Curr. Anthropol.* 40, 621-652
- Schwarz N. (2007). Attitude construction: Evaluation in context. *Social Cognition* 25: 638-656
- Schelhas J, and Pfeffer M. 2005. Forest values of national park neighbors in Costa Rica. *Human Organization* 64(4):386-398
- Schelhas, J. and M. Pfeffer. (2008). *Saving forests, protecting people?* Altamira Press, Lanham
- Sen, A. (1973). Behaviour and the concept of preference. *Economica* 40: 241-259
- Smith E, and Conrey F. (2007). Mental representations are states not things: Implications for implicit and explicit measurement. In: Wittenbrink B, and Schwarz N, editors. *Implicit measures for attitudes: Progress and controversies*. New York: Guilford. p 247-264
- Smith, E. and M. Wishnie. (2000). Conservation and subsistence in small-scale societies. *Ann. Rev. Anthropol.* 29: 493-524
- Stocke, V. and C. Hunkler. (2007). Measures of desirability beliefs and their validity as indicators for socially desirable responding. *Field Methods* 19: 313-336
- Strauss, C. (1997). Partly fragmented, partly integrated: An anthropological examination of "postmodern fragmented subjects. *Cult. Anthropol.* 12: 362-404
- Tooby J, and Cosmides L. (1992). The psychological foundations of culture. In: Barkow J, Cosmides L, and Tooby J, editors. *The Adapted Mind: Evolutionary Psychology and the Generation of Culture*. New York, NY: Oxford University Press.
- Trumbo CW, and O'Keefe GJ. (2005). Intention to conserve water: Environmental values, reasoned action, and information effects across time. *Society & Natural Resources* 18(6): 573-585
- Turyahabwe, N., C. Geldenhuys, S. Watts, and J. Obua. (2007). Local organisations and decentralized forest management in Uganda: roles, challenges, and policy implications. *Int. Forest. Rev.* 9(2): 581-596
- Varughese, G, and Ostrom, E. (2001). The contested role of heterogeneity in collective action: Some evidence from community forestry in Nepal. *World Development* 29(5, May): 747-65.

Watkins, C. (forthcoming). Documenting “real” forest resource use in rural Uganda. Accepted to *Human Ecology*

Wilson M, Daly M, and Gordon S. (1998). The evolved psychological apparatus of human decision-making is one source of environmental problems. In: Caro T, editor. *Behavioral Ecology and Conservation*. Oxford: Oxford University Press. p 501-523

Wunsch J. (2001). Decentralization, local governance and 'recentralization' in Africa. *Public Administration and Development* 21:277-288

Appendices

Appendix A: Survey

Name _____ Clan _____
 Age _____ Gender _____ Occupation _____
 Years in school _____ Political affiliation (type, level) _____
 Religion _____ Attend church how often: 3-4x/mo 1-2x/mo 1-6x/yr holidays never

Spouse name _____ Age _____ Clan _____
 Spouse occupation _____ Lives at home: always occasionally never

Total number of offspring produced _____ Total number alive _____

Gender and age of each offspring alive _____

Gender and age of each offspring passed _____

In house, total offspring _____ In house, total adults _____ Household size _____

In house, total other children _____ How many more children desired? _____

Do you farm? _____

What was planted last season/harvested now/being planted now (ONE YEAR CYCLE)

beans _____	sweet potatoes _____	greens _____	enjage _____
maize _____	ground nuts _____	tomatoes _____	tobacco _____
cassava _____	irish potatoes _____	sorghum _____	coffee _____
sorghum _____	passion fruit _____	peppers _____	eggplant _____
banana _____	sugarcane _____	onions _____	pineapple _____
millet _____	sugarcane (KSW) _____	popos _____	mangoes _____
greens _____	enjage _____	avocado _____	

What foods have you eaten in the last week? _____

In the last year, has your household had a non-agricultural monetary income? If yes, who, and from what activity?
 charcoal burning _____ brick making _____ sugarcane _____ tea _____ tobacco _____ waragi _____
 Wood for above uses: _____

Do you own the land that your home is on? YES NO garden? YES NO

Have you planted trees on your land? (if yes, type, number, year planted) _____

If yes, why did you plant these trees? _____

How many times have you entered the forest in the last week? 1-3 x 4-7x 8+

How many times do you collect water per day? 1-2 x 3-5 x 6+

Where do you collect water? _____

How many jerry cans of water do you use per day? 1-2 x 3-5 x 6+

Do you collect rain water? If no, why not? _____

Where do you collect fuelwood? _____

What do you use from the forest? _____

What are the rules of the forest? _____

Do these rules adequately keep the forest in the same current condition? YES NO

Are there enough trees in the forest? Do you have enough? YES NO YES NO

Appendix B: IRB Approval

Ms. Cristy Watkins
1614 Ferndale Place #1
Ann Arbor, MI 48104

Dear Ms. Watkins:

The Behavioral Sciences Institutional Review Board (IRB) has reviewed and approved your research proposal involving human subjects. The IRB determined that the research and its procedures are compliant with appropriate guidelines, state and federal regulations, and the University of Michigan's Federal Wide Assurance (FWA00004969 Expiration 6/12/06) on file with the Department of Health and Human Services (HHS).

Please remember that approval must be obtained for changes in procedures or consent document(s) related to your research proposal. If changes are contemplated, they must be approved prior to initiation of the modified procedures.

The approval period for this project is for a period of one year from the approval date listed below, or a shorter period, if specified. Please note your expiration date. Approximately three months prior to the expiration date, you will be notified so that your renewal application can be prepared, submitted, and reviewed in a timely manner without interruption in the approval status of this project. You must allow up to six weeks for the review process. **If you allow your approval to lapse, no work may be conducted on this project until appropriate approval has been obtained.**

You are also required to inform the IRB of all unanticipated or adverse events (i.e., physical, social, or emotional injury) as soon as possible after the event. The forms necessary for modifications and adverse event reporting can be obtained on the IRB website at <http://www.irb.research.umich.edu>.

Sincerely,



Daphna Oyserman, Ph.D.
Co-chair, Behavioral Sciences Institutional Review Board

cc: DRDA

PROJECT TITLE: Resource Utilization: The Implication of Local Perceptions and Behaviors for Forest and Chimpanzee Conservation in Uganda
PROJECT APPROVAL DATE: 3/31/2005 TO EXPIRATION DATE: 3/30/2006
SOURCE OF FUNDS: Rackham Graduate School, EXPLORER'S CLUB
IRB FILE NUMBER: B05-00008700-I