

CAN FOREST SECTOR DEVOLUTION IMPROVE RURAL LIVELIHOODS?

**AN ANALYSIS OF FOREST INCOME AND
INSTITUTIONS IN WESTERN UGANDA**

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*For Adam
You make everything possible
I love you*

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*The National Forest Plan aims to:
Help Ugandans get more money and a better life from forests;
Make more jobs and new ways to make money from forests;
Make sure that the forests and trees are looked after properly.*

New National Forest Plan, Popular Version

CAN FOREST SECTOR DEVOLUTION IMPROVE RURAL LIVELIHOODS?

AN ANALYSIS OF FOREST INCOME AND INSTITUTIONS IN WESTERN UGANDA

ABSTRACT

Forest sector devolution is widely promoted throughout the low income tropics as a policy that leads to poverty reduction. However, there is a dearth of empirical evidence to support this assertion. Drawing on the case of a major forest sector reform in Uganda, this dissertation addresses the question: has Uganda's forest sector reform led to improvements in rural livelihoods? Uganda provides an excellent case study of two parallel devolution processes: democratic decentralization of oversight of private forests to local government; and devolution of ownership and management of Central Forest Reserves to the for-profit parastatal National Forestry Authority.

The first empirical chapter uses pre and post-reform household level data to estimate the direction and magnitude of the effect of the reform on the contribution of forest income to rural income portfolios. The findings show that decentralization to local government has had minimal impact on the contribution of forests to household income portfolios. However, for the case of devolution to the National Forestry Authority, relatively wealthy households have significantly increased forest income since the reform was implemented.

Using the methods of institutional analysis, the second empirical chapter discusses the incentives facing actors involved in and affected by reform implementation. The analysis demonstrates that the motivations and information shaping incentives for forest officials and forest users are hindering the ability of poor and vulnerable households to increase the share of their income from forests.

The third empirical chapter describes heterogeneity in perceptions of formal withdrawal rights for forest products. The findings demonstrate that there is considerable heterogeneity in knowledge of formal forest withdrawal rights among forest officials, village leaders and households. Perceptions of formal rights do not appear to have a significant effect on the harvesting behavior of rural households.

The findings from this study challenge the assertion that forest sector devolution is an effective strategy for rural poverty reduction.

Elinor Ostrom, Ph.D.

Lauren Morris MacLean, Ph.D.

Roger Parks, Ph.D.

Arild Angelsen, Ph.D. (External)

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ACRONYMS

BUCODO – Budongo Forest Community Development Organization
BUNCA – Budongo Good Neighbours Conservation Association
CFM – Collaborative Forest Management
CFR – Central Forest Reserve
CPI – Community Protected Area Institution
DFID – Department for International Development, United Kingdom
DFO – District Forestry Officer
DFS – District Forestry Services
DID – Difference-in-Difference
FD – Forest Department
FID – Forestry Inspection Division
FSR – Forest Sector Review
FSSD – Forest Sector Support Department
FSUP – Forestry Sector Umbrella Program
GOU – Government of Uganda
LFR – Local Forest Reserve
MFPA – Murchison Falls Protected Area
MFPED – Ministry of Finance, Planning and Economic Development
MWLE – Ministry of Water, Lands, and Environment
NAADS – National Agricultural Advisory Service
NFA – National Forestry Authority
NRM – National Resistance Movement
PEAP – Poverty Eradication Action Plan
PFE – Permanent Forest Estate
PMA – Program for the Modernization of Agriculture
PMAU – Poverty Monitoring and Analysis Unit
PRSC – Poverty Reduction Support Credit
PRSP – Poverty Reduction Strategy Paper
RMNP – Rwenzori Mountains National Park
THF – Tropical High Forest
UBOS – Uganda Bureau of Statistics
UFSCS – Uganda Forest Sector Coordinating Secretariat (defunct)
UgShs – Ugandan Shillings
UNESCO – United Nations Educational, Scientific, and Cultural Organization
UPPAP – Uganda Participatory Poverty Assessment Project
UWA – Uganda Wildlife Authority
WCS – Wildlife Conservation Society

CHAPTER 1

WHAT SCOPE FOR FOREST SECTOR GOVERNANCE REFORM TO IMPROVE RURAL LIVELIHOODS?

1. INTRODUCTION

This dissertation brings together two issues currently high on the international forestry agenda. The first issue is the distribution of control over forests. Ownership and management of forests in the low income tropics has traditionally been highly skewed towards national governments. Increased recognition of the unequal distribution of forests has led donors, non-government organizations, and civil society movements to advocate for local management of forest resources. In response, governments around the world have initiated devolution programs that transfer forest management from centralized state bureaucracies to local actors (White and Martin 2002); recent estimates suggest that reforms devolving rights and responsibilities for natural resource management are underway in approximately 60 developing countries (Agrawal 2001; WRI 2003).¹ Since 2002, the area of forest designated for use by communities and indigenous peoples has increased by roughly 20 million hectares on public land, and 56 million hectares on private land in the 30 most forested countries (Sunderlin, Hatcher, and Liddle 2008).

A second major issue on the international forest policy agenda is the contribution of forests to the livelihoods of the rural poor. The declaration of the Millennium Development Goals catalyzed a reorientation of the role of forestry in international development assistance (United Nations 2000). Forestry projects are being formulated, implemented and evaluated on the basis of their ability to contribute to the overarching goal of poverty reduction (Oksanen and Mersmann 2003; Sunderlin et al. 2005). Our

¹ Reforms encompass several types of institutional change involving shifts from centralized to more diverse systems of governance including: federalism; polycentricity; deconcentration; decentralization; devolution; subsidiarity, and privatization (Mahwood 1983; Ostrom, Schroeder, and Wynne 1993; Parker 1995; Manor 1999; McGinnis 1999; Banner 2002; Faguet 2004). The common thread linking each of these mechanisms of institutional change is a process of devolving responsibilities and powers from centralized regimes to more diverse systems of governance. Cohen and Peterson (1996) cite confusion and careless use of terms as one of the methodological difficulties affecting the study of governance reforms.

understanding of the contribution of forests to rural livelihoods has grown tremendously over the past 10 years. Several studies account for forest income in the analysis of rural income portfolios (e.g. see Vedeld et al.(2004) for a meta-analysis), and other studies are ongoing.² The literature suggests that the contribution of forests to rural livelihoods is highly varied (Byron and Arnold 1999; Wunder 2001; Vedeld et al. 2004; Chomitz et al. 2006), and that different opportunities for forest income enhancement exist both within and between communities.

This research connects the issues of devolved control of forests and forest-based poverty reduction drawing on the case of a major forest sector reform undertaken in Uganda. Uganda's reform is an excellent case for studying the potential for achieving poverty reduction outcomes. In response to rapid forest loss and degradation, wide spread corruption, and lack of a coherent forest management strategy the Ugandan government implemented an extensive forest sector reform in 2003. A major objective of the reform was to improve the livelihoods of the poorest and most vulnerable households by increasing access to forest resources, securing forest rights, providing mechanisms for collaborative management, and developing opportunities for rural households to engage in a wide range of forest sector business opportunities.

The Ugandan reform provides case studies of two types of devolution: democratic decentralization to local government; and devolution to a for-profit parastatal.³ Prior to the reform the centralized Forest Department managed all forested land in Uganda. The reform abolished the century old Forest Department, creating the District Forest Service (DFS) which oversees the use of private forests and local forest reserves (i.e. democratic decentralization to local government), and the parastatal National Forest Authority (NFA) (i.e. devolution to for-profit parastatal), responsible for the management and conservation of the 506 central forest reserves (CFRs) throughout the country. Legislation enacted as

² The Center for International Forestry Research (CIFOR) is currently coordinating the collection of data documenting the contribution of forests to rural livelihood portfolios across roughly 35 sites in the low income tropics. See http://www.cifor.cgiar.org/pen/_ref/home/index.htm for details.

³ In this analysis the term *devolution* is used to describe the universe of governance related policy reforms. Meinzen-Dick and Knox (2001) use the term devolution to describe the process whereby central government agencies transfer rights and responsibilities to more localized institutions.

part of the reform restructured how 85% of Uganda's forests are governed.⁴ The objective of this research is to understand the effect of each of these variants of devolution on rural livelihoods, and to identify the underlying factors that have led to the various outcomes observed.

2. CAN FOREST SECTOR DEVOLUTION IMPROVE THE LIVELIHOODS OF THE RURAL POOR?

There is growing consensus among international development oriented organizations that improved governance of forests, generally understood as the devolution or democratic decentralization of rights and responsibilities, leads to forest-based poverty reduction (Fisher et al. 2005; WRI et al. 2005). However, the processes and conditions under which reforms lead to pro-poor outcomes are not well understood. Several scholars point out the normative emphasis in the literature highlighting the potential for devolution policies and programs to result in favorable livelihood outcomes (Agrawal and Gibson 1999; Agrawal and Ostrom 2001; Meinzen-Dick and Knox 2001). Interest and support for devolution policies as a poverty reduction strategy have persisted in the absence of a clear theoretical link between the two (Johnson 2001; von Braun and Grote 2002; Steiner 2008). Further, an emerging empirical literature suggests that natural resource focused devolution programs cause changes in local livelihoods both in positive and negative ways (Edmunds and Wollenberg 2003; Jagger, Pender, and Gebremedhin 2005; Jumbe and Angelsen 2006; Sikor and Nguyen 2007). The ambiguity that emerges from both the theoretical and empirical discourse on forest sector devolution and poverty reduction suggests the need for additional research that explores the welfare outcomes of reforms and their determinants.

Dietz, Ostrom and Stern (2003) caution that devolution reforms are viewed by many as panaceas for favorable economic and ecological outcomes. However, the dearth of compelling empirical evidence to suggest that this is the case. Further, the conditions required to support the objectives of devolution (i.e. enhanced efficiency, accountability,

⁴ The Uganda Wildlife Authority (UWA) retained responsibility for managing forests within national parks and wildlife reserves which comprise approximately 15% of Uganda's forests.

equity and sustainability) are very restrictive; even well functioning democracies have difficulty successfully implementing devolution reforms. Several scholars have identified important unanswered questions about governance reforms, including a lack of understanding of who in the local arena gains power as central authorities are devolved, how coordination and competition occurs among actors and groups of actors, and what strategic interactions take place between authorities and stakeholders (Ribot 2002; Smoke 2003; Larson 2005).

2.1. Research Questions

The broad objective of this study is to understand how Uganda's forest sector reform has affected forest-based rural livelihood outcomes. In this study income (i.e. subsistence and cash income) are used as a proxy for welfare.⁵ The study has three principal research questions:

- Has forest income increased for the rural poor as a result of the reform?
- Have political and economic incentives created by the reform process hindered the realization of increased forest income for rural households?
- Have changes in formal withdrawal rights for forest products influenced the harvesting behavior, and in turn importance of forest-based income to rural households?

2.2. The Relationship between Devolution, Forest Income and Poverty Reduction

Some policy scholars have raised concerns about enthusiasm among both the scholarly and practitioner communities for devolved governance regimes to lead to favorable economic and ecological outcomes (Agrawal and Ostrom 2001; Dietz, Ostrom, and Stern

⁵ The concept of a livelihood can be broadly understood as the capabilities, assets and activities required for a means of living, as per the Sustainable Livelihoods Approach (Ellis 1998), or in the context of the "five capitals approach" that considers natural, human, social, physical and financial capital. Capital endowments and the processes of capital use, transformation, and reproduction can be used to describe livelihoods (Bebbington 1999). Broadly conceptualizing the factors that matter to poor people in their daily lives is a very useful exercise, but provides challenges when it comes to identifying tangible indicators that can be used to evaluate policy reform outcomes (Angelsen and Wunder 2003).

2003). The hypothesis that devolution necessarily leads to poverty reduction is naïve.⁶ It assumes that policy mechanisms intended to favor the lowest income and most vulnerable populations are automatically implemented. Devolution is a process that involves potentially high costs to actors with competing incentives. This dissertation examines the effect of two variants of devolution on improvements in forest income for rural households living adjacent to forests. In each of the three empirical chapters forest income is the dependent variable of interest. Throughout this dissertation I argue that relationship between forest sector devolution and poverty reduction for rural households is extremely complex and requires that several fairly restrictive conditions be met.

2.3. Hypotheses

The central hypothesis of this dissertation is: *Devolution reforms lead to gains in forest income for rural households when the reform decreases the transaction and financial costs of engaging in the forestry sector, when the incentives of forest-gate officials motivate pro-poor outcomes, and when there are meaningful changes in access to forest products.* Three sub-hypotheses are tested empirically.

Sub-hypothesis 1: Devolution reforms generate opportunities for the poorest and most vulnerable households to increase income from forests.

In order to test the central hypothesis we first need to know if the reform has had a measurable impact on forest income for rural households. This hypothesis is tested in Chapter 3.

Sub-hypothesis 2: Devolution reforms generate incentives that motivate devolved authorities to favor increases in forest income for the rural poor.

⁶ In this analysis the concept of poverty reduction is includes both reducing the number of poor people, and also in the broader sense alleviation or making poverty easier to endure (Arnold 2002). The World Bank (2001) defines poverty as multiple human deprivation, inclusive of economic deprivation as well as social and political dimensions. Poverty reduction strategies involve three policy responses to the multi-dimensional nature of poverty “promoting opportunity, facilitating empowerment, and enhancing security” (World Bank 2001). Arnold (2002) points out in the context of forests this means securing poor households against things getting worse, and enabling poor households to take advantage of opportunities.

Sub-hypothesis 2 explores potential causal variables to explain the success or failure of reforms resulting in increased forest income. This hypothesis is tested in Chapter 4.

Sub-hypothesis 3: Devolution reforms that motivate changes in formal rights to harvest forest products lead to changes in household harvesting behavior, and in turn forest income.

The assumption that legislative changes necessarily result in behavioral change at the household level is tested with sub-hypothesis 3 in Chapter 5.

2.4. Why Uganda?

There are several reasons for selecting Uganda as an appropriate case for analyzing the influence of forest sector reforms on livelihood outcomes. First, Uganda is at the forefront of government wide devolution reforms in sub-Saharan Africa; it is second only to South Africa in the implementation of democratic decentralization reforms (Ndegwa 2002). Uganda has one of the longest established and most ambitious democratic decentralization programs in Sub-Saharan Africa (Francis and James 2003). Uganda is one of a handful of countries in sub-Saharan Africa that has undertaken a wide scale forest sector decentralization reform⁷; several other countries in the region are looking to Uganda for guidance regarding how to formulate and implement their own forest sector policy reforms. Though at the forefront of forest sector governance reforms in sub-Saharan Africa, there is limited empirical evidence to indicate how the benefits associated with forest have been re-oriented to local resource users.

Second, the improvement of rural livelihoods through forest-based income is a major focus of Uganda's forest sector reform process. The overarching goal of Uganda's National Forest Plan is:

“An integrated forest sector that achieves sustainable increases in economic, social and environmental benefits from forests and trees by all the people of Uganda, especially the poor and vulnerable”. (MWLE 2002)

⁷ Major forest sector reforms have been undertaken in Cameroon, Ghana, Malawi, South Africa and Senegal, and more recently in Mali and Kenya.

Evaluating livelihood outcomes at a relatively early stage is strong indicator of whether the reform is achieving some of the major goals it set out. Early knowledge about livelihood outcomes has important implications for the provision of forestry extension, forestry education and awareness, forestry revenue collection etc. In addition, evaluating livelihood outcomes allows for the integration of data about the changing role of forests in rural livelihoods into the various poverty reduction policies the Government of Uganda is engaged in (e.g. Poverty Eradication Action Plan, Poverty Reduction Strategy Papers, National Development Plan etc.).

Forests play a major role in the lives of the Ugandan people. The majority of Ugandans rely on woody biomass for domestic energy consumption, and products including timber, poles, and non-timber forest products are in high demand. Annual consumption of wood in Uganda is estimated to be approximately 25 million tons; 95 percent of this is consumed as fuel wood (MWLE 2002). For people living in or near forests, between 11 and 27 percent of their annual income is derived from the use and sale of forest products. The contribution of Uganda's forests to livelihoods at the national level is estimated to be \$190 million USD (Bush et al. 2004). In addition to contributing to people's incomes, forests act as important safety-nets for households at times when food and resources are scarce. Poorer households derive proportionally more of their income from forests, while relatively wealthy households capture more of the monetary value of forest products. The contribution of forests to Uganda's gross domestic product GDP is estimated to be between 2 and 6 percent (MFPED 1999)

Third, Uganda's forests are under considerable pressure due to conversion of forests to agricultural land, increased population, increased urban demand for charcoal, over grazing, uncontrolled timber harvesting, and policy failures. In 1980 forests and woodlands covered approximately 10.8 million hectares (45 percent) of Uganda's land area. The current rate of deforestation is estimated to be about 1 percent per annum, and the annual cost of deforestation is estimated to be between 3.8 and 5.7 million USD per year (Falkenberg and Sepp 1999). Though deforestation in central forest reserves has slowed in recent years, forest cover loss and forest degradation are occurring in ungazetted public forests (Nsita 2005). Plumptre (2002) estimates that approximately 80 000 hectares of forest has been lost in western Uganda since the mid 1980s, primarily on

lands outside of reserves and national parks. If current rates of deforestation continue, it is estimated that by 2020 privately held forests will be reduced to less than 700,000 hectares, and Uganda will face a national biomass deficit (Bush et al. 2004).

Despite two decades of economic growth, rural poverty remains a persistent problem (Ellis and Bahiigwa 2003). It is important that a realistic and informed view of the role of forestry in poverty reduction is articulated. Continued high rates of deforestation and forest degradation, combined with persistent rural poverty suggests that new knowledge and understanding of the role of devolved forest governance in poverty reduction is critical.

3. FOREST GOVERNANCE IN UGANDA

The governance of 85 percent of Uganda's forests was reformed between 1998 and 2003. The process led to a radically shift in the focus of forest management on both private and gazetted forests. Forests outside of central forest reserves received little attention prior to the reform. Central forest reserves had been managed using a traditional tropical forest management maximum sustained yield model. The reform process precipitated the documentation of the relative importance of forests to rural livelihoods and stressed the poverty-reduction potential of forestry related activities both on private lands and also within CFRs. In this section the main processes of the reform and their relationship Uganda's overall poverty reduction strategy are laid out.

3.1. Historical Context

The history of Uganda's forest governance is like many of the former British colonies in sub-Saharan Africa; a technically oriented centralized forest department established under the colonial administration, and later taken over by the post-colonial centralized governance structure (Webster and Osmaston 2003).⁸ Uganda's first forest policy was written in 1929 (MWLE 2001), and the first Forest Act was passed in 1964. Under the colonial administration the most valuable forests were gazetted as forest reserves (i.e. central and local forest reserves) in 1934. Considered part of the Permanent Forest Estate

⁸ The Scientific and Forest Department of Uganda was created in 1898 and renamed the Forest Department (FD) in 1927 (Jacovelli and Carvalho 1999).

(PFE), these forests were managed by the centralized colonial administration until independence in 1962 (MWLE 2001a). After a brief period where local forest reserves were managed by local administrations (i.e. 1964-1967), in 1968 the Forest Department re-established itself as the sole regulator of forests on both public and private lands (Nsita 2005).

From 1934 to the early 1970s the PFE was managed by the Forest Department using principles of technical forest management. During this period, Uganda had a reputation for having some of the best tropical forest management practices in sub-Saharan Africa (Jacovelli and Carvalho 1999; MWLE 2001). Under the Obote and Amin regimes in the 1970s and early 1980s things fell apart. Forests in the PFE continued to be managed by the Forest Department, but little attention was given to long term planning for sustainable forest management. Hamilton (1984) notes that by the mid 1980s, forest policy had become short-term and restricted in its aims, was based on out-of-date work plans, and that management to restrict activities in the Forest Reserves were ineffective.

In 1988, under President Museveni's National Resistance Movement government, a one-page forest policy statement was prepared (MWLE 2004a). The document guided the management of Uganda's forests until the major forest sector reform process was initiated in 1998. Prior to the writing of the 1988 statement, there was no formal policy outlining the management of forests on private land. A brief experiment with forest sector decentralization was undertaken in 1993 when a government wide decentralization reform was implemented. The first attempt to decentralize forest management was unsuccessful due to limited forest management capacity at the local government level, and also because forestry was a relatively low priority for cash constrained district governments pressured to provide health, education and transportation infrastructure to local constituents (Banana, Gombya-Ssembajjwe, and Bahati 2003; Nsita 2005). In 1995 forests were recentralized, and remained under the Forest Department until 2003.

3.2. The Forest Sector Reform Process

The forest sector reform was catalyzed by two events. First, it was part of the government-wide restructuring motivated by the 1995 Constitution and the 1997 Local Government Act intended to downsize the public service, rationalize government

functions, and improve the effectiveness and efficiency of public service provision (MWLE 2006). Second, in the late 1990s there was pressure to reform the sector due to corruption and deficiencies in the centralized Forest Department, and the realization that deforestation and forest degradation was taking place at an alarming rate throughout the country (MWLE 2004g).⁹

The Forest Sector Umbrella Program (FSUP) managed the reform process from 1998-2003. FSUP was a multi-donor program, undertaken in collaboration with the Government of Uganda through the Ministry of Water, Lands and Environment (MWLE), and coordinated by the Forest Sector Coordination Secretariat (now the Forestry Inspection Division within the MWLE).¹⁰ The FSUP had two objectives: to create a positive, effective and sustainable policy and institutional environment for the forest sector in Uganda and, through this, to increase economic and environmental benefits from forests and trees, particularly for the poor and vulnerable (MWLE 2004a).

3.3. Information Gathering and Policy Formulation Stage

The FSUP supported a number of processes including: a Forest Sector Review (MWLE 2001a), and the subsequent development of the Uganda Forestry Policy (MWLE 2001), the National Forest Plan (MWLE 2002), and the National Forestry and Tree Planting Act (Government of Uganda 2004). Central to the reform process was the abolition of the centralized Forest Department and the creation of the National Forestry Authority; the District Forestry Services; and the Forestry Inspection Division.¹¹ A timeline of events related to the forest sector reform is presented in Table 1.1.

⁹ In 1999 several senior Forest Department staff members were fired or suspended following allegations of financial irregularities and mismanagement of the forest resource (Jacovelli and Carvalho 1999).

¹⁰ Key donors included: GTZ; DFID; NORAD; UNDP; and the European Commission (MWLE 2004g).

¹¹ The initial recommendation for restructuring the Forest Department came in a post-constitution restructuring report on the MWLE in 1998. A National Forestry Authority was proposed: donors (especially DFID) insisted that the National Forest Plan should come before a new organizations could properly respond to new direction of forestry sector (MWLE 2004f). In 1998 FD made a proposal for its restructuring proposing transformation to a semi-autonomous agency and management of its own revenues. It proposed a new staff structure that did not reduce numbers (MWLE 2004f). The proposal was rejected.

Table 1.1: Timeline of Uganda's Forest Sector Governance Reform

	Year	Event	
Pre-reform period	1986	National Resistance Movement (NRM) comes into power; Economic and institutional reform process begins	
	1987	Resistance Council and Committees Statute, provide framework for local government structure	
	1988	One page Forest Policy statement issued by NRM	
	1992	Local government decentralization program launched	
	1994	National Environmental Management Policy for Uganda* ¹	
	1993	Government wide recentralization process implemented	
	1995		New Constitution of the Republic of Uganda adopted*
			National Environmental Statute; Water Statute; National Policy for the Conservation and Management of Wetland Resources *
			Forests sector re-centralized due to failure of local governments to manage private forests
	1996		Uganda participates in International Panel on Forests and International Forum on Forests
			Uganda Wildlife Statute*
	1997		Local Governments Act; National Gender Policy*
			First draft of Poverty Eradication Action Plan (PEAP)
Reform process	1998	Forest Reserves Order; Land Act*	
		Ugandan led donor supported Forest Sector Umbrella Program (FSUP) established; Forest Sector Review (FSR) commissioned	
		Ministry of Public Service restructures Ministry of Water, Lands and Environment, creates Forestry Inspection Division (3 posts created, but not filled)	
	1999		Uganda Forest Sector Coordination Secretariat established
			Uganda Wildlife Policy; National Water Policy*
			National Biomass Study completed
			Data collection for Forest Sector Review started
	2000		First revision of the PEAP of Poverty Reduction Strategy Paper (PRSP)
			Draft of Forest Sector Review document
			Plan for the Modernization of Agriculture*
	2001		Uganda Forest Policy published*
			Principles of National Forestry and Tree Act approved
	2002		NAADS launched by Ministry of Agriculture, Animal Industries and Fisheries
			National Forest Plan published*
			Head of FID post filled by former Assistant Commissioner of Forest Department
			Pilot projects to establish extension linkages with NAADS
	2002		Forest Sector Review published

Reform Implementation	2003	Forest Department officially disbanded
		Forestry Inspection Division posts filled (2 staff); FID officially launched
		District Forestry Services officially launched
		Uganda Forest Sector Coordination Secretariat (UFSCS) closes; FID takes over functions
		National Forestry and Tree Planting Act passed by Parliament*
		NFA Board of Directors appointed
	2004	NFA officially launched
		End of technical assistance from DFID to Ministry of Water, Lands and Environment
	2005	Second revision of the PEAP/PRSP
	2006	Resignations by top level NFA officials
	2007	New Executive Director and Board of Directors appointed to National Forestry Authority
	2008	Forestry Inspection Division replaced with Forest Sector Support Department
		Results from 2007 biomass study released by NFA

1. *Denotes national policy and recent legal changes affecting the forestry sector.

Sources: (MWLE 2001, 2001a, 2002, 2004a, 2004g)

Prior to the reform few data were available regarding the state of Uganda's forests, or the relative importance of forests to Ugandan livelihoods. One of the earliest actions of the FSUP was to commission a Forest Sector Review (FSR) with the aim of providing the first comprehensive overview of Uganda's forestry sector (MWLE 2001a).¹² The FSR took place between 1999 and 2001. Focal points of the FSR were an assessment of the forest resource and the institutions charged with its management, economic and private sector opportunities within the forestry sector, and the contribution of forests to livelihoods and poverty eradication. The information gathered during the FSR process informed the wider Uganda Forestry Policy, the National Forest Plan, and new legislation for the forestry sector (MWLE 2004b).

¹² The FSR involved the collection of both qualitative and quantitative data. To clarify and supplement existing data two important quantitative studies were commissioned. Due to expectations of a significantly increased role for the private sector in the post-reform period Jacovelli and Carvalho (1999) prepared a report outlining opportunities for private sector involvement in forestry. The second report involved an economic evaluation of the forest sector (Falkenberg and Sepp 1999).

Uganda's previous forest policy statement was a one page document written in 1988 (Government of Uganda 1988). A new forest policy was needed to provide direction for the sustainable development of the forestry sector. The new forest policy had several objectives including: aligning the forestry sector with current socioeconomic conditions; clarifying the role of forestry outside gazetted reserves; providing guidance on the balance between production and conservation; indicate the role of government, the private sector and rural communities in forest management; provide guidance on how to link forestry with other sectors; and clarifying Uganda's participation in international forestry processes (MWLE 2001, 2004d).

Overall the development of a new forestry policy for Uganda was a costly process due to data collection requirements, high level of human resources involved in compiling and analyzing information, and ensuring a high level of stakeholder engagement through workshops; stakeholder consultations; and participatory processes (MWLE 2004d). The plan as laid out by the FSUP is to review the Forestry Policy every 5-10 years to make sure that it remains relevant to current socioeconomic and environmental conditions. Aspects of the Forestry Policy related to sector coordination were not taken into account in the formulation of National Forestry and Tree Planting Act (Government of Uganda 2004) and need to be amended.

The National Forest Plan formulated in 2002 is a policy document to guide forest sector development. The National Forest Plan was viewed as a first step for turning Uganda's Forestry Policy into action (MWLE 2001). The NFP is a strategic policy framework that sets short, medium and long-term goals and programs for various sub-sectors and regions, and prioritizes issues. A first iteration of the NFP was oriented towards the technical objectives of sustainable forest management with little attention to wider national poverty objectives, or the institutions that would move the reform forward (MWLE 2004a). However, the final version makes explicit linkages with the Poverty Eradication and Action Plan (MFPED 2000a) in identifying reform mechanisms for achieving economic growth and transformation, good governance and security, ability to raise incomes of the poor, and improving the quality of life of the poor through forest sector development (MWLE 2002).

Prior to the reform the current forestry legislation in Uganda was the Forestry Act of 1964 (Government of Uganda 1964).¹³ New legislation was needed to support implementation plans laid out in the Forestry Policy and National Forest Plan processes, as well as to clearly lay out the role for the new forest management organizations (MWLE 2004a, 2004h). There were three major catalysts for the formulation of new legislation. First was the passing of the 1995 Constitution which led to major changes in land, environment and local government laws.¹⁴ Forestry law was required that reflected these changes. Second, recognition that the Forest Department would be disbanded required enabling legislation to put into place new organizational structures including the creation of the District Forestry Services, the National Forestry Authority; and the Forestry Inspection Division. Finally, the Forestry Act of 1964 was outdated and did not reflect new ideas in forest management emanating from increased engagement in international forest policy and conventions for initiatives such as collaborative forest management (MWLE 2004h)

A major function of the Bill passed in early 2004 was to clarify the roles of the new forest management organizations. The most attention was devoted to the creation of the National Forestry Authority. NFA was unpopular with a number of Members of Parliament, they wanted to retain the FD (MWLE 2004h). There was conflict regarding whether NFA should also take on the management of forests outside of reserves. Two arguments emerged. The first argument was that by giving NFA only the central forest reserves to manage, it would be too weak and unable to sustain itself. Conversely, some felt that if NFA was to work under the principle of self-sustainability then it was too much for it to take on additional public goods roles (i.e. looking after forests on private lands) (MWLE 2004h). A compromise was reached. There is a proviso in the Bill which stipulates that the Minister can delegate some regulatory functions on private and customary lands to the NFA as long as they are contracted and paid for such services (MWLE 2004h).

¹³ New Bill covers all forests, but allocates roles and responsibilities more clearly – and empowers local people and local governments to become more involved in forestry the former Bill (1964) gave a lot of powers to Commissioner of Forests over all forest resources (MWLE 2004h).

¹⁴ Prior to the 1995 Constitution and 1997 Land Act, and in accordance with the 1964 Forest Act, forests outside of the PFE were considered public land and managed by the Forest Department. Under the new legislation forests outside of the PFE are considered private or customary land (MWLE 2004f).

The National Forestry Authority was established under the National Forestry and Tree Planting Act as a government parastatal responsible for the management of central forest reserves.¹⁵ The NFA falls under the government Ministry of Water, Lands and Environment and is headed by a Board of Directors which is approved by the Minister (MWLE 2004g). The National Forestry Authority was initially funded by support from development partners and the Ugandan government with an expectation of fiscal self sufficiency within the first 3-4 years of operation, or by the 2008/2009 fiscal year.¹⁶

The majority of central forest reserves in Uganda have both production forestry and biodiversity conservations zones. Production forests are largely natural tropical high forest, though plantations make up an increasingly large share of the production forests. The National Forestry Authority earns revenue through the confiscation (i.e. which involve fines) and auctioning of illegally harvested timber, the sale of blocks of forest land or individual trees for timber harvesting, the leasing of CFR land for plantation establishment, the sale of seeds and seedlings etc. NFA fulfills its conservation mandate by protecting the portions of reserves that are set aside for biodiversity conservation.

The District Forestry Service (DFS) is responsible for coordinating forestry related activities throughout the districts. Districts oversee privately held forest and woodland, and a very small portion of forested land classified as local forest reserve. The primary functions of the District Forest Service include: issuing permits and collecting revenue associated with the transport and sale of marketed forest products including fuel wood, sawn wood, poles and charcoal; issuing permits to harvest timber or produce charcoal on privately held land; providing forestry extension services including promoting tree planting and supporting farmer adoption of sustainable land management practices; and providing support to communities that want to establish community forests. Districts employ District Forest Officers (DFO), forest rangers and forest

¹⁵ A parastatal is an organization which has some political authority and serves the state indirectly. While clearly identified as a parastatal in the policy documents, NFA also has a revenue generating function

¹⁶ The NFA Start-up Fund was supported by the European Union (EU), and the governments of Norway (NORAD) and the United Kingdom (DFID) who provided funds to meet initial capital investment and start-up operational costs. The EU provided financial assistance through the Forest Resources Management and Conservation Program (FRMCP) (MWLE 2006).

guards.¹⁷ The maximum number of allowable employees falling in each category is determined by the Uganda Public Service Commission in accordance with the perceived requirements within each individual district.¹⁸

The Forestry Inspection Division (FID) housed within the Ministry of Water, Lands and Environment is responsible for policy formulation and regulation of the forestry sector. Its primary responsibilities are overseeing both the NFA and the DFS, and approving timber harvesting licenses for large scale producers (i.e. those harvesting approximately 500 cubic meters of timber per year). Until 2008 the FID operated with a very small staff of seven Kampala based employees, and a very limited budget from the MWLE. Based upon input from key donors including Britain and Norway, the Forestry Inspection Division changed status in 2008 and is now called the Forest Sector Support Department. The shift from an inspectorate to a division is not trivial. The new Department is directed much more clearly by the potentially political motives of the Ministry of Water, Lands and Environment.

3.4. Mainstreaming Forestry-Poverty Linkages into the Reform Agenda

A priority for the FSUP was to mainstream forestry into several government wide processes taking place in the context of reforms implemented after the passing of the 1995 Constitution. A central focus of the FSUP was to highlight the significant contribution forests make to rural livelihoods.¹⁹ Prior to the FSR virtually nothing was known about the contribution of forests to rural livelihoods. A major challenge encountered during the reform process was to get farmers and forest owners thinking

¹⁷ The District Forest Officer (DFO) is the head of forestry for the District and falls within the District level Department of Natural Resources. Some districts also employ forest rangers and forest guards. Forest rangers generally take responsibility for forestry extension and issuing harvesting permits in a grouping of sub-counties. Forest guards are generally employed to oversee local forest reserves which fall under the mandate of the District. Guards are hired from the communities surrounding the forest. It is important to note that the majority of districts have vacancies in a large number of these positions as they do not have, or don't prioritize the funds to pay staff.

¹⁸ Since 2000 there has been a dramatic increase in the number of districts in Uganda. Districts are routinely subdivided, largely to satisfy demands of the electorate who view having their own district as an important political and economic move. As new districts are formulated, forestry is generally a low priority.

¹⁹ A historical focus on centralized technically oriented forest management, combined with antagonistic relations between the Forest Department and local communities throughout the 1980s and 1990s meant that forestry was viewed by both farmers and policy makers as having little to do with livelihood improvements.

about forestry as an income generating activity. A commonly voiced comment at stakeholder workshops associated with the Forest Sector Review was “forestry takes us away from farms” (MWLE 2004c).

The FSUP was instrumental in identifying linkages between forestry and livelihoods, emphasizing the potential role for forestry in the context of Uganda’s wider poverty reduction strategies including: the Poverty Eradication Action Plan (PEAP)²⁰; the Plan for the Modernization of Agriculture (PMA)²¹; Poverty Reduction Support Credit (PRSC)²²; the Uganda Participatory Poverty Assessment Project (UPPAP); the Poverty Monitoring and Analysis Unit (PMAU); and the Uganda Bureau of Statistics (UBOS) (MWLE 2004e).²³ Though natural resource related issues were not well integrated into the first PRSP document (MFPED 2000b), the updated PRSP document (MFPED 2005) included data collected during the Forest Sector Review process on the role of forests in the national economy and as a contributor to poverty reduction. Currently the United Nations Environment Program – Poverty and Environment Initiative is working on several strategy documents that situate natural resource management in the National Development Plan process (i.e. the current PEAP revision process) (MFPED 2007).

The National Forest Plan lays out a set of indicators for monitoring and evaluating the NFP progress and performance with respect to its goals of poverty eradication, economic growth and sustainable natural resource management. Its impact is measured according to the contribution to each of the four pillars of the Poverty Eradication Action Plan which include: economic growth and transformation; good governance and security; ability of the poor to raise incomes; improving quality of life for the poor (MWLE 2002). The process for monitoring involves the FID working with Government of Uganda

²⁰ The PEAP is Uganda’s Poverty Reduction Support Programme (PRSP). It is led by the Ministry of Finance, Planning and Economic Development (MFPED). Its role is to make poverty reduction central to all areas of government policy and action.

²¹ The PMA is a framework for eradication poverty among the rural poor in Uganda through the transformation of agricultural practices and services.

²² PRSC is a World Bank loan facility to support sectors that contribute to poverty reduction. Funds of roughly \$150 million USD per year are channeled through MFPED.

²³ UPPAP, PMAU and UBOS are all housed within MFPED. The role of UPPAP is to work with district authorities and civil society organizations to ground truth poverty assessments. PMAU monitors how poverty reduction strategies in all sectors are implemented, and the extent to which poverty is being reduced; UBOS produces all major government statistics including conducting a bi-national household level survey.

monitoring institutions (e.g. UBOS, Poverty Monitoring Unit etc.) to set quantified baselines and realistic targets for the achievement of impacts. A summary of the NFP strategies that pertain to rural livelihoods is presented in Table 1.2.

Table 1.2: Measuring the Impact of the NFP within the PEAP Framework¹

PEAP Pillar	Main NFP Strategy	Indicator of Impact
Good governance and security	CFM and customary forest management	Increase number of CFM agreements in Forest Reserves; Increase number and area of community forests
	Pro-poor regulations and guidelines	Open access to public information on forestry
Ability of the poor to raise incomes	Access to forest resources	Increase in percent of household income derived from forestry-related activities
	Improved forestry advisory services	Number of NAADS contracts for forestry advisory services
	Small-business development in forestry	Number of poor people with tree growing permits in Forest Reserves
	Security of land and tree tenure	Increasing access to forest reserves through CFM agreements or concessions
	Use of appropriate technologies	Increase in number of farmers using improved agroforestry technologies
Improving the quality of life of the poor	Use of forests as safety nets to reduce vulnerability	Increase in percent of population with secure access to forest resources for subsistence use (through CFM and community forestry initiatives); Address vermin issues; Secure access to medicinal plants; Guidelines for eviction and compensation; <i>tuangya</i> system ²⁴ ; Promoting agroforestry
	Biomass energy conservation	Increase in number of households using improved biomass energy technologies; Decline in distance to collect fuel wood
	Developing sustainable forest management	Reversed rate of deforestation, increasing on farm tree cover
	Securing cultural values of forests	Increased adoption of traditional management systems, land tenure rights and incentives to protect forests of spiritual or cultural significance

1. Adapted from National Forest Plan Table 8-1 (MWLE 2002).

²⁴ The “*tuangya*” system is the practice of growing food crops under newly planted trees until the trees grow and shade out the crops (MWLE 2002).

Forest-based poverty reduction indicators identified in the NFP are easily categorized in the context of the safety-net, current consumption and pathway out of poverty typology of the forestry-poverty literature (Angelsen and Wunder 2003). Forest products serve safety nets functions when they are used to overcome idiosyncratic shocks which usually involve an income shortfall or demand for cash. Vulnerability is an important factor determining the probability that households will be exposed to idiosyncratic shocks and whether or not they will have other safety net options (Pattanayak and Sills 2001; Vedeld et al. 2004). Forest products are also used to maintain current levels of consumption. A wide variety of forest products including fuel wood, wild foods, and medicinal plants are harvested on a regular basis to support the ongoing consumption demands of rural households (Cavendish 2000; Bush et al. 2004; Fisher 2004; Narain, Gupta, and van't Veld 2005). Forests act as a pathway out of poverty when they have the potential to significantly and sustainably increase household asset portfolios. Forests serve as a pathway out of poverty when forest products have significant potential to be marketed for cash income, and when households have the skill, and financial and social capital required to engage in the production and marketing of forest products (Wunder 2001; Arnold 2002; McSweeney 2002).

4. RESEARCH DESIGN AND STUDY SITES

4.1. Research Design

The outcomes of devolution reforms are particularly difficult to measure for several reasons: they are part of a portfolio of policies; baseline data are rarely available; aggregating outcomes is problematic; and the majority of reforms have only been partially implemented (Ribot 2003). To make claims about causal relationships between policy reforms and various outcomes a quasi-experimental research design is required. To understand how the reform has affected a particular unit of observation, for example a rural household, it is necessary to have data from before the reform was implemented to compare with data collected some time after implementation (Bardhan 2002). In addition, it is necessary to have a counterfactual, or a control group to control for changes occurring as a result of other factors. This group has not been affected by the reform and therefore serves as an indicator of what would have happened in the absence of the

reform (World Bank 2008). This study employs a research design called the nonequivalent comparison group design (Shadish, Cook, and Campbell 2002).²⁵ Rural households in forest sites affected by the reform (i.e. treatment groups) are compared with households in a forest site that was not affected by the reform (control group). These types of studies yield the most robust analytical results on the impacts of reforms (World Bank 2008).

Two treatment groups are considered. The first is the sample of villages and household that fall within private forest land currently overseen by the District Forestry Service; the Bugoma Forest Site (Treatment 1). Devolution to the District Forestry Service is an example of democratic decentralization to local government. Prior to the reform the forestry activities in this area were overseen by the centralized Forest Department. The second treatment group includes village and households that are adjacent to Budongo Central Forest Reserve (i.e. the Budongo Forest Site) (Treatment 2) overseen by the for-profit parastatal National Forestry Authority. Prior to the reform forestry activities in this region were also overseen by the centralized Forest Department. The control group includes villages and households living adjacent to Rwenzori Mountains National Park (Control). Forestry activities in this area have been overseen by the Uganda Wildlife Authority since 1994, when the forest was designated a National Park. The Uganda Wildlife Authority is a centralized agency.

4.2. Site Selection and Sampling

Forests and woodlands cover 24 percent of Uganda's land area. Seventy percent of forests, including tropical high forest, woodland and plantations are on private or customary land (MWLE 2001). The majority of Uganda's high value and biodiversity rich tropical high forest is located in the western region (i.e. 74 percent of fully stocked

²⁵ The non-equivalent comparison group design is among the most common of quasi-experimental designs. Variants include treatment groups and untreated comparison or control groups with dependent (i.e. pre and post test data collected on the same units) and independent samples. Due to the non-equivalency of the comparison and control groups, selection bias is assumed to be present. Several methods are available to test for both the external and internal validity of the research design (Shadish, Cook, and Campbell 2002). Several statistical tests and methods are available to test for initial selection bias in between the control and treatment groups, and then to correct for sources of selection bias, as well as identified threats to both external and internal validity. Doing so is beyond the scope of this dissertation.

tropical high forest and 32 percent of degraded tropical high forest) (MWLE 2001a). Roughly 1.9 million hectares or 30 percent of forests falls within Uganda’s Permanent Forest Estate (PFE). The PFE includes all central and local forest reserves (i.e. 15 percent of total forest), and all forested areas in national parks and wildlife reserves (15 percent of total forest) (Table 1.3).

Table 1.3: Forest Ownership in Uganda, percent

	Private land	Government land		Total
	Private and customary land	Central and Local Forest Reserves	National Parks and Wildlife Reserves	
Tropical high forest	7.1	6.2	5.4	18.7
Woodland	62.9	8.3	9.4	80.6
Plantation	0.2	0.4	0.0	0.7
Total	70.2	14.9	14.8	100.0

1. Figures for private or customary land include community forests.

2. Local forest reserves account for roughly 5000 hectares or less than 1% of total forest area.

Source: Adapted from MWLE (2001), data from National Biomass Survey, 1999.

This study focuses on three major forest sites in western Uganda: privately held forest south of Bugoma Central Forest Reserve (Treatment Group 1); Budongo Central Forest Reserve (Treatment Group 2); and Rwenzori Mountains National Park (Control Group). The sites are located in the northernmost region of the Albertine Rift; the area stretching between Lake Albert and Lake Edward (Map 1.1). The Albertine Rift is one of the most diverse ecosystems in Africa with more than 7,500 species of animals and plants, including many endemics.²⁶ According to data collected during the National Biomass Study published in 1999, western Uganda has the highest incidence of fully stocked tropical high forest (THF) in Uganda (52% or approximately 500,000 hectares) (MWLE 2001a).²⁷ It is also one of the most populated and conflict ridden regions in sub-Saharan Africa (Plumptre et al. 2003).

²⁶ The Albertine Rift has been identified as an Endemic Bird Area by Birdlife International, an Ecoregion by the World Wildlife Fund, and a Biodiversity Hotspot by Conservation International (Plumptre 2002).

²⁷This is in contrast to Uganda’s central region which has approximately 300,000 hectares of tropical high forest, the majority of which is degraded (MWLE 2001a).

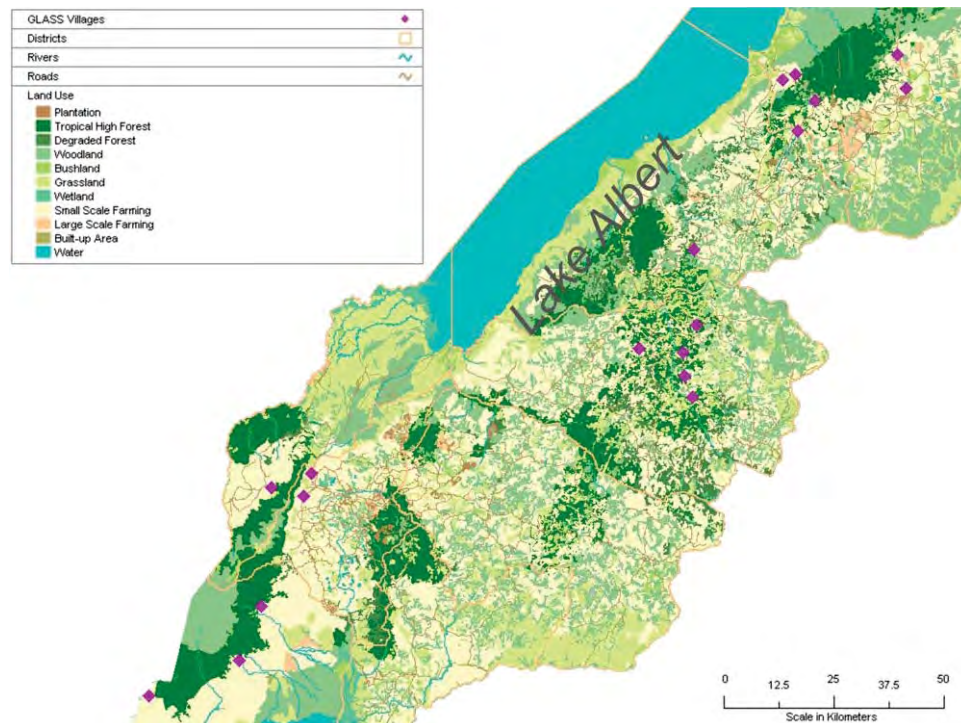


Map 1.1: Map of Uganda with Forest Sites Identified

The sampled forest sites and villages are a purposively selected subset of those included in a study conducted by the Wildlife Conservation Society (WCS) in 2003 that provides the baseline data for this study (Bush et al. 2004) (Map 1.2). The WCS baseline study was undertaken in four purposively selected forest sites and included 46 villages.²⁸ This study includes revisits to three of the four forest sites visited by WCS (Table 1.4). Kasagala Central Forest Reserve was not included in the follow-up study for two reasons. First, Kasagala Central Forest Reserve has the same pre and post reform governance structure as the Budongo Forest Site but is a woodland site, a clear outlier among forest

²⁸ The forest sites were selected by WCS as representative of the four dominant forest types and governance regimes in Uganda. WCS employed a multiple stage stratified random sampling process to select the villages included in the baseline study. As the focus of the study was communities adjacent to forests, the sampling was constrained to parishes (i.e. a parish is also known as an LCII – or the second lowest administrative unit in the Ugandan local government structure) immediately adjacent to the forest. In order to get good spatial representation around the perimeter of each forest site parishes were divided into 12 units with equal number of parishes. From each of the 12 units one parish was randomly selected. Within each selected parish a list of villages was compiled and one village was randomly selected from each parish (Bush et al. 2004).

types represented in the baseline study.²⁹ Maximizing variability in governance types and minimizing variability in other important exogenous factors was a priority for the study. Second, the project was limited by logistical and financial constraints making revisits to all four forest sites difficult. In each of the study areas there are multiple forest authorities present. However, each site has a dominant forest management authority that local resource users perceive as controlling forest access, harvesting, and marketing of various forest products.



Map 1.2: Map of Forest Sites with Villages Identified

²⁹ While forests in Budongo, Bugoma and Rwenzori sites are all classified as tropical high forest, there are differences in species composition depending upon the altitude and climatic conditions in the area. Both the Budongo and Bugoma sites are medium altitude sites (i.e. average altitude among the villages included in the follow-up study is 1096 m.a.s.l.); whereas the follow-up study villages in the Rwenzori Forest Site are in higher altitude areas (i.e. average of 1690 m.a.s.l.). Medium altitude tropical high forests are dominated by *Albizia zygia*; *Cordia africana*; *Maesopsis eminii*; *Celtis mildbraedii*; and *Khaya anthotheca* (Forest Department 1997). The higher altitude zones characteristic of the forests accessed in the Rwenzori forest site are dominated by: *Symphonia globulifera*; *Prunus africana*; *Albizia* and *Domebya* species (UWA 2004). In general the products harvested by local resource users are similar in both the medium and higher altitude tropical high forests. With respect to sawn wood, the highest value forest product, all three forest sites contain both medium and high value species suitable for harvesting as merchantable sawn wood.

Table 1.4: Forest Sites for the WCS (Baseline) and Jagger (Follow-up) Studies

Forest Site	Forest Ownership	Forest Type	Governance Pre-reform	Governance Post Reform	Included in:
Budongo	Central Forest Reserve	Tropical high	Forest Department	National Forest Authority (Parastatal)	WCS/Jagger
Bugoma	Private	Tropical high	Forest Department	District Forest Services (Local government)	WCS/Jagger
Kasagala	Central Forest Reserve	Woodland	Forest Department	National Forest Authority (Parastatal)	WCS
Rwenzori	National Park	Afromontane	Uganda Wildlife Authority	Uganda Wildlife Authority (Central government)	WCS/Jagger

WCS visited 11 or 12 villages in each forest site included in the baseline study. For the follow-up study six villages were selected from among the 11 or 12 in each forest site using proportional random sampling methods in order to maximize variation across the seven Districts (Table 1.5).³⁰ The stratified random sample of villages yielded a relatively spatially balanced sub-set of villages to include in the follow-up study (n=18).

Table 1.5: Proportional Sampling of WCS Study Villages for Follow-up Study

Forest Site	District	Number of Villages in WCS Sample	Number of Villages in Follow-up Sample
Budongo	Buliisa	2	2
	Masindi	10	4
Bugoma	Hoima	2	1
	Kibaale	10	5
Rwenzori	Bundibugyo	1	1
	Kabarole	4	2
	Kasese	6	3
TOTAL		35	18

³⁰ At the time of the WCS study all of the villages within the Budongo forest site fell within Masindi District. In July 2006 Buliisa District was created. The villages for the Budongo site were not selected proportionally according to the new districting, but rather randomly from among the 12 villages in the Budongo forest site.

In each village 30 households were randomly selected to participate in the quarterly survey (n=540). A list of the households currently residing in each village was compiled drawing upon information from LC1 registers, lists provided by village leaders, and information from other key informants. Polygamous households were listed according to the wife's name; each wife was considered a separate household unless key informants indicated that wives jointly undertook key livelihood activities such as cooking and cultivating.

4.3. Study Area

A summary of the agricultural systems, timber trade, other common sources of income are presented in Table 1.6.

4.3.1. Bugoma Forest Site (Treatment Group 1)

The Bugoma Forest Site includes six villages that fall within ungazetted privately held forest southeast of Bugoma Central Forest Reserve. Five of the villages included in the study are in Kibaale District, and sixth is in Hoima District. Large areas of Kibaale and southern Hoima were sparsely populated until approximately 10 years ago when migrants from southwestern Uganda arrived. Most of Kibaale District and all of Hoima District fall within the boundaries of the former Banyoro Kingdom.

The majority of households in the Bugoma Forest Site have relatively poor market access, though the number of agricultural traders has increased significantly in recent years. Households producing maize, rice, matoke, and cassava sell directly to agricultural traders that come to the village to purchase goods. Poor road conditions during the rainy season mean that households often store agricultural produce before selling to traders. The village in Hoima District has relatively good market access.

Forests in the Bugoma Site are under serious threat.³¹ Estimates from several forest agency documents suggest that approximately 50 percent of tropical high forest on private land is degraded, as compared with 17 percent in protected areas (Nsita 2005).

³¹ Within Kibaale and Hoima Districts there are small local forest reserves (LFRs) owned and managed by District governments. The management and protection of LFRs is generally a low priority for Districts. LFRs account for less than one percent of Uganda's total forest area.

Table 1.6: Characterization of Major Economic Activities in Forest Sites¹

	Bugoma Forest Site (Treatment Group 1)	Budongo Forest Site (Treatment Group 2)	Rwenzori Forest Site (Control Group)
Agro ecological	Western banana, coffee, cattle system characterized by moderate rainfall	Banana, millet, cotton (Buliisa), low rainfall; and Western banana, coffee, cattle system (Masindi), moderate rainfall	Montane system characterized by high rainfall
Altitude (m.a.s.l.)	1000-1500	900-1200	1500-1750
Common agricultural crops	Banana; coffee; maize; sweet potato; cassava	Annual crops including millet, sorghum and maize (Buliisa); Banana; coffee; maize; sweet potato; cassava	Banana; sweet potato; cassava; Irish potato; Arabica coffee; barley (at high altitudes);
Forest type	Tropical high (partially degraded); Forest savannah mosaic	Savannah (Buliisa) Tropical high (Buliisa and Masindi)	Afromontane
Major forest products harvested by rural households	Fuel wood Wild foods Building materials (poles and ropes)	Timber Fuel wood Building materials (poles and ropes) Thatch	Fuel wood Timber Wild foods (including meat) Ropes Bamboo Medicinal plants
Major forest products harvested by non-local extraction specialists	Timber	Rattan	<i>Prunus africana</i> (medicinal plant)
Dominant forest authority	District Forestry Service	National Forestry Authority	Uganda Wildlife Authority
Off-farm employment opportunities	None of note	Businesses in Masindi Town; Tourism; Timber trade	Mining at Kasese Cobalt Company; Hema Cement Plant; Tourism

Sources: Author's primary data; Nzita and Miwampa (1993); and MAAIF (1995).

Deforestation is a major issue in both districts, clearing land for agriculture, and also to establish property rights are the primary causes of deforestation in this area (Acworth

2005). Sawn wood production for the domestic market is also a leading cause of deforestation.

Sawn wood and charcoal are the main marketed forest products in the site. Within villages there are markets for woven products, wild yams, mushrooms and a few other wild products. The majority of sawn wood is harvested by migrant laborers from Kabale District in southwestern Uganda who are hired on three month contracts by large scale timber dealers based in Hoima town or Kampala. Very few local residents are engaged in sawn wood production and marketing. The bulk of sawn wood produced goes to markets in Hoima or Kampala; Kibaale District is currently the main source of sawn wood in Uganda. Most timber barons operate with annual pit-saw logging licenses issued by the Forestry Inspection Division that have an annual allowable cut (AAC) of 500 cubic meters. The main source of charcoal production is land cleared for agriculture. Charcoal is produced on a small scale as a by-product of the land clearing process. Due to a decline in the availability of charcoal in traditional charcoal producing areas closer to Kampala (i.e. Nakasongola and Mpigi Districts), charcoal traders travel to Districts such as Kibaale and Hoima to purchase charcoal.

4.3.2. Budongo Forest Site (Treatment Group 2)

The Budongo Forest Site is comprised of six villages adjacent to Budongo Central Forest Reserve. Four of the villages fall within Masindi District; the remaining two villages are in the newly created Buliisa District.³² The area is one of the most ethnically diverse in Uganda due to a large influx of migrants from northern Uganda, southwestern Uganda, and Democratic Republic of Congo. Steady in-migration has led to the clearing of a significant area of tropical high forest outside of the forest reserve. Budongo Forest Site is part of the former Bunyoro Kingdom. The dominant ethnic group in the area is the Banyoro.

Roughly 47 percent of the combined area of Masindi and Buliisa Districts are forested, a large proportion of which falls within Budongo Central Forest Reserve and the Murchison Falls Protected Area (MFPA) (Karibwije 2005). Budongo Central Forest

³² Buliisa District was created in 2006. It includes sub-counties Buliisa and Biiso which were formerly part of Masindi District.

Reserve was gazetted as a partially demarcated *Crown Forest Reserve* in 1932, and gained full status as a Central Forest Reserve in 1948. The Forest Department managed the reserve until early 2004 when the National Forestry Authority took over responsibility for all of Uganda's central forest reserves. The Reserve is managed for both biodiversity conservation and as a production forest. The total area of Budongo CFR is approximately 81000 hectares. Roughly 55 percent of the total Reserve area is tropical high forest; the remainder is grassland (Forest Department 1997). Budongo CFR ranks third in term of overall biodiversity importance in Uganda, and sixth in terms of the rarity value of the species represented (Acworth 2005). Several high value timber species are present throughout Budongo Central Forest Reserve, including four species of highly demanded mahogany rarely found outside the CFR.

The National Forestry and Tree Planting Act of 2003 dictates that access rights for resource users living adjacent to the reserve are determined by what is written in the current forest management plan for the Reserve. The Forest Management Plan for Budongo Central Forest Reserve stipulates that *subsistence* quantities of fuel wood, poles, timber from non-reserved species and sand are permitted to be harvested from the Reserve free of charge. In addition, grazing animals are permitted to visit water and salt lick points within the CFR (Forest Department 1997). However, due to conflicting understandings of the formal regulations on subsistence use of forest products from the Reserve, the majority of these activities are understood to be illegal by local resource users as well as by National Forestry Authority representatives. Enforcement by the National Forestry Authority which oversees Budongo Central Forest Reserve is inconsistent.

There are several easily accessed major markets in the Budongo Forest Site. Masindi Town is the major trading center in the region. There is a bi-weekly market in Biiso Town, as well as a weekly small ruminant market that services villages on the west and north-west borders of the CFR. There is also a large market for goods at the Butiaba landing site on Lake Albert. Timber harvesting is an important source of income; traders pick up loads of sawn wood from producers throughout the area. The main market for fuel wood is Butiaba landing site on Lake Albert. Charcoal is marketed to a limited extent within the study area. There is a local underground market for bush meat; most of which

is harvested from the Murchison Falls Protected Area or Budongo Central Forest Reserve.³³ Due to proximity to Murchison Falls National Park there is a local market for basketry produced by women in villages adjacent to the park. Women sell baskets through the Boomu Women's Group.³⁴

4.3.3. Rwenzori Forest Site (Control Group)

The Rwenzori Forest Site includes six villages that are immediately adjacent to Rwenzori Mountains National Park. Three of the villages are in Kasese District, two villages are in Kabarole District, and one village is Bundibugyo District, one of the most remote and under serviced districts in the country. The Rwenzori Mountains have been inhabited for centuries by the Bakonjo people. The Bakonjo are found primarily in the Rwenzori Mountains, and more extensively in the eastern part of Democratic Republic of Congo. Unlike the other two forest sites, there is very little ethnic heterogeneity in the Rwenzori Forest Site. Due to cultural differences and the difficulty of public service provision on the high altitude steep slopes of the Rwenzori Mountains, the Bakonjo are considered a marginalized population.

Rwenzori Forest Reserve was managed by the Forest Department until 1991 when its status was changed to National Park and management taken over by the Uganda Wildlife Authority. The Park was designated a United Nations Educational, Scientific, and Cultural Organization (UNESCO) World Heritage Site in 1994 (IUCN 1994). The Park is approximately 1000 square kilometers. The majority of households in the Rwenzori Forest Site live between 1500 and 2200 meters above sea level; they inhabit both grassland (1000-2000 m.a.s.l.) and montane forest (2000-3000 m.a.s.l.) vegetation zones (UWA 2004). The majority of forested land in the three districts that are included in this study is within Rwenzori Mountains National Park. The official policy regarding

³³ Many of the in-migrant ethnic groups from the north have a strong preference for bush meat including: bushbuck; buffalo; wild pig; monkeys; apes; and pythons. While men do the majority of the hunting, women generally sell the meat which they carry in covered baskets through the villages in search of buyers. This is most common on the northeast/Biiso side of the Reserve.

³⁴ Boomu Women's Group is a small community tourism project located on the Paara Road just south of the entrance to Murchison Falls Protected Area. In addition to selling basketry and other woven goods, the women operate a bed and breakfast, campground and restaurant (www.boomuwomensgroup.org).

access to forest resources is that the Park is strictly off limits unless there is a formally negotiated Memorandum of Understanding between the Uganda Wildlife Authority and the Community Protection Area Institution³⁵. At the time this research was conducted, two Memoranda of Understanding were under negotiation and two communities adjacent to the park were pilot testing access rights to bamboo found within the park. However, access to low value forest products for subsistence use is not strictly enforced. Many members of communities adjacent to the Park harvest products including fuel wood, wild fruits and vegetables, mushrooms, and vines used for making Kikonjo baskets. The harvesting of sawn wood and bush meat is more strictly enforced.

The Park has attracted a modest number of foreign tourists in recent years. UWA has a revenue sharing agreement whereby they share 20 percent of all entry fees with local governments on an annual basis. These funds are disbursed on approval of a Parish level (i.e. LC2) proposal for a community centered use of funds. Examples include the establishment of primary schools and health clinics. Other major natural resource oriented activities in the area are mining of cobalt, copper, limestone, salt and stones. Cobalt, copper and limestone are large scale activities; mining of salt and stones smaller scale and undertaken by rural households in the region.

The Rwenzori Forest Site is very large and has several major marketing centers including the towns of Bwera, Mpondwe and Kasese in Kasese District, and Fort Portal in Kabarole District. The majority of households in the Rwenzori Forest Site live in the mountains and transport goods long distances by foot to market. There are opportunities to sell agricultural produce in Bundibugyo Town, particularly cocoa and vanilla which are purchased by traders. However, to obtain higher prices, and also to purchase consumer goods, people from Bundibugyo frequently travel across the mountains to markets in Kabarole District on foot trails through Rwenzori Mountains National Park.

Forest products with significant markets include sawn wood, charcoal, *Prunus Africana*, and to a lesser extent poles, bamboo, fuel wood, baskets, and furniture. Other forest products including wild vegetables and fruits, mushrooms, medicinal plants, bush

³⁵ Community Protected Area Institutions or CPIs were developed to link communities to the protected area administration. They are generally comprised of the Secretaries for Production and Environment from each sub-county bordering the protected area (UWA 2004).

meat, mushrooms, and household implements are sold in village markets or at the nearest trading center. Sawn wood is produced by local pit-saw loggers on a relatively small scale, and sold in regional markets in Bwera, Kasese and Fort Portal towns. Within the communities surrounding the Rwenzori Mountains several small-scale furniture makers produce furniture for the regional market. There is an export market for the medicinal plant *Prunus africana*. However, the majority of local people are excluded from the *Prunus africana* market as exports are controlled by large scale businesses owners with national or international connections. There is an underground market for bush meat throughout the Rwenzori Mountains. Monkeys and bush pigs which comprise the majority of bush meat consumed in the region are illegally hunted in the National Park.

4.4. Threats to Validity

Quasi-experimental research design in the social sciences is challenging. Threats identified in this section are general to the overall research design.³⁶ Major threats include: the validity of the control group; spillover effects; time from reform implementation to evaluation; use of recall data; and reporting of illegal activities.

A major challenge for quasi-experimental studies of governance reform is finding an appropriate control group. Generally reforms are implemented at a national scale, meaning that the reform has the potential to affect goods and service provision universally. In Uganda, 85 percent of forests were directly affected by the reform, the remainder of forests, which fall within national parks and wildlife reserves were not affected by the reform. The Rwenzori Forest Site serves as a control in that it provides an example of how both absolute and relative forest income have changed in a site not affected by the reform. Additionally, it is an example of a centralized management system, though the mandate and capacity of UWA is very different than the mandate and capacity of the Forest Department. A critical assumption of this study is that the Rwenzori Forest Site is indicative of changes in the role of forest income in household livelihood portfolios that would have occurred in the absence of the reform.

³⁶ Threats to validity specific to the analyses in the empirical chapters are addresses within those chapters (i.e. Chapters 3-5).

The Rwenzori Forest Site is a more powerful control if there is limited change in factors that directly influence forest income. Examples include the degree of monitoring and enforcement of forest product harvesting, the implementation of collaborative management agreements, economic and political conditions, migration patterns, access to markets, changes in transportation infrastructure, etc. Since 2003 there has been an increase in the level of effort of UWA with respect to monitoring and enforcement activities, and investment in formalizing and implementing collaborative management agreements. The latter (i.e. CMA) has affected only 2 of the 6 villages included in the study. These changes make the interpretation of the results presented in this study more difficult. With respect to political stability, by 2002 the Rwenzori region was emerging from several years of conflict with the rebel group the Allied Defense Forces. By the time of the baseline study in 2003, households residing in internally displaced persons camps had returned to their villages and resumed small scale farming and livestock rearing. There have not been major changes in political and economic conditions, migration patterns, access to markets or transportation infrastructure in the control group study area since 2003.

The research design assumes that each of the three forest sites has a dominant forest authority: the DFS for the Bugoma Forest Site; NFA for the Budongo Forest Site; and UWA for the Rwenzori Forest Site. However, in all three sites there is a DFS presence; each site also has NFA and UWA officials which have varying degrees of influence. The study is designed to address the comparative effect of governance regimes, but given the nature of forest management in the country, spillover effects are inevitable. Data collected on interactions between forest officials and households in each study areas confirmed that the dominant forest authority has the bulk of contact with rural households.

The time between reform implementation and this evaluation of the reform is relatively short. Arguably 4-5 years is not a very long time period for which to evaluate the effects of Uganda's forest sector reform. However, the findings from this study point to both limited effects (i.e. the case of democratic decentralization) and significant changes (i.e. the for-profit parastatal National Forestry Authority) suggesting that reform progress thus far is contrary to the overarching objectives of both the new forest policy

and National Forest Plan. Having this information at an early stage of implementation is useful to donors, policy makers, the bureaucrats charged with implementing reforms, civil society organizations, and local communities affected by the reform.

Respondents were asked to recall events or conditions prior to the reform in both semi-structured and structured interview situations. There are two main risks associated with using recall data. First, unless the time period you are asking respondents to remember is pegged to a specific event, for example, an election, a drought etc., it is difficult for people to remember historical conditions precisely. In the context of this study, key informants involved in the reform process, and forest officials should be relatively good at recalling pre-reform conditions. However, village leaders and household respondents may not be aware of the reform, or if they are aware, they may not associate it with the date of effective implementation. Secondly, forest officials and others many have an incentive to provide biased information depending upon their perceptions about the potential gains from responding to questions strategically. This is a risk with both recall and non-recall data. In the evaluation context, actors engaged in implementation may bias responses leading to a more favorable view of reform outcomes.

The harvesting of various forest products, particularly high value products including charcoal, sawn wood, bush meat etc. is limited or illegal within protected areas. Getting respondents to reveal information about products harvested illegally or without permission is a challenge. To overcome this we emphasized to households that the information they were giving us was anonymous. The enumerators were experienced with a good understanding of the aggregation process making it easier to explain issues of anonymity and aggregation to household respondents. Secondly, because we collected data quarterly, trust was built between enumerators and respondents which enabled the collection of more reliable information over the course of the study. I believe data on quantities and prices of products harvested are relatively accurate across quarters, what is less reliable is the location of harvest as indicated by households. For example, households may have harvested sawn wood from within Rwenzori Mountains National Park, but indicated that it came from private forest.

5. DATA SOURCES AND METHODS

This study involved the use of several different survey methods and instruments. Data were collected at multiple scales. Secondary data were also used in the analysis.

5.1. Primary Data Sources

Multiple data sources and data collection methods are used in this dissertation. Primary data sources include: key informant interviews at the national, forest authority, district (LC5), sub-county (LC3), and village (LC1) levels.³⁷ The objective of collecting data at multiple levels was to get a complete picture of reform implementation, the level of awareness of the reform, and the incentives and constraints that characterize actor behavior.

³⁷ Relevant forest authorities include: the National Forestry Authority; the District Forestry Services; and the Uganda Wildlife Authority.

Table 1.7: Primary Data Collection Methods and Sample Size

Level	Respondent(s)	Central Topic(s)	Data Collection Instrument	Sample Size	Frequency
National level key informants	Policy makers; non-government organization representatives; donors	Reform process and implementation	Semi-structured interview	25	Single interview
Forest authority officials	NFA Range and Sector Managers; UWA Warden in Charge	Reform process and implementation	Semi-structured interview	3	Single interview
		<i>De jure</i> perceptions of forest rights	Structured Questionnaire	3	Single interview
Forest gate officials	Supervisors and contracted forest patrols (NFA); Forest rangers (enforcement and community conservation) (UWA)	Monitoring, enforcement, and community engagement in forest management	Semi-structured interview	10	Single interview
		<i>De jure</i> perceptions of forest rights	Structured Questionnaire	10	Single interview
District level key informants	District Chairmen	Reform process and implementation	Semi-structured interview	7	Single interview
	District Forestry Officers	Reform process and implementation	Semi-structured interview	7	Single interview
Sub-county level key informants	Sub-county Chairmen	<i>De jure</i> perceptions of forest rights	Structured Questionnaire	7	Single interview
		Reform process and implementation	Semi-structured interview	14	Single interview
Village level	Chairmen and village key informants	Village level demographics, forest use and management; agreements with forest officials; shocks and crises	Structured questionnaire	18	Start and end of fieldwork
		Crop calendar	Structured questionnaire	18	Single interview

		Price survey for common forest, agriculture and livestock products	Structured questionnaire	18	Quarterly
		<i>De jure</i> perceptions of forest rights	Structured questionnaire	18	Single interview
		Perceptions of change in forest cover/quality	Structured questionnaire	18	Single interview
		Village boundary mapping	Participatory mapping	18	Single interview
Household level	Household heads and other available members	Household level demographics; assets; forest ownership and use; group membership; forest rights (<i>de jure</i> perceptions and <i>de facto</i> use; social and political capital; shocks and risk; tenure security; perceptions of change in forest cover/quality	Structured questionnaire	540	Single interview
		Income portfolio data; expenditures; time use; crop raiding and estimated losses; interactions with forestry officials	Structured questionnaire	540	Quarterly

5.2. Survey Implementation

The field work for the follow-up study was undertaken between October 2006 and August 2007. A field team of seven researchers was involved in the data collection; the project leader (myself), one locally recruited research team supervisor, and five locally recruited enumerators. The minimum level of education of the locally recruited research team members was an Undergraduate degree in a relevant field. We did not have any issues of attrition in the research team. In addition to being involved in the data collection, the locally recruited team leader and enumerators were involved in data entry and cleaning. There was a very high level of commitment of all of the locally recruited researchers throughout the duration of the project.

During each quarter, households that participated in the survey were given small gifts. Each gift included a half kilogram of sugar, a bar of soap, and a packet of salt. During the initial focus group meetings participants were given a small juice box and a packet of cookies for attending the meeting. Village leaders and other individuals who participated in informing and mobilizing study households were paid a small mobilization allowance. Where it was necessary to use translators or guides, small payments roughly equivalent to the daily wage rate for agricultural labor were made. Overall there were no major problems with the implementation of the survey.

During the year of fieldwork we encountered periodic challenges that made data collection difficult. Among the challenges were: accessing remote communities and households, particularly during the rainy season; illness; alcoholism; translation requirements; and quality of translation services. The main access issues were mountainous terrain only accessible by foot (i.e. the majority of households in the Rwenzori Forest site), and very bad roads during the rainy season (i.e. many villages in the Bugoma Forest Site). Despite these challenges we were able to reach all households in each quarter. During the second quarter we experienced an unusually high rate of attrition due to illness. January – March is a period of high malaria incidence and several households had affected family members. Several members of the research team suffered from malaria during the course of the survey. Alcoholism is a serious problem in Uganda. We had 2-3 villages where a very high proportion of households were affected by alcoholism. Getting to these households very early in the day was the strategy that we

used to deal with this problem. In cases where respondents were unable to reliably respond to questionnaires we tried to get alternate household members involved in the interview, or rescheduled interviews.

Due to linguistic diversity in Uganda, translation was required for 30 percent of households in our sample. The Rwenzori Forest Site was a particular challenge as the majority of households speak only Rukonjo which is quite different than Runyakitara which is the major language spoken in west central Uganda. Fifty-eight percent of households in the Rwenzori Forest Site required some level of translation services. We also faced translation challenges in the Budongo Forest Site in communities with a high proportion of migrants from northern Uganda. Swahili is the *lingua franca* in most of these communities. In the Budongo Forest Site 33 percent of households required some level of translation. While we generally had good translation services, we did face challenges in some communities and in some quarters due to the availability of translators.

5.3. Secondary Data Sources

Data on the history of forest governance and the reform process are drawn from two sources. The first is a series of “Learning Notes” published as a collaborative effort by the Ugandan Ministry of Water, Lands and Environment key members of the Forest Sector Coordination Secretariat.³⁸ Policy documents and data generated throughout the forest sector reform process by the Forest Sector Coordination Secretariat (also known as Uganda Forests) provide important contextual material on the forests, forest users, and the rules or institutions that govern forest use. Grey literature including consultancy reports, government documents, and literature produced by civil society organizations are serve as important sources of information on the reform formulation and implementation process.

³⁸ For the complete set of Learning Notes see http://www.livelihoods.org/lessons/project_summaries/for6_UgandaNFP.html.

5.4. Data Sources and Methods by Chapter

Primary data sources and methods for the empirical chapters are summarized in Table 1.8.

Table 1.8: Primary Data Sources for Empirical Chapters

Chapter	Research Question	Primary Data Sources	Methods
3	Has forest income increased for the rural poor as a result of the reform?	Baseline (WCS) and Jagger dissertation data on household income portfolios	Difference-in-difference (DID) of means and DID estimator of conditional means
4	Have political and economic incentives created by the reform process hindered the realization of increased forest income for rural households?	Key informant interviews (District Forestry Services; Sub-county Chairmen ; National Forestry Authority Forest Officers; Uganda Wildlife Authority Officials	Qualitative comparative institutional analysis focusing on incentives
5	Have changes in formal withdrawal rights for forest products influenced the harvesting behavior, and in turn the importance of forest-based income for the rural poor?	Perceptions of withdrawal rights at multiple scales; Household level socioeconomic variables; Forest income data	Comparative institutional analysis; Econometric models to test relationship between rights and household level behavior

6. SCOPE AND STRUCTURE OF THE DISSERTATION

The dissertation is organized as follows. Chapter 2 is a review of the literature linking devolution, forestry and poverty. The purpose of the Chapter is to summarize the theoretical arguments linking devolution and poverty outcomes, and to apply those arguments to the forestry sector. Examples of reform outcomes are drawn from the growing literature on natural resource management and devolution outcomes. Chapter 3 presents the findings of a quantitative evaluation of the impact of the forest sector reform on the contribution of forest income to rural livelihoods. The empirical work sets the stage for the later two empirical chapters which delve into explanations for changes observed. In Chapter 4 the tools of institutional analysis are used to relate the incentives

facing participants involved in Uganda's forest sector reform to observed livelihood outcomes. The analysis highlights the role of collective action in achieving reform outcomes, and the potential for political and economic incentives to catalyze collective action failures. Chapter 5 tests the influence of legislative changes in forest rights on household level forest product harvesting behavior. Increasing access to forest resources is hypothesized to be one of the central mechanisms leading to larger forest incomes for rural households. The challenge of linking national level policy change to actions at the forest level is highlighted. Chapter 6 summarizes the findings presented in the empirical chapters for the cases of democratic decentralization and devolution to a for-profit parastatal. Policy recommendations for the Uganda case, as well as for the more general case are presented. The Chapter concludes with suggestions for future research.

CHAPTER 2
LINKING FOREST SECTOR DEVOLUTION AND POVERTY REDUCTION:
A REVIEW OF THE LITERATURE

1. INTRODUCTION

Devolution has found a prominent place in poverty reduction discourse (World Bank 2004). Reforms are generally motivated by the failure of centralized states to provide basic infrastructure and services; high levels of corruption within centralized systems, and the desire to foster democratic institutions that take into account the needs of a diverse citizenry (Wunsch and Olowu 1990; Vedeld 2003). Normative statements in the literature suggest that devolution may result in improved efficiency, accountability, equity and sustainability in the production and provision of public goods and services, which in turn presents opportunities for poverty reduction.¹ Enthusiasm for the potential benefits of devolution has extended to the natural resource sector. There is growing consensus among donors and conservation organizations that poverty reduction is an attainable goal of forest sector devolution (Fisher et al. 2005; Sunderlin et al. 2005; WRI et al. 2005).

Interest and support for devolution policies as a poverty reduction strategy have persisted in the absence of a clear theoretical linkage between the two (Johnson 2001; von Braun and Grote 2002; Steiner 2008). In this Chapter I argue that both the theoretical and empirical literatures provide only limited evidence to suggest a causal link between devolution and poverty reduction, both in the general case, and more so for the specific case of forest sector devolution. Considering the limited potential for forests to serve as a pathway out of poverty, and relatively few direct mechanisms for increasing forest income, there is limited scope for devolution led poverty reduction in the forestry sector. However, the potential for devolution mechanisms that have an indirect effect on forest income is significant and should not be overlooked.

¹ It is estimated that eighty percent of all developing and transitional countries have undertaken some form of decentralization over the past two decades (ICHRP 2005). United Nations bodies and development agencies provide significant support to decentralization initiatives (Treisman 2007). For example, as of 2000 the United Nations Development Program was supporting decentralization programs in 95 countries, and the United States Agency for International Development was supporting decentralization and democratic local governance initiatives in over 50 countries (Dininio 2000; UNDP 2002).

The Chapter is organized as follows. In Section 2 the literature linking devolution to poverty reduction is reviewed. While elements of the literature are theory driven, the majority of the devolution literature is most appropriately characterized as policy discourse. In Section 3 the potential role for forests in poverty reduction is discussed. Section 4 reviews the literature on forest sector devolution from the perspective of its effect on the direct and indirect mechanisms that favor forest-based poverty reduction. Section 5 concludes.

2. DOES DEVOLUTION FACILITATE POVERTY REDUCTION?

Though not initially a significant motive for devolution reforms in developing countries (Crawford and Hartmann 2008), poverty reduction is often posited as a favorable outcome of decentralized governance (Ribot 2002). Hypotheses linking devolution and poverty reduction emerge out of the presumption that devolution reforms foster favorable outcomes including: greater efficiency and equity in public service provision; greater accountability of local officials to constituents; and the sustainable use of resources (Ostrom, Schroeder, and Wynne 1993). Gains in efficiency, equity, accountability and sustainability should in turn facilitate poverty reduction. However, a close read of the literature on decentralization suggests that the causal link between devolution and poverty reduction is tenuous.

2.1. Efficiency Arguments

Improved efficiency is a central argument for the devolution of public service production and provision (Litvack, Ahmad, and Bird 1998; Treisman 2007).² Efficiency implies that resources are allocated in a way that maximizes the net benefit attained through their use.

² In the context of polycentric systems of governance, (Ostrom, Tiebout, and Warren 1961) introduced the distinction between the production of a public good or service and its provision by public authorities or some other group of actors. Production refers to the physical processes by which the good or service comes into existence, whereas provision is the process by which consumers obtain the good or service. Though only a minor factor in the consideration of private goods, the distinction between production and provision is very important for the case of public goods. For public goods, the relevant consumption unit is often the community, neighborhood or some other group of people, in addition to individuals. When the production or provision of public goods is unsatisfactory to the electorate, voters may move elsewhere (as in Tiebout's 1956 model), vote officials out of office, exert other forms of political pressure, or organize to produce or provide public goods themselves (McGinnis 1999). The propositions of Tiebout's model are most applicable to the developed country setting.

Public goods are more efficiently provided if the cost and demand conditions of provision are taken into consideration. Minimizing the cost of provision may vary with the scale of the public good or service, and demands may vary according to geographic or socioeconomic preferences. When constituent demands for public goods and services are satisfied cost effectively and precisely, efficiency is attained (Treisman 2007).

Efficiency involves minimizing both financial and transaction costs (World Bank 1997), and lower costs imply better access for the poor (Litvack, Ahmad, and Bird 1998). Costs may be reduced by increasing competition in the delivery of public services. The competition argument emerges from theoretical propositions advanced by Tiebout (1956); if individuals move costlessly among localities that offer different levels of provision of a public good, efficient outcomes will arise. The cost of more localized public service provision is also reduced by the effective mobilization of local resources. The assumptions underlying Tiebout's model are very restrictive and generally not applicable in developing countries where highly mobile populations with fixed governments are seldom found (Bardhan 2002; Treisman 2007). A more realistic model suggests that government is mobile, whereas the population is relatively fixed (Faguet 2004). Treisman (2007) asserts that the conditions for vigorous competition between local governments are so restrictive that they are seldom met. With the exception of taxation competition between local and national levels, there is little empirical evidence of increased competitiveness among local governments (Litvack, Ahmad, and Bird 1998).

Transactions costs are affected by devolution reforms. Reforms often alter how property rights or the rules of the market place and the roles of individuals operating within it (Bates 1989). In particular, market related transaction costs (i.e. the costs of making, monitoring and enforcing agreements between actors) are affected by the larger institutional environment (North 1990). Configurations of government and business elites can reduce the transaction costs of doing business and promote growth. Changes in the role and relative power of the bureaucracy can also play an important role in dictating the cost of entering and regularly engaging in market activities.

Efficiency is expected to improve due to better information at more localized levels of public service provision. In sectors that have undergone devolution, policies

should be better targeted to local needs (Cohen and Peterson 1996; World Bank 1997; Treisman 2007). Local governments, village leaders and others involved in implementing reforms have better information about the extent of economic distress experiences by different individuals, and are better able to tailor levels of consumption to the preferences of smaller, more homogenous groups (Wallis and Oates 1988; Hoddinott et al. 2001).³ Further, where fiscal decentralization is part of the devolution reform, local governments have greater control over tax collection and expenditure decisions. However, whether or not local leaders have strong enough motivation or incentives to give adequately preferential treatment to vulnerable groups is central to the success of pro-poor decentralization programs (Bardhan and Mookherjee 2006). Peterson (1995) suggests that there are functional differences between levels of government, and that lower levels of government favor developmental policies (i.e. economic growth) over policies that promote equity within communities.

2.2. Accountability Arguments

Reforms that shift power away from centralized authorities are expected to foster democracy by bringing government closer to the people. Devolution generally provides increased opportunities for formal checks and balances within the system as local governments, non-governmental organizations and other localized service providers hold the central government accountable (Treisman 2007). Litvack, Ahmad and Bird (1998) suggest three potential channels for accountability. The public finance literature relies on “voice and exit” to ensure local accountability and achieve allocative efficiency gains. Officials can be voted out of power through electoral processes, or citizens can vote with their feet (as per Tiebout). However, in most developing countries, opportunities for voice and exit are limited due to weak electoral systems and elite capture problems, and mobility is often constrained by poor information, infrastructure, and legal frameworks which result in weak markets for land, labor and capital.

³ See Faguet (2004) for a review of the literature dealing with the relationship between decentralization and government responsiveness. He concludes that over 50 years of research including numerous case studies and few large N empirical tests have failed to establish whether decentralization makes local governments more or less responsive to its citizens.

A third channel for accountability is via formal rules and oversight within government bureaucracies; though in most less developed countries, poor information and monitoring systems within bureaucratic hierarchies make instituting these types of checks and balances very difficult (Litvack and Seddon 1999). Though downward accountability is promoted by decentralization reforms, continuing to have some upward accountability as a check on abuse by local elites and other local actors can be an important mechanism for ensuring accountability. Ribot (2002) identifies downward accountability or accountability to the public as the most important type of accountability for democratic decentralization. However, the majority of decentralization reforms are characterized by upward accountability – where national politics bear heavily on local elections due to entrenched systems of patron-client networks.

Preconditions for devolution reforms to improve accountability are effective political competition, and a reasonable level of asset equality and literacy (Bardhan and Mookherjee 2006). These conditions are seldom observed in developing countries. Dreze and Sen (1989) note that reliance on local institutions to allocate relief is problematic for rural communities characterized by high levels of poverty, inequality of land, social status, literacy and political power (Bardhan and Mookherjee 2006). Generally those with decision making authority require incentives to ensure they take into account the needs of the poorest and most vulnerable households.

There is a debate in the literature regarding the importance of social capital to the success of systems of checks and balances in decentralization reforms.⁴ While it can lead to successful devolutions (Putnam 1993), it can also lead to negative outcomes when it facilitates corruption, cronyism etc. Fox (1996) argues that forming organizations at levels that are politically and economically influential to ensure state accountability is more important than building social capital at the level of small communities or associations. In countries where patronage and corruption are strongly linked to powerful social networks the challenge for devolution is significant.

⁴ Social capital is the attributes of social organizations such as trust, norms and networks that facilitate collective action for mutual benefit (Putnam 1993).

2.3. Equity Arguments

Devolution has the potential to improve various types of equity, including procedural, distributional and inter-jurisdictional equity (Ribot 2002). Procedural equity results when all actors have equal input in the decision making process and have the ability to influence the decision making process itself; distributional equity deals with the equal distribution of incomes, land and other resources (Kim 1996; Ribot 2002); and inter-jurisdictional equity refers to the redistribution of financial, physical or technical resources among different jurisdictions (Ribot 2002).

The development of local institutions that focus on socially productive outcomes that benefit all citizens is most likely when citizens function under a Rawlsian veil of ignorance, which implies that they do not have information about the position that they or the other members of the group will face in the future (Buchanan and Tullock 1962). In theory, the uncertainty associated with the veil of ignorance creates incentives for individuals to support outcomes that will result in the best possible individual outcomes under all circumstances (Buchanan and Tullock 1962). The result should be the creation of institutions that discourage the concentration of political power among elites and other politically powerful groups (Firmin-Sellers 1995).

Procedural and distributional equity at the local level is very unlikely when elites dominate decision making processes. Elite capture under decentralization occurs when poverty, socio-economic inequality and lack of political competition allow local elites to capture local governments (Bardhan and Mookherjee 2006). In practice, the biases of local elites often dominate decentralization processes, suggesting that centrally managed redistributions play an important role in maintaining equity (Litvack, Ahmad, and Bird 1998). Local level elites may be more exploitative and uncompromising about local goods than more centralized elites; decentralization may make marginalized populations worse off than they were under more centralized systems (Manor, 1999). Where power is distributed asymmetrically, and actors assume that they may be in control of decision making some time in the future, the conditions required to attain Pareto optimal outcomes that take into account equity are very unlikely.

There is no assurance that inter-jurisdictional equity will result from decentralization reforms. Local governments with greater capacity, tax base and ability to

collect rents on valuable resources will have an advantage over less favored regions which may be sparsely populated, remote from markets and have limited resources of significant market value. Inter-regionally equity can vary greatly if the central government fails to redistribute resources to poorer areas, or if regional or district governments do not redistribute within their jurisdictions (Litvack, Ahmad, and Bird 1998).

2.4. Sustainability Arguments

Sustainably managed resources provide secure benefits streams to constituents over time. Devolved resource management might allow resource users to draw a clear link between management practices and outcomes, increasing the likelihood of sustainable management. Natural resources may be more amenable than more general service and infrastructure provision to decentralization given their physical location within a local community, which allows local people to make informed and frequent decisions about management (Larson 2005). In addition, effective decentralization reforms can create an institutional basis for more popular and participatory management of natural resources (Ribot 2003), suggesting a higher likelihood of collective action leading to the more sustainable use of natural resources (Andersson 2003).

Issues of scale, externalities, and public goods make decentralizing natural resource management more complex than decentralizing services and infrastructure (Kaimowitz and Ribot 2002; Larson 2003). Oates (2001) suggests that externalities associated with environmental goods fall within one of three potential baseline models. Externalities differ for cases where environmental quality is a pure public good for the nation as a whole, where environmental quality is a purely local public good, and the most common case where environmental quality is subject to both local and inter-jurisdictional externalities. Ideally devolution is implemented such that the externalities associated with the management of the resource are not borne disproportionately by any particular group, including those that may never actually gain any direct benefit from the resource (Agrawal and Ribot 2000).

Devolution of natural resource management is complicated as it requires the relinquishing powers over the disposition of productive and often valuable resources

(Kaimowitz and Ribot 2002). Devolution can create rent seeking opportunities for devolved authorities that hinder sustainability. The literature on environmental federalism raises the potential for local governments to engage in a race to the bottom. General theories of the race to the bottom suggest that the race will occur when inter-jurisdictional economic competition exists. Local officials may seek to reduce costs to local businesses in the form of low taxes and excessively lax environmental standards, leading to suboptimal outputs of local public goods. Revesz (1997) points out that the race to the bottom debate and the issue of inter-regional externalities are two distinctly different problems, and argues that inter-jurisdictional competition leads to a maximization of social welfare rather than a race to the bottom. However, justification for limited intervention by higher levels of government can be found in cases where citizens living outside of the local jurisdiction are affected by inter-regional externalities.

2.5. Hypothesized Linkages between Devolution Reforms and Pro-poor Outcomes

The central arguments linking devolution reforms and poverty reduction are summarized in Table 2.1. The hypothesized direction of each mechanism for the general case of devolved public service provision is indicated. While there are several mechanisms that are expected to be positively correlated to poverty reduction, some are ambiguous and some are negative. An important point is that even where there is a hypothesized positive relationship between devolution and poverty reduction, the conditions required for the successful implementation of various mechanisms are often very restrictive. For example, while devolved authorities may be aware of the conditions facing the poor and which public services would benefit them the most, the correct incentives need to be in place to catalyze behavior by actors involved in the implementation of reforms.

The linear path between devolution and poverty reduction is not as simple as is implied in the literature. Four complexities central to understanding reform outcomes are highlighted in Figure 2.1. First, there are variants of devolution that have different incentives and capabilities associated with them. Second, the concept of poverty reduction is broad and encompasses various aspects of welfare gains including increased income, security of income and status, happiness etc. To say that devolution leads to poverty reduction ignores the complexity of various devolution processes and fails to

Table 2.1: Hypothesized Linkages between Devolution Reforms and Pro-poor Outcomes for the General Case

Mechanism	Process	Hypothesized effect for pro-poor public service provision
Efficiency		
Reduced financial and transaction costs due to competition between jurisdictions	Lower costs for all including the poor; local people willing to offer services; but conditions for competition seldom met	+/-
Better targeting due to accurate information at the local level	More accurate information; poor better accounted for	+
Increase in local government tax revenues to support local economic activity	More direct control over resources, and clear reinvestment in sector	+
Accountability		
Effective political competition	Citizens have greater and more equal voice	+
Checks and balances within system of governance	Mitigates problem of elite capture	+
Devolved power more accountable to electorate	Devolved power more aware of local needs, but local elites more easily captured	+/-
Equity		
Equity in public service provision decisions	The poor have greater voice in prioritizing public services	+
More equitable distribution of resources	Poor have increased asset base	+
Inter-jurisdictional equity	Poverty is frequently spatial, jurisdictions have different comparative advantages	-
Sustainability		
Local users realize costs and benefits of sustainable use	Poor more likely to invest in local goods and service provision	+
Local resource users have greater decision making authority over resources	Negative environmental externalities managed at local level	+/-
Local governments lax on regulations/taxes to attract business	Poor may bear disproportionate burden of negative environmental externalities	-

specify what aspect of poverty reduction is being addressed. Third, reform implementation to improve efficiency, accountability, equity and sustainability uses both direct and indirect mechanisms for influencing poverty reduction. To lift people out of poverty the focus should be on direct mechanisms that will have a significant influence on income or other aspects of asset accumulation. Indirect mechanisms should be considered over longer time horizons, and may serve to secure the position of the poor rather than raising them out of poverty (i.e. households do not fall further into poverty). Finally, the challenge to proponents of pro-poor devolution is whether the conditions necessary for the effective implementation of these mechanisms are feasible for a given political and economic context, and if there are characteristics of particular goods or services that make the conditions more or less likely to hold. Each of the variants of devolution creates a set of incentives that are simultaneously influenced by a number of endogenous and exogenous factors. Incentives mediate the implementation of reform objectives and affect the realization of outcomes.

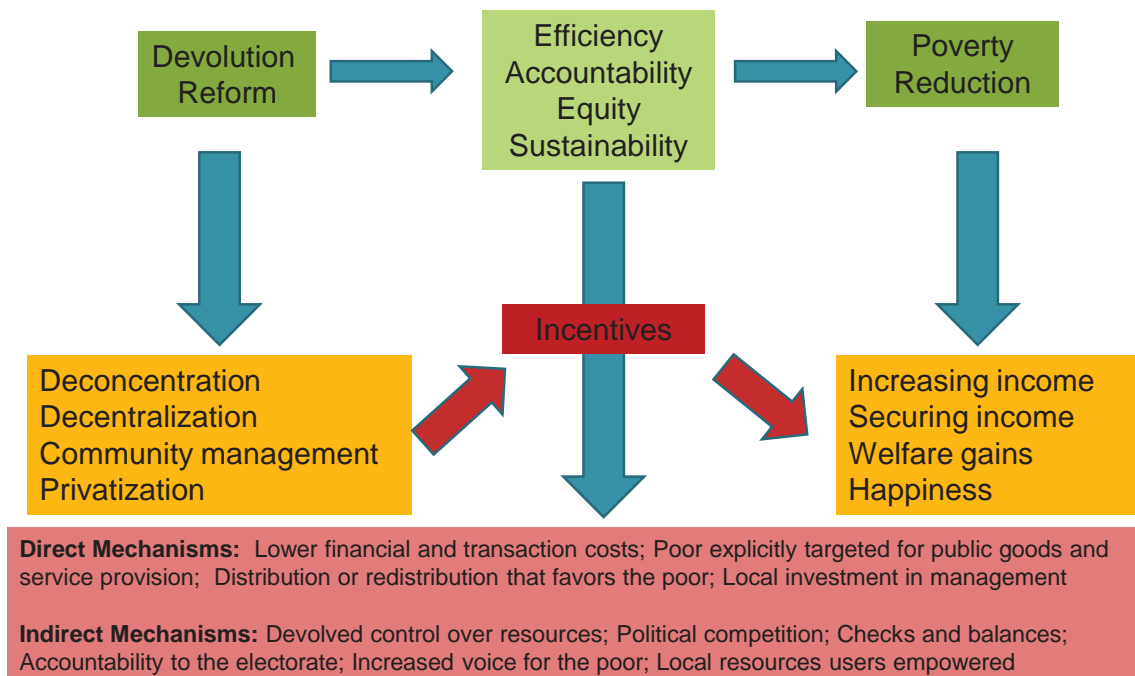


Figure 2.1.: General Framework Linking Devolution and Poverty Reduction

3. WHAT ROLE FOR FORESTS IN POVERTY REDUCTION?

Before delving into the literature on forest sector devolution and its relationship to poverty reduction, it is important to consider the role that forests play in rural livelihoods. Our understanding of the contribution of forests to rural livelihoods has grown tremendously over the past 10 years. A large number of studies account for forest and other environmental income in the analysis of rural income portfolios (Vedeld et al. 2004), and several ongoing studies will contribute to the growing literature.⁵ The literature suggests that the actual contribution of forests to rural livelihoods is highly varied (Byron and Arnold 1999; Wunder 2001; Vedeld et al. 2004; Chomitz et al. 2006), and that different opportunities for forest income enhancement exist both within and between communities.

Forests contribute to rural livelihoods in three ways: providing safety-nets in times of shortfalls in other livelihood activities; to support current consumption; and as a potential pathway out of poverty (Angelsen and Wunder 2003). Forest products serve safety nets functions when they are used to overcome idiosyncratic shocks, which usually involve an income shortfall or demand for cash. Vulnerability is an important factor determining the probability that households will be exposed to idiosyncratic shocks and whether or not they will have other safety net options (Vedeld et al. 2004). For example, when households have limited access to credit and formal sector employment, forest products play an important role as a source of insurance against natural shocks such as crop failures (Pattanayak and Sills 2001). Forest products are also used to maintain current levels of consumption. A wide variety of forest products including fuel wood, wild foods, and medicinal plants are harvested on a regular basis to support the ongoing consumption demands of rural households (Cavendish 2000; Bush et al. 2004; Fisher 2004; Narain, Gupta, and van't Veld 2005). When poverty reduction is understood broadly as securing access to forest resources to support the current consumption and safety-net needs of rural households, then there is a considerable role for forests in achieving poverty reduction outcomes. However, when households are both dependent on forests for subsistence income, and when opportunities for livelihood diversification are

⁵ The Center for International Forestry Research (CIFOR) is currently coordinating the collection of forest and livelihood data across roughly 35 sites in the low income tropics.

constrained, forests are potential poverty traps (Browder 1992; Byron and Arnold 1999; Wunder 2001; Arnold 2002).

Forests act as a pathway out of poverty when they have the potential to significantly and sustainably increase household income and/or asset portfolios. But finding policy reforms that lead to significant increases in forest income for poor and vulnerable households is a challenge. Forest products should have significant potential to be marketed for cash income. In addition, households should have the required skills to harvest the product, as well as the financial and social capital required to engage in the production and marketing of forest products (Wunder 2001; Arnold 2002; McSweeney 2002). Given that poor and vulnerable households generally face capital constraints forests may have limited potential for income enhancement (Arnold 2002).

As our knowledge of the contribution of forests to rural livelihoods increases, our conception of the forestry-poverty relationship becomes more nuanced. In turn, there should be nuance in the application of policy reforms that are intended to increase the role of forests in poverty reduction strategies. While there may be considerable scope for forests to contribute to poverty reduction, it is most likely that the safety-net and currently consumption functions of forests offer the most promise. For forest incomes to increase, forest products that can be exploited with the skill, financial capital, and social capital of poor households are required. Where there are constraints, policy reforms need to provide countervailing measures than enable poor and vulnerable households to take advantage of reforms.

4. LINKING FORESTRY, DEVOLUTION AND POVERTY REDUCTION

This section reviews the literature on forest sector devolution and its relationship to poverty reduction. Among the theorized outcomes of governance reforms that involve the effective devolution of natural resource management to local users are: improvements in the efficiency of production and provision of public goods and services (Ostrom, Schroeder, and Wynne 1993); improved accountability of decision makers to the resource users that are most affected by changes in the quantity and quality of the natural resource in question (Ribot 2003; WRI 2003); greater equity in procedural matters, the distribution of benefits and costs, and fiscal and public goods inter-jurisdictional equivalence (Ribot

2002); and improved short and long-term sustainability of natural resources (WRI 2003). As with the more general case, it is anticipated that these changes will empower local resource users including the poor, improve services that benefit the poor, and increase the range of livelihood strategies available relative to when central government agencies had responsibility and control over the use of natural resources (Crook and Sverrisson 2001; Ribot 2003).

In this section I set the case of forestry in the context of the earlier discussion on linkages between devolution reforms and poverty reduction. Examples from the empirical literature are referenced when possible, noting that the majority of the empirical literature is based upon qualitative case studies. There are few examples of large N studies with sampling strategies that allow for more robust conclusions regarding the potential links between forest sector devolution and poverty reduction. The empirical Chapters of this dissertation are intended as a first step towards a more rigorous treatment of the topic of poverty reduction through forest sector devolution.

4.1. Efficiency Arguments Applied to the Forestry Sector

Devolving forest sector service provision has an unclear effect on both financial and transaction costs for the poor. Proximity of forestry officials to resource users should lead to reduced financial and transaction costs (Ribot 1995). For example, the process for obtaining permission to harvest poles and fuel wood from communal woodlots managed by village level groups in northern Ethiopia required less effort with respect to time to travel to obtain permission to harvest products than for woodlots managed at higher administrative levels (Jagger, Pender, and Gebremedhin 2005). However, for highly regulated sectors such as forestry, devolution reforms may increase the financial and transaction costs borne by resource users. The introduction of multiple layers of bureaucracy can lead to an increase in the number of people that need to be consulted before harvesting and land use decisions are made, requiring financial and time investments. Larson (2002, 2005) found that timber companies in Nicaragua were frustrated by increasing costs associated with dealing with local officials after decentralization reforms were implemented. Conversely, timber companies in Cameroon

preferred working with decentralized authorities rather than dealing with administrative authorities and bureaucrats from the Forestry Ministry (Oyono 2004).

Awareness of local needs regarding household level use of forest resources should improve under devolution. Locally situated forest officials, local resource users and other decision makers are more likely to identify and prioritize their environmental problems accurately, resource allocation should be more efficient and information costs lower, and groups are likely to have a greater sense of ownership of decisions made locally such as rules for resource use (Larson 2002). In addition, the prevalence of low cost local labor favors investment in resource improvement and monitoring when local resource users view forest resources as important. For example, very poor household may want to manage forests for the sustainable production of subsistence products, whereas wealthy household with the capital to exploit higher value products may prioritize different aspects of management. Poteete and Ostrom (2004) suggest that there are various types of heterogeneity within user groups which either hinder or facilitate collective action. Types of heterogeneity among local forest user groups may include several aspects including socio-cultural background, interests and endowments, and that each of these may affect the potential for successful collective action differently (Baland and Platteau 1996; Baland and Platteau 1999). There is empirical evidence that challenges associated with heterogeneity and group size, and successful collective action can be overcome in cases where institutions are fostered that address these issues (Poteete and Ostrom 2004; Larson et al. 2007).

The hypothesized effect of increased local tax revenue from forestry related activities on the provision of forestry related public services is unclear. In the majority of developing countries undergoing forest sector reforms, the forest resource base may not be sufficient to provide the revenue required to support service provision in the forestry sector⁶. Even where there is an adequate supply of high value forest products, and well developed accessible markets, there is no guarantee that forestry revenue will be reinvested in the forestry sector. Faguet (2004) in an analysis of decentralization reform in rural Bolivia found that local governments prioritize public investment in response to

⁶Personal communication with Dr. Marty Luckert, Professor, Department of Rural Economy, University of Alberta, December 2008.

local needs. Under decentralization, public investment changed in education, water and sanitation, water management, agriculture and urban development; sectors that were strongly and positively correlated with local needs. Evidence from other sectors that have undergone governance reforms including health and education, indicates that competition for scarce finances at the district level means that the environment is often a lower priority for local government public service provision (Bahiigwa, Rigby, and Woodhouse 2005).

4.2. Accountability Arguments Applied to the Forestry Sector

It is unclear whether effective political competition favors the poor in the context of forest sector devolution. As noted above, constituents tend to prioritize the provision of services in the health and education sectors ahead of public services related to the environment and poor households are more likely to prioritize basic service provision over environmental management in voting decisions. The salience of forestry issues is an important pre-condition for successful forest management decentralization reforms. Andersson (2003) in a study of forest management decentralization in the Bolivian lowlands found that municipal governments took action in the forestry sector only when an important share of the electorate demanded services in the forestry sector. Politicians make commitments that enhance the likelihood of re-election, or find it difficult to enact environmental legislation or enforce laws that might decrease the likelihood of re-election (Bazaara 2003; Nkonya et al. 2004). For example, in Uganda's Kapchorwa District where landlessness is a problem, political candidates offered to de-gazette Mt. Elgon National Park if they were elected (Bazaara 2003).

The ability of devolution reforms to impose checks and balances within the forestry sector is not clear. Corruption and patronage are common in the forestry sector due to high levels of rent seeking (Ascher 1999; Barbier, Damania, and Leonard 2005; Smith et al. 2007).⁷ Corruption is more likely to effect the decentralization of forest

⁷ Rent seeking is defined as that part of the payment to an owner of resources over and above that which those resources could command in an alternative use. Rents occur when an actor manipulates prices and cause them to diverge from competitive levels. The existence of rents can lead to corruption by various actors attempting to gain access to rents (Kang 2002). Corruption occurs when actors use bribery, personal

management than the decentralization of good and service provision in other sectors (Tacconi 2007). Decentralized systems can be anarchic and fragmentary to the extent that you don't know how many people you have to bribe, and after paying at every point you don't know if the job will get done (Bardhan 2006). In highly regulated sectors where permits and quotas are common, devolution increases the number of opportunities for actors to undertake corrupt practices; corruption may be worse in devolved systems than other centralized systems.

Devolution should provide opportunities for local resource users to hold the devolved authority more accountable. A challenge for the forestry sector is that it is frequently dominated by elites (Ribot 1999; Agrawal 2001; Platteau and Abraham 2002). Under devolved systems collusion between local elites and special interests becomes much easier (Platteau and Abraham 2002; Bardhan 2006). There are numerous examples of local elites extracting payments from resource extraction specialists including the case of elites and migrant charcoal producers in Senegal (Ribot 1995), and logging companies dealing with village committees in Cameroon (Oyono 2004). In Indonesia, devolution enabled local elites including timber interests to exert greater influence on local legislative bodies ensuring that new decisions regarding laws and regulations favored their interests (McCarthy 2002).

Where there is a high degree of vertical integration in markets for high value forest products, strong connections between center and periphery make checks and balances more difficult to enforce. Elites that are well integrated into markets have little incentive to cooperate on collective activities that favor poor households (Bardhan 1993; Pender and Scherr 2002; Gebremedhin, Pender, and Tesfay 2003). Controlling the sale of forest produce limits opportunities for new entrants to the market. In Uganda, permits to legally trade charcoal are obtained by relatively well off actors who pay producers at low prices; local charcoal producers lose out on market opportunities (Bazaara 2003). The centralized Forest Department in Bastar, India enforced a ban on the

connections or some other means to attempt to influence policy decisions and gain rents (Rose-Ackerman 1999).

sale of bamboo shoots in market excluding landless women without alternative livelihood strategies from the market (Sundar 2001). Similarly, in Honduras, control of marketing of timber products by the forestry department has made it difficult for small-scale producers to enter the market, even when they plant the trees themselves (Contreras-Hermosilla 2003).

The absence of shared policy goals and values in intergovernmental systems often means that coercive arrangements exist causing lower level governmental tiers conform to a national level policy directives (May et al., 1996). A higher likelihood of principal-agent relationships between local governments and other actors is expected in cases where forest products and/or control over land are associated with power and wealth. This is particularly true in countries where elections are not fully democratic processes. High degrees of dependency (i.e. evidence of principal-agent relationships) in interactions between elected councils and merchants, foresters and political or religious figures has been observed in Senegal (Ribot 1995) and Uganda (Banana, Gombya-Ssembajjwe, and Bahati 2003).

4.3. Equity Arguments Applied to the Forestry Sector

The nature of political and power distributions and relationships are issues that have not been well addressed in the empirical literature (Agrawal, Britt, and Kanel 1999). Larson et al. (2007) notes that for devolution reforms in the forestry sector to benefit the poor, central authorities need to put into place mechanisms that ensure devolved authorities consider the poor. Higher level of government should be providing incentives that motivate local governments etc. to consider the poor in service provision.

The redistribution of forest resources is one of the most promising opportunities for the poor to increase forest income. Asset redistribution in the forestry sector can take two forms: the transfer of rights to forested land, and/or increased rights to access forest products that support subsistence or cash income for rural households. Redistribution of land is problematic in countries where land rights are contested and/or land scarcity is an issue. Competition for land in this setting is high and often underscored by ethnic tensions, and other social issues that may lead to greater conflict. A larger issue for land redistribution is the relative value of forested and agricultural land. When the value of

agricultural land exceeds the value of forested land there is an incentive for land owners to clear forests for agricultural production or the highest value alternative land use. While this may lead to increased household income, it is not an example of poverty reduction through forest-based income (Tacconi 2007).

Under devolution it is common for centralized actors to maintain control over the wider legal and regulatory framework governing the use of forest resources. For example, legal hurdles associated with forest management planning in Cameroon include the need to create and register the community forest committees with a written constitution, cartographically demarcate traditional territories, determine the extent of forest accessible for community forest, and establish forest management plans approved by prefecture authorities and the forest department (Graziani and Burnham 2001). It is very unlikely that community groups can finance and negotiate all of these requirements without external assistance. Similarly, in Burkina Faso, Cameroon, Mali, Senegal and Uganda the forest service requires detailed management plans from communities that intend to engage in commercial woodcutting (Ribot 1999). Foresters have argued that in the absence of their expertise, forest villagers act as land hungry peasants and destroy forests (Ribot 1999).

There are few countries where endowments of forest are homogeneous across the entire landscape. Heterogeneity in forest cover means that rent seeking opportunities are variable across jurisdictions. If there is heterogeneity, then devolution of forest resources is likely to decrease inter-jurisdictional equity rather than increase it. Sunderlin et al. (2008) identify a spatial correlation between forest cover and the incidence of poverty, pointing to potential opportunities for forest-based poverty reduction. However, given the depth of poverty in these areas, the remoteness of most forests, the relatively powerlessness of people that live in heavily forested areas, weak tenure security, and the difficulties of capturing forest rents, devolution reforms that focus on securing the safety-net and currently consumption functions of forests are likely to have the greatest impact.

4.4. Sustainability Arguments Applied to the Forestry Sector

Forest management affects users at the most local of levels, and can also have implications for individuals that are far removed from the forest spatially and temporally.

For example, watershed management and harvesting practices can affect water quality and the cumulative carbon sequestered in a large area, which citizens in distant areas may be concerned with. The public characteristic of forests and their potential as a source of multiple livelihoods and objects of multiple overlapping claims requires effective local democratic processes (Kaimowitz and Ribot 2002). For the high costs of sustainable forest management and protection to be borne by local resource users, the benefits of protection have to be recognized (Becker 1999). Part of the reason poor households do not prioritize forestry is that they have relatively high discount rates decreasing their interest in investing public goods and services accruing benefits in the medium to long run (Pender 1996). For example, poorer households are less likely to invest in woodlot establishment because it ties up land for several years, and because the returns on investment are realized over an extended period (Jagger and Pender 2003; Jagger 2008).

Devolved forestry management proposes several mechanisms for increasing the forest income of local resource users including establishing community forests, and negotiating collaborative management agreements between forest authorities and local communities. There is a strong link between the democratic decentralization literature and the community based natural resource management (CBNRM) literature. Often reforms involve the state sharing management or enforcement responsibilities with local communities, or provide new opportunities or incentives for community based initiatives. When CBNRM is successful, it may lead to increased income and improved natural resource management (World Bank 2008).

Variation in implementation of reforms and budgetary commitment across local governments and communities are also important determinants of sustainable forest management outcomes (Oyono 2005; Andersson and Gibson 2007; Banana et al. 2007). The competency or capacity of devolved authorities to implement sustainable forest management is an important issue. Local governments lack human, financial and technical resources that prevent them from providing adequate public services under decentralization (Crook and Sverrisson 2001; Edmunds et al. 2003). Technical capacity for forest management or knowledge about community or collaborative forest management is generally uncommon among elected officials (Larson 2002). Most local governments are constrained in their ability to hire foresters to undertake scientific

assessments of forest use, to help them understand forest degradation and opportunities for regeneration, and to implement participatory forestry or agroforestry initiatives that facilitate local management of resources and enhance livelihood opportunities (Larson 2002; Banana, Gombya-Ssembajjwe, and Bahati 2003).

There is evidence of a race to the bottom under forest sector devolution. For example, in Indonesia, when local governments had few other opportunities for revenue generation, they issued logging permits which accelerated deforestation (Curran et al. 2004). Indonesia's decentralization laws grant district governments more extensive powers to arrange their own regulatory regimes, and give them more responsibility for generating their own revenues to run decentralized services. Cash starved municipal governments with pressure to increase revenues use the opportunity to deplete resources in the short run (McCarthy 2002). In Senegal, the immediate cash needs of local governments led councilors to allow commercial charcoal producers to harvest in their forest areas, even though it resulted in substantial forest degradation (Ribot 1995). Kaimowitz et al. (1998) found that forest sector decentralization in Bolivia led to increased exploitation of forests in the short run.

Empirical evidence of the link between governance reforms and forest sustainability is highly variable both within and between countries that have enacted reforms, and has been explicitly addressed in relatively few studies. Several institutional factors mediate sustainability outcomes. Rules regarding forest use, and the degree to which they are enforced have a significant effect on sustainability outcomes (Oyono 2005; Banana et al. 2007). Contradictory regulations, lack of clarity regarding new forest rights associated with reforms, confusion about who is in *de facto* control of forest resources, and an unwillingness of the central government to intervene in cases of excessive forest loss are among the reasons that high rates of forest loss are observed under decentralization (Oyono 2005; Andersson and Gibson 2007).

4.5. Hypothesized Linkages between Forest Sector Devolution and Pro-poor Outcomes

The arguments and evidence presented in this section are summarized in Table 2.2. The story that emerges is that devolved forest management has additional complexities that

make poverty reduction more challenging than for the more general case. Of particular relevance to this study are the direct mechanisms for increasing income. Due to the high degree of regulation and the potential for rent seeking within the forestry sector, reducing the transaction costs of harvesting and marketing forest products is difficult in most settings. With respect to targeting goods and service provision to the poor, forestry has relatively low salience for local governments responsible for public goods and service provision in other sectors. Support for forestry extension, subsidized seedlings, small-enterprise development etc. is unlikely as devolved authorities have political incentives for prioritizing the health and education sectors. Redistributing control and decision making authority over forests and specific forest products is a major challenge for the forestry sector. Redistributions mean that if the poor gain, another group loses out. It is very difficult to convince actors to relinquish control over high value assets. Finally, devolution is expected to lead to more sustainable management of resources leading to a secure benefit stream over time. Several factors limit the potential for sustainable management under devolution including the dual nature of negative externalities associated with forests, limited technical capacity of devolved authorities, the incentive for devolved authorities to deplete resources to generate revenue for other sectors, and confusion over rules, regulations, and overlapping claims to resources hinders local management.

As was outlined in Chapter 1, Uganda's forest sector devolution involves parallel devolution processes: democratic decentralization to local government of oversight of private forests and local forest reserves; and devolution to the for-profit parastatal National Forestry Authority who manages central forest reserves. The focus of this analysis is on changes in forest income, which is a focal point of the reform objectives. The direct mechanisms identified in the pre-reform period (recall Table 1.2.) relevant to each variant of devolution are identified in Figure 2.2. As per Figure 2.1., underlying both direct and indirect mechanisms for catalyzing poverty reduction are a complex set of incentives influencing the behavior of actors engaged in implementing the reform process.

Table 2.2: Hypothesized Linkages between Devolution Reforms and Pro-poor Outcomes for the Forestry Case

Mechanism	Process	Hypothesized effect for forest-based poverty reduction
Efficiency		
Reduced financial and transaction costs due to competition between jurisdictions	Lower costs due to competition and efficiency; navigating multiple layers of governance may be costly	+/-
Better targeting due to accurate information at the local level	Better information about local use of forests and forest condition; but local governments favor growth oriented investment over pro-poor investment	+/-
Increase in local government tax revenues to support local economic activity	Forest resource base must generate significant tax revenue; reinvestment in sector unlikely	+/-
Accountability		
Effective political competition	Poor unlikely to prioritize forestry in voting decisions	+/-
Checks and balances within system of governance	More corruption in forestry due to rent seeking potential; Depends on vertical integration in markets for high value forest products	+/-
Devolved power more accountable to electorate	Rent seeking potential for forestry may lead to elite capture of local government; NGOs etc.	+/-
Equity		
Equity in public service provision decisions	Depends on whether devolved authority is engaged in forest rent seeking activities or if elites engaged in activities can manipulate devolved authority	+/-
More equitable distribution of resources	Meaningful redistribution of access to land or high value products difficult; Exploiting high value forest products requires financial and human capital; Foresters reluctant to relinquish controls	+/-
Inter-jurisdictional equity	Forest rent seeking potential is generally variable across jurisdictions; Strong spatial overlap between forests and the poor	-
Sustainability		
Local users realize costs and benefits of sustainable use	Poor have high discount rates making it difficult to wait for forest related benefits to accrue; Forests have local, regional and global externalities; difficult to see private benefits of environmental services;	+/-

<p>Devolved authority has greater decision making authority over resources</p>	<p>Capacity to sustainably manage forests is a major challenge for devolved authorities</p>	<p>+/-</p>
<p>Local governments lax on regulations/taxes to attract business</p>	<p>Race to the bottom can occur when devolved authorities have few other options for revenue generation</p>	<p>-</p>

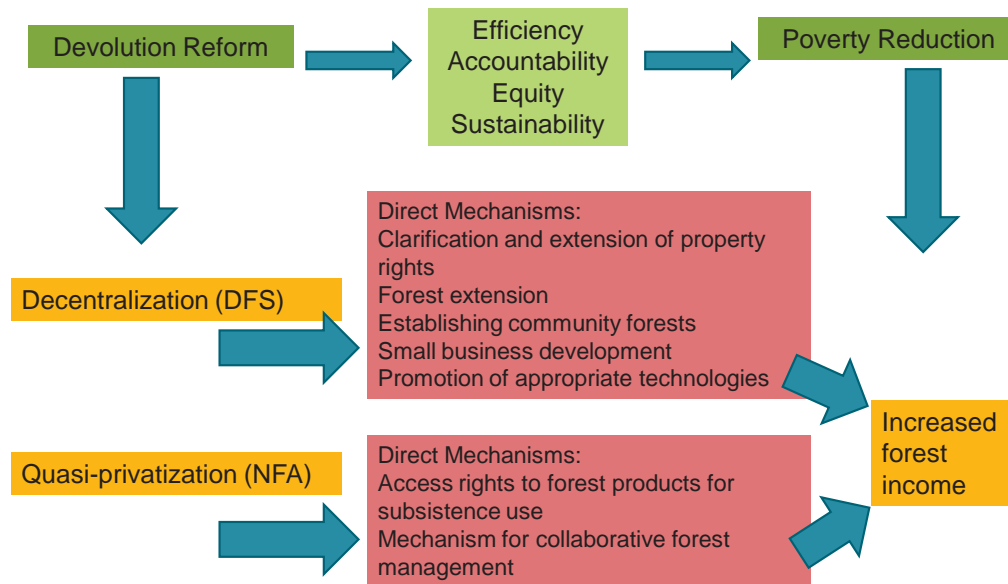


Figure 2.2.: Linking Uganda’s Forest Sector Devolution Process to Poverty Reduction

5. CONCLUSION

Devolution of forest management is not taking place in the naïve and ideal form stated in much of the policy literature (Larson 2003; Ribot 2003; McCarthy 2004; Ribot, Agrawal, and Larson 2006). The literature on devolution is broad and speaks to a variety of expected outcomes including greater: efficiency; accountability; equity; and sustainable management of resources. I have argued that these outcomes are intermediate steps toward potential poverty reduction outcomes. In the context of forests, the hypothesized outcomes from the broader devolution literature do not always hold. The above discussion allows for the statement of several propositions:

- Devolution provides few direct mechanism for lifting people out of poverty;
- Forests support current consumption and provide important safety-nets for the poor; securing these benefit streams is important to poverty reduction initiatives;
- Forests generate substantive gains in cash income when there are robust and accessible markets for high value forest products, and when producers have the financial and social capital to exploit opportunities;
- The link between devolution and poverty reduction is more tenuous for forest sector devolution than for the more general case.

A critical question in the context of forest sector devolution and poverty reduction is what are the proximate causal mechanisms that will lead to direct changes in the welfare of the rural poor, for example an increase in forest-based income. Many of the mechanisms of devolution reforms are focused on underlying factors that may make rural household better off, but do not directly affect income or other measurable aspects of livelihood improvements. These indirect factors have the potential to reduce the vulnerability of the poor, but only under optimal conditions and generally take some time to have an effect. Direct mechanisms include: reduced financial and transaction costs of harvesting and marketing forest products; targeting of forestry related goods and service provision to the poor; increased forest and forest product asset base; and securing a benefit stream from forests through sustainable management. The remainder of this dissertation is devoted to the empirical exploration of whether Uganda's devolution reform has led to changes in forest income, and exploring the underlying causal explanations for observed changes.

CHAPTER 3

HAS UGANDA'S FOREST SECTOR REFORM LED TO INCREASED FOREST INCOME FOR THE RURAL POOR?

1. INTRODUCTION

The objective of this Chapter is to evaluate how Uganda's forest sector reform has influenced the role of forest income in rural livelihood portfolios. Improved livelihoods for rural people living in or near forests is one of the most commonly cited expected outcomes of forest sector governance reforms (Agrawal and Ostrom 2001; Meinzen-Dick and Knox 2001; Fisher et al. 2005; WRI et al. 2005). While there is much optimism about the potential pro-poor benefits of devolution, there is a dearth of empirical data to confirm whether and under what conditions devolution results in favorable livelihood outcomes (Bardhan 2002; Meinzen-Dick, Di Gregorio, and McCarthy 2004). This study seeks to fill that gap.

Drawing on the case of a major forest sector reform in Uganda, this paper addresses the question: does forest sector devolution increase forest income for the rural poor? The reform, implemented in 2003, devolved the ownership and management of 85 percent of Uganda's forests. The centralized Forest Department was dismantled and responsibility for the oversight of private forests was transferred to the District Forestry Services, an example of democratic decentralization to a lower level of government. Ownership and management of central forest reserves was devolved to the for-profit parastatal National Forestry Authority. One of the main objectives the reform was to create opportunities for the poorest and most vulnerable rural households to increase the role of forest income in their livelihood portfolios.

The research employs a quasi-experimental research design comparing both pre and post reform income portfolio data for a large sample of households surrounding three major forests in western Uganda. Outcomes for two treatment groups are considered. The first group is comprised of households living in or near privately held forests southeast of Bugoma Central Forest Reserve overseen by the decentralized District Forestry Service (DFS). The second treatment group includes households adjacent to Budongo Central Forest Reserve managed by the for-profit parastatal National Forestry Authority (NFA). A control group of households adjacent to Rwenzori Mountains National Park, managed by the centralized Uganda

Wildlife Authority, is included in the design. The direction and magnitude of the effect of the reform on absolute and relative forest income is estimated using the difference-in-difference method of program evaluation. The method allows for the consideration of both group specific and time specific effects.

The Chapter is organized as follows: in the next section the literature related to governance reform and livelihood outcomes is reviewed. Section 3 describes the research design, study area, and methods used. Empirical results are reported in the fourth section. Section 5 concludes.

2. LITERATURE REVIEW

In Chapter 2 the literature addressing linkages between devolution and poverty reduction was summarized. Several direct mechanisms for increasing forest income for rural households were identified including: reducing the transaction and financial costs of using forest resources (Ribot 1995; Kaimowitz et al. 1998; Larson 2002; Oyono 2004; Jagger, Pender, and Gebremedhin 2005; Larson 2005); increasing access to forest resources (Ribot 2002; Angelsen and Wunder 2003; Ribot and Peluso 2003); making access to forest resources more secure over the medium to long-term (FAO 2002; Deininger 2003; DFID 2007; SIDA 2007); and receiving direct benefits (i.e. cash or in-kind payments) for participating in collaborative agreements with forest authorities (Gibson, McKean, and Ostrom 2000; Larson 2002; World Bank 2008).¹

Bardhan (2002) argues that empirical evidence demonstrating whether decentralization reforms lead to significant changes in income or other measures of livelihoods are absent from the literature. Though there is a dearth of empirical data to test the devolution-poverty link there are a few notable exceptions that employ quasi-experimental designs and large sample sizes. Crook and Sverrisson (2001) in a multi country study found that decentralization did not necessarily result in pro-poor outcomes. Elite capture of elected local governments was identified as a major factor contributing to the failure of pro-poor reforms. Positive outcomes were associated with cases where there was a strong commitment by national governments or political parties to promote the interests of the poor. Ravallion and van de Walle (2003) examining land allocation in Vietnam, and Bardhan and Mookherjee (2006)

¹ Payments for environmental services were not discussed in Chapter 2 as they are outside the scope of the devolution literature. Payments to households for the conservation of forest resources is another mechanisms for directly increasing household income.

examining credit, agricultural input kits, employment programs, and fiscal grants test hypotheses of elite capture of decentralized service delivery within villages finding little evidence of unequal outcomes. Both studies did find variation between villages suggesting allocation of decentralized resources is biased towards wealthier villages. Galasso and Ravallion (2005) in their analysis of Bangladesh's Food-for-Education program found that the poorest households were less likely to benefit from the program in communities with a high degree of land inequality. There was no evidence that the central government selected communities or distributed devolved funds taking into account relative poverty. The results from these studies are mixed. Political connectedness and elite membership, asset equality, and commitment by higher level government to ensure the lowest income constituents benefit from programs emerge as important variables.

Several recent studies analyze the link between forest sector reform and livelihood outcomes. There is evidence that rural households experience gains in income from forests as a result of reforms. Studies from Malawi (Jumbe and Angelsen 2006) and Ethiopia (Jagger, Pender, and Gebremedhin 2005) found that devolved forest management led to increases in income from forests for rural smallholders. However, both studies found a high degree of variation across communities and households affected by the reform. Studies that examine governance reforms in cases where the communities are involved in the distribution of timber concessions find that communities and households are better off after decentralization reforms (Oyono 2005; Palmer and Engel 2007), though again with a high degree of variation. Communities often benefit from in kind payments that support the development of rural infrastructure including schools and health centers, or receive direct cash payments from small scale timber concessions.

Political connectedness emerges as an important variable influencing reform outcomes for the poor. Recent studies from Vietnam (Sikor and Nguyen 2007) and Indonesia (McCarthy 2004) found that while devolution does generate benefits for the local poor, local power relations and the institutions regulating access to higher value forest resources are excluding the very poor from benefiting from reforms. There are numerous examples of local elites, NGOs and other special interests dominating local decision making processes regarding the assignment of rights, which may undermine outcomes for the rural poor (Ribot 1999; Agrawal 2001; Platteau and Abraham 2002). A key finding from synthesis research on the topic of decentralization is that if

reforms are to have welfare enhancing effects at the level of the rural household, attention needs to be paid to the structural inequities that emerge across the various settings in which reforms are implemented (Ribot 2003; WRI et al. 2005; Larson et al. 2007).

3. METHODS

3.1. Research Design

To make claims about causal relationships between governance reforms and various outcomes a quasi-experimental research design is required. To understand how the reform has affected a particular unit of observation, be it a demographic group such as the rural poor or specific forest area, it is necessary to have data from before the reform was implemented to compare with data collected some time after implementation has taken place (Bardhan 2002). In addition, it is necessary to have a counterfactual, or a control group, to account for changes that occur due to other factors. The control group serves as an indicator of what would have happened in the absence of the reform (World Bank 2008). This study employs a quasi-experimental research design called the nonequivalent comparison group design (Shadish, Cook, and Campbell 2002). `Households in Forest Sites affected by the reform (i.e. treatment groups) are compared with households in a Forest Site that was not affected by the reform (control group).² In this case the pre-reform and post-reform samples are independent. Household level data from the first and second time period are analyzed together as a pooled cross section.

3.2. Baseline and Follow-up Data, Site and Sample Selection

The baseline data for this study were collected in late 2003 immediately prior to the implementation of the forest sector reform. The baseline study was conducted by the Wildlife Conservation Society, Albertine Rift Programme with support from the European Union Forest Resources and Conservation Management Program (Bush et al. 2004). The primary objective was to quantify the contribution of forest products to

² The non-equivalent comparison group design is among the most common of quasi-experimental designs. Variants include treatment groups and untreated comparison or control groups with dependent (i.e. pre and post test data collected on the same units) and independent samples. Due to the non-equivalency of the comparison and control groups, selection bias is assumed to be present. Several methods are available to test for both the external and internal validity of the research design (Shadish, Cook, and Campbell 2002).

household income portfolios. The data collection involved a household survey designed to collect information on both subsistence and cash income generating activities.

In each of the four forests WCS visited 11 or 12 villages, for a total sample of 46 villages and roughly 640 households. WCS employed a multiple stage stratified random sampling process to select the villages included in the baseline study. As the focus of the study was communities adjacent to forests, the sampling was constrained to parishes (i.e. the second lowest administrative unit in the Ugandan local government structure) immediately adjacent to the forest. In order to get good spatial representation around the perimeter of each Forest Site, parishes were divided into 12 units with equal number of parishes. From each of the 12 units, one parish was randomly selected. Within each selected parish a list of villages was compiled and one village was randomly selected from each parish (Bush et al. 2004). Within each village participatory rural appraisal techniques including a wealth ranking exercise were used to categorize each household within the village as poor, average, or wealthy. From each group five households were randomly selected for the household interview in the baseline study (Bush et al. 2004).³

The nested research design of Forest Sites, villages, and households was limited to the three selected Forest Sites that were included in the WCS baseline survey. From each Forest Site the number of villages included in the sample was reduced from 12 to 6, largely due to financial and logistical constraints.⁴ However, the number of households surveyed in each village was increased to provide a representative sample of households within each village.

The 6 villages were randomly selected using a stratified random sampling method that took into consideration the distribution of the baseline survey villages by Forest Site and by district in order to maximize variation across the seven districts in

³ Household level data for the baseline study are not a random sample of the population of households. Ideally 1/3 of the sample would be drawn from each of the three wealth categories. The distribution of households in the baseline dataset across the three wealth categories is: 28 percent poor; 34 percent average; 38 percent wealthy.

⁴ Difference-of-means tests were conducted on total average household income, total average forest income, and the share of income from forests to compare the 34 villages included in the WCS study with the 18 villages selected for the follow-up study to ascertain the representativeness of the villages selected. There was no significant difference of means for the variables total household income and share of total income from forests. However, total household income from forests was significantly different for households falling with the larger sample of 34 villages and the sub-sample of 18 villages included in the follow-up study.

the study (n=18 villages).⁵ After the random selection was completed the location of the villages was checked to ensure sufficient geographic distribution around each Forest Site. The random selection process yielded relatively uniform distribution of villages around each of the three Forest Sites. Thirty households were randomly selected from each village (n=540 households). A list of households residing in each village was compiled, drawing upon information from village registers, lists provided by village leaders, and information from key informants. Polygamous households were listed according to the wife's name; each wife was considered a separate household unless key informants indicated that wives jointly undertook important livelihood activities such as cooking and cultivating. Lack of household level identifiers such as household names or Global Positioning System coordinates in the baseline study made it impossible to study the same households over time. This has implications for the type of analysis possible and the interpretation of results.

3.3. Analysis

The effect of the forest sector reform on rural income portfolios is evaluated using three measures: annual total household income, annual household forest income, and the share of annual household income from forest products.⁶ While income is an imperfect measure of overall household welfare, it is relatively easy to measure and can be used as a reasonable proxy for welfare (Angelsen and Wunder 2003).

In order to compare incomes across households a standardized unit of measure is required. Inter-household variations in size and demographic composition are taken into account following Cavendish (2002).⁷ Equivalence scale adjustments are typically comprised of three components: a time weighting equal to the proportion of the year each household member spends in the household; a nutritional weight allocated according to the age and gender of each household member; and an economy of scale weight. Unadjusted estimates of total income were divided by the household size in adjusted annual equivalents to produce total household income per

⁵ At the time of the WCS study all of the villages within the Budongo Forest Site fell within Masindi District. In July 2006 Buliisa District was created. The villages for the Budongo site were not selected proportionally according to the new districting, but rather randomly from among the 12 villages in the Budongo Forest Site.

⁶ The paper follows the standard income definition. Agricultural and forest income, for example, is gross value of products sold or consumed minus input costs. Following this, the value of family labor is not deducted, while the costs of hired labor are.

⁷ See Cavendish (2002) page 56 for a detailed discussion of adjusting crude income to adult equivalent units.

adjusted adult equivalent units.⁸ Adjusted annual incomes from the baseline data were adjusted to real values by multiplying incomes in 2003 by 6.38 percent which was the average rate of inflation in Uganda during the period 2003 through 2007.⁹

A major challenge for this study is that we do not have a true panel dataset with the same households both before and after the reform. The regression analysis combines the baseline data with the follow-up data to create a pooled cross section over time.¹⁰ This data structure fits with the research design in that it assumes that during each year of data a new random sample is taken from the relevant population. While pooled cross sectional data is treated as a cross sectional dataset for analysis purposes, it is important to include a dummy variable for year to account for aggregate changes over time (Wooldridge 2002).

The effect of the forest sector governance reform on forest income is evaluated using a program evaluation technique known as the “difference-in-difference” (DID) method. The difference-in-difference method allows for the consideration of both group specific and time specific effects. Effects can be estimated using descriptive statistics (i.e. double difference mean statistics) and also econometrically (Wooldridge 2002). Table 3.1 summarizes the variables required to estimate the effect of the reform on livelihood outcomes.

Table 3.1: Variables Required to Estimate Double-Difference Mean Statistic

	Bugoma Forest Site (Treatment 1)	Budongo Forest Site (Treatment 2)	Rwenzori Forest Site (Control)
Before	T _{1B}	T _{2B}	C _B
After	T _{1A}	T _{2A}	C _A

The double difference of the means of the treatment effect is modeled as follows:

⁸ Because the study area does not have a significant proportion of households with migrant laborers we assumed all individuals to be time weighted with 100 percent of their time in the household.

⁹ Uganda Revenue Authority. 2007.

http://www.ugrevenue.com/exchange_rates/previous.php?date=January+2008&Submit=Show.

Accessed 28 January 2008.

¹⁰ Given that this study does not use panel data (i.e. tracks the same households over time) – but rather uses pooled cross sectional data from two independent random samples, the potential effect of attrition due to factors including harassment from forest officials, economic opportunity elsewhere etc. cannot be ascertained. The relatively high proportion of households that have been in the village for greater than 10 years provides assurance that the sample drawn for the follow-up study is representative of the population of households in the 2003 baseline study conducted by the Wildlife Conservation Society. Approximately 80 percent of household heads in the follow-up sample have lived in their current village for greater than 10 years.

$$Treatment\ effect_1\ (District\ Forestry\ Service) = (T_{1A} - T_{1B}) - (C_A - C_B) \quad (1)$$

$$Treatment\ effect_2\ (National\ Forestry\ Authority) = (T_{2A} - T_{2B}) - (C_A - C_B) \quad (2)$$

Alternatively the difference-in-difference estimator can be used to model outcomes econometrically as follows:

$$Y_i = \beta_0 + \beta_1 treatment_dfs + \beta_2 treatment_nfa + \beta_3 time + \beta_4 treatment_dfs*time + \beta_5 treatment_nfa*time + \varepsilon_i \quad (3)$$

While comparing difference- in-difference means for both group and time specific effects can provide useful information, equations 1 and 2 assume that the policy change is not systematically related to other factors that affect outcome variables. In most cases the model in equation 3 is extended to include additional covariates that account for the possibility that random samples within a group have systematically different characteristics across the two time periods (Wooldridge 2002). Thus, the effect of the governance reform on the three livelihood outcome variables of interest is modeled econometrically according to the following equation:

$$Y_i = \beta_0 + \beta_1 treatment_dfs + \beta_2 treatment_nfa + \beta_3 time + \beta_4 treatment_dfs*time + \beta_5 treatment_nfa*time + \beta_6 land + \beta_7 labor + \beta_8 capital + \beta_9 minforest + \beta_{10} village + \varepsilon_i \quad (4)$$

$\beta_1 treatment_dfs$ is a dummy variable that indicates where the household is in the first treatment group (i.e. under the jurisdiction of the District Forestry Service), and $\beta_2 treatment_nfa$ is a dummy variable that indicates whether the household is in the second treatment group (i.e. under the jurisdiction of the National Forestry Authority). $\beta_3 time$ is a dummy variable that indicates if the household fell in the 2003 or 2007 sample. $\beta_4 treatment_dfs*time$ and $\beta_5 treatment_nfa*time$ are interaction variables that indicate whether the household falls in the treatment group and in the after the reform time period. Coefficients for these interaction variables measure the magnitude of change in the independent variable that can be attributed to the reform. $\beta_6 land$ is a vector of variables that indicate the endowment of land for each household. $\beta_7 labor$ is

a vector of variables that indicate the household's human capital and over all labor supply. β_8 capital is a vector of variables that indicate the household's available capital assets. β_9 minforest is number of minutes it takes to travel from the household to the nearest forest by the most common means of transportation. β_{10} village is a vector of variables that indicate several of the fixed conditions associated with each village. ε_i is the error term which accounts for effects that are not captured by other variables.

Models with left censored dependent variables (e.g. adjusted annual household income from forests, and share of annual household income portfolio from forests) are estimated using the Tobit regression model which account for the non-linear nature of data with a significant number of zeros (Long 1997).

4. RESULTS

Adjusted household total income by Forest Site and income quartile is presented in Table 3.2. With one exception, there have been increases in income across all Forest Sites and income quartiles. In all Forest Sites the largest increases in income are observed in the lowest income quartile. The general trend is an equalizing of incomes over time. Relatively similar percentage change across Forest Sites and income quartiles in the control group and treatment groups indicates that the reform has had a limited effect on total income.

Table 3.2: Adjusted Annual Household Total Income by Forest Site and Income Quartile^{1,2}

Research Site	Annual Household Total Income (UgShs.)		Change (UgShs.)	Percent Change
	2003	2007		
Rwenzori Forest Site (Control Group)	n=85	n=163		
Income Quartile	Adjusted (AEUS) total income, UgShs			
0-25	122 910	260 769	137 859	112.2
26-50	227 569	436 117	208 548	91.6
51-75	451 950	660 575	208 625	46.2
76-100	976 262	1 128 113	151 851	15.6
Average across all quartiles	439 119	569 902	130 783	29.8
Bugoma Forest Site (Treatment 1)	n=85	n=166		
Income Quartile	Adjusted (AEUS) total income, UgShs			
0-25	112 484	254 597	142 113	126.3
26-50	233 245	425 750	192 505	82.5
51-75	439 966	607 328	167 362	38.0
76-100	1 255 551	1 326 027	70 476	5.6
Average across all quartiles	562 047	650 150	88 103	15.7
Budongo Forest Site (Treatment 2)	n=86	n=168		
Income Quartile	Adjusted (AEUS) total income, UgShs			
0-25	113 083	247 308	134 225	118.7
26-50	232 714	433 286	200 572	86.2
51-75	422 618	609 373	186 755	44.2
76-100	1 106 264	1 241 129	134 865	12.2
Average across all quartiles	432 643	681 108	248 465	57.4

1. Pre-reform (2003) estimates calculated from data collected by the Wildlife Conservation Society in 2003.
2. During the follow-up study the average exchange rate was 1 USD=1,817 UgShs.

Absolute income from forests and the share of total income from forests are important indicators of how the reform has affected the contribution of forests to rural livelihoods. Average adjusted annual household forest income, the share of income from forests, and the percent changes in both are presented in Table 3.3. It is important to note that absolute income from forests declined by a relatively small amount (roughly 23 000 UgShs. or \$13 USD).¹¹ This indicates that the Rwenzori Forest Site is a relatively good control group for this study. Large changes in average

¹¹ During the follow-up study the average exchange rate was 1 USD=1817 UgShs. (Uganda Revenue Authority. 2007. http://www.ugrevenue.com/exchange_rates/previous.php?date=January+2008&Submit=Show. Accessed 28 January 2008)

household income from forests in the control group site would suggest a significant event such as a change in market access (i.e. the building of a road), or a major change in enforcement capacity of the Uganda Wildlife Authority, which would make it more difficult to interpret the findings for the treatment groups.

Estimates of the average change in annual household income from forests for the first treatment group suggest that District Forestry Service oversight has had a limited effect on forest income; as with the control group, absolute income from forests for the Bugoma Forest Site slightly decreased (-9 167 UgShs. or \$5 USD). Changes in forest income decomposed by income quartile reveal the differential effects of the reform. In the Bugoma Forest Site increases in income from forest products are associated with the lower three income quartiles. A similar trend is observed in the control group. Income from forests had declined among the wealthiest households in both the control group and the corresponding income group in the Bugoma Forest Site.

The mean share of income from forests has changed very little for households in the Bugoma Forest Site (-4.0 percent). Though the absolute income from forests has increased for households in the lower income quartiles, the relative importance of forests to the overall income portfolio has declined for very poor households (-9.3 percent). In the control group site the relative importance of forest income only slightly increased for very poor households (+0.8 percent). The comparison between the Bugoma Forest Site and the control group suggests that forests are still relatively important for the lowest income quartile in the control group site and are less important for the lowest income households in the Bugoma site. In Rwenzori the wealthiest households have the largest decline in the share of income from forests (-11.1 percent), and in the Bugoma site it is the poorest households that have the largest decline in proportion of income from forest products (-8.9 percent). These figures point to the relative importance of forests in the livelihoods of poor versus wealthy households.

In the Budongo Forest Site a different pattern emerges from the decomposition of forest income by wealth category. Comparisons between the second treatment group, NFA management in the Budongo Forest Site, and the control group indicate that average household incomes from forests have substantially increased (+55,463 UgShs., or \$31 USD) since the reform was implemented. While income from forests has increased for all income categories, by far the largest gains are observed in the

Table 3.3: Adjusted Annual Household Forest Income by Forest Site and Income Quartile^{1,2}

Research Site	Annual Household Forest Income (UgShs.)		Change (UgShs.)	Percent Change	Share of Annual Household Income from Forests, percent		Percent Change
	2003	2007			2003	2007	
Rwenzori Forest Site (Control Group)	n=85	n=163			n=85	n=163	
Income Quartile	Adjusted (AEUS) forest income, UgShs						
0-25	27 747	50 851	23 104	83.3	19.6	19.6	0.0
26-50	60 352	74 925	14 573	24.1	27.2	17.2	-10.0
51-75	112 548	105 597	-6 951	-6.2	24.4	17.1	-7.3
76-100	307 799	204 909	-102 890	-33.4	31.4	17.1	-14.3
Average across all quartiles	124 796	101 472	-23 324	-18.7	25.8	17.9	-7.9
Bugoma Forest Site (Treatment 1)	n=85	n=166			n=85	n=166	
Income Quartile	Adjusted (AEUS) forest income, UgShs						
0-25	24 647	36 032	11 385	46.2	23.3	14.4	-8.9
26-50	37 748	65 189	27 441	72.7	16.6	15.4	-1.2
51-75	62 257	74 974	12 717	20.4	13.4	12.4	-1.0
76-100	181 585	122 166	-59 419	-32.7	15.1	10.2	-4.9
Average across all quartiles	83 717	74 550	-9 167	-10.9	17.1	13.1	-4.0
Budongo Forest Site (Treatment 2)	n=86	n=168			n=86	n=168	
Income Quartile	Adjusted (AEUS) forest income, UgShs						
0-25	24 313	21 852	-2 461	-10.1	22.2	8.4	-13.8
26-50	29 253	35 417	6 164	21.1	12.5	8.5	-4.0
51-75	25 086	60 396	35 310	140.8	5.9	10.2	4.3
76-100	105 113	231 988	126 875	120.7	9.5	18.9	9.4
Average across all quartiles	43 926	99 389	55 463	126.3	13.0	12.1	-0.9

1. Pre-reform (2003) estimates calculated from data collected by the Wildlife Conservation Society in 2003.
2. During the follow-up study the average exchange rate was 1 USD=1,817 UgShs.

highest two income quartiles. Average household forest income in the wealthiest income quartile has increased by roughly 127,000 UgShs., or \$70 USD. Households in the lowest income quartile in the Budongo Forest Site have had the largest decline in share of income from forests (-13.8 percent) while Budongo households in the highest income quartile have had a large increase in the share of income (+9.4 percent).

In the Budongo Forest Site the wealthiest households are making the largest gains. In the context of this study the interesting question is the contribution of forests to the overall change in income and whether that change can be linked to the reform. While income from forests is increasing, the absolute change in forest income does not account for the significant gains in total income that are observed in the both the Rwenzori and Bugoma Forest Sites. However, among the wealthiest households in the Budongo Forest Site more than two thirds of income gains between 2003 and 2007 can be attributed to forests.

Double-difference mean statistics for the Bugoma Forest Site, the case of democratic decentralization to local government, are presented in Table 3.4. The results demonstrate the impact of the forest sector reform on total household income, annual household income from forests, and the share of income from forests. The overall change in average total household income relative to the control group is a decline of approximately 43,000 UgShs., or \$24 USD. However, most of this is attributed to changes in total income in the highest income quartile group. In the lower three income quartiles, changes in average total income in the Bugoma Forest Site relative to the control group have been relatively small.

Overall, the findings show that reform has had a very limited effect on the role of forest income in rural livelihood portfolios. In general, poorer households have had slight declines in absolute forest incomes, whereas the wealthiest households have had modest increases (roughly \$24 USD per household). Overall, the share of total annual household income from forests has increased by 4 percent. As with changes in absolute forest income, the relative importance of forests to total household income has declined for the poorest households. The share of total household income from forests has modestly increased for the upper three income quartiles.

Table 3.4: Double Difference Estimates of Reform Impacts for Bugoma Forest Site^{1,2}

Research Site	Bugoma Forest Site (Treatment 1)		Rwenzori Forest Site (Control Group)		Double Difference Statistic
Annual Household Total Income (UgShs.)					
Income Quartile	2007	2003	2007	2003	
	n=166	n=85	n=163	n=85	
0-25	254 597	112 484	260 769	122 910	4 254
26-50	425 750	233 245	436 117	227 569	-16 043
51-75	607 328	439 966	620 575	451 950	-1 263
76-100	1 326 027	1 255 551	1 128 113	976 262	-81 375
Average, all quartiles	650 150	562 047	569 902	439 119	-42 680
Annual Household Forest Income (UgShs.)					
Income Quartile	2007	2003	2007	2003	
	n=166	n=85	n=163	n=85	
0-25	36 032	24 647	50 851	27 747	-11 719
26-50	65 189	37 748	74 925	60 352	12 868
51-75	74 974	62 257	105 597	112 548	19 668
76-100	122 166	181 585	204 909	307 799	43 471
Average, all quartiles	74 550	83 717	101 472	124 796	14 157
Share of Annual Household Income from Forests (percent)					
Income Quartile	2007	2003	2007	2003	
	n=166	n=85	n=163	n=85	
0-25	14.4	23.3	19.6	19.6	-8.9
26-50	15.4	16.6	17.2	27.2	8.8
51-75	12.4	13.4	17.1	24.4	6.3
76-100	10.2	15.1	17.1	31.4	9.4
Average, all quartiles	13.1	17.1	17.9	25.8	3.9

1. Pre-reform (2003) estimates calculated from data collected by the Wildlife Conservation Society in 2003.

2. During the follow-up study the average exchange rate was 1 USD=1817 UgShs.

Double-difference mean statistics for the Budongo Forest Site, the case of management by the for-profit parastatal National Forestry Authority, are presented in Table 3.5. The overall change in average total household income relative to the control group is significant - approximately 118,000 UgShs., or \$65 USD. With respect to absolute average household income from forests, households in the highest income quartile have experienced very large gains in income since the forest sector reform was implemented – approximately 230,000 UgShs., or \$127 USD. However, households in the bottom two income quartiles have experienced losses in total household income from forests. The share of total household income from forests has

declined significantly for the poorest households, while households in the middle income quartiles have experienced modest gains in the importance of forests to their total income portfolio. However, it is the wealthiest households that show the largest gains, with an estimated 24 percent increase in the role of forests in their household income portfolios.

Table 3.5: Double Difference Estimates of Reform Impacts for Budongo Forest Site^{1,2}

Research Site	Budongo Forest Site (Treatment 2)		Rwenzori Forest Site (Control Group)		Double Difference Statistic
Annual Household Total Income (UgShs.)					
Income Quartile	2007	2003	2007	2003	
	n=168	n=86	n=163	n=85	
0-25	247 308	113 083	260 769	122 910	-3 634
26-50	433 286	232 714	436 117	227 569	-7 976
51-75	609 373	422 618	620 575	451 950	18 130
76-100	1 241 129	1 106 264	1 128 113	976 262	-16 986
Average, all quartiles	681 108	432 643	569 902	439 119	117 682
Annual Household Forest Income (UgShs.)					
Income Quartile	2007	2003	2007	2003	
	n=168	n=86	n=163	n=85	
0-25	21 852	24 313	50 851	27 747	-25 565
26-50	35 417	29 253	74 925	60 352	-8 409
51-75	60 396	25 086	105 597	112 548	42 261
76-100	231 988	105 113	204 909	307 799	229 765
Average, all quartiles	99 389	43 926	101 472	124 796	78 787
Share of Annual Household Income from Forests (percent)					
Income Quartile	2007	2003	2007	2003	
	n=168	n=86	n=163	n=85	
0-25	8.4	22.2	19.6	19.6	-13.8
26-50	8.5	12.5	17.2	27.2	6.0
51-75	10.2	5.9	17.1	24.4	11.6
76-100	18.9	9.5	17.1	31.4	23.7
Average, all quartiles	12.1	13.0	17.9	25.8	7.0

1. Pre-reform (2003) estimates calculated from data collected by the Wildlife Conservation Society in 2003.
2. During the follow-up study the average exchange rate was 1 USD=1817 UgShs.

While the difference-in-difference of means or double-difference statistic is illustrative, multivariate regression analysis is used to further explore the effects of the reform. Descriptive statistics for the variables used in the regression analysis as

summarized in Table 3.6. The model is estimated with the addition of covariates that account for the possibility that the random samples within a group have systematically different characteristics in the two time periods. The coefficients of primary interest with respect to the understanding the governance reform and its affect on livelihoods are *treatment_dfs*time* (i.e. effect for households living near forests overseen by the decentralized District Forestry Service post-reform; also Treatment 1) and *treatment_nfa*time* (i.e. effect for households living near forests overseen by the parastatal National Forestry Authority post-reform; Treatment 2). Regression results are presented in Table 3.7.

Table 3.6: Descriptive Statistics for Variables Used in Regression Analysis^{1,2}

Variable	No. of obs.	Mean	Stand. dev.	Min	Max
Baseline Data (WCS 2003)					
Adjusted total income, UgShs.	253	468 222	453 727	43 649	2 544 500
Adjusted forest income, UgShs.	253	84 747	169 884	0	1 470 238
Share of income from forests, %	253	18.80	21.12	0	90.99
Natural forest owned, hectares	253	0.13	0.80	0	7.80
Arable land owned, hectares	253	1.42	1.81	0	12.00
Female headed households	253	8.30	27.64	0	1
Education level of household head (cf. None)					
Some or completed primary	253	64.43	48.00	0	1
Secondary or above	253	19.76	39.90	0	1
Dependency ratio	253	151	104	0	600
Household head has lived in village greater than 10 years	253	83.80	36.92	0	1
Value of assets, UgShs.	253	291 542	903 983	0	7 330 000
Value of livestock, UgShs.	253	172 237	215 707	0	1 162 100
Minutes to nearest forest	253	62.76	56.00	0	360
Follow-up data (Jagger 2007)					
Adjusted forest income, UgShs.	499	632 285	471 252	115 714	4 336 662
Adjusted total income, UgShs.	499	91 815	148 197	0	1 919 542
Share of income from forests, %	499	14.33	12.54	0	74.48
Natural forest owned, hectares	499	0.27	0.58	0	4.86
Arable land owned, hectares	499	1.58	1.32	0	9.31
Female headed households	499	15.83	36.54	0	1
Education level of household head (cf. None)					
Some or completed primary	499	50.10	50.05	0	1

Secondary or above	499	28.46	45.16	0	1
Dependency ratio	499	142	112	0	700
Household head has lived in village greater than 10 years	499	80.76	39.45	0	1
Value of assets, UgShs.	499	209 925	554 392	0	8 970 000
Value of livestock, UgShs.	499	291 308	889 485	0	9 130 000
Minutes to nearest forest	499	34.75	44.24	0	240
Village level fixed effects					
Altitude, meters above sea level	18	1294	307	963	1872
Households per hectare	18	0.36	0.17	0.10	0.73
Minutes to nearest market for consumption goods	18	61.11	53.81	0	195
Ethnic diversity in village (c.f. one ethnic group)					
2 or 3 ethnic groups	18	33.33	48.51	0	1
Between 4 and 10 ethnic groups	18	27.78	46.09	0	1
More than 10 ethnic groups	18	16.67	38.35	0	1

1. During the follow-up study the average exchange rate was 1 USD=1817 UgShs.

2. The dependence ratio is the number of household members under 15 years plus the number of household members over 65 years divided by the number of members between 15 and 65 years of age. The ratio is then multiplied by 100.

Controlling for household and village level characteristics, the net effect of the reform in the Bugoma Forest Site (i.e. democratic decentralization to local government) is relatively small.

The transition from the Forest Department to the District Forestry Services appears to have had a negligible effect on average household income from forests (i.e. and increase of 9,838 UgShs., or \$5 USD). Decomposition by income quartile reveals that the poorest households have lost a modest amount of forest income (17,469 UgShs., or \$10 USD); whereas wealthy households have increased income from forests by an average of 55,150 UgShs., or \$30 USD. The share of income from forests has increased 3.1 percent for the average household. Regression results decomposed by income quartile indicate that the share of income from forests has declined for the poorest households (10.7 percent) and increased for the wealthiest households (11.6 percent). The decline in the share of income from forests for poor households is statistically significant at the 10 percent level. Though the variable indicating female headed household is not statistically significant it is important to note that approximately 32 percent of households falling within the Bugoma Forest Site sample in the lowest income quartile are female headed. For comparison

purposes, 21 percent of households in the highest income quartile are female headed in this study site.

These findings indicate that the transition to local government control over forest management has had a limited effect on livelihoods in the treatment group. Further, forest income for the poorest households has declined while there have been gains in forest income for the wealthiest households. Limited capacity of District Forest Officers (DFOs) operating in the two Districts that are included in the Bugoma Forest Site is a possible explanation for the lack of attention to improving rural livelihoods. DFOs in Hoima and Kibaale Districts devote the majority of their time to the collection of district revenues for timber and charcoal transport. Their primary connection with local resource users is via periodic locally broadcast radio programs. The majority of forest income in the Bugoma Forest Site is for subsistence use; local resource users are generally excluded from accessing markets for high value forest products. In addition, few are aware of the value of the timber that is being harvested on private and customary lands in this area. The desire to clear land for agriculture often means that land owners will invite timber harvesters to cut large trees on their land for no cost, or for a payment far below market value.

Findings for the Budongo Forest Site (i.e. households living adjacent to the Central Forest Reserve managed by the National Forestry Authority) suggest that the reform has had a large and unexpected effect in this area. In the Budongo Forest Site the average increase in household forest income is 95,972 UgShs., or \$53 USD. The differential effect of the reform on forest income for the poorest and wealthiest households is striking; households in the lowest income quartile have lost an average of 27,753 UgShs., or \$15 USD per household, while households in the highest income quartile are estimated to have increased forest income by 293,929 UgShs., or \$162 USD per year. The share of income from forests has increased 6.4 percent for the average

Table 3.7: Conditional Difference-in-Difference Estimates of Forest Income and Share of Income from Forests, Pooled Tobit Regression Results¹

Independent Variables	Forest Income			Share of Income from Forests		
	Full model (n=751)	Low income quartile (n=188)	High income quartile (n=185)	Full model (n=751)	Low income quartile (n=188)	High income quartile (n=185)
Household Level Variables						
Treatment DFS	-90.575*	9.262	-410.928**	-8.49	11.03	-28.28**
Treatment NFA	-184.205***	2.694	-604.519***	-13.83**	11.05	-38.47**
Time	-20.606	24.270***	-104.688	-7.57***	-1.91	-14.52**
Interaction DFS*Time	9.838	-17.469	55.130	3.06	-10.70*	11.58
Interaction NFA*Time	95.972***	-27.753**	293.929**	6.37**	-14.97***	25.45***
Hectares of natural forest owned by household	10.776	-3.370	-9421	0.39	-1.97	-0.52
Hectares of arable land owned by household	7.266*	248.12	15.316	-0.13	-0.96	1.21
Female headed household	-28.692	-1.863	-111.244	-1.66	0.84	-5.77
Household dependency ratio	-142.92***	-11.98	-270.82	0.00	0.00	-0.02
Education level of household head (cf. None)						
Some or completed primary	10.023	1.462	20.873	0.88	0.90	-0.60
Secondary or above	18.183	8.528	-44.072	-1.94	2.64	-6.62
Household head has lived in village greater than 10 years	-31.218**	-8.046	-53.658	-3.11**	-7.22**	-2.43
Total value of assets, UgShs.	0.0036	0.0052	0.0023	0.0000	0.0000**	0.0000
Total value of livestock, UgShs.	-0.0073	-0.0235	-0.0156	0.0000	0.0000*	0.0000
Time to nearest forest (minutes)	-400.35**	-114.85**	-921.92	-0.06***	-0.08***	-0.09**
Village Level Fixed Effects						
Village altitude (meters above sea level)	-30.26	-1.68	-210.18	0.00	0.01	-0.01
Households/hectare in village	-5.070	-4.787	-99.706	-0.25	-9.91	4.93
Time to nearest market (minutes)	284.36**	61.81	684.33	0.04***	0.01	0.09**

Ethnic diversity in village (c.f. 1 ethnic group)									
2 or 3 ethnic groups	13 978	-12 657	78 944	-2.21	-6.37	-1.85			
Between 4 and 10 ethnic groups	37 999	-16 745	194 983*	-0.91	-8.52	5.55			
More than 10 ethnic groups	118 820***	1 607	296 681**	6.11	-2.26	12.85			
Censored observations	61	21	12	61	21	12			
AIC	24.77	21.10	26.33	7.89	7.64	8.49			
BIC	13 735	3056.50	3979.56	1062.28	525.69	678.78			
Pseudo R-Squared	0.0049	0.0140	0.0070	0.0209	0.0397	0.0313			
Log-likelihood Ratio	-9277.58	-1960.26	-2412.63	-2941.33	-694.85	-762.24			

1. All models were checked for multicollinearity using the variance inflation factor (vif) test. The variance inflation factor is 4.68.
*** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

household. Regression results decomposed by income quartile indicate that the share of income from forests has declined for the poorest households (15 percent) and increased for the wealthiest households (25 percent). For all models the estimated coefficients for the variable *treatment_nfa*time* were significant at the 1 percent or 5 percent level. The findings indicate that the forest sector reform in the Budongo Forest Site is strongly favoring the wealthiest households. As with the Bugoma Forest Site, the largest share of female headed households fall within the lowest two income quartiles (i.e. 66 percent of female headed households). Only 13 percent of households falling within the highest income quartile are female headed: the reform is likely disproportionately benefiting male headed households. This is not surprising given the significant role of timber income in the large gains observed in the highest income quartile. Timber production is typically dominated by men.

The extent to which wealthy households in the Budongo Forest Site are benefiting significantly from engagement in the timber business points to some serious flaws in the implementation of the reform. Currently there is no legal mechanism for smallholders living adjacent to Budongo Central Forest Reserve to harvest timber. As part of the transition to the National Forestry Authority the presence of forestry officials in the Budongo Forest Site has increased. However, based upon data collected for this study it appears that serious monitoring and enforcement failures are taking place; specifically, enforcement is selective and disproportionately focused on the lowest income households. Selective enforcement may be partially attributed to a change in the way forest guards are compensated. Lower pay and fewer allowances relative to management by the centralized Forest Department have created an incentive for forest guards to collude with illegal timber producers. In addition, relative wealth, which suggests sufficient capital to purchase timber harvesting equipment and to hire labor to harvest timber, and social and political capital are important determinants in the ability of households to engage in the timber business. The timber value chain is relatively short and frequently vertically integrated in the Budongo Forest Site; producers often harvest timber based upon orders placed by timber traders or wholesalers from Masindi town.

4.1. Threats to Validity

A more ideal quasi-experimental design would be to have a true panel; the same households in the pre and post reform periods would be interviewed. Because the Wildlife Conservation Society wanted to guarantee respondents complete anonymity. During the baseline study they did not collect data on household names or GPS coordinates that could be used to following households over time. Data on the high proportion of households that have been in the village for greater than 10 years provides relative assurance that the sample drawn for the follow-up study is relatively representative of the population of households in the 2003 baseline study conducted by the Wildlife Conservation Society. Roughly 81 percent of household heads in the follow-up sample have lived in their current village for greater than 10 years.

The fact that different survey instruments and recall periods were used to collection income portfolio data in the baseline and follow-up studies is also a threat to validity. WCS used a one-time only socioeconomic survey that relied on respondent recall over a one year period to collected detailed income portfolio data. The follow-up study involved a quarterly income survey with shorter recall periods (i.e. one month for income from forest and other environmental products, wages and business income; three months for income from agriculture, livestock, livestock products and other sources). If the direction of change in forest income was the same for all cases there would be clear evidence of a systematic bias due to the survey instruments used. This was not the case.

5. CONCLUSION

The aim of this paper is to examine how Uganda's recent forest sector governance reform has affected the contribution of forests to rural incomes. While the reform is still in the early stages of implementation, the findings point to some striking changes or, in some cases, lack of change, in the role of forests in rural income portfolios in western Uganda. Overall, for Ugandans living in or near forests on private lands, the impact of the forest sector reform on rural livelihoods is negligible. Four years after the transition from Forest Department governance to District Forestry Service governance rural households have not increased the share of their income from forests through the sale of unprocessed or processed forest products. While wealthy households obtain larger incomes from forests and a larger share of total income from forests, the values are not large, and are indicative of the subsistence nature of forest

product harvesting in this area. These findings indicate that forest sector decentralization to local government in Uganda has not had the desired outcome of increasing the role of forests in rural household income portfolios.

A second story emerges from the analysis of the transition from Forest Department to National Forestry Authority in the Bugongo Forest Site. We found that relatively wealthy rural households living adjacent to the central forest reserve experienced large gains in income from forests, total income, and the share of income from forests. Households in the lowest income quartiles experienced moderate losses in forest income and significant losses in the share of income from forests. The majority of forest income for wealthy households in the study area is from sawn wood, which is harvested and sold illegally. In this case livelihoods have been improved, but due to the institutional failure of the National Forestry Authority to regulate and enforce rules regarding timber harvesting. The transfer of responsibilities for central forest reserves to the National Forestry Authority has not had the desired effect. Forests have improved the livelihoods, but only for relatively wealthy households accessing forest products illegally.

The differential effect of the reform on relatively wealthy and relatively poor households is important and highlights the value of decomposing the data by income quartiles. The findings from this study are consistent with Jumbe and Angelsen (2006); Jagger, Pender and Gebremedhin (2005); and Sikor and Nguyen (2007), who found that reforms have differential effects across households and communities. Important patterns emerge from the analysis that would not be observable if average impacts across the whole sample were the focus of the analysis.

Recall that the goals of FSUP were two-fold: to create a positive, effective, and sustainable policy and institutional environment for the forest sector in Uganda, and to increase economic and environmental benefits from forests and trees, particularly for the poor and vulnerable (MWLE 2004a). This research demonstrates that households in different income quartiles are differentially dependent upon forests, and that that reform has affected different income groups in different ways. Most importantly, the reform has not had the desired effect in either treatment group. What are the reasons for the failure of the reform to improve forest incomes for poor households? In the following chapter the institutional incentives influencing key actors' responsible for reform implementation are analyzed.

CHAPTER 4

WHAT INFLUENCES THE REALIZATION OF PRO-POOR DEVOLUTION OUTCOMES?

AN ANALYSIS OF INSTITUTIONAL INCENTIVES

1. INTRODUCTION

Devolution reforms are implemented with specific objectives such as forest-led poverty reduction. Achieving stated objectives requires high levels of collective action between actors central to the reform process at both the formulation and implementation stages. The actions of individuals and groups are influenced by institutions, or the rules of the game, which determine the incentives for individuals to engage in growth-enhancing or redistributive activities (Eggertson 1990; North 1990). Incentives and how actors interact with each other are essential determinants of reform outcomes (Andersson 2006). When political and economic incentives are absent or perversely structured, desired policy outcomes are less likely. Sub-optimal outcomes are often associated with problems of motivation, information, transaction costs, power asymmetries etc. (Bates 1988; Gibson et al. 2005).

This Chapter examines how Uganda's forest sector reform has affected institutional conditions leading to changes in forest income for the rural poor. The findings presented in Chapter 3 illuminate two stories of implementation failure. In the Bugoma Forest Site changes in both absolute and relative forest income for rural households are relatively small. The reform did not create incentives that motivate forest officials to work with rural households to increase income from forests. In the Budongo Forest Site, changes in both absolute and relative income are negligible for the lowest income households, but higher income households have experienced large gains in forest income. In this site, institutional change has occurred, but it has created a set of incentives that motivate forest officials to allow income generating opportunities to better off households. Have political and economic incentives created by the reform hindered the realization of increased forest income for poor and vulnerable households?

The central argument of this Chapter is that for collective action leading to increased forest income for rural households to occur, the incentives of forest officials working at the forest gate have to be designed to support that outcome. Uganda's reform

identified numerous opportunities for rural households to increase forest income including: increasing access to forest resources; improving forestry extension service delivery; promoting small-business development; securing land and tree tenure; and the use of income enhancing technologies such as planting agroforestry species. However, for effective change to occur, collective action between forest officials, local resource users and other important actors that support the implementation of policy strategies is required.

The organization of the chapter is as follows. In Section 2 the relationship between institutions, incentives and the devolution of natural resource management is reviewed. In Section 3 the data sources and methods used in the analysis are presented. An institutional analysis of the context and incentives influencing actors central to the reform is presented in Section 4. In Section 5 changes in forest income and their relationship to incentives are discussed. Section 6 concludes.

2. INCENTIVES AS DETERMINANTS OF POLICY REFORM OUTCOMES

Barrett, Lee, and McPeak (2005) suggest that identifying and harmonizing the link between incentives and institutions is critical to alleviating poverty and achieving sustainable resource use in the low income tropics. Governance reforms adapt or create a set of formal institutions designed to influence actor incentives, and in turn their decision making processes which influence reform outcomes. Underlying or parallel to the set of formal institutions is a set of informal or *de facto* institutions that directly influence perceived incentives. In order to understand the causal mechanisms underlying the outcomes of governance reform processes it is important to understand both formal and informal institutions, the incentives they foster, and how actors respond to those incentives. Incentives involve both external stimulus and internal motivation. Much of the emphasis on reforming institutions lies in the belief that failures of collective action can be solved by creating or fostering institutions that direct both individual and social actions intended to resolve collective action dilemmas (Bates 1988). In the context of governance reforms collective action situations arise at both the policy formulation and implementation stages.

The rewards and punishments or benefits and costs that individuals perceive as resulting from their actions and the actions of others are examples of the external stimuli that influence behavior (Gibson et al. 2005). Perceived rewards or punishments can motivate individuals to take actions that are productive for all involved. Or, perverse incentives lead individuals to avoid engaging in mutually productive outcomes or to take actions that are generally harmful for others (de Soto 2000). Incentive problems, information asymmetries, high transaction costs and limited willingness or ability to communicate can lead to serious failures with respect to the implementation of reforms. These potential avenues for failure exist within groups of actors (i.e. conflicts among local resource users, the hierarchical organizational structures of central and local government agencies, NGOs and donor agencies), and between groups of actors. Differences between actors preferences and interests, and disparities in their access to power, resources and information make cooperation leading to outcomes such as sustainable forest management extremely difficult (Andersson 2004).

Interacting with other actors is among the most important opportunities for altering capabilities and constraints. Interactions between actors are an important mechanism for the exchange of goods, services, resources and obligations that alter the capabilities or constraints that actors face. Decentralization reforms are expected to present opportunities to alter the frequency and quality or depth of actor interactions, resulting in movement towards or away from individual optima. Though interactions between actors may be mutually beneficial, it is often the case that they will be characterized by principal-agent type relationships where more powerful actors influence the actions of less powerful actors for their own gain.

Whether the poor and most vulnerable benefit from changes in governance is conditioned by the nature of political institutions operating at multiple scales; outcomes are determined by the information and motivation of actors with decision making authority (Bardhan and Mookherjee 2006). In the process of decentralization, groups whose special interests are not well represented within political processes may lose out to those who possess political power and pursue their own interests (Moe 1990). To achieve an adequate and effective balance of power and equity, there is likely to be a redistribution of power, information, and individual and group capacities for bargaining.

Parties will cooperate as long as cooperative arrangements make them better off than non-cooperation (Agrawal 2001; Oyono 2004).¹ Successful devolution reforms require inter-actor arrangements in which each party promotes their own interests, while respecting the interest of others.

3. METHODS

3.1. Data

In this Chapter the cases of the two forest sites affected by the reform are analyzed in comparison with the control group site. Both the Bugoma Forest Site and the Budongo Forest Site were purposively selected as representative forests in Uganda with respect to forest type and governance structure. The findings from this analysis are more robust than for a case study focused a single village or narrowly defined geographic area. The three forest sites encompass a large geographic area, and span several districts (n=7) and sub-counties (n=14). Villages (n=18) were selected on the basis of their spatial distribution within or around forests. The comparisons of interest are the Bugoma Forest Site (Treatment Group 1) and the Rwenzori Forest Site (Control); and the Budongo Forest Site (Treatment Group 2) and the control group.

There are three primary data sources for the analysis presented in this Chapter (Table 4.1). The first is a series of key informant interviews conducted with actors involved in the reform process. Interviews took place between June 2005 and August 2007. The objective of the interviews was to understand the reform process and implementation from the perspective of actors operating at multiple levels. Key informant interviews include: Kampala based government officials, forest authority officials (NFA and FID), consultants involved in reform process, and NGO representatives; District Chairmen, District Forestry Officers, and district level forest officials working at the forest gate; National Forestry Authority and Uganda Wildlife Authority officials including out-posted leadership as well as forest-gate representatives of each organization; NGO representatives working at the forest gate; and sub-county Chairmen.

¹ Which outcomes emerge depend on the relative bargaining power of the parties. Traditional economists have applied these ideas within the game theoretic mode with limited attention to gender, the role of the State and the role of communities (Agrawal 2001).

The second primary data source is a series of semi-structured interviews at the village level. Finally, select data from household level interviews are presented in this Chapter.

Table 4.1: Sampling Strategy and Sample Size for Data Collection on Reform Formulation and Implementation

Unit of Analysis	Bugoma Forest Site (T1)	Budongo Forest Site (T2)	Rwenzori Forest Site (Control)	Total
Districts	2	2	3	7
Sub-counties	4	5	5	14
Villages	6	6	6	18
Households	180	180	180	540
District Forestry Service	3	2	4	9
National Forestry Authority	1	7	0	8
Uganda Wildlife Authority	0	3	7	10

3.2. Analysis

Devolution processes are complex social phenomenon influencing situations at multiple scales and levels. Scale is defined as the spatial, temporal, quantitative or analytical dimension used to measure and study any phenomenon, and levels are the units of analysis that are located at different positions on the scale (Gibson, Ostrom, and Ahn 2000).² In this analysis scale is the spatial unit of jurisdiction defined by the forest sector devolution reform. The three spatially defined units in this analysis are: the Bugoma Forest Site; the Budongo Forest Site; and the Rwenzori Forest Site.

In this analysis levels refer to the conceptual levels of human choice put forward by Kiser and Ostrom (1982): operational, collective and constitutional choice. When individuals interact in repeated settings that effect physical outcomes they are in an operational situation. This is the level at which production and consumption decisions are made, and the level which is most relevant to this analysis. At the operational level several factors influence outcomes including: local incentive structures; local power

² Analyzing the institutions and incentives associated with governance reforms requires a variety of disciplinary tools. See Gibson, Ostrom and Ahn (2000) for a survey of cross-scale approaches from the fields of ecology and landscape ecology, geography, economics, ecological economics, urban issues, sociology, political science and political economy.

relations; capacity to carry out reform objectives; environmental and social ideology; the relative value of forested land; and corruption and patronage as they affect resource management (Ascher 1999; Larson 2003; Smith et al. 2007; Tacconi 2007). The rules that affect the structure of the operational situation are designed and agreed upon at the collective-choice level. This is the level at which policy making occurs and where the legal aspects of accountability are dictated (Larson 2003). Constitutional rules define who can make policy decisions and under what types of rules or procedures (Ostrom 2005).³

This analysis draws on the elements of the Institutional Analysis and Development Framework (IAD) (Ostrom 1990) that focus on incentives and how they influence outcomes. The emphasis is on how local institutional arrangements affect outcomes associated with Uganda's governance reform. The IAD framework allows for the framing of policy outcomes in the context of the biophysical resource, the attributes of the community, and the rules in use. The set of initial conditions are the environment that structures efforts to achieve outcomes. Within the context, an action arena and its incentives are identified. Incentives influence patterns of interaction which in turn affect outcomes. The basic elements of the IAD framework, which has been adapted for application to the analysis of forest sector governance reform by Andersson (2006) is provided below (Figure 4.1).

³ Tacconi (2007) building on a framework developed by Larson (2003) proposes a complimentary framework for analyzing poverty outcomes associated with forest sector decentralization reforms. Three elements determine the social outcomes of decentralized forest management: the legal sphere (constitutional); mediating factors (i.e. links between legal and local decision making sphere – as per Ostrom's collective choice level); the local government decision making sphere (operational); and economic incentives (i.e. market incentives, what does the regulatory framework promote).

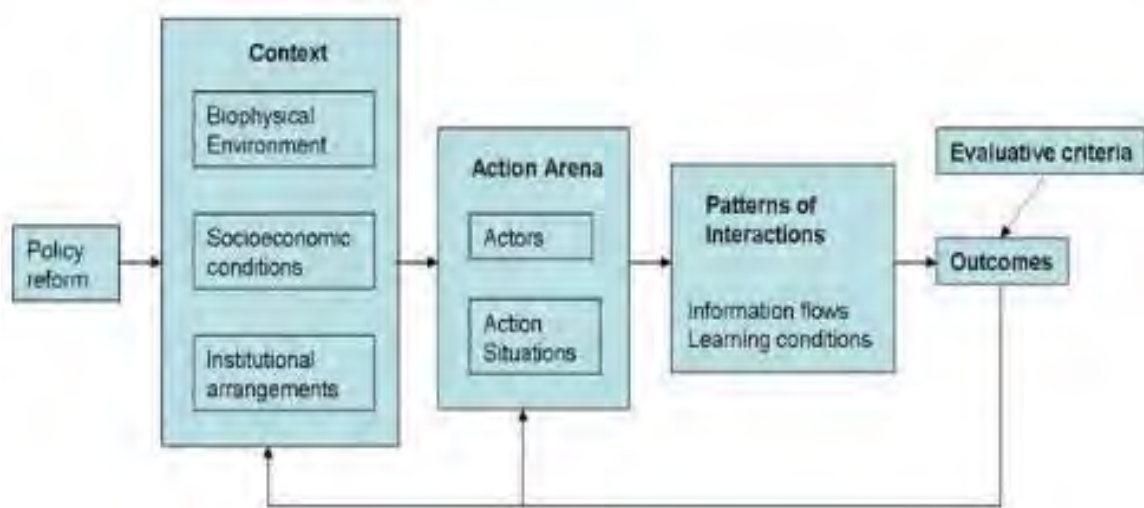


Figure 4.1: The Institutional Analysis and Development (IAD) Framework

The behavioral assumption underlying this analysis is that all actors seek to improve their welfare, but that they are boundedly rational. The central premise of bounded rationality is that actors experience limits in formulating and solving complex problems and in processing (i.e. receiving, storing, retrieving and transmitting) information (Simon 1957). In this behavior model, actors are fallible learners who develop routines, heuristics, or standard operating procedures for coping with life rather than strict rules of optimization; it is simply too challenging for individuals to make decisions based upon the processing of complete information (Jones 2001).⁴ Adaptations to strict models of rationality include: limiting what sorts of utility functions there might be; recognizing the costs of gathering and processing information; and the possibility of having a vector or multi-valued utility function (Simon 1957).

⁴ This model differs from the standard behavioral assumption of rational choice institutionalism which stipulates that individuals are rational self-interested actors that seek to secure most preferred or utility maximizing outcomes (Hall and Taylor 1996).

4. INCENTIVE ANALYSIS OF UGANDA'S FOREST SECTOR GOVERNANCE REFORM

4.1. Defining the Action Arena

The action arena defines the boundaries of the institutional analysis. Three action arenas are considered for this analysis. The first is the Bugoma Forest Site, privately held forests southeast of Bugoma Central Forest Reserve overseen by the decentralized District Forestry Service (Treatment 1). The second action arena is the Budongo Forest Site where the for-profit parastatal National Forestry Authority is the dominant forest authority (Treatment 2). The control group Rwenzori Forest Site discussed for comparative purposes. The dominant forest authority in the control group is the centralized Uganda Wildlife Authority

4.2. Actors Central to the Action Situation

Welfare enhancing changes in forest income depend on the incentive structures of several actors. Central to the implementation the Uganda's reform are: the District Forestry Services (DFS); the National Forestry Authority (NFA); pit-saw loggers and others engaged in the sawn wood value chain; and local forest resource users.⁵ Because I am concerned with outcomes occurring at the lowest level of analysis (i.e. the rural household), the focus of the analysis is on implementation decisions made at the collective choice and operational levels.⁶ The analysis considers the action situation for the period between 2003 and 2007

4.3. Influences on the Action Arena

The behaviour of actors in various action situations can be explained in terms of a set of influencing or contextual factors including the biophysical characteristics of the resource, the socioeconomic factors that influence how actors relate with one another; and the

⁵ The Forestry Inspection Division/Ministry of Water, Lands and Environment, and the donor community are actors that also influence the action situation. However, given that they do not have a direct relationship with rural households that utilize forest resources they are omitted from the analysis.

⁶ For the purposes of this study I consider only the direct users of forests, and the actors involved in managing forests and providing forestry related public services. Ugandan's and concerned citizens outside of Uganda that are not involved directly in the harvesting or management of forest resources, but whom might benefit from the wider-scale environmental services that forests provide are excluded from this analysis. Values associated with ecosystem services, biodiversity existence values, and ecotourism opportunities that accrue to indirect users of Uganda's forests are beyond the scope of this study.

rules-in use or the local institutional arrangements. These contextual factors are the independent variables in an institutional analysis. They are critical determinants of the outcomes of policy change.

4.3.1. Biophysical Environment

Forest cover and quality influence the potential for rural households to derive income from forests. High rates of deforestation and forest degradation were part of the impetus for the forest sector reform. The average rate of deforestation between 2000 and 2005 was 2.13 percent per year, an increase from an average rate of 1.76 percent per year between 1990 and 2000. In total, between 1990 and 2005, Uganda lost 26.3% of its forest cover, or around 1,297,000 hectares (United Nations 2005). Forest conversion and fragmentation means that forest users no longer have access to some forest products, or products such as fuel wood and wild foods that were traditionally harvested from forests, are now harvested from other land types such as fallows and bush land.

Forest cover and quality are rapidly declining in the private forests of the Bugoma Forest Site (Treatment Group 1) (Jagger 2009). Estimates from several forest agency documents suggest that approximately 50 percent of tropical high forest on private land is degraded, as compared with 17 percent in protected areas (Nsita 2005). Clearing of forests for agriculture is the primary driver of deforestation for private forests in the study site. Smallholders use slash and burn methods to clear forests. Demand for agricultural land is high due to an influx of migrants from land scarce Kabale and Kisoro Districts in southwestern Uganda, and due to increases in the price of marketable agricultural crops including maize, matoke and cassava.

Timber harvesting is the second major contributor to forest loss in the Bugoma Forest Site. The majority of medium value sawn wood passing through the main timber markets in Kampala markets is harvested in Kibaale and Hoima Districts. Timber harvesting is not a significant source of forest income for households permanently residing in the Bugoma Forest Site; the bulk of harvesting is undertaken by migrant timber cutters from southwestern Uganda known locally as “*fundis*”.

In the Budongo Forest Site (Treatment Group 2) forest cover is declining rapidly outside of the Reserve (Jagger 2009). Both small scale and commercial agriculture are

major threats to private forests adjacent to Budongo Central Forest Reserve. Kinyara Sugar Works engages in large scale production of sugar cane, and supports out-grower schemes that extend to the Reserve boundary. Pressure on forests outside of the Reserve increases the importance of access to forest products for both subsistence and cash income within the Reserve boundary. Within the Reserve there is evidence of declines in forest quality due to unsanctioned timber harvesting (Jagger 2009). Budongo Central Forest Reserve is one of the few places in Uganda where high value species including the mahoganies *Khaya* and *Entandrophragma* spp. are found. The estimated volume of wood lost as a result of illegal harvesting within the Reserve is estimated at 0.45 m³ per/ha/year, worth about 30,000 UgShs./ha/year (Gombya-Ssembajjwe, Buyinza, and Kakuru 2007).⁷ Masindi based timber traders hire and finance timber harvesting operations within the Reserve. Laborers are both migrant workers and local residents (Plumptre 2002; Gombya-Ssembajjwe, Buyinza, and Kakuru 2007).

In the Rwenzori Forest Site (Control group), forests outside of the protected area are under the same threat as elsewhere in western Uganda. Clearing forest for small-scale agriculture is the major driver of deforestation. Forest cover and quality are rapidly declining on both private and community forests adjacent to the National Park. Within the National Park local resource users perceive improvements in both forest cover and quality over the past 5 years (Jagger 2009).

4.3.2. Community Attributes

Community level factors including ethnic heterogeneity, participation in groups and associations, social and political capital etc. influence the ability of smallholders to alter the role of forests in their income portfolios. Forest user groups (FUGs) are organized around the management of a specific forest or woodlot, or the harvesting or production of a specific forest product. Heterogeneity influences the ability of local resource users to collectively organize to harvest and market forest resources. Until recently the Bugoma Forest Site (Treatment Group 1) was relatively ethnically homogeneous. The area is part of the Banyoro Kingdom and the majority of the rural population was from the Banyoro

⁷ Wood loss is roughly 1/3 of what a tropical forest is expected to produce in a year (Gombya-Ssembajjwe, Buyinza, and Kakuru 2007).

ethnic group. Over the past 10 years there has been an influx of Bakiga and Bafumbira migrants from Kabale and Kisoro Districts in south western Uganda where the population density is high and agricultural land is scarce. Many in-migrants have been allocated forested plots by local leaders and have cleared them for agricultural production, creating tension between the Banyoro and the in-migrant Bakiga/Bafumbira. The average number of ethnic groups in the study villages in the Bugoma Forest Site is four. Forest user groups are not common in the Bugoma Forest Site, only one FUG was found among the six study villages.

The Budongo Forest Site (Treatment Group 2) is one of the most ethnically diverse areas in Uganda due to a large influx of migrants from northern Uganda, southwestern Uganda, and Democratic Republic of Congo. The dominant ethnic group in the area is the Banyoro. The average number of ethnic groups in study villages in the Budongo site is 10. Ethnic tension is generally not a problem in this study site. In the Budongo Forest Site forest user groups are common; six forest user groups were observed among the study villages. Three of those groups are in the village nearest to the Murchison Falls Protected Area entrance; they produce baskets for tourists and run a small cultural tourism site. There is one dominant ethnic group in the Rwenzori Forest Site – the Bakonjo. In the control group forest user groups are very common. Sixteen FUGs were observed among the 6 villages included in the study.

Some forest user groups enter into agreements with forestry authorities. For example, in the Budongo Forest Site (Treatment Group 2), NFA is working with communities to establish the Budongo Good Neighborhood Conservation Association (BUNCA) in many of the villages adjacent to the Central Forest Reserve. NGOs focused on the sustainable use of forest resources within the Budongo Central Forest Reserve include Budongo Forest Community Development Organization (BUCODO), and EMPAFORM, a CARE sponsored project focused on empowering civil society for community forest management. Both BUCODO and EMPAFORM are relatively large and well funded non-governmental organizations that are working with communities to establish collaborative management agreements with the National Forestry Authority, to negotiate access rights to specific forest products from the Reserve, and to legally designate community forests outside of the Reserve.

In the Rwenzori Forest Site (Control Group), UWA has developed Community Protected Area Institutions (CPIs) to link communities to the protected area administration. They are generally comprised of the Secretaries for Production and Environment from each sub-county bordering the protected area (UWA 2004). The World Wildlife Fund (WWF), the Wildlife Conservation Society (WCS), CARE, and PRIMEWest (i.e. a large scale USAID funded project focused on biodiversity conservation) are among the major conservation focused organizations working directly with the both the Uganda Wildlife Authority and local communities in the control group site. In addition, several small scale NGOs are focused on activities in Rwenzori Mountains National Park. In the Bugoma Forest Site (Treatment Group 1) there is no provision for collaborative management agreements with the DFS. NGOs working in the area are not focused on forest governance or management.

4.3.3. Institutional Context and Rules-in-use

Rules-in-use refer to the norms that are respected by the actors participating in the action situation. Rule-in-use shape the incentives that actors face when they make decisions that influence the outcomes of policy reforms (Gibson et al. 2005; Andersson 2006). In the context of this analysis it is important to think about how rules-in-use affect the potential for poor and vulnerable households to obtain income from forest. Property rights which delimit the set of rules underlying forest resource use are central to this analysis.⁸

De facto rules and norms regarding the harvesting of forest products vary depending upon the type of product and the ownership of the forest. Many subsistence forest products are accessed freely and without permission from private forests. In general there are limited restrictions on harvesting fuel wood, wild foods, and medicines, meaning that the majority of households have secure access to these products. In areas where forests are highly fragmented or degraded it is more common for harvesters to seek permission before harvesting products. Forest products that have high value and are marketable have stricter withdrawal rights associated with them. Permission to harvest products such as sawn wood, charcoal, and poles is required by both the forest owner and

⁸ Property rights to withdraw forest products and their relationship to household level behavior are the subject of Chapter 5.

the District Forestry Officer. Rights to access forest products from central forest reserves and national parks are specified in national level legislation (i.e. The National Forestry and Tree Planting Act and Uganda Wildlife Act), and management plans specific to individual reserves and parks. A considerable amount of harvesting of subsistence products takes place within protected areas. Rules for harvesting of higher value products including sawn wood and bush meat are more strictly, though often selectively enforced.

The government wide movement towards decentralization catalyzed changes in land rights. Ungazetted forests previously classified as public lands are now classified as private land. Given the patterns of in-migration described above, demand for agricultural land is high. This has precipitated the clearing of forest to establish *de facto* property rights and has created an atmosphere of land grabbing in west central Uganda. Land rights are highly contested in the Bugoma Forest Site. There is a history of contested land rights as the original “mailo” land rights were established when the Baganda had control over a considerable portion of the Bunyoro Kingdom.⁹ At present there is a movement to return this land to the Banyoro Kingdom, which would over ride the rights of decedents of the original Baganda land lords. The transition away from the mailo system of land holding opens up new opportunities for exerting land rights.

4.4. Devolution and Incentives

In this section incentives are discussed in the context of motivations and information affecting the likelihood of implementing pro-poor reform mechanisms. The incentives for the dominant forest authority in each site, as well as the incentives for non-local and local resource users are discussed. The motivations and information for each actor are reviewed. Changes in forest income are discussed in the context of incentives and

⁹ Four tenure systems are common on private land: customary; *mailo*; leasehold; and freehold. Customary is the most common tenure system in Uganda. Customary tenure is a traditional land holding system that is governed by the customs, rules and regulations of the community. The second most common tenure system in Uganda is the mailo system. This system was established by the colonial government as a mechanism for giving tracts of land to the Baganda royal family. The tracks were measured in square miles. Landlords then had the option of dividing tracks of land into smaller parcels for rental to tenants. Mailo land traditionally had some restrictions on use. Tenants are generally permitted to bequeath land to their children, but restrictions on sub-letting plots of land vary. Leasehold and freehold are the least common tenure systems in Uganda. Freehold tenure means that the land owner holds a registered land title indefinitely. Leasehold systems involve the granting of land title, but usually for a specified period of time (Nkonya et al. 2004).

patterns of interaction between actors. When actors have competing incentives, or have incentives that undermine the actions of others, collective action leading to favourable reform outcomes unlikely (Gibson et al. 2005; Ostrom 2005).

4.4.1. District Forestry Service (Bugoma Forest Site, Treatment Group 1)

District governments have limited motivation to support forest sector activities including forestry extension, woodlot establishment, promoting sustainable forest management and the use of improved technologies etc. that would increase forest income for rural households. Even in forest rich districts such as Kibaale and Hoima sustainable forest management and community forest management activities have limited salience at the district level.¹⁰ In general forestry is viewed as revenue generating sector to fund local service provision in other sectors. District governments have political incentives to provide health, education and transportation infrastructure to local constituents; good performance in social service sectors is what is likely to get them re-elected. Under decentralization district government are short of revenues. The only case of reinvestment in the forestry sector identified by this study is the additional fees that timber harvesting license holders pay to support tree nursery development in their districts of operation.

In both Hoima and Kibaale Districts, the focus of the DFO's office is on revenue collection for sawn wood and charcoal production and transport. As stipulated in the National Forestry and Tree Planting Act (Government of Uganda 2004), sixty percent of revenues from forestry go to the national government, with the remainder remitted to district governments. There are three major sources of forest revenues for districts: the collection of taxes on transported forest products; collection of fees for timber harvesting licenses; and collection of fees for harvesting permits. Taxes are collected on sawn wood and charcoal transported outside of the District. The tax on sawn wood is 30 percent of the estimated value of the product. The tax on charcoal varies according to the size of vehicle it is transported in.¹¹ Chief Accounting Officers in both Hoima and Kibaale

¹⁰ Forestry is a relatively low priority sector in Uganda. Funding for forestry research in 2000 accounted for only 5% of the full time equivalent research staff of the National Agricultural Research Organization, whereas the relative share of total production was 10% for forestry (Beintema and Tizikara 2002).

¹¹ For example, the tax to transport a large lorry is 62,000 UgShs.

Districts were unable to provide estimates of the revenue collected from Forest Produce Movement Permits. District Forestry Officers keep poor records, and doing so might provide tangible evidence of rent seeking activities.

Timber harvesting permits are issued on an annual basis.¹² Annual fees for pit-saw logging and mobile sawmill licenses are 350,000 and 1,400,00 UgShs. respectively. Data on the number of permits issued on an annual basis and the estimated revenue from permits are summarized in Table 4.2. The cost of permits is standard throughout Uganda and has not increased since the forest sector reform was implemented. In both Hoima and Kibaale harvesting permit fees are paid to the District and remitted to the central government. Fees paid by small-scale producers or rural households to obtain permits for harvesting sawn wood and producing charcoal are a relatively small component of district revenues. Few forest owners seek district level permission to harvest forest products. Of the 180 households within the Bugoma Forest Site sample, only three out of the ten households that harvested sawn wood reported seeking a permit from the District. None of the 14 households that burned charcoal reported obtaining permission from the District.

Table 4.2: Issuance of Pit-saw Logging and Saw Milling Licenses, and Estimated District Revenues

	2004/2005	2005/2006	2006/2007	2007/2008
Hoima District				
Pitsaw Licences (number)	10	16	21	19
Sawmilling Licenses (number)	1	5	5	5
Total Annual Allowable Cut (m ³)	6000	13000	15500	14500
Estimated Revenue from Licenses (UgShs.)	4900000	12600000	14350000	13650000
Kibaale District				
Pitsawing Licences (number)	14	16	20	NA
Sawmilling Licenses (number)	1	3	0	NA
Total Annual Allowable Cut (m ³)	4959	11000	10000	NA
Estimated Revenue from Licenses (UgShs.)	5950000	9800000	7000000	NA

Data source: FID and Key informants.

¹² The annual allowable cut associated with a pitsaw logging license is 500 cubic meters; mobile sawmill license holders are authorized to harvest 1000 cubic meters per year.

In general there is confusion over forestry revenues and their transfer across levels of government. Chief Accounting Officers and District Forestry Officers interviewed for this study were unable to provide information on the value of taxes and fees collected and remitted to the central government. District governments are supposed to remit 25 percent to lower level sub-county governments. All three sub-county Chairmen interviewed in Kibaale District reported receiving revenues from the District, though not on a regular basis, and amounts lower than appropriate for the amount of forestry activity in their jurisdictions. In Hoima, the sub-county Chairman interviewed for this study reported never having received forestry related remittances from the district government. The focus of DFOs on revenue collection provides opportunities for officers to extract bribes that supplement their modest salaries (i.e. DFOs are paid roughly \$165 per month).

The holdover of staff from the Forest Department, low staffing levels, lack of transportation to reach rural households, and failure of the extension systems to address forestry issues, have resulted in institutional path dependence. The DFS has limited information and capacity to fulfil the objective of increasing forest income for rural households.

Districts employ District Forest Officers (DFO), forest rangers and forest guards.¹³ Though the DFS is a new organization, a high proportion of staff from the centralized Forest Department were carried over when the DFS was created in 2003. In the seven districts included in this study, six of the District Forestry Officers held regional postings with the Forestry Department. The holdover of FD staff has implications for implementing pro-poor reform objectives. Several Acting DFOs do not have the minimum level of training to be officially hired into the position, but for political reasons the Public Service Commission responsible for recruitment is acting very slowly, allowing them to remain in their positions.¹⁴ Most holdover foresters are trained in technical forest management. They lack training in community forestry,

¹³ The District Forest Officer (DFO) is the head of forestry for the District and falls within the District level Department of Natural Resources. Some districts also employ forest rangers and forest guards. Forest rangers generally take responsibility for forestry extension and issuing harvesting permits in a grouping of sub-counties. Forest guards are generally employed to oversee local forest reserves which fall under the mandate of the District. Guards are generally hired from the communities surrounding the forest. It is important to note that the majority of districts have vacancies in a large number of these positions as they do not have, or don't prioritize the funds to pay staff.

¹⁴ An undergraduate degree in forestry is required for all District Forestry Officers.

sustainable land management, forestry extension, biodiversity conservation and other aspects of forest management focused on improving livelihoods.

Re-districting has had a negative effect on forest management.¹⁵ The creation of new sub-national units is an important component of Uganda's government wide decentralization reform process, and is frequently used as political tool (Green 2008).¹⁶ With each new district, the infrastructure of environmental management has to be put in to place; every district should have a trained forester. Since 2000 there has been a dramatic increase in the number of districts in Uganda. Districts are routinely subdivided, largely to satisfy demands of the electorate who view having their own district as an important political and economic move. As new districts are created forestry is a low priority. Buliisa District which is included in this study was created in July 2006. One year after the District was created they were still without a DFO.

The District Forestry Service is expected to serve a large number of households and cover large areas of forest. DFOs and their staff have transportation, either personal cars, or motorcycles provided by the Districts. However, DFOs in both Hoima and Kibaale indicated that getting money from the District to pay for fuel for the vehicles was very difficult. As indicated in Table 4.3, in Hoima there is one DFS staff per 33,146 hectares of private forests. The ratio of households to DFS staff in Hoima is 22,604:1. DFS staff are even more constrained in Kibaale; there is one DFS staff person for every 47 713 hectares of forests. The ratio of households to DFS staff in Kibaale is 27,855:1.

Under the reform it was decided that the National Agricultural Advisory Services would be responsible for forestry extension to rural households. The District Forestry

¹⁵ Each new district created requires a new set of technical and administrative staff including: Chief Administrative Officer (CAO); Resident District Commissioner (RDC); deputy CAO; deputy RDC; District Auditor; Clerk; Community-based Services Manager; Education officer; Engineer; Extension coordinator; Finance Officer; Director of Health Services; Information Officer; Inspector of Schools; Land Officer; National Agricultural Advisory Services Officer; District Environmental Officer; District Forestry Officer; Personnel Officer and Planner etc. (Green 2008).

¹⁶ Uganda currently has more districts (or highest level sub-national units), and far fewer people per unit than any other African state. In 1991, immediately prior to the launch of the local government decentralization program there were 34 districts. Currently there are 79 verified districts with an average of 383 071 people/district. In comparison, neighbors Kenya, Tanzania, and Democratic Republic of Congo have 8, 26, and 11 highest level sub-national administrative units with per unit populations of 4 692 250, 1 555 923 and 5 694 182 respectively. Only Russia (83), the Philippines (82), and Turkey (81) have more highest level sub-national units (Green 2008).

Officer is supposed to act as a broker of extension (i.e. matching rural households with NAADs teams) rather than a provider of services (MWLE 2004c). Given the limitations of District Forestry Officers few households receive forestry extension. Thirty-five percent of households in the study reported having in person interactions with NAADS. Of those who had contact with NAADS, only 2 percent reported receiving extension on a forestry related topic.

Table 4.3: Area of Forest, Rural Population and Service Delivery Ratios, Bugoma Forest Site

	Hoima District	Kibaale District
District area (hectares)	593 300	424 600
Area under forest (hectares)	160 511	167 044
Area under private forest (hectares)	99 438	135 520
Number of rural households	67 815	83 566
Number of DFS Staff	3	3
Hectares of private forest per DFS staff	33 146	45 713
Households per DFS staff	22 604	27 855

Sources: Key informants; NFA (2005); Karibwije (2005); UBOS (2006).

4.4.2. National Forestry Authority (Budongo Forest Site, Treatment Group 2)

In order to understand the incentives of the National Forestry Authority to facilitate increased forest income for poor households it is useful to understand the motivations of two sub-groups within the NFA: Range and Sector Managers (i.e. mid-level managers); and officials working with communities at the forest-gate. Mid-level managers are motivated by the expectation of fiscal self sufficiency for the organization, which in turn ensures their job security. During the forest sector reform process it was mandated that within four years of inception (i.e. by 2008) the Authority was required to be fully self-sufficient.¹⁷ Attaining fiscal self sufficiency has directed their work toward business opportunities including activities such as: contracting for plantation establishment within CFRs; mapping and auctioning merchantable timber; focusing on revenue generating enforcement, such as the collection of forest produce transport taxes and the sale of

¹⁷During the reform process there was a debate as to whether NFA should be an authority or an agency. The idea of an “authority” was that it would be self-financing and not have to rely on the central government for budget support. Agency on the other hand would be able to raise and spend its own revenues, but would remain a civil service institution with financial support from the central government (MWLE 2004f).

confiscated timber; and the sale of seeds and seedlings. Serious focus on the business and enforcement aspects of forest management mean that little attention has been given to developing opportunities for the rural poor to engage in livelihood enhancing activities within reserves. The majority of opportunities for revenue generation within reserves (e.g, plantation establishment; buying standing trees at auction etc.) require considerable capital investment. Rural households living adjacent to reserves do not have the capital to engage in such activities.

Forest-gate officials are strongly influenced by changes in human resource management that occurred as part of the reform. NFA has a significant presence in Budongo Central Forest Reserve at the forest gate with six outposts around the perimeter of the Reserve. In the transition from the FD to NFA forest guards ceased to be central government employees and now work on a contract basis for NFA. Contracts are short term, most are two months in duration, guards receive lower pay than under the FD, and payment of salaries is irregular. Forest guards reported a significant decline in morale and overall job satisfaction since NFA took over Budongo Central Forest Reserve. Lack of job security and declines in pay have created incentives for forest guards to collude with illegal timber harvesters. Many illegal pit-saw loggers reported paying bribes to forest gate NFA officials as a cost of doing business.¹⁸ As with the DFS there is a significant overlap between forest guards that worked for the FD and those that currently hold contracts with NFA.

At the forest gate incentives of NFA staff interacting with communities are not directed towards activities that promote poverty reduction for rural households. Though significant stakeholder engagement and planning went into the development of guidelines for establishing collaborative forest management agreements (CFMAs) between the National Forestry Authority and villages adjacent to central forest reserves (MWLE 2003), the process is complex and bureaucratic, few NFA employees are trained in initiating and negotiating CFMAs, and there are no incentives for staff or contractors to devote time and effort to developing relationships between communities and the NFA.¹⁹

¹⁸ A survey of the sawn wood value chain was conducted concurrent with this research. The data have not been analyzed as yet.

¹⁹ Policy Statement No. 5 of the National Forest Policy provides for the development of collaborative partnerships with rural communities for the sustainable management of forests which should define the

The National Forestry Authority is a sophisticated forest management organization. Managers have access to a significant amount of data (e.g. GIS data, stock maps; biodiversity assessments etc.) that were generated during the forest sector review process. Budongo CFR has one Sector Manager that oversees activities throughout the Reserve. There are a significant number of NFA staff and contract patrols working from field stations situated around Budongo CFR. There are eight field stations each with a supervisor. In addition, there were 29 contracted patrol men working in the Reserve when this research was conducted. Sector managers and supervisors are provided with transportation, giving them good access to rural households living adjacent to the Reserve. The ratio of forest area to number of NFA staff is 2132 hectares per NFA staff.

4.4.3. Uganda Wildlife Authority (Rwenzori Forest Site, Control Group)

The motivations of Uganda Wildlife Authority staff are not easily discerned. UWA does not have a for-profit mandate. Rather the focus of their work is on forest and biodiversity protection within the National Park. UWA has two types of staff at field stations: enforcement rangers; and community conservation rangers. Because the ethnic group that lives in the area is linguistically unique in Uganda, most UWA staff working in the Park are from the same ethnic group (i.e. Bakonjo). To avoid creating opportunities for collusion between forest rangers and local people, forest rangers are regularly transferred to other field stations around the Park.

The Uganda Wildlife Authority has a highly sophisticated system for collecting information about illegal activities within the Park. They have been well supported by donors and non-governmental organizations, and are using a GPS monitoring system to track illegal activities spatially. This allows them to focus their enforcement activities more effectively. Rwenzori Mountains National Park is 100,000 hectares and at the time of this research had 72 field staff or a ratio of 1 ranger for every 1388 hectares of Park. This ratio is far better than that of the DFS, and slightly better than the ratio for NFA in

rights, roles and responsibilities of partners and the basis for equitable sharing of benefits (MWLE 2002). CFM is to focus specifically on the poorer and more marginal groups in society, who depend on forest resources for their livelihoods, generally do not have a voice, and are often driven by poverty into poor land management practices (MWLE 2001). According to NEMA (2004) CFM agreements have been developed between the NFA and community groups which involve 1 757 households supporting collaborative management of 6 498 hectares of forest.

the Budongo Forest Site, but the terrain in RMNP is only accessible by foot and is very steep.

UWA has the benefit of having several years of experience with learning how to negotiate collaborative management agreements with local community members. At the time of this research they had seven CMAs with parishes bordering the park. In addition to having a large number of staff dedicated to community conservation, they have a revenue sharing program that allows villages immediately adjacent to the Park to receive funds for community projects such as establishing health centres and schools. Twenty percent of gate fees collected are reinvested in community development activities. This provides community members with a tangible benefit in exchange for facilitating the conservation efforts of UWA.

4.4.4. Pit-saw Loggers, Sawn wood Traders, Wholesalers and Retailers

The primary motivation for pit-saw loggers is profit maximization. In Uganda the felling and sawing of boards is artisanal, usually done by a team of four laborers using cross-cut saws (i.e. pit-saw loggers). In the Bugoma Forest Site the majority of sawn wood is produced by migrant pit-saw loggers from south western Uganda (i.e. *fundis*) hired by large-scale timber dealers. *Fundis* generally work on three month contracts and are supervised by a manager temporarily located in the harvesting area. In the Budongo Forest Site the majority of sawn wood is produced by pit-saw loggers that live in villages adjacent to Budongo Central Forest Reserve.²⁰ Many of the local loggers are recent migrants to the area. Pit-saw logging is done by local people in the Rwenzori Forest Site also. Due to the capital requirements of engaging in logging (i.e. buying equipment and hiring staff) it's generally wealthier households that are involved in the business. Table 4.4 provides a summary of the percentage of local households in the sample engaged in sawn wood production. Both the Budongo and Rwenzori Forest Sites have a relatively high incidence of sawn wood production, particularly among relatively wealthy households.

²⁰ In recent years a significant proportion of the sawn wood produced in Budongo has been exported to Juba, Sudan. A construction boom in southern Sudan has increasing demand for low and medium value hardwoods. The commercial sawmills that used to operate in Budongo Central Forest Reserve are no longer operational.

Table 4.4: Households Harvesting Sawn Wood between August 2006 and July 2007, percent

Income Quartile	Bugoma Forest Site (Treatment Group 1) (n=151)	Budongo Forest Site (Treatment Group 2) (n=155)	Rwenzori Forest Site (Control) (n=155)
0-25	0.0	0.0	12.8
26-50	2.6	7.3	4.7
51-75	2.6	12.2	17.9
76-100	10.5	40.0	34.2
Average across all quartiles	3.9	13.9	16.1

Source: Author's primary data.

Timber traders, wholesalers and retailers are motivated by profit maximization, and by maintaining relationships that will ensure they can continue to trade in sawn wood either legally through the purchase of timber harvesting and transport permits, and/or illegally by maintaining relationships with forest officials. License holders producing above their annual allowable cut seek to cultivate relationships with DFOs and NFA officials that stamp and clear timber out of the District. Licenses issued typically go the same group of business people year after year. Both Hoima and Kibaale DFOs have considerable input into who obtains the annually allocated pit-saw logging licenses issued within each District.²¹ The Kibaale DFO indicated that a larger number of licenses have gone to local timber dealers in recent years.

An important part of maximizing profits is minimizing the fees, taxes and bribes that need to be paid to forest officials.²² District Forest Officers have an incentive to catch illegal harvesting in that it provides them with an opportunity to extract bribes. Sawn wood producers seek to avoid officials at all levels of the value chain so that they can minimize the cost of doing business. However, DFOs find themselves in a dilemma – they seek to extract bribes to support their personal needs, but are reluctant to extract bribes at a level that will make sawn wood production too costly thus cutting off a source of revenue for themselves.

²¹ Francis and James (2003) cite evidence of local governments taking advantage of having control over contracts and appointments as patronage and rent seeking opportunities.

²² Business leaders in Uganda reported commonly making supplemental payments (i.e. bribes) to civil servants for basic services such as export permits, business licenses, tax assessments and loan applications (Goldsmith 2003).

The sawn wood value chain in Uganda is vertically integrated, meaning that pit-saw loggers negotiate for the right to harvest trees with reliable information about sawn wood prices at the end point in the market. Land owners that are not engaged in sawn wood production have both limited information about the value of standing timber as well as an incentive to have large trees removed from their land if they are planning to clear forest for agricultural production. This means that rural households frequently allow loggers to harvest trees for free or for below market value.

Producers, timber traders, wholesalers and retailers involved in pit-saw logging have formed associations. In the Bugoma Forest Site there are two pit-saw associations: Hoima Pitsawyers Association Ltd.; and the Bunyoro Timber Dealers Association.²³ The current function of pit-saw associations is networking. For example, in Hoima District to apply for a timber harvesting licence you must be a member of either an association. In the Budongo Forest Site there is one pit-saw association: the Masindi Pitsawyers and Wood Users Association. People engaged in the pit-saw business share information with each other which helps them maximize their production and profits. Licensed holders are authorized to harvest the equivalent of one lorry load of timber per month (i.e. 12 lorries are roughly equivalent to 500 cubic meters of sawn wood). However, the Hoima DFO indicated that some license holders are harvesting as much as one lorry per day. Rough estimates based upon field observations in Kibaale District suggest that approximately 1000 lorries (i.e. 20 per week) were cleared for transit by the DFO in Kakumiro Town during the 2006/2007 fiscal year. The legally permitted number of lorries for the same time period was approximately 240. The Acting DFO estimates that he personally clears 10 lorries per week for a total of roughly 500 per year, more than twice the legally allocated number. The overharvesting of timber in the area is evidence of both profit maximizing behavior of people in the pit-saw business and the failure of authorities to regulate the production and transport of sawn wood.

²³ Pit-sawing associations were promoted by the Forest Department in the mid-1990s. They were viewed as a way to manage the production and sale of timber within timber rich districts. Rather than having to deal with hundreds of producers, the FD could deal with the elected leaders of associations (Muhereza 2003).

4.4.5. Rural Households

Rural households are motivated by welfare improvements. In the context of devolution reforms they seek ways to increase household income, secure property rights, increase land values; in general, like the rest of us, they want to enjoy a better standard of living. Rural households fall into two groups, those that own forests, and those that do not; the latter access forest products from forests owned by others, from community forests, or from protected areas including central forest reserves and national parks.

Forest owners seek to increase the value of land owned. Forest owners consider the value of forests both in terms of their ability to provide goods that support subsistence and cash income, as well as the potential benefits from forest related environmental services (Tacconi 2007). Where the value of agricultural land or other land uses exceeds the value of forested land there is no incentive to preserve forests (Geist and Lambin 2001). Land values based upon purchases and sales for each of the three Forest Sites are presented in Table 4.5. The data illustrate that the value of forested land is low relative to land under annual or perennial crops, meaning that land owners seeking to maximize the value of land have little incentive to leave land under forest.

Table 4.5: Average price of Land Purchases and Sales, 2001-2007

Primary Land Use	Average Price/Per Hectare UgShs. (number of observations)		
	Bugoma Forest Site (T1)	Budongo Forest Site (T2)	Rwenzori Forest Site (Control)
Forest	542 583	No observations	263 579
Cropland (annuals)	698 902	460 234	1 219 671
Cropland (perennials)	602 975	330 160	1 113 519
Fallow	529 882	369 560	771 518
Shrubs/bushes	541 082	320 889	482 034
Average	557 887 (n=110)	358 795 (n=38)	859 324 (n=74)

Source: Author's primary data.

Forest owners also seek to secure property rights. Clearing land for agriculture is the most effective way of establishing private property rights. The conversion of forest to agricultural land reduces opportunities for rural households to obtain forest income. The percentage of households within each income quartile that cleared land is summarized in Table 4.6. Forest clearing is most common in the Bugoma Forest Site where there are

large migrant populations and land rights are contested. Forest clearing is also common in the Rwenzori Forest Site. Land is constrained on the steep slopes of the Rwenzori Mountains.

Table 4.6: Households that Cleared Forest between August 2006 and July 2007, percent

Income quartile	Bugoma Forest Site (T1) (n=151)	Budongo Forest Site (T2) (n=155)	Rwenzori Forest Site (Control) (n=155)
0-25	17.9	12.2	33.3
26-50	41.0	2.4	7.7
51-75	20.5	2.5	46.2
76-100	50.0	25.0	36.8
Average across all quartiles	34.1	10.0	31.7

Source: Author's primary data.

Both forest owners and non-forest owners are motivated by the desire to maintain a supply of forest products that supports their safety net and current consumption needs. A wide variety of products are withdrawn from forests for subsistence use including: fuel wood, wild fruits and vegetables, poles and vines for building materials or handicrafts etc. Forest owners with sufficient land may chose to diversify their land holdings such that they maintain some forest, securing themselves a forest-based benefit stream over time. While there is an incentive to preserve area under forest, traditional forest products are frequently harvested from other land uses including fallows and bush land. This is a result of the high degree of fragmentation in the area. Rules-in-use for accessing forest products for subsistence use are very flexible. In general, products including fuel wood, medicines and wild foods are accessed freely and without permission from land owners or community leaders. Table 4.7 indicates the percentage of forest products that are

Table 4.7: Share of Forest Products Harvested from Forests (vs. other land use), percent

	Bugoma Forest Site (Treatment Group 1) (n=173)	Budongo Forest Site (Treatment Group 2) (n=174)	Rwenzori Forest Site (Control) (n=172)
Fuel wood	74.7	61.3	69.4
Poles	66.4	48.9	46.3
Medicines	25.1	9.9	41.1

Source: Author's primary data.

harvested from forests (i.e. vs. other land uses).

Forest owners and users are limited with respect to the information they have available to them for sustainable forest management. Under the reform forestry extension was delegated to the National Agricultural Advisory Services (NAADS). NAADS has not taken on forestry as a serious extension topic, in part because they operate on a demand driven fee for service basis. Smallholders have to choose to pay to receive forestry extension. Given that returns to tree planting and agroforestry initiatives accrue over the medium to long term, and that the price of planting materials (i.e. seeds and seedlings) is very high in Uganda there is very limited willingness to pay for forestry extension services. Further NAADS does not target the poorest households. The topic and mode of communication between households in the sample and NAADs are described in Table 4.8.

Table 4.8: Topic and Mode of Communication for Household Interactions with NAADS, percent^{1,2}

	In person (n=182)	Radio (n=247)	Print (n=15)
Afforestation	2.2	0.8	0.0
Marketing of agricultural products	5.5	10.5	46.7
Crop production	58.2	60.3	26.7
Livestock production	18.1	13.4	20.0
Soil fertility and conservation	3.9	2.8	0.0
Cooperative activities	2.8	10.1	6.7
Bee keeping	5.5	1.6	0.0
Other	3.8	0.5	0.0

1. 242 households reported having at least one interaction with NAADS.

2. Unit of observation is interaction.

Source: Author's primary data.

Afforestation is a very uncommon topic of interactions with NAADS.

DFS, NFA and UWA interact with rural households on forestry related topics including: deforestation/forest protection; forest product use; afforestation etc. Data on the percentage of households that had a least one in person or radio interaction with the relevant forestry authority are summarized in Table 4.9. As expected, in person contacts with NFA officials in the Budongo Forest Site and UWA officials in the Rwenzori Forest

Site are quite common. In the Bugoma Forest Site only eight percent of households indicated having an in person interaction with a member of the three person DFS staff.

Table 4.9: Interactions between Households and Forest Authorities, percent

Interactions with forest authorities	Bugoma Forest Site (Treatment Group 1)		Budongo Forest Site (Treatment Group 2)		Rwenzori Forest Site (Control)	
	In person	Radio	In person	Radio	In person	Radio
Household with DFS	8.0	80.2	8.8	51.9	15.0	32.2
Household with NFA	1.9	13.6	40.6	43.8	2.9	3.9
Household with UWA	1.2	6.7	10.6	24.4	51.6	32.2

Source: Author's primary data.

4.5. Incentives as Explanators of Forest Income Outcomes

The objective of the incentive analysis is to provide context and an institutional explanation for the changes in forest income observed in Chapter 3.

4.5.1. Bugoma Forest Site (Treatment Group 1)

The double difference mean statistics for annual household income from forests, and the share of annual household income from forests are presented in the final column of Table 4.10. As was discussed in Chapter 3, overall the reform has had a very limited effect on the role of forest income in rural income portfolios. When the analysis is decomposed by income quartile, the data illustrate that forest income has become less important to the poorest households and more important to the relatively wealthy households in the sample. Is there an institutional explanation for these findings?

Table 4.10: Double Difference Estimates of Reform Impacts for Bugoma Forest Site^{1,2}

Research Site	Bugoma Forest Site (Treatment 1)		Rwenzori Forest Site (Control Group)		Double Difference Statistic
Annual Household Forest Income (UgShs.)					
Income Quartile	2007	2003	2007	2003	
	n=166	n=85	n=163	n=85	
0-25	36 032	24 647	50 851	27 747	-11 719
26-50	65 189	37 748	74 925	60 352	12 868
51-75	74 974	62 257	105 597	112 548	19 668
76-100	122 166	181 585	204 909	307 799	43 471
Average, all quartiles	74 550	83 717	101 472	124 796	14 157
Share of Annual Household Income from Forests (percent)					
Income Quartile	2007	2003	2007	2003	
	n=166	n=85	n=163	n=85	
0-25	14.4	23.3	19.6	19.6	-8.9
26-50	15.4	16.6	17.2	27.2	8.8
51-75	12.4	13.4	17.1	24.4	6.3
76-100	10.2	15.1	17.1	31.4	9.4
Average, all quartiles	13.1	17.1	17.9	25.8	3.9

1. Pre-reform (2003) estimates calculated from data collected by the Wildlife Conservation Society in 2003.

2. During the follow-up study the average exchange rate was 1 USD=1817 UgShs.

The political and economic incentives of the DFS, actors engaged in pit-saw logging, and local forest owners and users are limiting the potential for reform expectations to be realized. Several factors are limiting the ability of the DFS to facilitate an increased role for forest income in the portfolios of rural households. First, the DFS is solidly focused on generating as much forestry revenue for district governments as possible. The bulk of revenues come from the taxing of sawn wood and charcoal as it leaves the district. Second, the DFS has very limited capacity to fulfill the mandate of helping rural households with forestry related activities. The activities of the DFS outside of the District headquarters and exit points where forest produce is taxed are severely constrained by lack of staff, transportation and mandate to undertake forestry extension.

Forest owners have few incentives to preserve forests. First, agricultural land is more valuable than forested land. Forest clearing limits the potential for increasing forest

income. Second, even though forest cover is rapidly declining in the Bugoma Forest Site and fragmentation is common, households continue to harvest forest products from other land uses including fallows, bush land etc. Part of the reason that forest income is declining for relatively poor households is that those households are harvesting fuel wood, medicines and other traditional forest products from other land uses.²⁴ Because wealthier households are more likely to own forested land they have been able to maintain or increase forest income. Finally, rural households in the Bugoma Site have very limited contact with forest officials. This means that their level of awareness of forest conservation and opportunities for generating forest income are limited.

The most significant opportunity for raising forest income in the Bugoma Forest Site is participation in the lucrative sawn wood market; the majority of local residents are excluded from this market. The business is built on long-standing social networks and the mode of doing business in the study area is to hire migrant labourers to produce sawn wood. Sub-county Chairmen, village leaders, and household respondents expressed frustration that pit-saw managers and loggers working for business people in Kampala seemed to move freely throughout the area harvesting at their discretion. Due to limited knowledge in the area of the value of sawn wood at its end market, and incentives to clear land for agriculture, local resource users associate little or no value with standing timber. It is common for land owners to invite timber harvesters to harvest large trees on their land, facilitating land clearing.

4.5.2. Budongo Forest Site (Treatment Group 2)

The double difference mean statistics for annual household income from forests, and the share of annual household income from forests are presented in the final column of Table 4.11. The contribution of forest income to rural livelihoods has changed significantly since the reform was implemented in 2003, particularly for households in the highest income quartile. Despite tremendous planning and donor investment in the National Forestry Authority, the poorest and most vulnerable households have not benefited from the reform.

²⁴In this analysis products harvested from outside of forests are categorized as other environmental income.

Table 4.11: Double Difference Estimates of Reform Impacts for Budongo Forest Site^{1,2}

Research Site	Budongo Forest Site (Treatment 2)		Rwenzori Forest Site (Control Group)		Double Difference Statistic
Annual Household Forest Income (UgShs.)					
Income Quartile	2007	2003	2007	2003	
	n=168	n=86	n=163	n=85	
0-25	21 852	24 313	50 851	27 747	-25 565
26-50	35 417	29 253	74 925	60 352	-8 409
51-75	60 396	25 086	105 597	112 548	42 261
76-100	231 988	105 113	204 909	307 799	229 765
Average, all quartiles	99 389	43 926	101 472	124 796	78 787
Share of Annual Household Income from Forests (percent)					
Income Quartile	2007	2003	2007	2003	
	n=168	n=86	n=163	n=85	
0-25	8.4	22.2	19.6	19.6	-13.8
26-50	8.5	12.5	17.2	27.2	6.0
51-75	10.2	5.9	17.1	24.4	11.6
76-100	18.9	9.5	17.1	31.4	23.7
Average, all quartiles	12.1	13.0	17.9	25.8	7.0

1. Pre-reform (2003) estimates calculated from data collected by the Wildlife Conservation Society in 2003.
2. During the follow-up study the average exchange rate was 1 USD=1817 UgShs.

The fiscal self-sufficiency mandate of NFA means that the focus of most of their activities is on catalyzing new business opportunities and managing logging within reserves. As a for-profit parastatal they are concerned with profit maximization. In recent years standing trees or felled logs have been auctioned to the highest bidder. Smallholders living adjacent to the Reserve are not in a position to compete in auctions with large scale timber traders from Masindi and Kampala. The lack of opportunity to obtain permission to legally harvest sawn wood means that local pit-saw loggers harvest sawn wood illegally, though frequently collude with NFA guards at the forest gate.

In Budongo CFR where un-sanctioned pit-saw logging is a major problem there is significant emphasis placed on monitoring and enforcement of illegal activity. However, there is more to the story of enforcement. There is a high degree of selectivity with respect to who is sanctioned, and the enforcement of rules regarding the harvesting of fuel wood, poles, wild foods and other products that support the current consumption and

safety-net requirements of households. The Sector Manager at the time of this research resigned from NFA in 2008 due to his frustration with trying to deal with corruption among supervisors and contracted patrol men that were colluding with pit-saw loggers.

It is common for excessive force to be used to deal with smallholders that illegally harvest products or encroach on the Central Forest Reserve. In Budongo CFR, the Uganda Police Defense Force (UPDF) has been engaged on several occasions to assist the NFA with enforcement; specifically with cracking down on illegal timber harvesting within the CFR.²⁵ Several households reported beatings, harassment, and arrests without due process. This has caused tension between the National Forestry Authority and local communities and appears to be exacerbating illegal forest product use rather than abating it. In the Budongo Forest Site 14 percent of households reported that at least one member of their household had been beaten by NFA staff. Of those only 29 percent were arrested. None reported being processed through the judicial system. Rather they were imprisoned for a few days and then let go.

Despite selective enforcement the sawn wood business in the Budongo Forest Site is booming. Both quantitative and qualitative data from a value chain analysis conducted concurrent to this study suggest that sawn wood producers in the Budongo area are paying large and regular bribes to National Forestry Authority officials in order to continue to conduct business. The absence of an effective mechanism for obtaining rights to harvest timber, and the significantly increased presence of forest officials in the Budongo Forest Site is a strong indication that local elites are colluding with forestry officials.

Local resource users face the same incentives as they do in the Bugoma Forest Site. Their objective is to clear land for agriculture, though a considerable number of respondents specialize in pit-saw logging as their primary source of income. Interestingly there were no observations for forested land sold or bought over the past five years in the Budongo Forest Site (see Table 4.5). One possible explanation for this is that households are encroaching on the Central Forest Reserve (this was observed in three of the villages immediately adjacent to the Reserve) when they require new land.

²⁵ NFA officials are not armed with weapons.

There are significant challenges for implementing effective collaborative forest management (CFM) agreements between NFA and communities adjacent to Budongo CFR. The transition from the FD to the NFA has not been smooth, and many communities have an adversarial relationship with the Authority. By agreeing to work with NFA to monitor and enforce regulations within the Reserve, many resource users would find themselves reporting on neighbors and having to curtail their own activities. In cases where unsanctioned pit-saw logging is undertaken by loggers brought in from southwestern Uganda by local politicians and business men, it is difficult to ask communities to police their actions. Communities are not empowered to stop migrant pit-saw loggers. Pit-saw logging undertaken by local people is motivated by personal profit. Logging is hard work and people do it because they see the income generation potential. Most CFM agreements involve benefit sharing at the community level. It is difficult to see how benefits at the community level would countervail the profits that illegal forest product harvesters obtain.

A major design flaw of Uganda's forest sector reform was the failure to empower the Forestry Inspection Division (FID) which is supposed to provide oversight to the activities of both the DFS and NFA. For the first several years of its existence (i.e. 2003-2007) the FID was unable to provide any sort of meaningful oversight or technical support to either organization. Though it functioned as an Inspectorate from 2003-2007 it was still subject to the recruitment process of the Ministry of Water, Lands and Environment.²⁶ It took two years for the director to be hired, and another two years before further staff were hired. At the time this research was conducted the FID had 7 staff members and a very limited budget it received from the Ministry of Water, Lands and Environment.

In the design of the reform the NFA ended up being a far more powerful organization than the FID. Due to the limited capacity of the FID the Timber Monitoring Inspection Unit was situated at NFA. This means that the NFA is policing itself when it comes to monitoring the flow and revenue collection associated with the sawn wood business. The salary and prestige associated with the head of FID is not on par with the

²⁶ Recruitment to the FID is via the Ministry for Public Service. Given that the FID falls within the Ministry for Water, Lands and Environment it is limited to hiring at on the relatively low civil service pay scale and according to hierarchical systems (MWLE 2004g).

head of NFA, making it difficult for the FID to work closely with and regulate NFA (MWLE 2004g). Further, from 2004-2006 the head of the National Forestry Authority was a Norwegian national who had strong ties with both the donor community, as well as President Museveni and his cohort.²⁷ Until recently the FID had been largely ignored by donors, non-governmental organizations and other potential sources of funding.

5. CONCLUSION

The central argument of the Chapter is that the processes of institutional change catalyzed by Uganda's forest sector reform have failed to address motivational and information problems for actors involved in the implementation of reform objectives. Uganda's National Forest Plan laid out an ambitious program with a heavy emphasis on improving rural livelihoods, particularly for the poor and most vulnerable, by promoting forestry related activities. The institutional analysis of context, actors, incentives and patterns of interaction points out the complexities of achieving poverty reduction outcomes when a heterogeneous group of actors with competing objectives and varying capabilities, constraints, and incentives are involved in the formulation and implementation of the reform process.

In the Bugoma Forest Site (Treatment Group 1) the revenue generation incentives of districts and individual district officials mean that the focus of all activities is on the collection of taxes and fees. Money is required to fund social services offered at the district level, and forestry officials seek to supplement their salaries. There are too many opportunities to rent seek. The capacity of the DFS to deliver forestry related services to rural households is extremely limited. At the same time, rural households are not demanding forestry services. The priority for most smallholders is land clearing for agricultural production. As forests in this area disappear or become more fragmented, smallholders are accessing traditional forest products from other land uses. Engaging in the lucrative sawn wood market in the study area is very difficult for local residents. Pit-saw logging requires skill, and capital to invest in equipment and hire labor.

In the Budongo Forest Site, higher level NFA officials are focused on raising revenue for the organization. Creating new forestry related income generation

²⁷ In December of 2006 Olav Bjella resigned his post as Executive Director of NFA over a disagreement with the government regarding giving away Central Forest Reserve land to a private company.

opportunities for poor households is not a priority. In the Budongo Forest Site a considerable number of local residents are engaged in unsanctioned pit-saw logging. They are able to conduct their business successfully due to a high level of collusion with forest-gate officers. At this same time there is an antagonistic relationship between some pit-saw loggers and NFA forest guards. Both collusion between forest officials and illegal loggers, and collusion enabling loggers to transport and sell sawn wood is taking place. Further analysis is required to understand the political and social capital endowments of those who are sanctioned vs. those who are able to collude with officials. Due to strained relations between communities and the NFA, and the profit maximizing interests of unsanctioned pit-saw loggers to continue doing business, there is limited scope for collaborative management agreements.

It appears that the changes in forest income observed in Chapter 3 are at least in part explained by the role of incentives in the decision making processes of actors. The findings point to the importance of understanding incentives and their underlying motives and information as reforms are implemented. While power asymmetries cannot be anticipated prior to the creation of new forest management organizations, reforms should be evaluated in the early stages of implementation for evidence of incentive problems that undermine the central objectives of the reform.

CHAPTER 5
REFORMING FOREST RIGHTS:
CLARITY, HARVESTING BEHAVIOR AND FOREST INCOME

1. INTRODUCTION

This Chapter examines how forest officials and forest users interpret *de jure* forest rights, and in turn how their interpretations affect the income of rural households. The creation or reinforcement of statutory rights by altering the legal framework specifying rules of use is an important component of many forest sector reforms (Agrawal and Ostrom 2001; Edmunds et al. 2003; Nguyen 2006).¹ Reforms that increase and/or secure benefit streams are expected benefit the poor by providing opportunities for diversified livelihood strategies contributing to poverty reduction and economic development (World Bank 2008).

How legislative or constitutional level changes in rights are understood and interpreted by actors involved in policy implementation, and by local resource users has implications for changes in forest-based income for rural households. An implicit assumption of reform motivated changes in legal rights is they are automatically reflected in operational level resource use (Thanh and Sikor 2006). However, changes in statutory rights are affected by the political economy setting in which devolution takes place. Consideration of the availability of information, local power relations, production systems and local institutions is important (Andersson 2006; Sikor and Nguyen 2007). Evaluating operational level implications of changes in constitutional rights is central to understanding the relative success of governance reforms (Agrawal and Ostrom 2001).

Extension and clarification of forest rights was one of the main reform mechanisms identified in Uganda's Forest Policy (MWLE 2001). Improving access to forest resources is identified in the National Forest Plan as a critical mechanism for raising the incomes of the poor through forest-based activities (MWLE 2002). The

¹The terms "rights" and "rules" are often used interchangeably in the natural resource management literature. Rights are the product of rules, where rights are actions that are authorized, and rules are the prescriptions that create authorizations (Schlager and Ostrom 1992). Rules are differentiated from norms in that rules are generally monitored and enforced; actors that break rules face both formal and informal sanctions (Ostrom 2005).

National Forestry and Tree Planting Act of 2003 (Government of Uganda 2004) laid out access rights as they pertain to forests on private and customary land, as well as access rights within central forest reserves. The 2003 legislation replaced the Forestry Act of 1964 which had dictated forest rights for 40 years.

This analysis utilizes both qualitative and quantitative multiple scale data on perceptions of *de jure* and *de facto* forest rights. Specifically the chapter addresses the following questions²:

- Are perceptions of *de jure* rights heterogeneous within and between scales?
- Do household level perceptions of *de jure* rights influence harvesting behavior?
- Does the interpretation of *de jure* rights influence household income from forest products?

The Chapter is organized as follows. Section 2 reviews the literature on forest access rights. In Section 3 the methods for data collection and analysis are presented. Results are presented in Section 4. Section 5 concludes. Reform motivated changes in *de jure* rights are presented in Appendix 5A.

2. LITERATURE REVIEW

Forest sector reforms with poverty reduction objectives utilize a variety of mechanisms for increasing the role of forests in rural livelihood portfolios. Changing the legal framework surrounding forest use by transferring, redistributing, and/or securing property rights to forest resources is a common mechanism for improving returns to assets (Ribot 2002; Ribot and Peluso 2003; Di Gregorio et al. 2008).³ The bundle of rights that resource users hold affects the incentives that individuals face, the types of actions they take, and the outcomes they achieve (Schlager and Ostrom 1992).⁴ Having a larger and

² Analysis related to a third question examining the determinants of household level clarity of perceptions of *de jure* withdrawal rights for wild foods, fuel wood and sawn wood rights was omitted from this Chapter as the results did not offer any clear insights regarding specific household level characteristics associated with clarity.

³ Property rights are the social institutions that define or delimit the range of privileges granted to individuals to specific assets (Libecap 1989; Pearse 1990).

⁴Operational rights are conditioned by operational level rules that effect day-to-day decisions made by participants in a given setting (Kiser and Ostrom 1982). The operational level of analysis is the level at which production and consumption decisions are made. Management, the right to regulate internal use patterns or withdrawal rights and transform the resource by making improvements; exclusion, the right to determine who will have an access right, and how it might be transferred; and alienation, the right to sell or

more diverse portfolio of rights as well as short and long run decision making authority over resources facilitates opportunities to utilize forest resources in a variety of different ways.

In the context of forests, conceptualizations of property rights extend far beyond the right to alienate private property. For both theoretical and empirical research a nuanced understanding of property rights that considers multiple rights dimensions for a given landscape unit or specific resource is proposed (Campbell et al. 2001). Over the past two decades property scholars have advanced several typologies suitable for conceptualizing property rights as they apply to both private and commonly held resources. Those with both theoretical and empirical application to forests include: Schlager and Ostrom (1992); Kundhlande and Luckert (1998); Leach, Mearns and Scoones (1999); Ribot and Peluso (2003); and Benda-Beckman, Benda-Beckman, and Wider (2006).

In order to isolate variables directly related to changes in forest income, this analysis draws on Schlager and Ostrom's (1992) parsimonious classification of property rights. In their classification five rights are specified: access; withdrawal; management; exclusion; and alienation. Access, the right to enter a defined physical space, and withdrawal, the right to obtain the products of a resource are operational level property rights; access is a precondition for withdrawal. Access and withdrawal have the clearest link to enhancing forest income opportunities for resource users in the short to medium term. Management, the right to regulate internal use patterns or withdrawal rights and transform the resource by making improvements; exclusion, the right to determine who will have an access right, and how it might be transferred; and alienation, the right to sell or lease management or exclusion rights complete the typology.⁵

In Schlager and Ostrom's (1992) discussion of property rights, rights specified by property laws and regulations are referred to as *de jure* or legal property rights. These

lease management or exclusion rights are collective choice rights (Schlager and Ostrom 1992). Collective choice rights are governed by collective choice rules which determine who is eligible to be a participant and the specific rules to be used in changing operational rules (Kiser and Ostrom 1982). A third level of rules, the constitutional level, determine collective choice activities (i.e. who is eligible to be a participant), and the rules to be used in crafting collective choice rules (Ostrom 2005).

⁵ Management, exclusion and alienation are collective choice rights. The rules that affect the structure of the operational situation are designed and agreed upon at the collective choice level.

rights are generally determined at the constitutional level, though are frequently formulated at the collective-choice level. Formal arrangements including constitutional provisions, statutes and judicial rulings are examples of *de jure* rights. Legal rules governing property rights are part of the institutional framework that conditions the appropriation of labor, goods and services.⁶

People can have access to resources in the absence of constitutionally sanctioned property rights. *De facto* property rights are formulated and observed at the operational level. They are often dictated by informal conventions and customs regarding the allocation and use of property and access to benefits. Both *de jure* and *de facto* rights are important analytical indicators of who holds power, and how powers are differentially distributed. Which property rights are chosen depends on how rights are chosen, as well as which rights are desired. Most property rights are chosen collectively, via a combination of formal and informal political institutions (Ensminger 1992).

In the forestry sector, property rights designate the rules of both land and product (for example, tree tenure) tenure systems (Bruce and Fortmann 1988; Schlager and Ostrom 1992; Kundhlande and Luckert 1998). However, holding a right does not necessarily ensure that resource users can access the benefit stream associated with that right (Kundhlande and Luckert 1998; Ribot and Peluso 2003). Property rights are a necessary, but not sufficient condition for the realization of benefits from resources. Heterogeneity in perception and observance of rights emerges from the rents associated with the resource, the transaction costs associated with observing the rights; and costs associated with failing to observe rights as they are stipulated (i.e. breaking rules underlying rights) (Pearse 1990; Kundhlande and Luckert 1998; Hegan, Hauer, and Luckert 2003)

Riker and Weimer (1993) cite clarity of allocation as one of four characteristics of property rights systems that are salient to economic behavior.⁷ Clear and precise allocation of private property rights to all productive commodities and assets is a necessary precondition for Pareto efficiency within perfectly competitive markets.

⁶ Other components of the framework include: organizational forms; enforcement; and norms of behavior (North 1990).

⁷ Other salient characteristics of property rights for ensuring economic efficiency are: cost of alienation; security from trespass; and credibility of persistence (Weimer 1997).

Economic systems allocate rights to commodities and assets using a combination of *de jure* and *de facto* rights (Kundhlande and Luckert 1998; Ostrom 2005). A challenge for governance reforms is that while *de jure* allocation of rights may be precise, it is seldom complete. *De facto* patterns of use complete the allocation of rights, and in some cases override *de jure* allocations (Weimer 1997). In general *de jure* rights allocations are more easily modified than *de facto* rights.

Several recent studies consider how changes in *de jure* forest rights translate to operational changes for resource users. The general finding is that changes in *de jure* rights are infrequently accompanied by analogous changes for resource users. Two studies from Vietnam explicitly address the question of how devolution motivated changes in formal rights affect households living adjacent to forests; both Nguyen (2006) and Thanh and Sikor (2006) found that forest sector devolution in Vietnam led to discrepancies between legal rights, actual rights and forest use. Reasons for discrepancies between *de jure* and *de facto* rights include: uncertainty and confusion due to multiple coexisting legal and normative systems can that determine access to resources (McCarthy 2004); implementation decisions regarding what, how and to whom the transfer of rights is made (Ribot 1995); and the failure to provide local users with significant control over collective and constitutional choices related to rule design, management and enforcement (Agrawal and Ostrom 2001).

The majority of empirical studies focusing on linkages between property rights and outcomes are focused on sustainable forest management outcomes. Comparing private and community forest management in Guatemala, Gibson, Lehoucq and Williams (2002) found that *de facto* institutions and their enforcement are much more important than *de jure* property rights. In a study of decentralization reforms in India and Nepal, Agrawal and Ostrom (2001) found that governance reforms that delegate rights of access and use of forests did not produce much change in forest management or the relationship between state and community actors. With respect to livelihood outcomes, Thanh and Sikor (2006) observed a high degree of negotiation over rights at the local level influenced by the economic value associated with specific rights. Poorer and less politically connected households had trouble negotiating access to higher value forest products.

3. METHODS

3.1. Research Methods

Asking people about knowledge of forest rights is challenging. Rights typically have overlapping dimensions and are often a sensitive issue due to land disputes and other resource related conflicts. In order to capitalize upon trust built between respondents and enumerators over the course of the study we waited until the third visit to each household to ask questions about perceptions of *de jure* access rights. Questions were framed in the context of how actors would explain the official set of rights and rules regarding accessing forests, specific forest products, and markets for forest products to new village members. To clarify, enumerators emphasized our interest in learning about legally permitted or official forest rights.

The third question this Chapter addresses requires data about operational level rights exercised by households. Asking people about both *de jure* and *de facto* rights at the same time would have been conceptually challenging for both enumerators and respondents, as well as posing significant challenges to respondents due to limited household level compliance with many *de jure* rights. Households were asked during our fourth and final visit whether they had accessed forests, harvested various forest products, or transported forest products during the past 12 months. These data were triangulated with data on actual harvesting behavior recorded in quarters one through four. In cases where the answer was positive, we followed with a series of questions about whether or not permission from the relevant authority was obtained, and what rules regarding the particular action the household was required to comply with.⁸ In addition to the specific household level questions about *de jure* and *de facto* access rights the analysis in this Chapter relies on household level data on income from forest products, socioeconomic status, household demographics, household access to information, and social and political capital. For the analysis of changes in *de jure* rights (see Appendix A for a discussion of

⁸ Examples of rules related to access of a forest; harvesting and marketing of specific forest products include: duration of permission; number of times permitted; season; who in the village holds the right; specific forest area access or withdrawal can take place in; limits on technology used; specification of subsistence harvest only; number of people permitted to access/withdraw; whether an escort is required; limits on species harvested; limit on age of tree harvested; and any other conditions as they apply to physical access of forested areas; specific forest products; or marketing forest products.

reform related changes in forest rights), and the current status of rights portfolios several legislative and policy documents were consulted.

3.2. Sampling

Data on *de jure* rights were collected across the following dimensions:

- At various levels of administration including: District Forestry Officers; forest managers working for the National Forestry Authority or the Uganda Wildlife Authority; forest officials working at the forest gate (i.e. directly with community members); village leaders; households in the selected study sites;
- Across forest tenure systems including private forest, Central Forest Reserves, and National Parks;⁹ and
- For a diverse portfolio of rights including: access; management; exclusion; alienation; land alteration; withdrawal (i.e. for several specific forest products); and transporting forest produce.

Details of the sampling strategy and sample size for each category of actors are summarized below (Table 5.1).

⁹ Data were also collected for *de jure* access rights to community forests. These data are not presented here.

Table 5.1: Sampling Strategy and Sample Size for Data Collection on *De jure* Forest Rights

Unit of Analysis	Sampling Strategy	Research Methods	Bugoma Forest Site (Treatment Group 1)	Budongo Forest Site (Treatment Group 2)	Rwenzori Forest Site (Control Group)	Total
District Forest Officers	Population	Key informant interviews and structured questionnaire	2	2	3	7
Forest Authority Managers	Population	Key informant interviews and structured questionnaire	NA	2	1	3
Forest gate officials	Population	Key informant interviews and structured questionnaire	NA	5	5	10
Village leaders	Population of villages selected through stratified random sampling procedure	Key informant interviews and structured questionnaire	6	6	6	18
Households	All households included in Jagger follow-up study	Structured household questionnaire	180	180	180	540

Data on *de facto* rights were collected at the household level using the same sample of households indicated in Table 5.1.

3.3. Analysis

Data on perceptions of *de jure* rights among public officials collected using key informant interviews and with semi-structured questionnaires were summarized using qualitative comparative analysis. Where possible responses have been synthesized and presented in tables following typologies of rights, forest tenures and categories of officials. Descriptive statistics of *de jure* household perceptions of rights summarizing quantitative findings from household socioeconomic surveys are presented following the typology of rights and forest tenures established earlier in the chapter.

Descriptive statistics are used to explore the relationship between household perceptions of *de jure* withdrawal rights, *de facto* harvesting actions, and household income for three products purposively selected to represent important livelihood contributions of forests: wild foods¹⁰, an example of a product commonly harvested to fulfill safety-net or gap-filling functions; fuel wood, an example of a product harvested by almost all households throughout the year to support current consumption; and sawn wood, an example of a high value marketed product that has the potential to lift households out of poverty. Household level awareness of *de jure* access rights, their *de facto* behavior and household income derived from harvesting each product is considered for the following forest tenures: private forest; Budongo Central Forest Reserve; and Rwenzori Mountains National Park. Dependent variables include: average annual household income from wild foods; fuel wood; and sawn wood derived from each of the three tenure categories. The effect of perceptions of *de jure* rights on forest income is modeled econometrically according to the following equation:

$$Y_i = \beta_0 + \beta_1 de\text{jure}\text{rights} + \beta_2 land + \beta_3 labor + \beta_4 capital + \beta_5 min\text{forest} + \varepsilon_i \quad (1)$$

¹⁰ A variety of wild foods are consumed throughout the study area. Households were asked about *de jure* withdrawal rights for the most important wild food in their village. The wild food that was most important to livelihoods (i.e. taking into account both subsistence and cash values associated with each food) was determined during village level focus groups. Most common wild foods harvested from forests included: wild yams (n=5); mushrooms (n=4); wild vegetables (n=4); wild fruits (n=2); honey (n=1); and bush meat (n=1). One village indicated that they did not rely on forests for the provision of food.

β_1 *de jure* rights is a nominal variable that indicates the household perception of the *de jure* right to the specific forest product (i.e. 0=Not permitted; 1=Harvest with permission; 2=Harvest with no permission). Where relevant a second *de jure* rights variable describing perceptions of rights to withdraw products from protected areas (i.e. Budongo CFR or Rwenzori NP) was included in the regression. Control variables include β_2 *land* is a vector of variables that indicate the endowment of land for each household. β_3 *labor* is a vector of variables that indicate the household's human capital and over all labor supply. β_4 *capital* is a vector of variables that indicate the household's available capital assets. β_5 *minforest* is number of minutes it takes to travel from the household to the nearest forest by the most common means of transportation. ε_i is the error term which accounts for effects that are not captured by other variables. Models with left censored dependent variables (e.g. annual household income from wild foods, fuel wood and sawn wood) are estimated using the Tobit regression model which account for the non-linear nature of data with a significant number of zeros (Long 1997).

4. RESULTS

4.1. Heterogeneity in Perceptions of De Jure Withdrawal Rights

Perceptions of *de jure* withdrawal rights are presented for actors involved in the devolution reform including: forest managers (i.e. DFOs for private forests, NFA Range and Sector Managers in Budongo Central Forest Reserve, and the Chief Warden in Rwenzori Mountains National Park); forest gate officials¹¹; village leaders; and rural households. Forest Authority managers supervise and provide leadership to field based or forest-gate staff. Forest Authority managers have limited direct contact with local resource users. Forest-gate officials are individuals that are in direct contact with local resource users and serve as liaisons between local resource users and the higher level managers working with either the National Forestry Authority or the Uganda Wildlife

¹¹ I use the term *forest-gate* in the spirit of the term farm-gate. Forest-gate officials are representatives of forestry organizations engaged in activities (i.e. extension, monitoring and enforcement, community liaison etc.) at the point of production.

Authority.¹² Village leaders have a significant role in forest management in western Uganda. They are the point of contact for forestry officials and often arbitrate forest use disputes. Awareness and interpretation of constitutional level rights affects their ability to fairly settle disputes and provide guidance on rights to new village members. Households were asked about perceptions of *de jure* rights regardless of their level of engagement in the forestry sector.

4.1.1. Heterogeneity in Perceptions of De Jure Withdrawal Rights for Private Forests

In the transition from ungazetted public forest to private ownership of forests two distinct bundles of withdrawal rights exist in the post reform period: rights for forest owners; and rights for forest users (Table 5.2). There is a high level of knowledge regarding the withdrawal of subsistence products by forest owners from private forests. District Forestry Officers, village leaders and forest owners are 100 percent clear about *de jure* withdrawal rights for fuel wood, poles, medicines, and wild foods. For charcoal and sawn wood, products that are commonly marketed, District Forestry Officers were generally aware of the requirement to obtain permission prior to harvesting from private forests. Only one DFO indicated that charcoal burning was not permitted. Because permission to harvest charcoal and sawn wood is granted at the District level; a high degree of awareness of the withdrawal rights is expected. Village leaders and household respondents that own forests were less clear about the requirement of obtaining permission before harvesting charcoal. Seventy-one percent of village leaders and only 38 percent of household respondents were aware that they are required to obtain a permit to burn charcoal. Those that were unaware generally felt that they could burn charcoal without permission from District authorities.

Village leaders and household respondents had a higher degree of clarity regarding harvesting sawn wood from owned private forests (82 and 66 percent respectively). District authorities require a letter from the LC1 Chairman (i.e. village

¹² District level forest gate officers are omitted from this analysis. Only three of the seven districts included in the study employ field staff (i.e. Kasese, Hoima and Kibaale Districts). Their primary function is timber and charcoal revenue collection at exit points from the district. They have very limited or no contact with smallholders living adjacent to forests.

leader) to accompany a request for a timber harvesting permit. Village leaders may be unaware of the requirement if they have never been asked to provide a letter for a community member. As with charcoal, the majority of respondents who were unclear about the requirement to obtain permission assumed they could harvest sawn wood without obtaining a permit.

There is a considerable degree of heterogeneity in knowledge of *de jure* withdrawal rights for subsistence products for forest users harvesting from forests they do not own. The official *de jure* withdrawal rights are that resource users should obtain permission from the forest owner prior to harvesting any product from the forest. For charcoal and sawn wood permission from district authorities is also required. The data suggest that there are three types of perceptions with respect to *de jure* withdrawal rights: perceptions for marketed products; perceptions for subsistence wood products; and perceptions for subsistence non-timber forest products. For marketed forest products including charcoal and sawn wood, there was a high degree of awareness of *de jure* withdrawal rights among DFOs, village leaders, and household respondents. The only exception was for household respondent's knowledge of *de jure* withdrawal rights for charcoal. Only 62 percent of households were aware of the requirement to obtain permission to burn charcoal on other's private forest.

The mirroring of the new forest legislation and *de facto* rights is reflected in knowledge of *de jure* withdrawal rights for subsistence wood products. Informal rules within many of the study villages dictate that you seek permission before harvesting fuel wood and poles from other's forests. In many of the study villages fuel wood and poles are increasingly scarce. While DFOs had limited knowledge of *de jure* withdrawal rights for poles and fuel wood, approximately half of village leader and half of household respondents were aware of the *de jure* withdrawal right, suggesting a high degree of overlap between *de facto* village rights and *de jure* withdrawal rights. A higher proportion of village leaders (61 percent), and household respondents (73 percent) indicated they should obtain permission prior to harvesting poles. DFOs were unaware of the requirement to obtain permission from forest owner before harvesting subsistence non-timber forest products. This demonstrates a lack of awareness of the new legislation, perhaps explained by the fact that 86 percent of present DFOs were district level Forest

Department representatives prior to the reform. Information sharing between the Kampala based FID and the DFS has been very limited. The findings also suggest that DFOs view non-timber forest products as open access resources. Village leaders (39 percent and 44 percent for medicines and wild foods respectively) and household respondents (30 percent and 33 percent for medicines and wild foods respectively) were moderately aware of the expectation to seek permission prior to harvesting non-timber forest products

Table 5.2: Perceptions of *De jure* Withdrawal Rights for Private Forest

Local Forest Owners				
Product	De Jure Status ¹	Awareness of De Jure Status, percent		
		DFO (n=7)	Village Leader (n=17) ²	Household (n=233)
Fuel wood	Yes	100.0	100.0	100.0
Poles	Yes	100.0	100.0	100.0
Medicines	Yes	100.0	100.0	100.0
Wild foods	Yes	100.0	100.0	100.0
Charcoal	WP	85.7	70.6	37.7
Timber/Sawn wood	WP	100.0	82.4	66.1
Local Forest Users				
Product	De Jure Status ¹	Awareness of De Jure Status, percent		
		DFO (n=7)	Village Leader (n=18)	Household (n=499)
Fuel wood	WP	18.6	50.0	54.7
Poles	WP	42.9	61.1	72.9
Medicines	WP	0.0	38.9	30.3
Wild foods	WP	0.0	44.4	33.4
Charcoal	WP	100.0	88.9	61.6
Timber/Sawn wood	WP	100.0	94.4	87.8

1. Yes=Permitted; WP=With Permission; No=Not permitted; NA=Not applicable. Permission may be granted by the land owner; the District Forestry Officer; the National Forestry Authority; or the Uganda Wildlife Authority depending upon the tenure and access right under consideration.
2. In the Budongo Forest Site one village had no households with privately owned forest.

4.1.2. Heterogeneity in Perceptions of De Jure Withdrawal Rights for Budongo CFR

Knowledge of *de jure* withdrawal rights in Budongo CFR are complicated by several factors. First, rights are specified in both the National Forestry and Tree Planting Act, and in the Budongo Forest Management Plan. According to the legislation, withdrawal rights stipulated in the Forest Management Plan take precedence over rights in the national

level legislation. However, because the Budongo Forest Management plan was developed in 1998 prior to the reform there is a lot of confusion about *de jure* withdrawal rights among officials and resource users. Second, the CFR is divided into several zones depending upon the production potential and biodiversity significance of the area. *De jure* withdrawal rights vary depending upon whether the area of forest accessed is in the production or protected area of the CFR. Finally, there is a very large and diverse migrant population in the area. In some cases there are significant linguistic barriers between forest officials and households, or village leaders and households that make the transmitting of information about rights a challenge.

Knowledge of *de jure* withdrawal rights for local forest users living adjacent to Budongo Central Forest Reserve is summarized in Table 5.3. Analysis of perceptions of *de jure* withdrawal rights indicates a relatively high degree of heterogeneity. In general, forest managers and forest gate officials had accurate perceptions of *de jure* access rights for subsistence products including fuel wood, poles, and grazing. However, there was a low level of awareness of *de jure* rights to harvest medicines and wild foods. Both forest managers interviewed indicated that the harvesting of medicines and wild foods from the production forest for subsistence use was permitted, but that there is a lack of clarity regarding these specific products in the forest management plan for Budongo. In general village leaders and households had more accurate perceptions of *de jure* rights than forest managers and forest gate officials regarding the harvesting of medicinal plants and wild foods, though the percentage of village leaders and households with accurate perceptions was still relatively low. Of household respondents that were unaware of the *de jure* withdrawal rights for medicines and wild foods roughly half thought harvesting required permission, and the remainder thought harvesting was permitted without obtaining permission.

Both village leaders and household respondents had a relatively low level of knowledge of *de jure* withdrawal rights for fuel wood, poles and grazing. In general village leaders and households had the perception that these withdrawal rights were more restrictive than forest management plans suggest. Some of the heterogeneity in response is attributed to whether the respondents reside in a village adjacent to a part of the forest that is set aside for production. Awareness of the ability of local forest users to obtain

permission to harvest timber from the forest was surprisingly low among both forest gate officials and household respondents. Prior to the reform it was relatively easy for local resource users to obtain casual timber harvesting licenses. However, under the new auction system implemented by NFA, local resource users lacking significant capital are excluded from obtaining permission.

Table 5.3: Perceptions of *De jure* Withdrawal Rights in Budongo CFR^{1,2}

Product	De Jure Status	Awareness of De Jure Status, percent			
		Forest Manager (n=2)	Forest Gate Officials (n=5)	Village Leaders (n=6)	Households (n=161)
Fuel wood	Yes	100.0	80.0	16.7	11.5
Poles	Yes	50.0	20.0	0.0	4.3
Medicines	No	0.0	0.0	16.7	32.3
Wild foods	No	0.0	0.0	20.0	32.6
Grazing	WP	100.0	80.0	33.3	16.8
Timber/Sawn wood	WP	100.0	60.0	83.3	55.3

1. Yes=Permitted; WP=With Permission; No=Not permitted; NA=Not applicable. Permission may be granted by the land owner; the District Forestry Officer; the National Forestry Authority; or the Uganda Wildlife Authority depending upon the tenure and access right under consideration.
2. Charcoal was omitted as it not commonly produced within the CFR.

4.1.3. Heterogeneity in Perceptions of De Jure Withdrawal Rights for Rwenzori Mountains National Park

The Rwenzori Forest Site serves as a control group in this analysis. *De jure* withdrawal rights were articulated when the National Park was established in 1994. Though there have been changes in withdrawal rights over time, generally favoring increased access to specific forest products, *de jure* withdrawal rights have been fairly consistent over the past several years. The Chief Warden for Rwenzori Mountains National Park was interviewed about access rights for households living in villages immediately adjacent to the National Park (Table 5.4).¹³ As per the General Management Plan, local resource users are not permitted to access the National Park, or to harvest any specific products unless there is a formal Memorandum of Understanding (MOU) between UWA and the

¹³ Most of the villages adjacent to RMNP have relatively short borders with the Park, but extend for some distance away from the Park. A large number of villages border the Park, but relatively few households that live immediately adjacent to the Park. Due to steep slopes and high altitudes it requires significant climbing to reach the Park boundary.

Parish level Community Protected Area Institution (CPI). The other provision for limited subsistence access and withdrawal rights is if the Parish is actively engaged in a pilot project to testing the efficacy of benefit sharing. The Chief Warden indicated that during the time of the study only two Parishes were participating in pilot projects, one of which is included in this study. The current pilot for resources sharing involves the collection of fuel wood, medicinal plants, honey, bamboo, and vines for subsistence use and only with permission of UWA officials working at the forest gate.

With respect to the withdrawal of subsistence products there was a general bias in responses towards more limited rights. Many forest gate officials were unaware of the potential for negotiated agreements between UWA and Parish CPIs. This may be due to the separation of duties of UWA officials. There are presently two types of rangers working in Rwenzori Mountains National Park, law enforcement and community conservation rangers. The ratio of law enforcement officers to community conservation officers is approximately 7 to 1.

There was a high degree of clarity on the lack of grazing rights in RMNP. This is not surprising given the strong focus of UWA on wildlife management.¹⁴ Village leaders were very clear about the absence of *de jure* grazing and timber harvesting rights. While village officials were relatively clear about the harvesting of medicines and bamboo with permission from UWA officials, there were much lower levels of knowledge about rights for subsistence products including vines and wild foods. A significant proportion of households felt that they had very limited rights. With the exception of the Parish with the pilot benefit sharing agreement, households generally felt that they had very limited or no rights to harvest resources from the Park. However, there was a high degree of knowledge about the lack of grazing and timber rights for local resource users. Stopping both grazing and timber harvesting has been a focus of UWA as both practices have a significant impact on forest condition and wildlife populations within the Park.

¹⁴ Grazing domesticated animals in protected areas is potentially harmful to indigenous wildlife populations.

Table 5.4: Perceptions of *De jure* Withdrawal Rights for Rwenzori Mountains National Park¹

Product	<i>De jure</i> right	Awareness of <i>De Jure</i> Status, percent			
		Forest Manager (n=1)	Forest Gate Officials (n=5)	Village Leaders (n=6)	Households
Fuel wood	WP	100.0	40.0	66.7	12.8
Poles	WP	100.0	40.0	16.7	5.2
Medicines	WP	100.0	60.0	66.7	41.5
Wild foods	WP	100.0	40.0	50.0	15.7
Bamboo	WP	100.0	60.0	83.3	50.9
Ropes/vines ²	WP	100.0	40.0	33.3	17.4
Grazing	No	100.0	100.0	100.0	99.4
Timber/Sawn wood	No	100.0	60.0	100.0	99.4

1. Yes=Permitted; WP=With Permission; No=Not permitted; NA=Not applicable. Permission may be granted by the land owner; the District Forestry Officer; the National Forestry Authority; or the Uganda Wildlife Authority depending upon the tenure and access right under consideration.

2. Ropes and vines are very important to the Bakonjo people. They use vines to produce traditional Kikonjo baskets.

Several findings emerge from the discussion of knowledge of *de jure* withdrawal rights across the four tenure regimes (i.e. private forest owned; private forest others'; CFR; and NP). First, there is a high degree of clarity regarding harvesting rights on owned private land. Second, knowledge of formal rights varies according to the type of products. For high value marketed products such as sawn wood there is a high degree of awareness across all of the tenure regimes. Respondents were less clear about *de jure* withdrawal rights for products used primarily for subsistence, perhaps due to an overlap in *de jure* and *de facto* rights making the two conceptually difficult to separate.¹⁵ A third point is that even in the control group site, there is a high degree of heterogeneity in knowledge of *de jure* withdrawal rights. This finding points to the challenge of transferring information on formal access rights to the level of forest users. Particularly important is the lack of accurate knowledge of *de jure* withdrawal rights among forest-gate officials, the main source of information on withdrawal rights for most resource users.

¹⁵ It would be interesting to look at the degree of enforcement of harvesting wild foods as the landscape transitions from forest to cropland (and points in between – i.e. fallow). Are harvesting rights for fuel wood, wild foods etc. stricter as land values increase? An idea for another paper.

4.2. Does Knowledge of De Jure Rights Influence Forest Product Harvesting Behavior?

The analysis in Section 4.1 demonstrates that there is a high degree of variation in household level understanding of withdrawal rights. But are *de facto* harvesting actions influenced by the households' perceptions of de jure rights? And is there any significant difference in the income derived from the harvesting of various products according to perceptions about *de jure* withdrawal rights? These questions are explored using data for three forest products that represent the safety-net (e.g. wild foods), current consumption (e.g. fuel wood) and pathway out of poverty (e.g. sawn wood) functions of forests.

Data demonstrating the influence of perceptions of *de jure* harvesting rights for wild food, fuel wood and sawn wood on actual harvesting behavior are presented in Tables 5.5, 5.6, and 5.7. The tables are structured as follows. *De jure* withdrawal rights appear in column two in bold italics. In column three the percent of household respondents holding the *de jure* perception of withdrawal rights for the specific category is indicated. Column four shows the percent of households holding the perception that harvested the product. Finally, column five shows the average annual household income derived from harvest of the product for those households that at least one time between August 2006 and July 2007.¹⁶

The percentage of households with accurate *de jure* perceptions regarding harvesting wild foods is relatively low for each of the three tenure categories, and there does not appear to be a strong relationship between clarity of *de jure* rights and actual harvesting behavior. In the case of private forests, the largest share of households perceived *de jure* withdrawal rights for wild foods characterized by harvesting without permission, whereas in the centrally managed Rwenzori Forest Site perceptions were skewed towards not being permitted to harvest wild foods. The average household income from the harvesting of wild foods from Budongo CFR and Rwenzori Mountains National Park was highest for households that perceived that harvesting wild foods was not permitted. This may be due to limited consequences of getting caught harvesting wild foods. Both NFA and UWA officials indicated that monitoring and enforcement efforts were focused on products such as sawn wood and bush meat rather than relatively

¹⁶ The average exchange rate during this period was 1 USD=1,817 UgShs.

minor non-timber forest products harvested for subsistence use. Also, both Budongo and Rwenzori forests are biodiversity rich and yield a variety of wild foods that may be hard to find outside of protected areas. Households may be willing to risk getting caught to obtain specific foods. Finally, households that perceive harvesting wild foods is not permitted in CFRs and National Parks harvest a larger volume of products; they try to make each trip into the protected area worthwhile.

Table 5.5: Relationship of Household Harvesting (*De facto* behavior) of Wild Foods to Perceptions of *De jure* Rights

	Household perception of <i>de jure</i> rights (legal right in italics)	% of households with <i>de jure</i> perception	De facto Action	
			% of households with <i>de jure</i> perception who harvested wild foods	Average hhd. income from harvest of wild foods (UgShs.) ¹
Private forest (all sites) (n=479)	Harvesting not permitted	2.5	58.3	11 336
	<i>Harvesting with permission</i>	33.4	60.0	30 213
	Harvesting permitted	64.1	68.1	27 904
Budongo Central Forest Reserve (n=135)	<i>Harvesting not permitted</i>	32.6	22.7	29 115
	Harvesting with permission	38.5	17.3	11 133
	Harvesting permitted	28.9	15.4	8 950
Rwenzori Mountains National Park (n=173)	Harvesting not permitted	84.3	15.9	15 731
	<i>Harvesting with permission</i>	15.7	29.6	6 394
	Harvesting permitted	0.0	NA	NA

1. Income estimates include: wild fruits; mushrooms; wild vegetables; roots and tubers including wild yams; spices; edible insects and honey. Estimate excludes bush meat which has a distinct set of withdrawal rights associated with it.

Data illustrating the relationship between household level perceptions of *de jure* withdrawal rights and household level harvesting behavior for fuel wood are presented in

Table 5.6. As with wild foods, there is relatively limited awareness of *de jure* withdrawal rights across all tenure categories, with awareness being the lowest for the Budongo CFR and RMNP. This finding points to the challenges of clarifying rights to resource users for tenure regimes other than privately held forest. In the Budongo Forest Site almost 30 percent of households that believe they are not permitted to harvest fuel wood from the CFR are doing so. The average value of the fuel wood harvested is lower than for households that believe the formal rule is to harvest with permission.

Twelve percent of households that perceive harvesting of fuel wood is not permitted in RMNP harvested fuel wood during the study period and obtained a larger average value of fuel wood than those that were aware of the requirement to obtain permission to harvest. This pattern was also observed for wild foods. Households that are aware of the requirement to obtain permission to harvest wild foods and fuel wood may be harvesting lower values of products precisely because they are obtaining permission to harvest. When forest rangers in RMNP grant permission to harvest products they stipulate the type (in the case of wild foods) and quantity of the product that can be harvested. Households that do not seek permission harvest a wider variety of products and larger quantities of products. In the Budongo Forest Site there is much less of a culture of requesting permission from forest officials.

Table 5.6: Relationship of Household Harvesting (*De facto* behavior) of Fuel wood to Perceptions of *De jure* Rights

	Perception of <i>de jure</i> rights (legal right in italics)	% of households with <i>de jure</i> perception	De facto Action	
			% of households with <i>de jure</i> perception who harvested fuel wood	Average hhd. income from harvest of fuel wood (UgShs.)
Private forest (all sites) (n=499)	Harvesting not permitted	1.8	66.7	109500
	<i>Harvesting with permission</i>	54.7	82.7	99717
	Harvesting permitted	43.4	98.1	101739
Budongo Central Forest Reserve (n=165)	Harvesting not permitted	44.2	28.8	45186
	Harvesting with permission	44.2	28.8	62997
	<i>Harvesting permitted</i>	11.5	36.8	16843
Rwenzori Mountains National Park (n=172)	Harvesting not permitted	87.2	12.0	49000
	<i>Harvesting with permission</i>	12.8	50.0	36000
	Harvesting permitted	0.0	NA	NA

There is a high level of awareness of *de jure* withdrawal rights for sawn wood across all tenure regimes (Table 5.7). For both private forest and Budongo Central Forest Reserve, households that are aware that sawn wood can be harvested with permission have significantly higher incomes from sawn wood than households that believe sawn wood harvesting is not permitted. Illegal harvesting of sawn wood is enforced more effectively than for products such as fuel wood and wild foods. People may be aware of illegal sawn wood production as a focal point for forestry officials and curtail their harvesting activities accordingly. While the official *de jure* rights specify that rural households living adjacent to Budongo CFR can obtain permission to harvest sawn wood, at the time of the study the NFA was not issuing official timber harvesting permits to local households. Data collected on bribes paid to NFA officials indicates that 10 households paid bribes to NFA forest officials to obtain permission to harvest sawn wood during the course of the year-long study. Of the 10 households with income from sawn

wood, eight of them had indicated that the *de jure* withdrawal right required seeking permission to harvest sawn wood.

Table 5.7: Relationship of Household Harvesting (*De facto* behavior) of Sawn wood to Perceptions of *De jure* Rights¹

	Perception of <i>de jure</i> rights (legal right in italics)	% of households with <i>de jure</i> perception	De facto Action	
			% of households with <i>de jure</i> perception who harvested sawn wood	Average hhd. income from harvest from sawn wood (UgShs.)
Private forest (all sites) (n=493)	Harvesting not permitted	3.0	6.7	15000
	<i>Harvesting with permission</i>	87.8	11.3	106011
	Harvesting permitted	9.1	6.7	112000
Budongo Central Forest Reserve (n=161)	Harvesting not permitted	44.7	11.1	77622
	<i>Harvesting with permission</i>	55.3	6.7	141000
	Harvesting permitted	n=0	NA	NA
Rwenzori Mountains National Park (N=172)	<i>Harvesting not permitted</i>	99.4	0.0	NA
	Harvesting with permission	0.6	0.0	NA
	Harvesting permitted	0.0	NA	NA

1. It is likely that income from sawn wood harvesting in Budongo Central Forest Reserve and in Rwenzori Mountains National Park is under-reported. Some income was reported as income from sawn wood production on private land; and other income was simply not reported.

4.3 Multivariate Analysis

Coefficients illustrating the effect of *de jure* perceptions on household income from wild foods, fuel wood and sawn wood are presented in Table 5.8¹⁷ The regressions control for households level characteristics. Overall it appears that perceptions of *de jure* rights do not have a significant effect on the income that households derive from various forest products. Two of the regressions have weakly significant results suggesting that perceiving you need permission to harvest wild foods from Budongo CFR, and fuel wood

¹⁷ Descriptive statistics for variables used in the regression analysis are presented in Appendix 5B.

from Rwenzori Mountains National Park has a negative effect on the income from those products. The more compelling story these regression results point to is the fact that perceptions of formal rights have a limited effect household level harvesting behavior and its associated income.

Table 5.8: Effect of *De Jure* Perceptions of Withdrawal Rights on Household Income from Forest Products

Household income from wild foods	Private forest		Protected area (CFR or NP)	
	De jure yes		De jure with permission	De jure yes
Bugoma Forest Site (Treatment Group 1)	5925		NA	NA
Budongo Forest Site (Treatment Group 2)	-3661		-17629*	-135
Rwenzori Forest Site (Control Group)	1531		13556	No obs
Household income from fuel wood	Private forest		Protected area (CFR or NP)	
	De jure with permission	De jure yes	De jure with permission	De jure yes
Bugoma Forest Site (Treatment Group 1)	-19772	-198	NA	NA
Budongo Forest Site (Treatment Group 2)	-37728	-3322	11605	15705
Rwenzori Forest Site (Control Group)	-74500	-68822	-40773*	No obs
Household income from sawn wood	Private forest		Protected area (CFR or NP)	
	De jure with permission	De jure yes	De jure with permission	De jure yes
Bugoma Forest Site (Treatment Group 1)	165 360	98231	NA	NA
Budongo Forest Site (Treatment Group 2)	-48 033	No obs	-97 341	No obs
Rwenzori Forest Site (Control Group) ²	NA	NA	NA	NA

1. All models were checked for multicollinearity using the variance inflation factor (vif) test. The variance inflation factor is 1.88.

2. There was not enough variation in perceptions of *de jure* rights for this regression to generate meaningful regression results.

*** Significant at the 1% level; ** significant at the 5% level; * significant at the 10% level.

5. CONCLUSION

This Chapter addresses the potential role for reform related changes in *de jure* forest rights to influence household level behavior. An analysis of awareness of *de jure* rights five years after Uganda's forest sector reform was implemented, suggests that there is a high degree of heterogeneity among stakeholders at multiple levels. Stakeholders generally have more accurate perceptions about *de jure* rights for high value forest products including sawn wood and charcoal. There are three potential reasons for this. First, there is a formal process associated with obtaining permission to harvest these products. Second, there are more serious penalties associated with failing to adhere to regulations. Third, the collection of revenues from marketed forest products is a major focus of forest officials. Put simply, people spend more time collecting information about things that matter more (i.e. higher value products). There is significant confusion among forest officials and village leaders regarding formal forest rights for lower value forest products. This is problematic as forest-gate officials and village leaders are frequently called upon to settle disputes about forest use.

Overlapping regulations present a major challenge for the assignment of formal rights in the Budongo Forest Site. Rights to undertake forestry related activities and harvest specific forest products are stipulated in both the National Forestry and Tree Planting Act and the Budongo Forest Management Plan. Though the NFTP stipulates that CFR forest management plans countervail the NFTP there is a high degree of confusion regarding what activities can be undertaken within various parts of the CFR. Surprisingly there is a high degree of heterogeneity among forest gate officials and village leaders in the Rwenzori Forest Site as well. *De jure* forest rights have been articulated for a much longer period of time (i.e. backed by the Uganda Wildlife Act of 1996) and the General Management Plan which guides activities in Rwenzori Mountains National Park does not contradict with Wildlife Act.

Heterogeneity in clarity of *de jure* forest rights at these higher levels of organization presents a major challenge for the successful implementation of aspects of devolution reforms focused on forest rights as a mechanism for improving rural livelihoods. Forest officials and village leaders are the primary source of information about forest rights for rural households. *A priori* I hypothesized that household level

awareness of *de jure* forest rights would be highly correlated with contact and information received from forest officials. If leaders and people in positions of authority are themselves unclear about formal forest rights, then there is little expectation that rural households will be aware of and observe *de jure* rights. The analysis demonstrates that there is a high degree of heterogeneity in knowledge of rights among households within the sample. These findings are consistent with Nguyen (2006) who found wide differentiation in forest benefits for rural households in Vietnam.

The second part of the analysis focuses on whether or not households act according to their perceptions of *de jure* withdrawal rights for wild foods, fuel wood and sawn wood and what the implications of their actions are for household income. An important observation is that clarity in *de jure* rights does not necessarily result in households receiving or taking advantage of the benefit the right confers. There are households that are aware of *de jure* forest rights who chose not to harvest forest products. What is more interesting are the examples of households who perceive the right to be absent (i.e. not permitted to harvest) yet continue to do so. The data illustrate that for lower value forest products for which degree of enforcement and penalties are likely to be lower are more commonly harvested even when households believe that they do not have the formal right. For higher value products such as sawn wood, households that chose to harvest when they perceive that they have not formal right to do so have lower average incomes from sawn wood harvesting. A similar trend was observed for fuel wood harvested from Budongo CFR by households that believe they do not have formal rights to harvest from the CFR.

APPENDIX 5A – REFORM MOTIVATED CHANGES IN FOREST RIGHTS

Prior to Uganda's forest sector reform forest rights on both ungazetted and gazetted public forest were specified by the 1964 Forest Act.¹⁸ The 2003 National Forestry and Tree Planting Act replaced the 1964 legislation. To illustrate substantive changes in rights, pre-reform *de jure* rights are compared with post-reform *de jure* rights. Rights are presented for the three forest tenure systems included in this study: private land; central forest reserves; and national parks.¹⁹ Because forest level management plans play an important role in articulating rights for local resource users the specific *de jure* rights for Budongo Central Forest Reserves and Rwenzori Mountain National Park are presented.²⁰

Rights are grouped into two categories: rights related to forests as a landscape level unit of analysis; rights related to specific forest products (Table 5A1).²¹ Rights related to forests at the landscape level include: access; management; exclusion; alienation; and alteration. Where relevant, management rights are disaggregated into two categories related to livelihood outcomes: planting trees; and designating boundaries. Rights of alienation are disaggregated by the right to sell forested land and the right to sell standing trees. The right to sell standing trees is a landscape level right as the seller of the tree does not harvest the product. Withdrawal or harvesting rights are generally tied to a specific forest product. Products are identified according to whether they are generally used by households for subsistence uses, or to generate cash income. The products included are the most commonly harvested in the study area. Rights to transport

¹⁸ In the pre-reform period gazetted forests were all lands declared central or local forest reserves or national parks.

¹⁹ Data for rights associated with community forest are not presented here. Roughly half of the villages in the sample had community forests, none of which were formally designated as such.

²⁰ Rights related to the use of forests and forest products in national parks are also presented. Though there were no changes in national park access rights associated with the forest sector reform, the case of national parks provides valuable insights into awareness and the behavioral implications of governance under a centralized authority with a relatively high level of information sharing, monitoring and enforcement capacity.

²¹ I propose two additions to the Schalger and Ostrom (1992) typology of collective-choice access rights: the right to permanently alter land use, and the right to transact. The right to permanently alter land use is independent of management as it involves a long-term change in the nature of the good. Holding this right indicates the ability to alter the value of a major asset. When land use change occurs, forest rights as they are defined in either *de jure* or *de facto* terms are no longer applicable. In most rural settings a new set of institutions apply according to the nature of the land in its alternative use.²¹ The right to transact is very important to the hypothesis that forest sector governance reforms have the potential to allow local resource users to use forests as a pathway out of poverty. Transacting in forest produce provides cash income which allows households to accumulate assets and diversify risk.

specific forest products are presented separately as they are not correlated with land or product tenure.

5A.1. Changes in *De Jure* Forest Rights on Private Land

Under the Forestry Act of 1964 ungazetted forests were considered public lands. The most significant change associated with the new forest legislation and the Land Act of 1997 is the designation of all ungazetted forest as private land. This designation is regardless of the land tenure system that the private forest falls under.²² Designation of private ownership has led to the clarification of several landscape level rights including the right to mark boundaries; exclude others from accessing or using the forest; and the ability to alter land use. In addition, it has introduced restriction on local resource users that do not own forested land. The shift from public to private ownership of forest has changed access rights regarding harvesting products for subsistence use, particularly for resource users that do not own forests. In the post-reform period The National Forestry and Tree Planting Act clarifies that forest users should seek the permission of forest owners prior to harvesting products. For marketed products including charcoal and timber this implies seeking two levels of permission: the first from the forest owner; and a second level from the District Forestry Officer. Substantively the changes mean higher financial and transaction costs for both forest owners and users.

²² There are four major land tenure systems in Uganda: customary; *mailo*; leasehold and freehold. In western Uganda customary and *mailo* are the most common systems of landholding.

Table 5A1: *De Jure* Forest Rights of Local Resource Users on Private Land, Pre and Post Reform^{1,2}

	Pre-reform	Post-reform	
	Public Land ³	Private Forest	
Landscape Level Rights		Local Forest Owners	Local Forest Users
Access, entering or transiting through	Yes	Yes	WP
Management, planting trees	Yes	Yes	NA
Management, marking or maintaining boundaries ⁴	Not specified	Yes	NA
Exclusion	No	Yes	NA
Alienation, sale of land	Not specified	Yes	NA
Alienation, sale of trees	Yes ⁵	Yes	NA
Alteration, change land use	Not specified	WP	WP
Withdrawal Rights			
Fuel wood (subsistence)	Yes	Yes	WP
Poles (subsistence)	Yes	Yes	WP
Medicines (subsistence)	Yes	Yes	WP
Wild foods (subsistence)	Yes	Yes	WP
Grazing (subsistence)	Yes	Yes	WP
Ropes/vines (subsistence)	Yes	Yes	WP
Charcoal (cash)	WP	WP	WP
Timber/Sawn wood (cash)	WP	WP	WP

1. Sources: The Forests Act of 1964 (Government of Uganda 1964); and The National Forestry and Tree Planting Act of 2003 (Government of Uganda 2004).
2. Yes=Permitted; WP=With Permission; No=Not permitted; NA=Not applicable. Permission may be granted by the land owner; the District Forestry Officer; the National Forestry Authority; or the Uganda Wildlife Authority depending upon the tenure and access right under consideration.
3. Public land was also referred to in the 1964 Forests Act as “open land”.
4. Boundary marking includes a number of activities including: planting trees to demarcate boundaries; clearing boundaries; establishing markers (for example, concrete pillars); or utilizing the land as a *taunga*. *Taunga* is a system of establishing crops in cleared protected area boundaries. In exchange for the right to cultivate in the area, *taunga* participants are expected to maintain and monitor the protected area boundary and to look after the trees that are planted to mark the boundary.
5. Only if land is held as leasehold or freehold.

5A.2. Changes in *De Jure* Forest Rights for Budongo Central Forest Reserve

The major change for Central Forest Reserves is the realization of the potential of collaborative management agreements for protecting the forests. New legislation has a strong emphasis on collaborative management agreements that allow for the

establishment of *taunga* systems along reserve boundaries, as well as the active participation of communities in monitoring and enforcing rules of forest use.²³

It is difficult to clearly articulate specific withdrawal rights for local resource users in Budongo CFR. Prior to the reform rights were stipulated in the 1964 Forestry Act. In the 2003 National Forestry and Tree Planting Act deference is given to the current forest management plan which in the case of Budongo CFR took effect in 1997. Several products important to subsistence users of forests are not explicitly mentioned in the forest management plan. In CFRs, subsistence collection of forest products, with the exception of grazing, was also permitted in the pre-reform period. It is unclear whether the omission of specific rights regarding what might be considered minor forest products such as medicines, wild foods and vines was intentional. Further, the National Forestry Authority has made decisions that have trumped existing forest management plans and the new legislation such as allowing grazing permits to be issued in grassland compartments of the production forest²⁴, and allowing charcoal burning of select species in select compartments of the forest when a collaborative forest management agreement exists (MWLE 2003). Budongo CFR is split into three management zones: strict nature reserve; a production forest; and an area between the nature reserve and the production forest that serves as a buffer. These distinctions are important to the assignment of *de jure* rights. For example, no forest products are permitted to be harvested from the strict nature reserve, while there are several products that local resource users can obtain permission to harvest from the production forest or the buffer zone (Table 5A2).

²³ There is passing reference to collaborative forest management in the Forest Management Plan for Budongo Forest Reserve, though no specification of how such agreements would be formulated or implemented.

²⁴ NFA has also issued charcoal burning licenses in several Central Forest Reserves. Budongo CFR is not among the reserves where licenses are currently being issued.

Table 5A2: *De Jure* Forest Rights of Local Resource Users for Budongo Central Forest Reserve, Pre and Post Reform^{1,2}

	Pre-reform	Post Reform
Landscape Level Rights		
Access, entering or transiting through	Yes	Yes
Management, marking or maintaining boundaries ⁴	Not specified	WP
Exclusion	Not specified	WP
Alienation, sale of land	No	No
Alienation, sale of trees	No	No
Alteration, change land use	No	No
Withdrawal Rights ³		
Fuel wood (subsistence)	Yes	Yes
Poles (subsistence)	Yes	Yes
Medicines (subsistence)	Yes	No
Wild foods (subsistence)	Yes	No
Grazing (subsistence)	No	WP ⁴
Ropes/vines (subsistence)	Yes	No
Charcoal (cash)	No	WP
Timber/Sawn wood (cash)	WP	WP

1. Sources: The Forests Act of 1964 (Government of Uganda 1964); The National Forestry and Tree Planting Act of 2003 (Government of Uganda 2004); The Management Plan for Budongo Central Forest Reserve 1997-2007 (Forest Department 1997); The Uganda Wildlife Act of 1996 (Government of Uganda 1996); and Rwenzori Mountains National Park General Management Plan 2004-2014 (Uganda Wildlife Authority 2004).
2. Yes=Permitted; WP=With Permission; No=Not permitted; NA=Not applicable. Permission may be granted by the land owner; the District Forestry Officer; the National Forestry Authority; or the Uganda Wildlife Authority depending upon the tenure and access right under consideration.
3. Sanctioned removal of forest produce is only from areas designated as production forest. Parts of the reserve set aside as they are of interest for scientific or biodiversity conservation purposes.
4. The new legislation includes a provision for the leasing of CFR lands for plantation establishment.
5. Grazing has been authorized in Budongo CFR by permit under National Forestry Authority management as a mechanism for revenue generation. This decision is in contradiction to the Forest Management Plan for Budongo Forest Reserve which specifies no grazing.

5A.3. *De Jure* Forest Rights for Rwenzori Mountains National Park

Regarding access, management and exclusion, local resource users have considerable rights as long as there is a Memorandum of Understanding (MOU) between the Parish level Community Protected Area Institution (CPI) and UWA that articulates rights for local resource users. The *taunga* system has been widely adopted in Rwenzori Mountains National Park. As with Central Forest Reserves, access rights to products are specified in the General Management Plan for Rwenzori Mountains National Park. With the exception of grazing, local resource users can obtain permission to harvest most

subsistence products as long as there is an existing MOU. However, resources must be harvested from within an Integrated Resource Use Zone (IRUZ) which encompasses an area adjacent to communities but not more than three kilometers from the boundary. Exceptions are made for products that cannot be found within the three kilometer IRUZ (Uganda Wildlife Authority 2004). In some cases UWA has been negotiating MOUs with Parish level officials for almost 10 years. The length of the negotiation process speaks to the difficulty of establishing clear collaborative management agreements that satisfy both the local resource users and UWA (Table 5A3).

Table 5A3: *De Jure* Forest Rights of Local Resource Users for Rwenzori Mountains National Park^{1,2}

	Status Quo
Landscape Level Rights	
Access, entering or transiting through	WP
Management, planting trees	No
Management, marking or maintaining boundaries	WP
Exclusion	WP
Alienation, sale of land	No
Alienation, sale of trees	No
Alteration, change land use	No
Withdrawal Rights	
Fuel wood (subsistence)	WP
Poles (subsistence)	WP
Medicines (subsistence)	WP
Wild foods (subsistence)	WP
Grazing (subsistence)	No
Bamboo	WP
Ropes/vines (subsistence)	WP
Charcoal (cash)	No
Timber/Sawn wood (cash)	No

1. Sources: The Uganda Wildlife Act of 1996 (Government of Uganda 1996); and Rwenzori Mountains National Park General Management Plan 2004-2014 (Uganda Wildlife Authority 2004).
2. Yes=Permitted; WP=With Permission; No=Not permitted; NA=Not applicable. Permission may be granted by the land owner; the District Forestry Officer; the National Forestry Authority; or the Uganda Wildlife Authority depending upon the tenure and access right under consideration.

5A.4. Changes in *De Jure* Rights to Transport Forest Produce

Transacting in forest produce generally requires the ability to transport and sell forest product.²⁵ Transportation of forest produce requires the acquisition of a Forest Produce Movement Permit (FPMP). The permit is issued by either the District Forestry Services or the National Forestry Authority depending upon the source of the forest produce (i.e. private land or Central Forest Reserve respectively). FPMPs were amended in conjunction with the National Forestry and Tree Planting Act in 2003. Forest produce explicitly listed on the FPMP include: logs; timber; charcoal; fuel wood; rattan cane, sand etc.²⁶ The value added tax for an FPMP is 30 percent of the estimated value of produce. High ranking FID and NFA officials were unclear regarding the full extent of forest products that require a FPMP. Some officials reported that any marketable forest product requires an FPMP to be transported; others reported that only the forest products explicitly listed on the FPMP require the FPMP. For the purposes of this analysis forest products are commonly marketed throughout western Uganda are discussed. The expectation is that District Forestry Officers submit copies of FPMPs to the National Forestry Authority so that they can track the volume and movement of timber throughout the country. FPMPs are valid for only one trip within two days of the date of issue, and specifies where the timber is coming from (e.g. typically district of origin) and going to (e.g. typically town or specific market) (Table 5A4).²⁷

²⁵ Permission to sell forest produce is generally tied to the physical market space where products are sold rather than to a specific product. For example, timber stall owners in Hoima town pay market dues to a market authority which organizes and maintains market structures. Typically sawn wood; poles; and charcoal are sold in defined market spaces. Data for *de jure* rights regarding the sale of forest produce are omitted from the below table. Sale of forest produce was not affected by the forest sector reform. Produce from National Parks are also omitted from the analysis. In the few cases where the harvesting of forest products is permitted, it is only for subsistence use. Thus the transport and sale of produce originating from a National Park is not relevant.

²⁶ This analysis is limited to forest produce that is commonly transported in the study region including: fuel wood; charcoal and sawn wood. Local resource users are seldom engaged in the transporting of rattan from Budongo Central Forest Reserve which is generally harvested by local resource users working as day laborers for large scale Kampala based producers.

²⁷ District Forestry Officers that were interviewed for this study reported that timber transporters and traders frequently modify the dates on FPMPs (for example, 1/12/2006 becomes 11/12/2006), so that they can be used multiple times for the transportation of either tax tree and/or illegally harvested forest produce.

Table 5A4: *De Jure* Transportation Rights of Withdrawal by Forest Product, Pre and Post Reform^{1,2}

	Pre-reform	Post-reform
Fuel wood	WP	WP
Charcoal	WP	WP
Sawn wood	WP	WP

1. Sources: The Forests Act of 1964 (Government of Uganda 1964); The National Forestry and Tree Planting Act of 2003 (Government of Uganda 2004); The Management Plan for Budongo Central Forest Reserve 1997-2007 (Forest Department 1997); The Uganda Wildlife Act of 1996 (Government of Uganda 1996); and Rwenzori Mountains National Park General Management Plan 2004-2014 (Uganda Wildlife Authority 2004).
2. Yes=Permitted; WP=With Permission; No=Not permitted; NA=Not applicable. Permission may be granted by the land owner; the District Forestry Officer; the National Forestry Authority; or the Uganda Wildlife Authority depending upon the tenure and access right under consideration.

APPENDIX 5B: DESCRIPTIVE STATISTICS USED IN REGRESSIONS

Table 5B.1: Bugoma Forest Site (Treatment Group 1), Descriptive Statistics for Variables Used in Regression Analysis^{1,2}

Variable	No. of obs.	Mean	Stand. dev.	Min	Max
Forest income from wild foods, UgShs.	174	21644.05	37876.73	0	286215
Forest income from fuel wood, UgShs.	174	86497.07	53635.83	0	468000
Forest income from sawn wood, UgShs.	174	1491.379	10405.43	0	120000
Perception <i>de jure</i> right wild foods private forest, yes (cf. with permission)	173	0.803468	0.398529	0	1
Perception <i>de jure</i> right fuel wood private forest, with permission (cf.no)	173	0.277457	0.449043	0	1
Perception <i>de jure</i> right fuel wood private forest, yes	173	0.722543	0.449043	0	1
Perception <i>de jure</i> right sawn wood private forest, with permission (cf.no)	172	0.947674	0.223333	0	1
Perception <i>de jure</i> right sawn wood private forest, yes	172	0.052326	0.223333	0	1
Natural forest owned, hectares	168	0.470989	0.775804	0	4.856228
Arable land owned, hectares	168	1.683842	1.182676	0	7.689027
Female headed households	168	0.166667	0.373792	0	1
Dependency ratio	168	145.2877	109.4549	0	600
Education level of household head (cf. None)					
Some or completed primary	168	0.541667	0.49975	0	1
Secondary or above	168	0.244048	0.430805	0	1
Household head has lived in village greater than 10 years	168	0.755952	0.430805	0	1
Value of assets, UgShs.	168	243022.9	469029	0	3264000
Value of livestock, UgShs.	168	323946.4	857065.6	0	5640000
Minutes to nearest forest	168	11.62024	13.70316	0	80

1. During the follow-up study the average exchange rate was 1 USD=1817 UgShs.

2. The dependence ratio is the number of household members under 15 years plus the number of household members over 65 years divided by the number of members between 15 and 65 years of age. The ratio is then multiplied by 100.

Table 5B.2: Budongo Forest Site (Treatment Group 2), Descriptive Statistics for Variables Used in Regression Analysis^{1,2}

Variable	No. of obs.	Mean	Stand. dev.	Min	Max
Forest income from wild foods, UgShs.	176	7655.523	22103.53	0	191100
Forest income from fuel wood, UgShs.	176	57479.91	59422.75	0	345750
Forest income from sawn wood, UgShs.	176	22994.16	76845.5	0	576000
Perception <i>de jure</i> right wild foods private forest, yes (cf. with permission)	137	0.649635	0.478835	0	1
Perception <i>de jure</i> right wild foods CFR, with permission (cf. no)	135	0.385185	0.488452	0	1
Perception <i>de jure</i> right wild foods CFR, yes	135	0.288889	0.454934	0	1
Perception <i>de jure</i> right fuel wood private forest, with permission (cf.no)	157	0.66879	0.472155	0	1
Perception <i>de jure</i> right fuel wood private forest, yes	157	0.292994	0.456592	0	1
Perception <i>de jure</i> right fuel wood CFR, with permission (cf. no)	165	0.442424	0.498186	0	1
Perception <i>de jure</i> right fuel wood CFR, yes	165	0.115152	0.320176	0	1
Perception <i>de jure</i> right sawn wood private forest, yes (cf. with permission)	157	0.089171	0.285904	0	1
Perception <i>de jure</i> right sawn wood CFR, yes (cf. with permission)	161	0.552795	0.498756	0	1
Natural forest owned, hectares	170	0.103671	0.353217	0	2.023428
Arable land owned, hectares	170	1.38093	1.389666	0	9.30777
Female headed households	170	0.188235	0.392055	0	1
Dependency ratio	170	132.2731	111.1805	0	600
Education level of household head (cf. None)					
Some or completed primary	170	0.447059	0.498658	0	1
Secondary or above	170	0.364706	0.48277	0	1
Household head has lived in village greater than 10 years	170	0.764706	0.425436	0	1
Value of assets, UgShs.	170	284140.9	808650.4	0	8970000
Value of livestock, UgShs.	170	384861.8	1238572	0	9130000
Minutes to nearest forest	170	35.48176	44.54148	0	

1. During the follow-up study the average exchange rate was 1 USD=1817 UgShs.

2. The dependence ratio is the number of household members under 15 years plus the number of household members over 65 years divided by the number of members between 15 and 65 years of age. The ratio is then multiplied by 100.

Table 5B.3: Rwenzori Forest Site (Control Group), Descriptive Statistics for Variables Used in Regression Analysis^{1,2}

Variable	No. of obs.	Mean	Stand. dev.	Min	Max
Forest income from wild foods, UgShs.	173	29600.38	52710.8	0	394500
Forest income from fuel wood, UgShs.	173	143701.9	99661.52	0	501600
Forest income from sawn wood, UgShs.	173	18156.07	59141.4	0	447000
Perception <i>de jure</i> right wild foods private forest, yes (cf. with permission)	159	0.503145	0.50157	0	1
Perception <i>de jure</i> right wild foods NP, with permission (cf. no)	172	0.156977	0.364841	0	1
Perception <i>de jure</i> right fuel wood private forest, with permission (cf.no)	171	0.707602	0.4562	0	1
Perception <i>de jure</i> right fuel wood private forest, yes	171	0.274854	0.447752	0	1
Perception <i>de jure</i> right fuel wood NP, with permission (cf. no)	172	0.127907	0.334961	0	1
Perception <i>de jure</i> right sawn wood private forest, with permission (cf.no)	166	0.777108	0.417445	0	1
Perception <i>de jure</i> right sawn wood private forest, yes	166	0.13253	0.340092	0	1
Perception <i>de jure</i> right sawn wood NP, yes (cf. with permission)	172	0.005814	0.076249	0	1
Natural forest owned, hectares	163	0.246858	0.479551	0	2.428114
Arable land owned, hectares	163	1.674306	1.357508	0	8.903084
Female headed households	163	0.116564	0.321889	0	1
Dependency ratio	163	149.5676	114.2704	0	700
Education level of household head (cf. None)					
Some or completed primary	163	0.509203	0.501456	0	1
Secondary or above	163	0.251534	0.435232	0	1
Household head has lived in village greater than 10 years	163	0.901841	0.298447	0	1
Value of assets, UgShs.	163	97882.82	128757.9	0	945000
Value of livestock, UgShs.	163	156969.3	216668.1	0	1550000
Minutes to nearest forest	163	58.04908	51.56514	0	240

1. During the follow-up study the average exchange rate was 1 USD=1817 UgShs.

2. The dependence ratio is the number of household members under 15 years plus the number of household members over 65 years divided by the number of members between 15 and 65 years of age. The ratio is then multiplied by 100.

CHAPTER 6

CONCLUSIONS

1. INTRODUCTION

The push to devolve the ownership and management of forests to local actors has become a common poverty reduction strategy promoted by donors, conservation organizations, and others in the development community. At the same time, since the Millennium Development Goals were formulated in 2000, forestry has been trying to find its place in poverty reduction discourse. The outcome of merging these two development discourses is the promotion of devolved forest management as a policy reform strategy for improving the welfare of the poor and most vulnerable. Uganda's forest sector devolution reform is fully in the spirit of both the devolution and poverty discourses. The reform has the stated objective of both raising forest based income, and securing the safety-net and current consumption contributions of forests for the poorest and most vulnerable.

Among the theorized outcomes of governance reforms that involve the devolution of natural resource management are: improvements in the efficiency of production and provision of public goods and services (Ostrom, Schroeder, and Wynne 1993); improved accountability of decision makers to the resource users that are most affected by changes in the extent and quality of the natural resource in question (Ribot 2003; WRI 2003); greater equity in procedural matters, the distribution of benefits and costs, and inter-jurisdictional fiscal condition and public goods provision (Ribot 2002); and improved short and long-term sustainability of natural resources (WRI 2003). Improvements in efficiency, accountability, equity and sustainability are in turn expected to contribute to poverty reduction. Relative to central government responsibility and control over the use of natural resources, these changes are predicted to empower local resource users (including the poor), improve services that benefit the poor, and increase the range of livelihood strategies available (Crook and Sverrisson 2001; Ribot 2003).

Two critical questions emerge from the expectation of devolution led poverty reduction in the forestry sector. This first is: what are the proximate causal mechanisms that lead to direct changes in the welfare of the rural poor? Many of the mechanisms of devolution reforms are focused on underlying factors that make rural households better

off, but do not directly affect income or other aspects of welfare outcomes that are measurable in the short run. These indirect factors have the potential to reduce the vulnerability of the poor, but only under optimal conditions and generally over an extended time horizon. In contrast, direct mechanisms that lead to increased incomes for the rural poor include: reducing financial and transaction costs of harvesting and marketing forest products; targeting forestry related goods and service provision to the poor; increasing the forest and forest product asset base; and securing a long-term benefit stream from forests through sustainable management. The second question is: what scope is there for forest-led poverty reduction? Policy makers need to be careful not to overstate the role of forests as a pathway out of poverty (Wunder 2001; Arnold 2002). Forests support current consumption and provide important safety-nets for the poor; securing these benefit streams is important to poverty reduction initiatives. A growing body of empirical literature suggests that forests generate substantive gains in cash income only when there are robust and accessible markets for high value forest products, and when producers have the financial and social capital to exploit opportunities (Vedeld et al. 2004; Angelsen and Wunder 2003).

Dietz, Ostrom and Stern (2003) caution us about the optimism surrounding devolution reforms. Supporting their reticence are several in depth reviews of devolved forest management in developing countries that tell us devolution is not taking place in the ideal form stated in the theory (Agrawal and Ribot 1999; Ribot 2002; Ribot, Agrawal, and Larson 2006; Larson 2005; Larson et al. 2007). The conditions required to support the objectives of devolution (i.e. enhanced efficiency, accountability, equity and sustainability) are very restrictive; even well functioning democracies have difficulty successfully implementing devolution reforms. Several scholars have identified important unanswered questions about governance reforms, including a lack of understanding of who in the local arena gains power as central authorities are devolved, how coordination and competition occurs among actors and groups of actors, and what strategic interactions take place between authorities and stakeholders (Larson 2005; Ribot 2002; Smoke 2003).

This study raises questions about both the theoretical and empirical basis for expectations of pro-poor forest sector devolution. The objective of this study is to test the

welfare improving effects of Uganda's forest sector devolution reform, and to explain observed outcomes using the lens of institutional analysis. The central argument of this study is that forest sector devolution is unlikely to lead to the use of forests as a pathway out of poverty for poor and vulnerable households. The empirical analysis is based upon extensive field research examining the impact of forest sector devolution strategies in forest dependent communities in western Uganda. The main finding is that devolving authority over forests is a complex process that requires the collective action of both authorities engaged in implementing reform objectives and land users themselves. The study demonstrates the complexity of crafting institutions that support favorable outcomes.

This dissertation explores the impact of the reform by analyzing: the direct effect of the reform on forest based income; how the reform has affected the incentives that motivate the actors involved in the implementing the reform; and how legislative changes in forest rights influence the forest product harvesting behavior of rural households. The analysis focuses on cases representative of the two devolution processes undertaken as part of Uganda's forest sector reform: democratic decentralization to local government (i.e. the Bugoma Forest Site); and devolution to a for-profit parastatal (the Budongo Forest Site). The research design for this study includes a control group, the Rwenzori Forest Site. The control group is an example of a centralized governance regime, and serves as an indicator of what might have happened in the absence of the reform.

2. SUMMARY OF MAIN FINDINGS

The study starts out by reviewing the literature linking devolution of public goods and service provision to poverty reduction. The review of the more general literature suggests two caveats to the assertion that there is a causal link between devolution and poverty reduction. The first is that the conditions required for the realization of many reform mechanisms are very restrictive and seldom hold in developing country settings. The second caveat is that there are few mechanisms that directly affect indicators of welfare improvement such as income. Many reform mechanisms are likely to affect household welfare, but in an indirect manner and only over an extended period of time.

The public goods nature of forests and the characteristics of the forestry sector add an additional level of complexity to the realization of increased income for constituents through the devolution of forestry related goods and service provision. Due to the high degree of regulation and the potential for rent seeking within the forestry sector, reducing the transaction costs of harvesting and marketing forest products is difficult in most settings. With respect to targeting goods and providing services to the poor, forestry has relatively low salience for many local governments responsible for providing the myriad of public goods and services demanded by constituents. Support for forestry extension, subsidized seedlings, small-enterprise development etc. is unlikely as devolved authorities have political incentives for prioritizing the health and education sectors. Redistributing control and decision making authority over forests and specific forest products is a major challenge for the forestry sector. Redistributions mean that if the poor gain, another group loses out. It is very difficult to convince actors to relinquish control over high value assets. Finally, devolution is expected to lead to more sustainable management of resources leading to a secure benefit stream over time. Several factors limit the potential for sustainable management under devolution including: limited technical capacity of devolved authorities; the incentive for devolved authorities to deplete resources to generate agency revenue; and confusion over rules, regulations, and overlapping claims to resources.

The questions addressed empirically in Chapters 3-5 are:

- Has forest income increased for the rural poor as a result of the reform?
- Have political and economic incentives created by the reform hindered the realization of increased forest income for rural households?
- Have changes in formal withdrawal rights for forest products influenced the harvesting behavior, and in turn importance of forest-based income to rural households?

Uganda's reform involved parallel devolution processes. The first process, involving a change in the oversight of private forests from the centralized Forest Department to the District Forestry Services, is an example of democratic decentralization to a lower level of government. The second process transferred the ownership and management of

Central Forest Reserves from the Forest Department to the for-profit parastatal National Forestry Authority.

2.1. Democratic Decentralization to Local Government (Bugoma Forest Site)

The expectation for democratic decentralization to local government to result in changes in forest income is motivated by the anticipation of institutional change leading to:

- Reduced financial and transaction costs of engaging in forest product harvesting and marketing activities;
- Effective forest extension service delivery;
- Distribution or redistribution of forest resources to local resource users; and
- Sustainable management of forests to secure benefit streams for local resource users.

The quantitative analysis which controls for differences in household endowments of land, labor and capital, and for village level fixed effects suggests that decentralization has had a limited effect on the contribution of forest income to rural income portfolios. Overall, the effect of the reform is relatively small; average annual household income from forests has increased by approximately \$5 USD. Decomposition by income quartile reveals that the lowest income quartile households have lost the equivalent of \$10 USD in forest income; whereas wealthy households have increased income from forests by an average of \$30 USD. The share of income derived from forests has increased 3.1 percent for the average household. Regression results decomposed by income quartile estimate the share of income from forests has declined for the lowest income quartile households (10.7 percent) and increased for the highest income quartile households (11.6 percent).

In order to better understand observed changes (or lack thereof) in forest income, the incentive structures underlying the actions of the District Forestry Service, migrant pit-saw loggers, and local resource users are explored. The hypothesis is that the reform has created a set of incentives for these actors that lead to a failure of collective action to improve the welfare of the rural poor.

The institutional analysis of incentives focused on the motivations, information, and power asymmetries for the Bugoma Forest Site. There are several reasons for the

District Forestry Service to devote very limited attention to increasing the forest income of rural households in the study area. First, there is too much pressure for districts to raise revenue by taxing high value forest products. Forestry is viewed as a revenue generating sector, though it has a low level of reinvestment. An effective mechanism for many districts for raising revenue is to tax timber and charcoal transported outside of the district. As a consequence, District Forestry Officers (DFOs) spend the majority of their time collecting revenues as products pass through marketing centers. Second, there is a high degree of overlap between staff that used to be district level representatives of the centralized Forest Department, and DFOs currently employed by districts. There is a problem of institutional path dependence within the organization. Many DFOs are operating on a business as usual model, even though the sector has been restructured. Third, forestry is a relatively low priority sector for most districts; the capacity of the DFOs office is constrained by low numbers of field staff, lack of transportation etc. Under the reform, forestry extension was delegated to the National Agricultural Advisory Services, so DFOs and their staff have limited motivation to reach out to households. The primary mode of communication between District Forestry Officers and rural households is periodic locally broadcast radio programs.

Rural households have limited interest in increasing incomes through forest-based opportunities; they do not demand forestry services from local governments and elected officials. A priority for most smallholders is forest clearing for agricultural production. Most respondents obtain the largest share of forest income from subsistence use of products including wild foods, fuel wood, poles etc. As forests in this area disappear or become more fragmented, smallholders are accessing traditional forest products from other land uses. Thus far the supply of subsistence products is not constrained. The greatest opportunity in the area for substantial increases in forest income is to engage in the lucrative sawn wood market. However, this is very difficult for local residents. Pit-saw logging requires skill, and capital to invest in equipment and hire labor. Production and trade is dominated by non-local business dealers with long standing political connections. In cases where land owners are selling trees to timber harvesters, the desire to clear land for agriculture often leads land owners to invite timber harvesters to harvest trees for no cost, or for a payment far below market value.

Reform led legislative changes that increase property rights to forest resources are hypothesized to be a central mechanism for increasing forest incomes. An analysis of DFO, village and household level perceptions of *de jure* or formal access rights reveals a surprising degree of heterogeneity in their understanding formal rights, particularly among forest officials and village leaders. Descriptive statistics are computed to explore whether there are systematic patterns that emerge between perceptions of formal withdrawal rights and household harvesting behavior. For the case of private forests there is a correlation between perceptions and household harvesting behavior when the belief is that harvesting is not permitted. Regression results examining the relationship between perceptions of rights and harvesting behavior were not significant for any of the products considered (i.e. wild foods, fuel wood and sawn wood) harvested from private land. The findings point to the complexity of motivating household level behavior by changing formal property rights.

2.2. Devolution to For-profit Parastatal (Budongo Forest Site)

The expectation for devolution to a for-profit parastatal to result in changes in forest income is motivated by the anticipation of institutional change leading to:

- Reduced financial and transaction costs of engaging in forest product harvesting;
- Support for collaborative management agreements that involve benefits to villages, households or both; and
- Distribution or redistribution of rights to harvest specific forest products to local resource users.

The quantitative analysis of changes in forest income presents a quite different picture of reform outcomes for the Budongo Forest Site. For the case of devolution to the for-profit parastatal National Forestry Authority, households in the highest income quartile have experienced very large gains in both absolute and relative forest income. In the Budongo Forest Site, the average increase in household forest income is \$53 USD. The differential effect of the reform on forest income for the poorest and wealthiest households is striking; households in the lowest income quartile have lost an average of \$15 USD per household, while households in the highest income quartile are estimated to have increased forest income by \$162 USD per year. The share of income from forests has

increased 6.4 percent for the average household. Regression results decomposed by income quartile indicate that the share of income from forests has declined for the poorest households (15 percent) and increased for the wealthiest households (25 percent).

In the Budongo Forest Site, higher level NFA officials are focused on raising revenue for the organization. Creating new forestry related income generation opportunities for poor households is not a priority. In the Budongo Forest Site a considerable number of local residents are engaged in unsanctioned pit-saw logging. They are able to conduct their business successfully due to a high level of collusion with forest-gate officers. At the same time there is an antagonistic relationship between some pit-saw loggers and NFA forest guards. Both collusion between forest officials and illegal loggers, and collusion enabling loggers to transport and sell sawn wood is taking place. Further analysis is required to understand the political social capital endowments of those who are sanctioned vs. those who are able to collude with officials. Due to strained relations between communities and the NFA, and the profit maximizing interests of unsanctioned pit-saw loggers to continue doing business, there is limited scope for collaborative management agreements. Collaborative management agreements were expected to benefit the poorest and most vulnerable households. However, due to pressure for the National Forestry Authority to become fiscally self-sufficient, negotiating management agreements that secure or increase access to subsistence forest products is a low priority.

An analysis of NFA, village and household level perceptions of *de jure* or formal access rights reveals a surprising degree of heterogeneity in with respect to clarity of rights, particularly among all respondents. Apart from *de jure* withdrawal rights for sawn wood, there is a good deal of confusion about which product can be harvested from within the CFR. One of the major reasons for the confusion among forestry officials is the overlapping and contradictory statements in the National Forestry and Tree Planting (NFTP) Act and the Budongo Forest Management Plan which was formulated prior to the NFTP. The situation in Budongo CFR (and other CFRs around the country) is complicated by political statements by President Museveni such as “forests are for the people”, which lead people to believe that they are permitted to access CFRs without limitations.

Descriptive statistics are computed to explore whether there are systematic patterns that emerge between perceptions of formal withdrawal rights and household harvesting behavior. Household level behavior may be influenced by perceptions about rights. In the case of wild foods, households that believed harvesting was not permitted obtained significantly higher incomes from wild foods. The inverse relationship was observed for sawn wood. Households that believed sawn wood harvesting was not permitted obtained, but harvested regardless, obtained lower levels of income. The effect of knowledge of *de jure* rights may be correlated with the degree of enforcement of the specific product. Given that harvesting of wild foods is *de jure* permitted, there should be limited or no monitoring of those activities. Regression results examining the relationship between perceptions of rights and harvesting behavior showed a negative and significant relationship between income from wild foods and households that believe they have to obtain permission to harvest.

2.3. Lessons Learned from Centralized Management in the Rwenzori Forest Site

The Rwenzori Forest Site provides an example of trends in forest income in the absence of the forest sector reform. The descriptive analysis of changes in forest income between 2003 and 2007 shows that overall there was an eight percent decline in forest income for rural households living adjacent to the National Park. Forest income for the lowest income households stayed the same, where as forest income in the upper three income quartiles declined. Though it is difficult to draw conclusions from these basic descriptive statistics, UWA is at least ensuring that low income quartile households, which have the highest share of income from forests, maintain patterns of consumption of forest products.

Is there an institutional explanation for the findings on forest income? One factor that emerges as an important determinant of failed outcomes in the other two study sites is pressure for the DFS and NFA to raise revenue. UWA officials do not have a mandate to raise revenue, which perhaps allows them to focus on activities including promoting rural afforestation, negotiating collaborative management agreements with communities adjacent to the Park, and monitoring and enforcement. The emphasis of the UWA mandate on conservation makes collaborative management with communities an

imperative. UWA has successfully negotiated collaborative management agreements with communities adjacent to the Park, though some of the agreements took a long period of time (over 10 years) to negotiate.

There is a surprisingly high degree of heterogeneity regarding knowledge of *de jure* withdrawal rights in the Rwenzori Study Site. In general households adjacent to the Park perceive very limited rights (i.e. most perceive that they have no right to harvest vs. requiring permission to harvest specific products). Further, there appears to be no correlation between perceptions of forest rights and household income from various products. The findings further validate the assertion that it is very challenging and takes a long time for changes in formal rights to be acknowledged and internalized at the household level.

3. POLICY RECOMMENDATIONS

Two sets of recommendations emanate from this research. The first is a set of recommendations specific to the Ugandan case. The second set of recommendations is intended for policy makers, donors, development practitioners and other relevant parties engaged in the formulation and implementation of forest sector devolution strategies that have poverty reduction objectives.

3.1. Recommendations for Uganda

Uganda's forest sector reform is now in its sixth year post-implementation. If forests are to play a role in Uganda's poverty reduction strategy several issues should be addressed. The District Forestry Service faces significant challenges. They have significant responsibility with oversight of seventy percent of Uganda's forests. Uganda's forest cover continues to rapidly decline. Estimates based upon the most recent biomass study (2008) suggest that within 20 years forests outside of protected areas will be converted to other land uses. Improving the capacity of the DFS to provide forestry extension to rural households is an imperative. As forest cover declines, rural households will have increasingly limited opportunities to access forest products that support the safety-net and currently consumption functions of forests. Establishing an effective forestry extension service that operates either within or alongside the DFS is an imperative. Such a service

should be publically funded and offer substantial subsidies/incentives to forest owners to invest in forest management and woodlot establishment. If donors are promoting forest sector devolution as a poverty reduction mechanism they have to be ready to put significant funds behind service provision that will ensure forest conservation.

The most lucrative forestry activity is sawn wood production. Given the barriers to entry for poor households, and the social and political capital of long standing sawn wood networks, it seems unlikely that there is significant potential for rural households that are not already engaged in the sawn wood business to enter it. However, there is potential for households that own private forest to generate income from forests through the sale of standing trees to sawn wood producers. Market information would allow them to make informed transactions with producers. Uganda already has well established systems for the transmission of agricultural commodity prices via cellular phone networks. The inclusion of prices for common types (i.e. species and size) of sawn wood would allow individuals selling trees to obtain fair market value for them.

The volume of unsanctioned timber that is being harvested in Budongo Central Forest Reserve has implications for forest incomes and forest sustainability. Currently it is only relatively wealthy households and migrant loggers that engage in timber production. Creating a mechanism for poor households living adjacent to the CFR to engage in sanctioned sawn wood production has two potential benefits. First it would redistribute the revenues from sawn wood production across households living adjacent to the CFR. Second, it would allow for more controlled harvesting from the production areas of the CFR. The NFA currently manages the CFR for both production and conservation. Finding a way to include households that live adjacent to the CFR in legally sanctioned timber harvesting activities does not mean that larger scale producers should be excluded. If timber production is managed sustainably, the CFR has sufficient stock to support currently sanctioned harvesting as well as new opportunities for rural smallholders.

If a mechanism for sanctioning timber by rural households is implemented, Collaborative Management Agreements will be easier to negotiate and implement. There will be incentives for both the NFA and rural households to participate in CFMAs. NFA will want to work as closely as possible with community members to monitor timber

harvesting that has been sanctioned. Communities will find it in their best interest to work with NFA to secure withdrawal rights to a variety of forest products and to monitor the CFR for illegal activity that could undermine their income generating activities.

A final recommendation, which has been partially implemented at the time of writing, is to empower the Forestry Inspection Division so that it can provide checks and balances on both the NFA and DFS. Until 2008 the FID operated with a very small staff of seven Kampala based employees, and a very limited budget from the MWLE. Based upon input from key donors including Britain and Norway, the Forestry Inspection Division changed status in 2008 and is now called the Forest Sector Support Department. They have increased from a staff of 7 to a staff of 40 employees, and have a much larger operating budget. However, the shift from an inspectorate to a division is not trivial. The new FSSD is influenced by the potentially political motives of the Ministry of Water, Lands and Environment, whereas the former inspectorate was a semi-autonomous entity. The more general recommendations presented in the following section also apply to Uganda.

3.2. Policy Recommendations for the General Case

The findings from this study offer insights to policy makers, development practitioners, and national governments involved in the design of devolution reforms. A first lesson is the forestry officials' attention is divided by competing pressures to generate revenue and improve rural welfare. The public goods nature of forests, and the influence of their condition across multiple scales of users, implies there should be public financial support for the management of forests. Revenue generation responsibilities create opportunities for forestry officials to rent seek, which has negative implications for rural households, producers of marketed forest products and the sustainability of the resource.

A related point is the need to consider the revenue generation potential of the forest resource base. Uganda, like many other low income countries, has high rates of deforestation. Relying on forests to provide revenues sufficient to support organizations such as the DFS or NFA, while also expecting to secure sustainable benefit streams for rural households are competing objectives. For countries with significant forest resources this may be a more realistic objective, but for the majority of countries in sub-Saharan

Africa it is unlikely that the forest resource base is adequate to support the organizations charged with managing it.

Forest sector reforms should include an *ex ante* assessment of the political and economic incentives of actors involved in the *implementation* of reforms. Issues of motivation, information, and power asymmetries are central to observed reform outcomes. There is a potential challenge with respect to forest sector reforms that seek to improve welfare and improve ecological sustainability. The incentives for one outcome may not be compatible with the incentives to support other outcomes. For each collective action dilemma there is a set of underlying institutions that will either favor or hinder its success. Trying to mitigate incentive problems at the early stages of implementation is critical to reform success.

Policy makers should be cautious about the relevance of legislative level rights reforms. The findings from Chapter 5 should be of note to advocates of increasing forest rights for rural people. There is no argument that increasing statutory rights is imperative with respect to empowering local people. The challenge lies in making sure that information about constitutional level rights is transferred through multiple levels of governance. Even when formal rights are clearly understood by resource users, this research shows that they do not necessarily influence behavior. The complexity of the situation lies in both misinterpretation of formal rules, and in overlapping claims from customary or informal systems of rules that dictate behavior at the forest gate.

A potential critique of this research is that it covers a relatively short time span. Proponents of devolution reforms suggest that you need to wait at least 10 years to see the effects of reforms. I argue that the data collected from this type of study is extremely valuable, and that waiting for 10 or 15 years to see the effects of a reform is too long. Regular monitoring and evaluation is important because it provides key information on progress. Limited progress over a four year period with respect to increasing forest income, as is the case in the Bugoma Forest Site, is a salient finding. I concur with Larson et al. (2007) and Andersson and Gibson (2007), who point to the importance of monitoring the livelihood portfolios of those living in or near forests during policy implementation to ensure that the poorest households are not disproportionately disadvantaged. A second reason for early monitoring of reform outcomes is the

imperative of forest cover change in Uganda and other countries facing high rates of deforestation. The projection for forests outside of protected areas in Uganda is that they will completely disappear within 20 years. Waiting 10 years to evaluate the effects of a reform could have major implications for the future of forests.

The international forestry community has turned its attention to climate change mitigation projects known as “Reduced Emissions for Deforestation and Forest Degradation (REDD)”. The premise of REDD is that developing country governments and communities will receive payments for reducing and stopping deforestation. Piggybacking on the issue of reduced deforestation is the promise of benefits for rural households that comply with the expectations of REDD. There are lessons that emerge from this study which are relevant to this new phase of forestry projects. First, the success of projects depends on changing the incentives of smallholders who clear forests for agriculture, and loggers who engaged in unsustainable timber harvesting. An institutional analysis of incentives of the many actors involved in *implementing* projects and affected by projects such as the one presented is critical. Second, regular monitoring of project outcomes, even if the benefits are expected to take some time to realization, will provide important information on the progress of projects. Finally, the promise of forest sector devolution provides a cautionary tale about the emphasis on development panaceas. While REDD has tremendous potential to improve both forest conditions and livelihoods, there are numerous pitfalls that should be recognized to ensure the most successful implementation possible.

4. DIRECTIONS FOR FUTURE RESEARCH

The findings from this study suggest that in some settings there may be limited potential for forestry to serve as a pathway out of poverty. The focus of this analysis has been on forest income as an indicator of poverty reduction outcomes. However, poverty reduction is a broad concept that extends beyond increasing income for the poor. In most settings the real potential for forest sector devolution reforms to support poverty reduction may be in securing incomes from products that fulfill the safety-net and current consumption functions of forests. A study with a similar research design that takes the safety-net and/or current consumption functions of forests as the dependent variable may illuminate

greater potential for devolved forest management to foster outcomes that allow people to sustain important aspects of their livelihood portfolios without falling deeper into poverty.

Much of the story that emerges from this study is about the ability to participate in the market for high value forest products, in this case sawn wood. If this is where the greatest hope for forests to serve as a pathway out of poverty lies, research is needed about the structure of the sawn wood value chain, the political and social networks that support it, and the barriers to entering the value chain.

This study was conducted only four years after reform implementation. An obvious task for future research is to revisit the villages and households included in this study in another 4-5 years. This would provide a second post-reform data point to compare with the baseline data collected by WCS in 2003. This is not only interesting from a research perspective, but would also provide important information that can be used to monitor reform progress. Another possible extension for this research is to visit the Kasagala Central Forest Reserve. Kasagala CFR was part of the original WCS research design, but was omitted from this study due to logistical constraints. Both Kasagala and Budongo underwent the same devolution process (i.e. were managed by the Forest Department, now the NFA); a study of Kasagala would allow us to test how robust the findings for the Budongo Forest Site are.

This study is somewhat unique to the forest sector devolution literature. There is a dearth of studies that use household level data to understand reform outcomes. And even fewer that employ experimental designs to analyze outcomes. Finding another case with household level data and a comparable research design would allow for powerful comparisons. Similar reforms have been undertaken in Cameroon, Ghana, Kenya, Malawi, Mali, South Africa, and Senegal. Rwanda is about to undertake a forest sector reform modeled on Uganda's experience. The Rwanda case presents an opportunity to collect high quality baseline data on the contribution of forests to rural livelihoods prior to reform implementation.

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- . 2001. World Development Report 2000/2001: Attacking Poverty. Washington, DC: World Bank.
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- . 2008. *Poverty and the Environment: Understanding Linkages at the Household Level*. Washington, DC: World Bank.
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EDUCATION

- Ph.D. Public Policy, Indiana University, USA, 2009
Fields: Environmental Policy; Institutional Analysis; Modern Political Economy; Public Policy
Dissertation: *Can Forest Sector Devolution Improve Rural Livelihoods? An Analysis of Forest Income and Institutions in Western Uganda*
Committee: Elinor Ostrom (Chair); Lauren Morris-MacLean; Roger Parks; Arild Angelsen (External)
- M.Sc. Forest Economics, University of Alberta, Canada, 1998
Thesis: *An Economic Analysis of Afforestation in Rural Zimbabwe*
Readers: Marty Luckert (Supervisor); Vic Adamowicz; Jim Beck
- B.A. Economics, University of Alberta, Canada, 1994
-

ACADEMIC APPOINTMENTS

- 2010 Assistant Professor, Department of Public Policy, University of North Carolina at Chapel Hill, Chapel Hill, NC, USA
- 2009 Postdoctoral Research Fellow, Department of Agricultural Economics, Purdue University, West Lafayette, IN, USA
-

PUBLICATIONS

Refereed Journal Articles

- Reyes-Garcia, Victoria, Vincent Vadez, Jorge Aragón, Tomas Huanca, and Pamela Jagger. The Uneven Reach of Decentralization: A Case Study among Indigenous Peoples in the Bolivian Amazon. *International Political Science Review*. Forthcoming.
- Bartley, Tim, Krister Andersson, Pamela Jagger, and Frank van Laerhoven. 2008. The Contribution of Institutional Theories to Explaining Decentralization of Natural Resource Governance. *Society and Natural Resources* 21(2): 160-174.
- Jagger, Pamela, and Martin K. Luckert. 2008. Investments and Returns from Cooperative and Household Managed Woodlots in Zimbabwe: Implications for Rural Afforestation Policy. *Land Use Policy* 25(1): 139-152.
- Jagger, Pamela, John Pender, and Berhanu Gebremedhin. 2005. Trading-off Environmental Sustainability for Empowerment and Income: Woodlot Devolution in Northern Ethiopia. *World Development* 33(9): 1491-1510.

- Pender, John, Pamela Jagger, Ephraim Nkonya, and Dick Sserunkuuma. 2004. Development Pathways and Land Management in Uganda. *World Development* 32(5): 767-792.
- Pender, John, Ephraim Nkonya, Pamela Jagger, Dick Sserunkuuma, and Henry Ssali. 2004. Strategies to Increase Agricultural Productivity and Reduce Land Degradation: Evidence from Uganda. *Agricultural Economics* 31(2/3): 181-195.
- Jagger, Pamela, and John Pender. 2003. The Role of Trees for Sustainable Management of Less Favored Lands: The Case of Eucalyptus in Ethiopia. *Forest Policy and Economics* 3(1): 83-95.
- Jagger, Pamela, and John Pender. 2001. Markets, Marketing, and Production Issues for Aquaculture in East Africa: The Case of Uganda. *Naga - The ICLARM (International Center for Living Aquatic Resources Management) Quarterly* 24(1&2): 42-51.
- Grundy, Isla, Jane Turpie, Pamela Jagger, Ed Witkowski, I. Guambe, Daniel Semwayo, and A. Solomon. 2000. Implications of Co-Management for Benefits from Natural Resources for Rural Households in Northeastern Zimbabwe. *Ecological Economics* 33(3): 369-381.
- Alavalapati, Janaki, William White, Pamela Jagger, and Adam Wellstead. 1996. Effect of Land Use Restrictions on the Economy of Alberta: A Computable General Equilibrium Analysis. *Canadian Journal of Regional Science* 19(3): 349-365.

Other Refereed Publications

- Jagger, Pamela. Forest Sector Reform, Livelihoods and Sustainability in Western Uganda. In *Governing Africa's Forests in a Globalized World*, L. German, A. Karsenty and A.M. Tiani eds. London, UK: Earthscan Publications Ltd. and Center for International Forestry Research. *Forthcoming*.
- Jagger, Pamela, and John Pender. 2006. Influence of Programs and Organizations on the Adoption of Sustainable Land Management Technologies in Uganda. In *Strategies for Sustainable Land Management in the East African Highlands*, edited by J. Pender, S. Ehui and F. Place. Washington, DC: International Food Policy Research Institute and World Bank.
- Nkonya, Ephraim, John Pender, Pamela Jagger, Dick Sserunkuuma, C. Krammer Kaizzi, and Henry Ssali. 2004. *Strategies for Sustainable Land Management and Poverty Reduction in Uganda*. IFPRI Research Report No. 133. Washington, DC: International Food Policy Research Institute.
- Sedjo, Roger, Brent Sohngen, and Pamela Jagger. 2001. Carbon Sinks in the Post Kyoto World. In *Climate Change Economics and Policy*, edited by M. Toman. Washington, DC: Resources for the Future Press.
- Simpson, R. David, and Pamela Jagger. 2000. Biodiversity in the Market Economy. In *Encyclopedia of Biodiversity*, edited by S. Levin. London, UK: Academic Press.

Manuscripts under Review

Jagger, Pamela. Sustainable Natural Resource Use for Rural Income Generation in Western Uganda. Submitted to *In Pursuit of Prosperity in Rural Uganda – Opportunities and Constraints*, S. Benin and T. Benson eds. Washington, DC: International Food Policy Research Institute.

Manuscripts in Preparation

Andersson, Krister P., Jacqueline Bauer, Pamela Jagger, Marty Luckert, Ruth Meinzen-Dick, Esther Mwangi, and Elinor Ostrom. Unpacking Decentralization. For submission to *Ecology and Society*.

Arinaitwe, Arthur, and Pamela Jagger. Where do Environmental Incomes come from? Land Tenure and Rural Livelihoods in Western Uganda. For submission to *Forest Policy and Economics*.

Jagger, Pamela. Forest Incomes after Uganda's Forest Sector Reform: Are the Poor Gaining? For submission to *Journal of Development Economics*.

Jagger, Pamela, Marty Luckert, Abwoli Banana, and Joseph Bahati. What Should We Really be Asking? A Comparison of Methods for Understanding Rural Livelihoods. For submission to *Journal of Natural Resources Policy Research*.

Published Grey Literature

Jagger, Pamela. 2008. *Forest Incomes after Uganda's Forest Sector Reform: Are the Poor Gaining?* CAPRI (CGIAR System Wide Program on Collective Action and Property Rights) Working Paper Series No 92. Washington, DC: International Food Policy Research Institute.

Jagger, Pamela. 2004. *Artisans of Political Theory and Empirical Inquiry: 30 Years of Scholarship at the Workshop in Political Theory and Policy Analysis*. Bloomington, IN: Workshop in Political Theory and Policy Analysis.

Jagger, Pamela, and John Pender. 2003. *Impacts of Programs and Organizations on the Adoption of Sustainable Land Management Technologies in Uganda*. Environment and Production Technology Division Discussion Paper No. 101. Washington, DC: International Food Policy Research Institute.

Jagger, Pamela, John Pender, and Berhanu Gebremedhin. 2003. *Woodlot Devolution in Northern Ethiopia: Opportunities for Empowerment, Smallholder Income Diversification, and Sustainable Land Management*. Environment and Production Technology Division Discussion Paper No. 107. Washington, DC: International Food Policy Research Institute.

Babu, Suresh, Peter B. R. Hazell, Pamela Jagger, and Anna Knox. 2002. *Future Opportunities for Rural Africa*. Environment and Production Technology Division Workshop Summary Paper No. 11. Washington, DC: International Food Policy Research Institute.

Jagger, Pamela, and John Pender. 2001. *Policies for Improved Land Management in Uganda*. Environment and Production Technology Division Workshop Summary Paper No. 10. Washington, DC: International Food Policy Research Institute.

- Pender, John, Pamela Jagger, Ephraim Nkonya, and Dick Sserunkuuma. 2001. *Development Pathways and Land Management in Uganda: Causes and Implications*. Environment and Production Technology Division Discussion Paper No. 85. Washington, DC: International Food Policy Research Institute.
- Hazell, Peter B. R., Pamela Jagger, and Anna Knox. 2000. *Technology, Natural Resource Management and the Rural Poor*. IFAD Working Paper. Rome, Italy: International Fund for Agricultural Development.
- Jagger, Pamela, and John Pender. 2000. *The Role of Trees for Sustainable Management of Less Favored Lands: The Case of Eucalyptus in Ethiopia*. Environment and Production Technology Division Discussion Paper No. 65. Washington, DC: International Food Policy Research Institute.
- Jagger, Pamela, William White, and Roger Sedjo. 1999. *El Niño, Ice Storms and the Market for Residential Fuelwood in Eastern Canada and the Northeastern US*. RFF Discussion Paper No. 44. Washington, DC: Resources for the Future.
- Jagger, Pamela, Adam Wellstead, and William White. 1998. *An Expenditure Based Analysis of Community Dependence: A Case Study of the Foothills Model Forest*. CFS and Foothills Model Forest Socioeconomic Publications. Edmonton, AB: Canadian Forest Service.

AWARDS, FELLOWSHIPS, AND GRANTS

- | | |
|-----------|--|
| 2008 – 09 | Indiana University, College of Arts and Sciences, J. Stewart and Dagmar K. Riley Dissertation Year Fellowship (\$15,000 USD) |
| 2008 | Indiana University, Workshop in Political Theory and Policy Analysis, Dissertation Writing Fellowship (\$7,500 USD) |
| 2006 – 07 | Center for International Forestry Research (CIFOR), Poverty Environment Network (PEN) Grant (\$30,000 USD) |
| 2006 – 07 | Consultative Group for International Agricultural Research (CGIAR), System-wide Program on Collective Action and Property Rights (CAPRI), Ph.D. Field Research Fellowship (\$29,000 USD) |
| 2006 – 07 | National Science Foundation (NSF), Doctoral Dissertation Enhancement Award (\$12,000 USD) |
| 2006 – 07 | Social Science Research Council (SSRC), International Dissertation Field Research Fellowship (IDRF) (\$10,000 USD) |
| 2005 – 06 | United States Department of Education, Foreign Language and Area Studies (FLAS) Fellowship (Swahili) (\$14,500 USD) |
| 2004 – 07 | Social Science and Humanities Research Council of Canada (SSHRC), Doctoral Fellowship (\$65,000 CDN) |

2004	Indiana University, School of Public and Environmental Affairs (SPEA), Award for Excellence in Doctoral Research (\$500 USD)
2001	Consultative Group for International Agricultural Research (CGIAR) Secretariat, Neville Clarke Award for Outstanding Teamwork, for collaboration on the International Livestock Research Institute (ILRI) – International Food Policy Research Institute (IFPRI) Project, Policies for Sustainable Land Management in the Highlands of East Africa
1996 – 98	International Development Research Council of Canada (IDRC), Value of Trees Project Award (\$12,000 CDN)

RECENT ACTIVITIES AND PRESENTATIONS

Journal Reviewer

Africa Today

Agricultural Economics

Agriculture, Ecosystems and Environment

Ecological Economics

Environment and Development Economics

Journal of Policy Analysis and Management

International Journal of the Commons

World Development

Grant Reviewer

International Food Policy Research Institute (IFPRI) – 2020 Vision Network for East Africa

International Tropical Timber Organization (ITTO) – Pre-project Proposal Review for 33rd Session

Panel Chair

2008 *12th Biennial Conference of the International Association for the Study of the Commons*, Cheltenham, England

2006 *11th Biennial Conference of the International Association for the Study of Common Property*, Bali, Indonesia

2004 *Annual Meeting of the African Studies Association*, New Orleans, LA, USA

Panel Discussant

2007 *CAPRI-BMZ Workshop and Policy Conference on Collective Action and Property Rights*, Entebbe, Uganda

2006 *11th Biennial Conference of the International Association for the Study of Common Property*, Bali, Indonesia

Presentations

Renegotiated Property Rights and Livelihood Outcomes after Uganda's Forest Sector Reform

2008 *12th Biennial Conference of the International Association for the Study of the Commons*, Cheltenham, England

What Should We Really be Asking? A Comparison of Methods for Understanding Rural Livelihoods

- 2008 *12th Biennial Conference of the International Association for the Study of the Commons*, Cheltenham, England
- 2008 Center for International Forestry Research, *Poverty Environment Network Workshop*, Barcelona, Spain

Forest Sector Reform and Rural Livelihood Outcomes in Western Uganda

- 2009 Michigan State University, East Lansing, Michigan, USA
- 2008 University of North Carolina, Chapel Hill, North Carolina, USA
- 2008 Queen's University, Kingston, Ontario, Canada
- 2008 *12th Biennial Conference of the International Association for the Study of the Commons*, Cheltenham, England
- 2008 Faculty of Forestry and Nature Conservation, Makerere University, Kampala, Uganda
- 2008 Center for International Forestry Research, Bogor, Indonesia

Livelihoods and Sustainability after Uganda's Forest Sector Reform

- 2008 *Colloquium, Workshop in Political Theory and Policy Analysis*, Bloomington, IN, USA
- 2008 *Workshop on Forest Governance and Decentralization in Africa*, Durban, South Africa
- 2008 Rights and Resources Group, Washington, DC, USA
- 2008 Department of Agricultural Economics, Purdue University, West Lafayette, IN, USA

Negotiating Rights after Uganda's Forest Sector Governance Reform

- 2006 *11th Biennial Conference of the International Association for the Study of Common Property*, Bali, Indonesia

Bureaucratic Incentives and Decentralizing Forest Management: A Preliminary Test of Hypotheses

- 2006 *Annual Meeting of the Midwest Political Science Association*, Chicago, IL, USA
- 2005 *Annual Meeting of the African Studies Association*, Washington, DC, USA

Decentralization Reforms and Forests in Sub-Saharan Africa: Implications for Equity

- 2004 *Annual Meeting of the African Studies Association*, New Orleans, LA, USA

Equity and Accessibility of Rural Public Services: A Comparative Institutional Analysis of Local Governance in Brazil and Uganda

- 2004 *Annual Meeting of the American Political Science Association*, Chicago, IL, USA

Woodlot Devolution in Northern Ethiopia: Opportunities for Empowerment, Smallholder Income Diversification and Sustainable Land Management

- 2003 *International Conference on Rural Livelihoods, Forests and Biodiversity*, Bonn, Germany

Motivating Smallholder Investment in Sustainable Land Management: Emerging Roles for NGOs and CBOs in Uganda

2002 *International Symposium on Society and Natural Resources*, Bloomington, IN, USA

2002 *Regional Conference for Policies for Sustainable Land Management in the East African Highlands*, United Nations Economic Commission for Africa, Addis Ababa, Ethiopia

2002 *Workshop on Improved Policies for Sustainable Land Management in Uganda*, Kampala, Uganda

Community and Private Tree Planting for Sustainable Land Management and Improving Rural Livelihoods in Tigray, Ethiopia – Understanding the Trade-offs

2002 *Regional Workshop on Sustainable Land Management Policies in the Highlands of Tigray*, Mekelle, Tigray, Ethiopia

Evolving Roles for Programs and Organizations: Promoting Sustainable Land Management in Rural Uganda

2001 *Policies for Improved Land Management in Uganda Policy Workshop*, Kampala, Uganda

The Role of Trees for Sustainable Management of Less Favored Lands: The Case of Eucalyptus in Ethiopia

2001 *International Conference on Land Management*, Danbury Park, Essex, England

2000 *Seminar on Policies for Sustainable Land Management in the Ethiopian Highlands*, International Livestock Research Institute, Addis Ababa, Ethiopia

Markets, Marketing and Production – Issues for Aquaculture in Sub-Saharan Africa: The Case of Uganda

2000 *Annual Meeting of the International Institute of Fisheries Economics and Trade*, Corvallis, OR, USA

El Niño, Ice Storms and the Market for Residential Fuelwood in Eastern Canada and the Northeastern US

1999 *Resources for the Future, Forest Policy and Economics Annual Advisory Board Meeting*, Washington, DC, USA

TEACHING EXPERIENCE

2006 - 07 Adjunct Faculty, School of Public and Environmental Affairs, Indiana University, Bloomington, IN, USA

The Political Economy of Food (Senior Undergraduate Seminar)
Environment and People (Freshman Survey Course)

2001 Visiting Instructor, International Livestock Research Institute, Addis Ababa, Ethiopia

Short seminar, *Introduction to Statistical Analysis with STATA*

1996-97 Teaching Assistant, Department of Rural Economy, University of Alberta, Edmonton, AB, Canada
Environmental Impact Assessment with Professor Vic Adamowicz
Introduction to Forest Economics with Professor Marty Luckert

ADDITIONAL PROFESSIONAL EXPERIENCE

2008 Pre-doctoral Research Associate, Department of Agricultural Economics, Purdue University, West Lafayette, IN, USA

2006-07 Visiting Researcher, Makerere University, Kampala, Uganda

2003-06 Research Assistant, Workshop in Political Theory and Policy Analysis, Indiana University, Bloomington, IN, USA

2004 Visiting Researcher, International Food Policy Research Institute (IFPRI), Environment and Production Technology Division, Washington, DC, USA

1999-03 Research Analyst, International Food Policy Research Institute (IFPRI), Environment and Production Technology Division, Washington, DC, USA

1998-99 Research Assistant, Resources for the Future (RFF), Energy and Natural Resources Division, Washington, DC, USA

1998 Consultant, World Bank, Development Working Group, Washington, DC, USA

1998 Research Assistant, Department of Rural Economy, University of Alberta, Edmonton, AB, Canada

1997 Research Associate, Institute for Environmental Studies (IES), University of Zimbabwe, Harare, Zimbabwe

1996-98 Economic Research Technician, Canadian Forest Service, Social Science Research Group, Edmonton, AB, Canada

COLLABORATIVE PROJECTS

2007 – Assets and Market Access BASIS Collaborative Research Support Program (AMA BASIS CRSP) Long-term Research Grant *Natural Capital and Poverty Reduction*. Collaboration between: Purdue University, Department of Agricultural Economics; Norwegian University of Life Sciences (UMB); and the Center for International Forestry Research (CIFOR)

2006 – Economic evaluation of a rural community based AIDs treatment program in Kabarole, Uganda funded by the Canadian Institutes for Health Research (CIHR). Collaboration between the University of Alberta, Makerere University, and the Kabarole Research Center

- 2006 – Sustainable Agriculture and Natural Resource Management Collaborative Research Support Program (SANREM CRSP) Long-term Research Grant *Decentralization Reforms and Property Rights: Potentials and Puzzles for Forest Sustainability and Livelihoods*. Collaboration between: the Workshop in Political Theory and Policy Analysis, Indiana University; CGIAR System Wide Program on Collective Action and Property Rights (CAPRI); and the Center for International Forestry Research (CIFOR)
- 2005 – Poverty Environment Network (PEN) of the Center for International Forestry Research (CIFOR), a group of 35 Ph.D. scholars contributing to a global comparative database on the relationship between forest use and poverty in the low income tropics

PROFESSIONAL MEMBERSHIPS

African Studies Association
American Political Science Association
Association for Public Policy Analysis and Management
International Association for the Study of the Commons
International Society of Tropical Foresters

LANGUAGES

English (fluent); French (basic); Runyakitara – western Uganda (basic); Swahili (basic)

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