Conservation from the Bottom-Up: Human, Financial, and Natural Capital as Determinants of Resilient Livelihoods in Kigoma Rural, Tanzania

Yared J. Fubusa
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CONSERVATION FROM THE BOTTOM-UP: HUMAN, FINANCIAL, AND NATURAL CAPITAL AS DETERMINANTS OF RESILIENT LIVELIHOODS IN KIGOMA RURAL, TANZANIA

by

Yared J. Fubusa

A dissertation submitted in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

Human Dimensions of Ecosystem Science and Management

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Logan, Utah
2010
ABSTRACT

Conservation from the Bottom-up: Human, Financial, and Natural Capital as Determinants of Resilient Livelihoods in Kigoma Rural, Tanzania

by

Yared J. Fubusa, Doctor of Philosophy

Utah State University, 2010

Major Professor: Dr. D. Layne Coppock
Department: Environment and Society

Rhetoric of “community-based conservation” has gained prominence among development specialists and environmentalists, yet such projects are often implemented from the top-down in Africa. This dissertation contends that only a bottom-up approach can foster resilient livelihoods and environmental stewardship.

This study focused on determinants of household resilience within a poverty-stricken agricultural community near Gombe Stream National Park (GSNP) in western Tanzania. The research purpose was to explore: 1) relationships between villagers and GSNP management; 2) how groups and individuals view priority livelihood problems and solutions; 3) various attributes of households; and 4) perceived trends for household resilience and how these are related to natural, social, human, and financial capital as per the Sustainable Livelihoods Framework (SLF).

A mixed-methods approach provided qualitative and quantitative assessments. Data collection consisted of Rapid Rural Appraisal (RRA), key informant interviews, focus group discussions, and household surveys. The RRA was conducted adjacent to
GSNP while other work was implemented over a larger area. Survey data were analyzed using descriptive statistics, chi square, and logistic regression. Regression examined relationships between trends in resilience variables (quality of life or ability to solve problems) versus trends in capital.

Results from the RRA indicated high polarization and problems between villagers and GSNP management. A more complex picture, however, emerged from subsequent investigations revealing that the most important issues facing local communities were inadequate public services, ineffective leadership, and development isolation. This situation was exacerbated by population growth, poverty, and environmental decline.

Regression results identified lack of income, manual labor, and skills and knowledge as factors undermining household resilience. Other data indicated a need for improving farming systems.

In conclusion, while all forms of capital mattered to resilience, human and financial were most lacking. Knowledge of such variation strengthens future applications of the SLF. Practical implications include how an indigenous educational institution, the Gombe School of Environment and Society (GOSESO), could operate in the area. The GOSESO needs to adopt a bottom-up, participatory approach that emphasizes capacity building for poverty reduction and conservation. This could allow for broader goals of economic and cultural vitality, as well as environmental stewardship, to be achieved.
ACKNOWLEDGMENTS

Acknowledging many people who have helped me achieve this doctorate degree has turned out to be the most difficult part of writing this dissertation. This is because, from my humble roots in a small village in western Tanzania to this monumental academic and professional success, I have been blessed to receive countless support from dozens and dozens of people.

Thanking every individual without missing others is a daunting task. But, I will try here to thank certain individuals who have enriched my life profoundly along this journey and for and to whom I would like to express my profound, sincere gratitude for their partnerships and friendships.

There are no words to fully thank professors, students, and staff in my Department of Environment and Society here at Utah State University. My major Professor, Dr. Layne Coppock, is a very special friend and wonderful mentor. His experiences doing range ecology and management, international development, and systems analysis in Ethiopia and Kenya through his Pastoral Risk Management (PARIMA) project continue to inspire me. Layne is a quick thinker and is definitely one of the best major professors anybody could hope to have.

The first person I met during my first visit to Utah State University was Professor Terry Sharik, then head of the Department. I have heard Terry tell other people that he immediately recognized my unyielding commitment to my cause in Tanzania. Though Terry played and continues to play a key role in helping me form a network of partners to launch my efforts, he remains humble by not taking credit for the phenomenal
fundraising and organizational abilities that we have developed together since 2005. “What Yared is doing is transformational,” Terry has told the media about me. “We helped him make connections, but he did all the footwork. I’ve never known a Ph.D. student who has been so successful in fundraising.” Terry is to-date doing an exceptional job as the Board Chair of our newly incorporated non-profit organization of GOSESOS-USA. I continue to learn a lot from his outstanding leadership abilities and diplomacy. Terry, you will always be my hero.

I have also received outstanding academic support from my friend, Dr. Claudia Radel. Her intellectual wit and the ability to simplify complex issues continue to amaze me. I have also received unwavering academic and emotional support from other professors on my graduate committee. I will never forget many informative lunch sessions I had with Dr. Rob Lilieholm and Dr. Chris Conte. While Rob accepted a new research/teaching position at the University of Maine, I felt honored when he agreed to continue serving on my graduate committee. I have benefitted immensely from his outstanding extensive work related to African national parks.

Chris, I am enjoying reading your book, Highland Sanctuary: Environmental History in Tanzania’s Usambara Mountains. I dream of becoming a good author like you. Grant Cardon, I wish to say I truly benefitted from an independent class that I took with you and from your deep knowledge of soil systems. You are a good buddy. For all of my professors on my graduate committee, our partnership has just started. I look forward to working together in years to come.
John Lowry has always been there as a good friend and supporter of my work here at USU. He has incredible technological skills. Dr. Steve Burr was heavily involved in drafting vision, mission, and objectives of GOSESO during my early years at USU. The same can be said about Barbara Middleton. Other early professional and emotional assistance also came from Doug Reiter, Jodie Madsen, Dick Toth, Tracy Jones, Becky Hirst, Wes James, Drew Rayburn, Bill Spain, Jascha Zeitlin, Jack Green, Chuck Chappell, Margo Simmons, Dan and Debbie Armstrong, and the list could continue.

It is with great pleasure that I thank my friend and brother, Dr. Reuben Rose-Redwood and his wife Cindy Rose-Redwood. I have known Reuben for over a decade. When I first met Reuben in 1997, I had just arrived in the United States to pursue my college education at Longwood University. We were freshmen in college at the time, and right from the very outset, I was struck by his intellect and open-mindedness. Reuben stayed with my family at Kiganza village in 2002 and witnessed a clear disconnect between local people and the park management of Gombe. He was one of the first to recommend the creation of an institution that seeks to build the social capacity of local communities so that they have more of a stake in ensuring that environmental sustainability is achieved in a socially equitable manner.

Special thanks go to those men and women who helped me conduct this research throughout the six phases. I will never forget the many hours we spent walking on foot from village to village. Sometimes we had to ride our bikes. We traveled together by boat and car. Even during tough times, you were there with your smile and humor. We spent many daytime hours on the ground, meeting research participants and visiting their plots
of land and then several hours at night trying to make sense of what we saw during each
day of research. Your names will never be forgotten: Makiri Ngangaji, Salum Ramadhani, Juma Yanga, Said Yanga, Mpayimana Ezekiel, Ashahadu Hamidu, and Salome Ngongo. To my drivers, Lawi Richard and Doto Shengero, I remain very
grateful.

I thank the College of Natural Resources and Utah State University for providing
structural and administrative support during the infant years of GOSESO’s development.
This kind of support gave us credibility as we were still trying to incorporate GOSESO to
become a stand-alone non-profit and tax-exempt organization in the United States.

No words can truly explain how thankful I am to my beloved extended family in
Tanzania. I was fortunate to grow up in a very happy and strong family. To my Mom,
Scolastica Nyamweru Fubusa, and my Dad, Kenyatta Jonas Fubusa, you have been the
engine of my life. It was my dad’s death in the evening of February 25, 2004 that further
ignited my determination to create a lasting vehicle of change.

I was teaching at the University of Virginia when my Dad passed away. My
Dad’s lockbox, which my surviving relatives assumed held money, contained only three
photos of me. That day, I realized that my Dad’s legacy was me. Everything he had, he
invested in me so I could get an education. That made me take a second look at my life
and I knew then that, through me, my Father’s life could benefit thousands of people with
similar humble backgrounds.

Dad, I know you can hear me even today. Please know that your son loves you
and this doctorate degree is dedicated to you and Mom. I know that we will meet one
day. I still remember the song of me that you used to sing during evening hours. Even now I still sing that song during tough days: *Mwanangu Yared...tunga! Mwanangu Yared...tunga!* Okay, Dad, let us translate this song into English: *My son Yared...prosper! My son Yared...prosper!* I have been reminded over and over how similarly I look like my Dad. My deep voice is his. My dark complexion is his. I also inherited his charisma.

It has been argued that alongside the success of every man, there is a woman. My mom has been that woman. For each morning that I wake-up during my extended fieldwork in Kiganza village and even here in the States, I consider it another Christmas gift just to know that my Mom is still with us and healthy. She continues to live in the same house where we all grew up, but this time surrounded by many happy grandchildren from my brother and sisters. Mom, you are the most gentle and yet powerful woman I have ever met in my years of traveling throughout the world. I still cannot believe how you managed to raise six Daughters and two Sons in a single household. Even in the midst of economic hardship, it was your smile, endurance, and perseverance that kept all of us happy. You are my secret weapon, the unsung hero!

Apart from my parents, my seven siblings continue to amaze me with their love and support. I could have done what many other Africans do when they come to America; that is, work and send money back home as remittances to support their families. Even to-date, my family continues to live very normal lives in the village. They understand that my time and attention has been to finish this doctorate degree with extra time consumed with building a project that belongs to the people of Tanzania and the
world. To my Mom and Sister, I promise you that now that I have finished this doctorate degree, I will do my part to give you a better livelihood. I am glad that we all share a common belief that a person’s happiness cannot be achieved through accumulation of materials but through love and belonging to a happy community. We all realize that instead of building fences we need to build friendships. My Brother, Filipo, remains a vital element in my personal growth. He has a natural wisdom of life and unmatched tenacity to endure tough times. He continues to live in the village with his wife Salome and their growing family of five beautiful children.

As I have said, I come from humble beginnings. I grew up in the small rural village of Kiganza near Lake Tanganyika and Gombe Stream National Park—yet I have come so far due to my own efforts rather than relying on the privileges of family wealth or elite status.

It was my early life experiences growing up in a small village on the eastern shoreline of Lake Tanganyika just outside Gombe Stream National Park in western Tanzania that have shaped research interests in community-based conservation, sustainable livelihoods, household resilience, and poverty reduction. Here I would like to thank each member of my Kiganza village in western Tanzania as well as express thankfulness for the wildlife that used to be a part of our livelihoods.

I was no more than five years old when my village hired a group of hunters to kill the ‘enemy’ baboons. As a child I saw countless heads, legs, and hands of baboons on display in the government building in the center of the village. Almost everybody in the village came to see the ‘enemy’ wildlife that had crippled the subsistence economy and
hindered crop productivity for centuries. Many of my friends were jubilant to see dead wildlife, but I never felt that way. What I saw were heads of baboons that bore remarkable similarities to humans. As far as I can remember, watching their dead open eyes was like watching the eyes of my grandmother who had died the year before. Their faces clearly bore an uncanny resemblance to humans. Their dark eyes had the color of my own. Even at that age, I felt that wildlife near our village were in danger and that their end was near.

I now understand the connection between the plight of wildlife and the economic realities facing our people. As I grew up and took a leadership role within my community, I saw the need to create an institution that fosters the coexistence of humans and wildlife; one that bridges human prosperity with wildlife conservation. These childhood experiences in the villages have provided a solid foundation for this dissertation research and, together, they have informed the creation of the Gombe School of Environment and Society or GOSESO.

No words can truly express my profound gratitude to the staff and volunteers of GOSESO in Tanzania. I would need to take a few dozen more pages to list everybody. To these men and women, credibility of the messenger was more important than the message itself. Even during tough moments that, especially, came after the economic recession that hit our supporters here in the States and Tanzania, you never gave up on my call to action. You are the ones on the ground. You remain invisible to the outside world. Yet you are there, day and night. Together, we pledged to sacrifice all we have to build a successful indigenous-led institution that benefits future generations and wildlife of the
region. We agreed that, together, we will grow as the project grows. A true friend demonstrates friendship in his actions. I will never forget you.

In December of 1995, while working at Gombe Stream National Park, I had the privilege of hosting a very special group of high school students of APES (African Primate Environmental Studies) and their chaperones. These APES were Prince Edward County high school students from Farmville, Virginia. Since fifth grade they had planned this trip, encouraged by their talented-and-gifted program teacher Cathy Cottrell. Several times they had traveled to conferences in the U.S. to see Jane Goodall. When National Geographic awarded Goodall the Hubbard Medal in Washington, D.C., they were the only students invited.

It had taken years of correspondence and encouragement from Jane Goodall, and a lot of support from family and school administrators back in Farmville, but here the APES were: Monte Foster, Kate Grenouillou, Anna Jordan, Daniel Lombana, Toby Schiffer, Laura Simpson, and Louise Wells. Chaperoning the group was Cathy Cottrell, teacher Barbara Toney, and Jim Jordan. As their gift to Tanzania, the APES group facilitated my admission to Longwood University in their beautiful hometown of Farmville, in the heart of Virginia, and the group raised money for my airfare to the States. Even to date, the APES members remain my good friends. In fact, Cathy, the head of this trip, has become mother to all of us. I love you all.

My other special thanks go to the community of Longwood University in Virginia that started this journey of academic success here in the States. The love and support that I received from Longwood and the people of Farmville enriched my life beyond words. I
was extremely humbled when I received an invitation last year from the President of Longwood University to deliver a keynote speech during Fall Convocation. Unfortunately, due to extenuating circumstances, I instead spoke at Longwood's Sustainability Conference on March 20, 2010. I appreciate Longwood University’s continuing support and giving me the opportunity to share my vision of a more prosperous future for Africa.

My profound gratitude goes to Dr. Jane Goodall who, in the early 1990s, during my early teen years, accepted and loved me as her own son. I did not know then that she was, indeed, one of the most powerful and influential people this world has ever seen. She accepted me for who I was and believed that I was destined to achieve great things when I grew up. I am glad that I was part of a small circle of talented young people in Tanzania who became founding members of her international Roots and Shoots Program. Jane, I thank you for the opportunity you gave me during those early years of going around Tanzania as your spokesperson, inspiring other young people to join your movement. While I may have grown up to embrace my own vision for the future, you will remain a pillar in my academic and emotional maturity.

Jane, I still consider you not just my mentor, but also a good friend and my second mother. The people of Kigoma Region may not remember you for your outstanding work with chimpanzees in the wild, but they will remember you for what you did for the youth in the region. I am currently one of your most notable students in the region. Our successes will be your successes and our failures will not have a good reflection of your monumental work. I have grown up to become a vital branch of your
tree. The future, the burden of those marginalized people and charismatic wildlife of the Kigoma Region now lies on our shoulders.

Dozens and dozens of committed individuals have supported the GOSESO vision through in-kind and financial contributions. More special thanks go to 200+ individuals who have donated to GOSESO, both small and large. Most notable individual support has come from the Butler family in Virginia who have not only given scholarships to our students in Tanzania but also built a classroom in honor of my mom and dad. I feel honored that the Butler family accepted me as one of their sons during my freshman years at Longwood University and they remain part of my life today. Pam, Will, Gay, and Mac Butler, I love you all.

Nancy and Ralph Haga have also been special. I remember my last visit in Virginia where I had the privilege of speaking at her Methodist Church, the church that adopted me during my first semester in college. The title of my lecture was “from the basket to the school in Tanzania.” While introducing me to the audience, Nancy showed everybody the only African basket that I brought from Tanzania during my first arrival in the states over ten years ago. I was reminded how my life in their town was nothing but “missionary work,” meaning that I smiled with people who would otherwise not smile with someone of my dark complexion, and I shook hands with those who would not dare to cross racial lines.

Very exceptional support has come from my friends Dick Mullineaux and his wonderful wife, Marion McCormick. For the last three years, Dick and Marion have become one of our largest individual donors. We had a great time hosting them in
western Tanzania last year. Even as senior citizens, Dick and Marion are growing younger and stronger than ever. The couple has been instrumental in reviving the bylaws of GOSES0-USA to become more inclusive and transparent. Given their exceptional support, a new building of two classrooms in the heart of Kitobe Forest has been built bearing their names. In fact, Marion and Dick have been pushing for me to complete this dissertation sooner than later.

Our other major donors have been Barbara and Stan Trachtenberg of Jackson Hole, Wyoming. They, too, took their time to stay with us in western Tanzania. Barbara and Stan were one of our earliest supporters. They also took me in as their own son. In fact, their son, Joel, is one of our most important board members for GOSES0-USA. I have also benefitted from Jack Greene and his wonderful wife Christina in their capacity as donors, friends, and fundraisers.

My thanks go to various international volunteers at GOSES0-Tanzania. The most notable of them all is by far Drew Braithwaite. In 2007, Drew became the first student volunteer in Tanzania. “My first visit to GOSES0 was a life-altering experience,” Drew has told Utah State University community. He graduated from USU in spring 2008 as the College of Natural Resources valedictorian and just finished spending almost two years working with us in Tanzania. I never heard Drew complain about our humble lifestyles in Tanzania, the fact that we are the only non-governmental organization in Kigoma Region who does not drive a Mercedes Benz, where everybody is a volunteer. Volunteers, such as Drew, actually seem to enjoy this very fact. In order to ensure that the voices of
GOSESO-Tanzania is properly represented during board meetings of GOSESO-USA during my absence, Drew volunteered to be a board member here in the United States.

Since 2005, I have received unwavering and strong support from the government of Tanzania and local citizenry in the Lake Tanganyika Region. I remain encouraged by this partnership. Our partners in Tanzania include Kigoma District Council, Tanzanian Ministry of Education and Vocational Training, Tanzania Institute of Education, National Environment Management Council, University of Dar-Es-Salaam, Gombe Stream National Park, Tanzania National Park Authority, and the regional government of Kigoma.

GOSESO’s international partners include Utah State University, the Walton Family Foundation, the Teton Science Schools in Wyoming, the International Community Foundation of San Diego, Ashoka Foundation, Cell Signaling Technology of Massachusetts, the International Foundation of New Jersey, Matthews Community Foundation of Virginia, and the New England Biolabs Foundation. Above all, more than 200 individuals here in the States have donated to GOSESO over the last five years.

Here, very special thanks go to my friend and supporter, Ms. Christy Walton and the Walton Family Foundation (WFF). There is no way we would have achieved the successes we enjoy today if it were not for the early and timely support from WFF. They took a risk on me at the time when nobody else dared. Many other supporters followed their lead and, above all, they never gave up on me. Even to date, they continue to love and support my vision of bridging human prosperity with wildlife conservation in Africa. They supported us at a time when others had deemed us “unbankable.”
These early and crucial gifts from WFF covered the following items: 1) funding for my Doctoral education here at Utah State University; 2) funding early phases of this dissertation research and GOSESO development, including a feasibility study and partnership building; 3) we also created our grass-roots, indigenous-based curriculum for the Gombe School; 4) procuring over 500 acres of Kitobe Forest that is now being restored for education, research, and as headquarters of GOSESO. Since GOSESO is an indigenous-led institution, we are updating our land ownership from a 99- to 999-year lease (renewable); 5) incorporating GOSESO to become a legally recognized institution in both Tanzania and the USA; and 6) helping us to increase capacity and quality of our academic and outreach programs.

Special thanks also go to Richard Kiy and Amy Carstensen of the International Community Foundation (ICF). They remained patient with us even when we did not meet deadlines. It was especially important since the mission of ICF and WFF is to serve projects located here in the States and Central and Latin America.

I remain very grateful for the support I received from my friend and brother, Jack Shea and the entire Teton Science Schools (TSS) community. My life was enriched during these informative days of meeting students and teachers. TSS also sponsored my meals and lodging during my extensive visits at their beautiful campuses in Jackson Hole, Wyoming. I was very amazed by Jack’s remarkable leadership abilities, his ways of talking to stakeholders, and forward-thinking abilities. He remains a role model to me. Like Jack, I now conduct meetings with stakeholders of GOSESO in very traditional styles, sometimes under mango trees. I still remember that dinner we had in a restaurant
in Jackson Hole: me, Jack Shea, Professor Terry Sharik, and Wayne Turner, in the spring of 2005. It turned out to be the most important dinner we ever had. It was where three phases in the implementation of GOSESO were drafted. Since we did not have any pen or paper, Jack came up with an idea. “Let’s ask the server to give us a pen and we can use this napkin!” I still have that napkin. The three phases and timeline were: 1) Feasibility Study and Partnership Building; 2) “School Without Walls”; and 3) “School Within Walls.”

Other most notable institutional support has come from the New England Biolabs Foundation and the Cell Signaling Technologies of Massachusetts. Their support was particularly important during economic recession. Special thanks go to the Comb Family for embracing me as one of their own family members. Each year I visit Massachusetts and have the privilege of staying at the beautiful and lovely home of Dave and Coleen Comb in Manchester. Their mother, Marilyn, is one of the most generous and loving people. Don Comb is also a very loving patriarch of Comb Enterprises. His wife Linda is equally impressive. I had the honor to sail in the Atlantic Ocean with Don and his son Dave during my last visit in 2009.

I also acknowledge the financial support for the last 18 months of my training at Utah State University from the United States Agency for International Development (USAID) via the Pastoral Risk Management (PARIMA) project of the Global Livestock Collaborative Research Support Program (GL-CRSP). The PARIMA project operated out of Utah State University from 1997 to 2009. The GL-CRSP was managed by the University of California at Davis under grant PCE-G-00-98-00036-00.
Special thanks also go to the Ashoka Foundation. I was extremely humbled in the fall of 2008 when the Ashoka Foundation recognized me to be among the leading international social entrepreneurs. This award is a great honor not only to me personally, but also to everyone who has and continues to support our exciting educational, research, conservation, and economic efforts in Tanzania.

Special thanks also go to six individuals who agreed to volunteer their time and resources as board members of GOSESO-USA. It happened to be a very special group of wise people with extensive experiences in management and operations of non-profit organizations. As I write, these six board members are as follows: Professor Terry Sharik; Dr. Joel Trachtenberg; Chuck Chappell; R. Kent Clark; Wayne Turner; and Nick Delmolino. R. Kent Clark has been outstanding. As the Director of Corporate and Foundation Relations at Utah State University, he brought to me and GOSESO extensive experience in non-profit development and management, including 15 years on staff or on boards of organizations. In addition to supporting the fundraising of GOSESO, Kent has acted and continues to act as pro bono counsel on organizational and strategic matters. For now, my responsibilities afford me little time to enjoy GOSESO’s idyllic campus, which offers spectacular views of Lake Tanganyika, lush miombo woodlands, and the mountains of Gombe Stream National Park. Along with completing this doctoral research, I have maintained a busy speaking schedule throughout the United States and abroad trying to forge partnerships. But I am institutionalizing my vision and pursuing my dream—a lasting dream that builds on my father’s legacy.

Yared J. Fubusa
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CHAPTER 1
INTRODUCTION AND OBJECTIVES

“If you want to know the end, look at the beginning”
—African Proverb

The Problem

In this dissertation I confront questions of poverty and natural resource conservation in a rural community of northwestern Tanzania. My original research plan was highly focused. It centered on how to bridge a gap between human prosperity and wildlife conservation in the Kigoma Region. Specifically, Gombe Stream National Park (GSNP), on the shore of Lake Tanganyika, was the centerpiece. The GSNP is home to a world-famous population of chimpanzees. The chimpanzees are reportedly undergoing a significant decline in numbers (Greengrass 2000; Figure 1.1; Plate 1.1). It is thought that this decline is due, in large measure, to direct and indirect effects of humans on the GSNP ecosystem, including poaching and habitat destruction (Plate 1.2). For places like GSNP to survive, there must be a new social contract between park management and local human communities.

Although numerous studies have been conducted at GSNP during the last five decades, most have concentrated on behavior and ecology of chimpanzees and baboons. In contrast, there has been virtually no research on the local people or how their problems could be addressed. Robbins (2004) suggests the necessity of a new research approach that can document how individuals cope with change, how households are able to organize themselves for survival, and how people are united in groups in order to achieve collective action to overcome threats to their livelihoods. Robbins (2004, 13) also
convincingly argues, “political ecology is something that people do, a research effort to expose the forces at work in ecological struggle and document livelihood alternatives in the face of change.”

Local people have typically been seen as the major problem in African natural-resource conservation. A growing literature on “community-based conservation,” however, takes a different view and sees local people as a necessary part of sustainable conservation solutions (Tear and Forester 1992; Cortner and Moote 1998; Neumann 1998; Knight 2000; McCarthy 2002; Schelhas et al. 2002; Dovie et al. 2005). The main idea behind community-based conservation is to provide incentives for local people to help preserve nearby natural resources. Community-based conservation also involves creating the political framework whereby local people are included in the decision-making process (Redford and Stearman 1993; Cortner and Moote 1998; Neumann 1998, 2004; Nelson 2003; Madden 2004).

The notion of community-based conservation has been criticized by some. The main criticism is based on the definition of the term “community.” There is now a growing outcry against assuming the “community” as being stable, knowledgeable, homogenous, and even superior to the state or noncommunity members from distant places with respect to biodiversity protection. Even small and intact communities tend to be very heterogeneous with community members differing internally especially through factors such as inequality, exploitation, and violence.

But how can survival of protected areas be promoted if poverty on the outside of those areas is rampant? Where do we begin? Gray (1991, 18) is quoted in Redford and
Stearman (1993, 254), stating that “a people cannot live as people unless they control their resources, their future, and their own development.” Redford and Stearman (1993, 254) continue to insist that “…biologists must be prepared to recognize that an indigenous group has the right to decide the direction of its future, even if that future holds no place for the biodiversity conservationists so highly value.” It appears that the first step is helping people escape poverty. Once progress is made on this front, problem solving with respect to natural-resource conservation is more realistic.

New pathways of rural development in Africa are emerging following decades of failure by the international community and governments to eliminate rural poverty and protect natural resources. One trend is to embrace “livelihoods approaches” that build on the strengths of local people while still taking into consideration the power of policies, institutions, and management of risks (FAO 1996; Carney 1998). The analysis of sustainable livelihoods often has an initial focus on various types of assets held by communities (Scoones 1998). The livelihoods framework starts by identifying constraints, both at local and macro levels, which affect the ability of poor rural people in their struggle to rise above poverty. In Africa, being rural typically means being very poor. This typically means having annual income below a certain level that result in economic insecurity. Thus, poverty was carefully defined in a manner that was contextually relevant. To ensure that no pre-determined definitions of poverty were imposed upon the research participants, the understanding and definition of poverty was elicited from the participants themselves. Many of the rural poor are isolated from various opportunities based on economic circumstances; this includes lack of access to
information, sanitation, health, or education. Popularity of sustainable-livelihoods concepts is based on these facts (FAO 1996; Carney 1998). The framework is not limited to agriculture alone; it also includes other sectors such as education, health, rural infrastructure or social conditions (DFID 2009).

Another trend has been the embrace of innovation systems with multiple stakeholders that put local problem-solving at center stage (Ashby 2003; Sanginga et al. 2009). This includes more widespread use of authentic participatory methods and action research for grass-roots problem solving (Chambers 1997; Krishna et al. 2004; Coppock 2010). Bebbington (1999, 2022) notes that “we need a framework that bridges the more materialist and the more hermeneutic and actor-centered notions of poverty and livelihood.” Bebbington argues for a new framework that will enable people to “not only understand the way in which people deal with poverty in a material sense (by making a living), but also the ways in which their perceptions of well-being and poverty are related to their livelihood choices and strategies; and the capacities that they posses both to add to their quality of life” (Bebbington 1999, 2022).

Scoones (1998) views a sustainable livelihood as one that can recover from shocks and stresses, return to its normal condition, and do so without undermining the well-being of natural environments. In his analysis of outcomes and trade-offs, Scoones argues that sustainable livelihoods tend to create the following results: increased numbers of working days, reduced poverty, improved well-being, and enhanced human capabilities. The sustainability side will likely generate livelihood adaptation, decreased vulnerability, enhanced resilience, and an improved natural resource base.
Walker et al. (2004) define resilience as “the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks.” Walker et al. (2004) also identify the four different components of resilience that are known to represent stability as resistance, latitude, panarchy, and precariousness. These are somehow similar to the four variables of resilience given in this study of Kigoma Rural (see Chapter 5), namely: (1) quality of life; (2) ability of the household to recover from a serious problem or crisis; (3) confidence in the future; and (4) confidence in personal problem solving. In fact, Walker et al. (2004) see resilience as the ability to create new systems of economic, ecological, and social structures when they become untenable.

This research thus gradually embraced a broader focus to include more attention to problem solving among a larger population of local people in the Kigoma Rural District that includes GSNP. In terms of academic scholarship, this research contributes new perspectives to the sustainable livelihoods debate. It asks what confers resilience among rural households (Scoones 1998; DFID 2009). In terms of practical outputs, research results were expected to have local use in the design of programs pioneered by a non-profit organization called the Gombe School of Environment and Society (GOSESO). I am the founding Executive Director of GOSESO. The GOSESO, created in 2005, aims to foster a new generation of Africans—both locally and elsewhere—who are inspired by environmental stewardship, community self-reliance, and economic sustainability. The GOSESO mission is to generate widespread support to lay groundwork for improving both human and wildlife prosperity through education for
rural Africans that promotes self-reliance, economic and cultural vitality, human health, and peace. The main operational approach envisioned for GOSESO is to act as a change agent is to build human capacity via education and outreach (www.goseso.org).

Qualitative and quantitative research methods were employed in this research, including rapid rural appraisal (RRA), key informant interviews, focus groups, and a household survey using a random sample of local villagers. Respondents were asked to help identify the obstacles that limit their ability to escape poverty, make progress toward more sustainable livelihoods, and consequently improve their stewardship of the local environment.

This dissertation is organized using a traditional format. Following this chapter, Chapter 2 provides an in-depth literature review. Chapter 3 describes the larger study region. Chapter 4 gives more detail on the specific study area as well as the research methods. Chapter 5 contains all the research results and discusses them with respect to the literature. Chapter 6 presents conclusions with regards to research scholarship as well as the practical implications for the future activities of GOSESO.

Research Objectives

1. Determine the general relationship that exists between lowland villagers—residing on the margins of GSNP—and GSNP management. How might this relationship be improved?

2. Determine how selected groups and individuals—representing various sectors of local society from both the lowlands and uplands—view priority livelihood problems and possible solutions. Does GSNP emerge as important in this debate?
3. Describe rural households in the lowlands and uplands based on a random sample of respondents. Who are these people, and what are their livelihoods based upon?

4. Determine perceived trends for household resilience among lowland and upland households and the extent that resilience trends are related to trends in various forms of natural, social, human, and financial capital. Would lack of human and social capital be the largest constraints for improved livelihood resilience? Or would something else emerge as most critical?
Figure 1.1. Decline in chimpanzee population at Gombe Stream National Park, Tanzania. (Source: Greengrass 2000)
Plate 1.1. Two generations of chimpanzee families in Gombe Stream National Park (Photo Credit: Jane Goodall Institute).
Plate 1.2. Local villagers on an improved road in Kigoma Rural (Photo Credit: Drew Braithwaite).
African scholars have given several reasons for Africa’s poor economic performance. Such reasons range from policy-related issues of institutional and structural adjustment, a lack of managerial and technological capabilities, the legacy of long-term historical trends (e.g., colonial exploitation), and poor political environment due to the under-utilization of Africa’s natural and human resources. One argument advanced by controversial scientist Jared Diamond in *Guns, Germs and Steel* (1999) is that the economic success of a country over history depends on topography and geographical endowment. A country’s productive capacity is based upon geographical location, climate, flora, fauna, and topography, which enable people to grow crops for both consumption and export. Diamond argues that all peoples, regardless of their culture or society, have equal ability to utilize nature’s resources, but what they differ in is their access to raw materials to start with.

A similar geographical argument has been advanced by Collier (2006), who divides African countries into three major groups, namely: landlocked countries like Zambia and Zimbabwe, those nations lacking adequate resources like Rwanda and Burundi, and resource-rich countries such as Tanzania and Mozambique. Collier takes a historical approach and maintains that resource-poor countries with coastlines have always done better economically than those resource-rich landlocked countries, and that landlocked and resource-poor countries have always performed poorly economically.
Unfortunately, Collier insists that most densely populated African populations are found in resource-scarce and landlocked countries.

Another popular anthropological reason given to explain Africa’s poor economic showing is the tribal rivalries that come as a result of Africa’s many diverse tribal and ethno-linguistic groups scattered throughout the continent. Moyo (2009) has identified more than 1,000 tribes in sub-Saharan Africa alone, each with its own language and ways of life. With less than 40 million people, Tanzania has almost 130 disparate tribal groupings while Nigeria, with roughly 150 million people, has over 400 tribes. While this tribal diversity may be a good thing, some scholars view this as one reason why Africans find it hard to perform better economically, unlike Europe with far fewer ethno-linguistic groups. Other reasons advanced have been largely racist—that the Africans are simply incapable mentally, culturally, and physically to think for themselves and that deep inside their psyche, Africans are incapable of reasoning for themselves without aid from other continents (Moyo 2009, 31).

While I agree that millions of people in sub-Saharan Africa live in destitute poverty, I take a more optimistic view of Africa by arguing that millions of people throughout history have dragged themselves out of severe poverty since the 18th Century Industrial Revolution. Poverty is a result of poor productivity per worker, poor health, lack of appropriate job-market skills, poor physical infrastructure, and chronic malnutrition. A study by Krishna et al. (2004) on “Escaping Poverty and Becoming Poor” among Kenyan villages has taken a similar approach. Their study identifies pathways to severe poverty while identifying those pathways likely to lift people out of severe
poverty. The study also paints a more hopeful and realistic picture of African households. To Krishna et al. (2004), poverty is not static. Many households that were poor 25 years ago had escaped poverty, suggesting that those households who are poor today may actually escape poverty in the future. Indeed, households facing chronic poverty are likely to pass on poverty to subsequent generations. One principal reason for becoming poor was poor household health and health-related expenses, death of the major bread earner, funeral expenses, large family size, small or unproductive landholdings, drunkenness, and laziness. Those households that were able to escape poverty did so through improvement of health of household members and application of various income diversification techniques. Like Krishna et al. (2004), this dissertation is based upon the goal to end poverty based on micro-scale action at the household and village scale.

Another optimistic scholar on the future of rural Africa has been Jeffrey Sachs (2005). Sachs admits that the Western-led capitalist economic system is not helping the poorest of the poor in Africa. Instead, his approach seeks to find ways of encouraging the people of the developed world to play their part in ending extreme poverty. Sachs acknowledges that rural Africans will need external support to overcome their current dismal conditions. Unlike Krishna et al. (2004), Sachs does not localize poverty and, instead, he encourages affluent nations to help end poverty through international aid. Sachs is clearly embracing a macro approach to poverty reduction and does not perceive globalization as being a threat to the poorest of the poor since it has largely bypassed them. Here I disagree.
Coppock et al. (2009) and Coppock (2010) illustrate how investment in human capacity and creation of market linkages can lead to development progress among the rural poor in southern Ethiopia. In this case bottom-up processes have enabled settled pastoralists to grasp opportunities in livestock export markets. Local incomes and quality of life have improved as a result (Coppock et al. 2009; Coppock 2010).

Exploitation of the poor by the rich causes poverty and exposes them to endless abuse. Unlike Krishna et al. (2004), Sachs mentions nothing on the dynamic flow of households in and out of poverty. Average income can rise, but if the income is distributed unevenly the poor may benefit little, and pockets of extreme poverty may persist, especially in geographically disadvantaged regions. I agree with Oyelaran-Oyeyinka and Barclay (2004), who have singled out Africa’s lack of developed human capital and the absence of indigenous institutions as the single most important reason that may explain the continent’s poor economic performance.

Gray (1991, 18) is quoted in Redford and Stearman (1993, 254), stating that “a people cannot live as people unless they control their resources, their future, and their own development.” Redford and Stearman (1993, 254) continue to insist that “…biologists must be prepared to recognize that an indigenous group has the right to decide the direction of its future, even if that future holds no place for the biodiversity conservationists so highly value.” A letter from the forest-dwelling native Amazonians to conservationists is also presented: “We propose joining hands with those members of the worldwide environmentalist community who: 1) recognize our historical role as caretakers of the Amazon Basin; 2) support our efforts to reclaim and defend our
traditional territories; and 3) accept our organizations as legitimate and equal partners” (Redford and Stearman 1993, 250).

Figure 2.1 depicts the three main points covered in the literature review with a focus on application to Tanzania: wildlife conservation, sustainable livelihoods, and rural education. This dissertation research is part of a growing literature that explains why many of the so-called “community-based conservation” programs in Africa have run into problems and have failed to protect wildlife and, in some cases, such programs have left indigenous human populations increasingly poor and resentful of any conservation efforts. Declining wildlife populations and the degradation of rural livelihoods in and near Gombe Stream National Park (GSNP) in western Tanzania create a sense of urgency to develop and test new models of conservation and poverty mitigation. The long-term sustainability of both wildlife and indigenous communities are linked, especially in western Tanzania because of its globally significant biodiversity (Neumann 1998). The GSNP is described shortly.

The vision for the future is proposed through the creation of indigenous-based institutions that link human prosperity to wildlife conservation in the Gombe area. The Gombe School of Environment and Society (GOSESO) provides a model institution which is designed to foster a new generation of Africans inspired by environmental stewardship, community stability, and economic sustainability. The GOSESO has been described as the first indigenous-led organization in the Kigoma Region. The GOSESO has been incorporated in both Tanzania and the United States of America as a non-profit
organization. The goal is to foster environmental stewardship, economic viability, and human dignity (Chapter 6).

Wildlife Conservation Background

**Land Use Struggle in Western Tanzania**

The vegetation conditions at GSNP determine the availability of shelter and food sources for wildlife. For example, the area of Kasekela has abundant food sources, while the poor southern range of Kalande is less desirable to chimpanzees because of its poor quality and quantity of food sources (Greengrass 2000). The *mabungo* fruits are plentiful at both Kasekela and Mitumba areas to the north and are very rare in the southern range of the park. Wildlife and the indigenous human populations on the edges of the park, especially in the southern range of Kalande, are forced to rely on a less-desirable diet, such as *ngongo* and *mlama* trees, and this has caused their community to become weaker. Reports from Gombe have shown that the number of wildlife species in the southern range is declining, partly because of the poor availability of food sources (Greengrass 2000). Indigenous people surrounding Gombe are known to cross park boundaries to collect wildland resources, including fruits. It has been reported that both chimpanzees and the local people often eat the same kinds of fruits (Pusey et al. 2007).

The vegetation within GSNP differs from one range to the next. The central and northern range of the park are similar to equatorial rainforests, whereas the southern range of Kahama is less forested with simply open *miombo* woodland and has thin riverine stretches between valleys (Goodall 1986, 49). This low forest density in the south could be attributed to frequent bush fires and a low level of annual rainfall when
compared to the central and northern areas that experience fewer bushfires and higher rainfall per year. However, the exclusion of local people seems to have changed the ecology of the park. Changes in the vegetation inside the park mean changes in wildlife habitat.

The core area of GSNP has thick forests as a result of high rainfall, lack of fire, and absence of other human disturbances in recent decades. A good example of the forested core is Kakombe Valley. The Kakombe Valley appears to be a resilient system, capable of marked ecological recovery. Evidence of this is given by pictures taken decades ago that show Kakombe Valley to have been dominated by open woodlands. These woodlands were the result of a long period of human-induced disturbances prior to park establishment (Greengrass 2000).

Conservation efforts in Tanzania and other African nations have traditionally been inspired by visions of Africa as Earth’s “Last Eden,” with its abundance of wildlife and picturesque natural scenery. Such environmental narratives have their origins in European colonial discourses of nature, which continue to shape cultural perceptions of the African continent today. In fact, many of Tanzania’s wildlife parks were first established as colonial game reserves, where European elites were allowed to hunt for sport while stringent restrictions were placed on hunting among “native” populations. After the British colony of Tanganyika gained its independence in 1961, local communities were still largely excluded from the national park system, while Western researchers were granted special access to these very same sites (Neumann 1998).
Nelson’s (2003) short paper based on Tanzanian wildlife, entitled “Environmental Colonialism: Saving Africa from the Africans,” made compelling arguments that modern Western-led environmentalism in Africa in some cases has been in direct conflict with scientific facts and knowledge. Current environmentalism is possessed of a strong missionary spirit with a desire to rediscover an earthly Garden of Eden among Westerners. This approach led to the creation of many national parks in Africa.

Elsewhere in Africa, severe conflicts between national park policies and the needs of indigenous Africans have led to governmental repression of uprisings. Restrictions imposed by park authorities in Montagne d’Ambre National Park in Madagascar in the 1980s pushed local people to riot and suffer arrest in order to demand a share of resources from their national park. In Togo (West Africa), in 1991, indigenous people in Keran National Park chased away government officials from the park, and they reoccupied the park (Neumann 1998, 6). Coconut peasants around the Jozani Forest Reserve (Zanzibar, Tanzania) threatened to hunt the highly endangered red colobus monkeys, which in the world are found only in this tiny reserve of Zanzibar, if government officials did not dedicate a large portion of tourism income toward their local economy (Siex and Struhsaker 1999).

To understand sociopolitical motivations that could force local people to violate park laws at GSNP, one must examine other prevailing factors throughout Tanzania, such as how the park was created in the first place, plus other conditions from Tanzania’s colonial era, such as land ownership and hunting laws. This will explain the process of local dispossession, resistance to park laws, and poaching.
Creation of Protected Areas

The first stage of park creation in Tanzania slowly started in 1892, during Germany’s colonial era rule (Neumann 1998). It gained momentum a decade later when the first full-time professional forester was appointed in 1903 and was followed by the enactment of the first legislative law, called the Forest Conservation Ordinance, a year later (Schabel 1990). The German and British intentions of creating game reserves in Tanzania were for economical rather than environmental reasons. For example, the colonial government prohibited natives from using forests because they wanted to make Tanzania a profitable timber producer, for domestic use as well as for export to factories in Europe (Neumann 1998).

Mainland Tanzania, then called Tanganyika, was never regarded as an important territory by either Germany or Britain. The game reserve department during the colonial era received low priority in budget allocation. In fact, the department was nearly eliminated during the 1931 budget debates (MacKenzie 1988; Neumann 1998). Bates and Rudel (2000) examine the politics behind park creation in tropical countries and counter the claim that park creation is an effective tool of biodiversity conservation. They argue that many parks exist on “paper” only and do not provide effective, on-the-ground protection for flora and fauna. Many national parks throughout tropical Africa lack the resources to do their mandated jobs.

Land Ownership

The definition of land ownership by the colonial governments in Tanganyika was extremely narrow because it was based solely on land occupation. For instance, all settled
lands or lands under active cultivation were simply classified as occupied by the colonial
government. All “unoccupied” forests, plus areas of seasonal usage and drought reserve
areas, were classified to be public lands (Coulson 1971). Occupied lands were deemed
public lands while forests and game lands were reserved for governments, sometimes
called “crown lands.” Public lands were administered by “Native Authorities” (Conte
2010, personal communication).

Land is very important in the lives of people in developing countries, especially in
Tanzania where most of the population is primarily rural and agrarian. The Tanzanian
government has set aside a large portion of its land for wildlife protection, which far
exceeds land set aside for wildlife in industrialized countries. Even though Tanzania is
among the ten poorest countries in the world, nearly 33 percent of the country’s land is
under some sort of governmental protection for wildlife (Neumann 1998). There is a
complicated relationship of agrarian land ownership and wildlife protected areas in
Tanzania. Peasants using simple machinery, especially the hand hoe, produce over 80
percent of the agricultural production in Tanzania (Neumann 1998, 6).

Major shifts in agrarian policy among poor nations have often been brought by
the revolution of collective noncompliance by the masses of peasants. The intentions of
peasant communities are often built into the definition and that their symbolic resistance
should be known as an integral part of class-based resistance. Scott (1986) argues that the
power of poor peasants is in their remarkable ability to conceal what he calls “everyday
resistance.” Their acts, when taken cumulatively, constitute a form of revolution.
Peasants’ resistance cannot be ignored as it tends to contain very effective political
messages through collective action: “ignoring them is equal to ignoring the most vital means by which subordinate classes manifest their political interests.” Thus, the strengths of peasants come through indigenous institutions that are organized in their numbers and momentum.

**Colonial Hunting Laws**

Hunting was a privilege given to Europeans, and prohibited for the native population. The local people needed to have a hunting license before they could hunt certain controlled species for meat, such as antelope, buffalo, and hippo. Natives without such a license were permitted to hunt animals considered “irrelevant” including river pigs, warthogs, porcupines, ground pigs, and monkeys. After the First World War, when Tanganyika came under the control of the British, three types of game reserves were created. At the top of the list was the “complete game reserve” that had the strictest rules (Neumann 1998, 100). Under this category, only a very few people were permitted to hunt and no hunting license could be given to any native without permission from the governor, who had absolute power over the reserves. Africans were permitted to hunt for food only, never for sport.

Sport hunting was considered a unique privilege, reserved for Europeans, and Africans were discouraged from living near the game reserves under this law. The law also forbade certain traditional hunting practices, including the use of nets, gins, traps, snares, pit-falls, poison, or poisoned weapons. Hunting was reserved for the upper class and was a ritual event that differentiated Europeans from the natives. It demonstrated the masculinity of the upper class through “sportsmanship,” hunting not for food, but rather
for leisure or sport. During this period in Tanzania’s history, for instance, a person’s class was determined by his (women did not hunt) ability to bring a big game animal, like an elephant, to its untimely death (Neumann 1998, 100; Schabel 1990).

The colonialists used the hunting of wild animals in Tanzania as a means of degrading the native population. This was reflected in the design of the hunting laws, where the idea of conservation was largely ignored. The colonial era hunting laws disregarded the fact that hunting by Africans involved certain cultural values and practices very important in their daily lives. It was these same values and practices that seemed to offend the sensibilities of the colonialists’ culture of superiority. They seemed to fear that allowing the Africans to hunt and enjoy other benefits of the forest would make them equal to their masters. Certain commercially valuable species of trees, such as cedar, were illegal for natives to possess. Plus, the rights to harvest valuable timber and forests usage could only be given to colonialists and not native Africans.

The colonial law, therefore, was rightfully viewed as being very restrictive to the native Africans and as being quite liberal to non-Africans. Scott (1986) maintains that hunting has always been a part of the traditional subsistence strategies among many people in poor societies. Poaching, therefore, “entails less a change of behavior than a shift in the law of property relations.” Scott’s approach proposes an anthropological solution to natural resource management.
Sustainable Rural Livelihoods

Conceptual Aspects

In part, this research employs a Sustainable Livelihoods (SL) framework as first advanced by Scoones (1998). The SL framework can be helpful in understanding how development constraints emerge at various levels (household, individual, or community), and why an individual chooses to adopt a particular livelihood strategy. It is a holistic approach to environmental management, poverty reduction, and rural development. The framework seeks to identify constraints and opportunities for the poor in their local environments, and then assess available assets and formulate opportunities in order to reach an informed intervention.

In his formulation of the SL framework, Scoones (1998) lists four broad clusters of livelihood strategies that cover a wide range of options available to poor people in rural areas: agricultural intensification, extensification, livelihood diversification, and migration (Figure 2.2). With intensification, farmers tend to gain more of their livelihood through agriculture often by using their own labor and other inputs as available. Extensification involves expansion of agricultural or grazing area. Diversification can involve development of new enterprises on- or off-farm that increase income streams. Migration involves movement away from home areas in search of new livelihoods.

The literature on SL has emerged in recent years. Initially, it was discussed in a 1980s report by the World Commission on Environment and Development (Singh and Gillman 1999). Sustainable development has often been cited as a key aspect of SL. Sustainable development concepts emerged in the early 1980s out of an urgent need to
integrate humans and nature, improve conditions of the world’s poor, achieve freedom and peace, and build a healthy environment (Martens 2006).

The Brundtland Commission gave one of the first definitions of sustainable development as “development which meets the needs of the present without compromising the ability of future generations to meet their own needs.” A similar definition was given by Giampietro (2003), who defines sustainable development as “the capacity of a society to move itself, in a certain time period, between satisfactory, adaptable and viable conditions.” The definition of sustainable development can be complex, because it is often characterized by multiple interests, lack of structure, uncertainties, and uncontrollability. While there have been sharp disagreements concerning how best to define the concept of sustainability, many scholars agree that differential access to resources determines success or failure of a sustainable livelihood.

The main goal of the SL Framework is to strengthen the livelihoods of people by enhancing their ability to build on their assets. Singh (1999) and other scholars have argued that a sustainable livelihood is one that is economically effective and socially equitable. Chambers and Conway (1992) insist that a sustained livelihood must contribute net benefits to other forms of livelihoods in both short- and long-terms at local and national levels. There are links between livelihoods, culture, and politics (Gwynne and Kay 2004).

The SL framework tends to place special emphasis on the role of assets; this places the focus on what poor people already have, instead of what they do not have. Livelihood trajectories and decisions tend to have both political and cultural
consequences: “livelihood decisions are not only economically driven and structured, they are also imbued with cultural and political significance” (Gwynne and Kay 2004, 177). When a household has access to land and good agricultural markets, that household will likely pursue a livelihood strategy that is based on agriculture. Davies et al. (2008, 56) have given the following summary of the SL framework:

The sustainable livelihoods framework … incorporates and summarizes much of what is considered “best practice” in development. The approach is most widely applied to design and support development interventions among poor and disadvantaged rural people. The approach recognizes that health and well being outcomes and associated environmental factors such as natural resource condition are important to the quality of people’s lives as well as financial income; that people draw on diverse assets and use multiple strategies to provide for their needs; and that available strategies are determined by social, political, ecological and other factors in the broader environment.

The SL Framework has multiple approaches, which share similar attributes (Gwynne and Kay 2004). First, the framework focuses on what people actually do and never derives conclusions from the mechanisms of the general political economy. Second, it encourages people to be creative because creativity tends to produce seeds of development. Third, the framework encourages livelihood diversification. Lastly, the framework often encourages locally based research and the use of case studies.

The SL framework has been further modified over time. Figures 2.3 (Davies et al. 2008) and 2.4 as well as Tables 2.1 and 2.2 illustrate elaborations (all from DFID 2009). These latest illustrations are different from the framework ideas first advanced by Scoones over ten years before. While Scoones was able to list only four forms of capital or assets (i.e., natural, economic/financial, human and social), the latest illustrations provide extensive analysis of the fifth capital: physical capital.
**Eliminating Poverty**

The Sustainable Livelihoods (SL) framework is now regarded as the best instrument to understand livelihood trends, especially among poor people. The framework is often people-centered, does not function in a linear manner, and is never regarded as a model of reality. Instead, its main function is to help stakeholders identify necessary entry points in their livelihood planning. The framework models various dynamic relationships and implies direct causality. It identifies main factors affecting peoples’ livelihoods and it can be used in both planning and assessing livelihood sustainability. The framework summarizes the main livelihood components and outlines factors that influence livelihoods. It never provides a list of issues to be considered, but it is adaptive to any particular circumstance. Allison and Ellis (2001, 386) insist, “One of the advantages of the livelihoods approach is that it makes no assumption about ‘community’.”

The SL framework remains an important tool in planning and management of projects that strive to eliminate poverty. Throughout this dissertation research, I made sure that the core framework elements not be compromised during adoption stages; especially participatory analysis principles. Since a commitment to poverty eradication is always the framework cornerstone, this study has ensured that there is a constructive dialogue among stakeholders to address economic and political factors influencing poverty.

Sustainable livelihood framework is a useful tool because it helps ‘order complexity’ by organizing the multidimensional factors that constrain choice or expand
opportunity. This framework bridges the gap between micro and macro levels by drawing attention to both the forms of capital available to individual actors, and the structural and institutional context in which actors must operate (DFID 2009). Five forms of capital are given, namely financial, human, physical, social, and natural (see Figures 2.2, 2.4). Their study also outlines two other institutional dimensions (i.e., processes and structures).

**Vulnerability Context**

A special emphasis of this study was placed into the framework’s vulnerability context that deals with an external environment, which affects people’s livelihood (Scoones 1998). Here, various conflicts that can have negative effects on the livelihood of the poor were identified. As human populations increase and the usage of natural resources multiply, conflicts over access to natural resources tend to increase. Vulnerability context factors can directly affect people’s asset status and hinder people’s options in their pursuit of important livelihood outcomes. Thus, the new livelihoods framework starts by identifying constraints, both at local and macro levels that face poor rural people in their struggle to rise above poverty. The “most robust livelihood system is one displaying high resilience and low sensitivity; while the most vulnerable displays low resilience and high sensitivity” (Allison and Ellis 2001, 379).

Vulnerability is rooted in the idea that people’s livelihood and assets available are affected by three things: trends, shocks, and seasonality (Table 2.1). Trends can influence rates of return for a chosen livelihood strategy; while these could be benign, they also tend to be more predictable. Additionally, international economic shocks, abrupt changes in exchange rates, and terms of trade can have severe impacts on poor people. Shocks
refer to disruptions like storms, floods, or civil conflicts that are capable of destroying assets directly and force people to leave their homes and dispose of assets such as land as a coping strategy. Seasonal shifts in prices, job opportunities, and food access can create severe hardships for millions of poor people in developing countries.

People can be affected differently by components of the vulnerability context. Natural shocks are likely to have more adverse agricultural effects on rural people than on people with urban employment. Understanding the nature of vulnerability is an important component in any sustainable livelihoods analysis. These contexts represent a part of the framework in which poor people have no control. There is little they can do to alter them except for conflict intervention.

The strength of the SL framework is in its ability to measure the degree of interaction of the micro, meso, and macro forces that can strengthen or limit sustainable livelihoods. The framework highlights the significance of government policies and institutions in structuring “the exercise of state power, framing the broad questions about who gets what, and the why of development policy” (Hoon 1998, 1). The SL Framework often seeks to strengthen institutions, both formal and informal, at micro and macro levels. Governments can promote or hinder sustainable livelihoods. Effective governance will mean getting policies right, building coherent sectors, creating policies informed by local knowledge, and developing appropriate decision-making mechanisms (Newell cited in Hobley 2001, 16).

The framework’s emphasis on the vulnerability context also represents externally driven changes within transforming structures and processes, such as changes in
governmental policies. Within the livelihood framework approach, a core element of vulnerability context management is to help people become more resilient through emphasis of their strengths. By supporting poor people and improving their ability to access financial services such as insurance, their vulnerability can be reduced significantly. This ensures that critical institutions and organizations become more responsive to their needs. Not all trends indicate negative effects or vulnerability. Some economic factors can help to eradicate some pervasive diseases through new technology innovations that are valuable to poor people.

While arguing in favor of “transforming structures and processes” (i.e., institutions) in achieving sustainable livelihoods, Allison and Horemans (2006, 57) make the following summary:

Institutions comprise rules, norms and shared strategies, whether developed locally and embedded in culture, or formulated at other levels in legislation and policy. These determine both the livelihood strategies that people are able to pursue, and their vulnerability to shocks and stresses. The sustainable livelihoods framework also accounts for entitlement and human capability by locating the “influence” that people have on institutions as mediating between “assets” and “institutions.” The framework highlights critical feedbacks between “institutions” and the “risks” that people face or their “vulnerability context.”

Folke et al. (2005) argue that science and policy in sustainability must address the interplay between periodic and abrupt changes, and their subsequent relation to resilience. Folke et al. (2005, 443) define resilience as the “capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks.” They make a compelling case in favor of combining indigenous knowledge and the scientific world: “Management is about
bringing together old knowledge from diverse sources, into new perspectives for practice” (p. 445).

There are two aspects of vulnerability in SL: stresses and shocks, and coping ability. Chambers and Conway (1992) define stresses as cumulative and continuous pressures facing people and ecosystems, such as seasonal shortages and a declining natural resource base. Their definition of shocks suggests sudden and sometimes unpredictable impacts to producers including flood, fire, or drought. On the other hand, Ellis (1998) has defined coping as the ability to maintain consumption in times of disaster, which may include drawing on savings, using food stocks, sales of livestock, or access to gifts from relatives and friends. Certain individuals or households can reduce vulnerability by employing a number of tactics such as income diversification or increasing assets to act as a shield in time of loss (Chambers and Conway 1992).

Livelihood Assets

In their analysis of integrated conservation and development projects, many scholars in the field, including Garnett et al. (2007), have identified five types of capitals: natural, social, human, physical, and financial. Davies et al. (2008, 57) insist that: “Different mixes of and degrees of substitution among the different types of capital assets provide inputs to people’s livelihood strategies, while these assets also represent the outcomes that characterize people’s lives.” Access to these capital or asset categories in the form of ownership or the right of use is the main concern of the framework in efforts to support livelihoods and fight against poverty. People require a wide range of assets to build positive livelihood outcomes and no single asset category on its own can produce
all outcomes sought by people. Poor people, in particular, have very limited access to any given asset category. As a result, poor people must learn how to nurture and combine these limited assets creatively to ensure their survival. Table 2.3 is a summary of various capital and institutional dimensions.

The framework suggests how assets can be combined to generate desired livelihood outcomes, a process that involves two types of relationships through sequencing and substitution. Sequencing investigates the likelihood that a person who manages to escape from poverty starts with a particular combination of assets and whether the access to one type or sub-set of assets can lead people out of poverty. Substitution, on the other hand, investigates whether one type of capital can be substituted for others, something that is likely to increase options for support. The increase of human capital, for instance, can compensate for a shortage in financial capital.

**Relationships Within the SL Framework**

Understanding highly complex relationships within the framework is a daunting task and represents a core step in poverty elimination. Assets can be either created or destroyed due to shocks, trends, and seasonality of the vulnerability context. Both policies and institutions can have a significant influence on access to assets. Transforming structures and processes can: (a) create assets, such as government policy to invest in basic infrastructure that is capable of creating physical capital, a technology generated creates a human capital, or creation of indigenous institutions can create social capital; (b) determine access to ownership rights and institutions that regulate access to
common resources; and/or (c) influence accumulation of assets, such as taxation can significantly influence rates of asset accumulation.

Throughout this study, it was important to bear in mind that this relationship is not linear and that individuals and groups are capable of transforming structures and processes. More influence can be exerted if peoples’ asset endowment has been increased. People with access to a wide range of asset options are capable of switching between multiple strategies. As Figure 2.3 implies, creation of institutions involves risk-taking and management. However, it is risks that are likely to turn into assets. It is the influence of both risks and assets that yield into institutions. In fact, Davies et al. (2008, 56) make the following general statement about the role of the sustainable livelihoods approach:

The sustainable livelihoods approach is not a measure or test of sustainability. Rather, it is a tool or way of thinking designed to assist in identifying changes that can be made to institutions, to people’s assets or their strategies in order to promote the resilience of local livelihood systems. In doing so it may highlight factors that constrain or enhance the sustainability of these systems.

Thus, the outcomes come as a product of the influence or combination of risks, assets, institutions, and strategies.

**Criticisms**

Although the SL framework details a list of important concepts and operational guidance, the framework also has its own weakness in both its representation and interpretation. The SL framework is still very new, and concerns over the framework are starting to emerge. The following is a summary of major points against the SL framework. First, the SL approach has been criticized by some as a model that employs
new terminologies to repackage what has been written and researched in many development practices (Singh 1999). It is argued that the SL framework is yet another integrated rural development (IRD) approach that has been given a new name.

Parris and Kates (2003) argue furthermore that while the framework of sustainable livelihood has such broad appeal, it also has little specificity. The framework lacks indicators that have been universally accepted and backed by strong theory, plus credible data collection and analysis. Others have argued that the new SL framework is simply over-ambitious and that it provides limited guidance on how to move forward. While appealing, the SL is criticized for being very immature in its research methodologies. The argument is that the new framework does not provide clear guidance on how to move forward from analysis to action.

The SL framework also lacks influence in policy making and policy implementation. There are valid concerns as to whether the SL framework has a real capacity to transcend sectors as it proposes itself doing, since governments and donor organizations are heavily operating along sectoral lines, especially in the way they allocate budgets. Structural problems are simply too heavy to be overcome by the new SL framework (Allison and Horemans 2006). While the SL framework clearly applies to both rich and poor people, the framework is not clear on the issue of unequal income distribution between the rich and poor. Here Allison and Horemans (2006, 764) argue that the framework’s overemphasis on the ‘asset pentagon’ (Figure 2.4) comes at the expense of other issues. Allison and Horemans continue to insist that the framework is “insufficient for analyzing and addressing power and power relations.” Finally, Allison
and Horemans (2006, 764) argue that “with its focus on ‘households’ it does not explicitly consider intra-household differences in livelihoods (e.g., between women and men, youth and elders) and the impact of larger scales of social organization, such as the occupational group, community, ethnic group and nation.”

**Strengths**

Despite these criticisms, nearly all critics have argued in favor of using the SL framework. The new framework builds on the strengths, rather than weaknesses, of the poor rural people. The SL framework targets selective building blocks such as income diversification, agricultural production, and infrastructure while centering on the existing livelihoods and SL’s approach of bottom-up. Proponents of the SL approach argue that many traditional development practitioners fail to identify how macro or sectoral policies can negatively impact micro-level livelihoods at community or individual levels (Singh and Gillman 1999). Orthodox development planners tend to use a top-down approach by emphasizing projects that are donor driven. Traditional development practitioners also fail to examine unequal power relations among individuals in a community (Helmore and Singh 2001; McCarthy 2002). The SL Framework is unique because it combines participation and empowerment into its analysis. The SL approach tends to consider different forms of vulnerability that shape livelihoods (Twigg 2001).

The strength of the SL model is in its ability to master and understand various strategies that households or individuals use to cope and adapt. Here Singh and Gillman (1999) define coping strategies as short-term responses to a particular shock like sudden unemployment, sickness, or death. They also define adaptive strategies as the ability of
people to change their behavior patterns due to shock and stress in their struggle to build a solid long-term asset base. As Davies et al. (2008, 55) insist:

> We use the sustainable livelihoods approach as a research heuristic, as the basis for systems modeling, as a tool for collaborative planning by families and communities, and for improving cross-cultural communication. We are finding that it has value in promoting a systemic understanding of the linked social, cultural, economic and ecological issues that impact people.

A focus on assets and the ability of people to adapt to a changing local environment suggests that interventions are better based on peoples’ strengths rather than their weaknesses (Carney 1998). In fact, Singh (1999) has challenged the old-fashioned style of focusing on people’s needs by arguing that this approach often creates a ‘hand-out’ mentality that is likely to negatively affect their progress. The adaptive strategies in the SL model often focus on people as the center of analysis and solution creation. The approach enables people to understand various contexts and assets available to poor people, that will in turn identify priority policies and other sectors involved in the policy design (Pasteur 2001). The strength of putting emphasis on local strategies, instead of disrupting them, creates environments of bottom-up decision making that have often been ignored by many conventional models (Singh 1999).

There are five steps in the application of SL which can also be applied interchangeably or simultaneously (Singh and Gillman 1999). The first step involves the analysis of strengths or assets in a society, which also consists of identifying risks, indigenous knowledge base, and short-to-long-term adaptive strategies. The second step is to investigate the effect of both micro and macro policies on local livelihoods and then formulate strategies that complement, rather than disrupt, ongoing livelihood strategies.
The third step is impact assessment of technology and its significance to the existing local knowledge base. The fourth step is identification of available economic and social investment strategies that may affect livelihood strategies. This often includes personal financial resources and other macro issues like education and health. The final step involves continuous monitoring of the approach in order to ensure that the system adapts well on local, regional, and international issues (Carney 1998; Singh and Gillman 1999).

The SL framework is dominated by “people” instead of “things,” it focuses on “qualities” and not “numbers,” “the poor” rather than “the rich,” and also invests in both “women and men” rather than “men only” (Chambers 1987 cited in Davies et al. 2008, 56). “Conventional economic focus on market production, salaried employment, and cash income as the key elements of well being was ethnocentric, reductionist, and inadequate to account for the strategies people actually use to obtain a living” (Davies et al. 2008, 56). On the same page, Davies et al. continue to argue that:

Rather, people pursue livelihood security in many ways: ‘through ownership of land, livestock or trees; rights to grazing, fishing, hunting or gathering; through stable employment with adequate remuneration; or through varied repertoires of activities’. There is the need to recognize the often transient, mobile, dispersed, and diverse nature of such activities when pursued by poor people and the importance of reflecting local conditions, priorities, and beliefs in approaches to development.

The historical emphasis on formal employment, cash incomes, and market production fails to account for the various strategies actually used by people to earn their living.
Descriptions of Various Forms of Capital

As a prelude to the first step of the SL framework—analysis of assets—several forms of assets or capital need to be highlighted. These include human, social, natural, physical, and financial. These are briefly discussed below.

Human Capital

Human capital includes knowledge, skills, labor ability, and good health that jointly enable a person to perform various livelihood strategies to achieve livelihood objectives (Scoones 1998). Human capital is particularly important at a household level, which here includes the amount and quality of the available labor. Human capital at a household level varies based on household size, leadership potential, skill level, or health status of family members. Human capital can be considered a building block or means to achieve desired livelihood outcomes. In fact, when properly accumulated, it can be regarded as an end in itself.

Human capital has many well-developed indicators, although some, including life expectancy, are hard to measure at a local level. The average number of years a child spends in school can be easily quantified, as well as the percentage of girls enrolled in school. The SL framework, though, is still not clear on how to measure the quality, impact, and value of education to livelihoods. Similarly, the correlation between years spent in school and the knowledge generated can be hard to measure, as well as the general relationship between these factors and leadership potential. Counting human population is yet another indicator, which can further be linked to other forms of capital.
As Garnett et al. (2007, 6) insist, “…immediate threats to biodiversity are underpinned by the inexorable rise in population.” Garnett (2007, 6) also argues that:

Absolute population size can also affect the effectiveness of local regimes for governing natural resources. In pre-agricultural societies, humans usually interact closely with 150 other individuals but can readily recognize the faces of 2000 and it may be that, above this level, there is a threshold limit to the complexity of interactions that require a qualitatively different governance structure.

The SL framework does not consider formal education as the only source of knowledge under human capital. A clear understanding of existing local knowledge, how this knowledge is shared among people, what is added to it, and the overall purpose this particular knowledge is capable of aiding understanding. Some knowledge can be productive (like modern farming knowledge) and other knowledge can be greatly unproductive unless coupled with other forms of knowledge (such as knowledge of appropriate quality standards).

**Social Capital**

Here, social capital and political capital are combined. Adato et al. (2006, 227) are correct in their assessment that “social capital has been identified in the literature as an important avenue of upward mobility for poorer people.” It is assumed that social resources upon which people have access are inter-related: 1) networks and connectedness, either vertical (patron/client relationship) or horizontal (between individuals with shared interests) relationships build people’s trust and ability to work as a team while expanding access to wider institutions; 2) membership of more formalized groups, in which members adhere to mutually-agreed or commonly accepted norms, rules, and sanctions; and 3) relationships of trust, reciprocity, and exchanges facilitate
cooperation, reduce transaction costs, and act as a basis for informal safety nets among the poor.

Social capital is intimately connected to transforming structures and processes of all other livelihood building blocks (Scoones 1998). Social capital can be thought of as the product of these structures and processes, even though this relationship should not be oversimplified. Structures and processes can themselves be products of social capital—implying that the relationship is self-reinforcing at times. Adato et al. (2006, 229) state: “Individual’s investment in social capital is shaped by social identity… social mechanisms of access to capital and insurance are likely to be ineffectual in highly unequal societies such as South Africa.”

Social capital also has many negative outcomes. Allison and Horemans (2006, 758) state: “The literature on ‘social exclusion’ adds a political dimension by focusing on how, through their relations to the more powerful, groups of people may become excluded from economic opportunities, social networks and political processes.” First, social capital formation is capable of creating a class of disadvantaged social groups especially when certain groups are excluded, for example landless women with limited skills. Second, when networks are hierarchical and coercive they can limit mobility, thus preventing people from escaping from poverty. Third, organization memberships often entail obligations that include assisting others during difficult times.

Therefore, simply counting numbers of registered groups in an area does not guarantee a good measure of social capital because nature and the quality of a group is as important as the number of groups. Looking at trends, whether an organization is
improving or worsening, is more important than simply gauging exact levels of social capital. People with overlapping memberships can be particularly hard to measure, especially when it becomes obvious that certain groups of people have been excluded from all groups. Another likely observation would be to investigate people’s coping strategies during times of crisis and the way people rely on available social resources to survive.

*Natural Capital*

Natural capital represents natural resource stocks that can be derived through resource flows and services that support livelihoods (Scoones 1998; Bohringer et al. 2003; Garnett et al. 2007; Davies et al. 2008). There are various resources that make up natural capital, ranging from intangible public goods, like the atmosphere, to divisible assets used directly in production, like land and trees.

The SL framework acknowledges a particularly close link between natural capital and the vulnerability context (Scoones 1998). Most of the shocks affecting the poor are themselves natural processes likely to destroy natural capital (such as earthquakes, fires, and floods) or seasonality that can change the value and productivity of natural capital over an extended period of time. Natural capital has a clear importance to people deriving all or part of their livelihood based on resource-based activities including forest gathering, fishing, farming, or mineral extraction. No single human can exist without some environmental service or food production.

While the existence of various types of natural assets is important, the quality, access, and how natural assets can combine and vary over time are all important,
including seasonal variation in value. Degraded land with fewer nutrients can be less
important in livelihoods, especially in areas where people have no access to water or even
necessary physical capital or infrastructure that would enable people to use water
(Bohringer et al. 2003; Martinez-Alier 2003; DeFries et al. 2004; Dixon 2005). It is
important to understand the various ways that a society gains access to natural capital; for
example, land tenure may include private ownership, common ownership, rental use, or
contested access. Quality of natural capital also matters, including the productivity of
land and the extent of biodiversity.

**Physical Capital**

Physical capital is the combination of producer goods and basic infrastructure that
support livelihoods. Producer goods are equipment and tools used by people in
production; infrastructures are the physical environment that enables people to become
productive (Scoones 1998). Examples of essential infrastructure include transport,
shelter, water supply and sanitation, energy, and accessible information. Except for
shelter, infrastructure is normally a public good that can be used by a community without
direct payment. Producer goods can either be owned individually, or on individual basis,
or obtained through “fee for service.”

Lack of certain basic infrastructure can be regarded as a core measurement of
poverty. Lack of energy and water can cause deterioration of human health and thus,
reduce productivity. Increases in transport and production costs can force producers to
operate under comparative disadvantage as more time is spent meeting basic needs,
securing access to markets, and in production than would be necessary if basic
infrastructure was in place. Porter’s (2002, 285) paper “Living in a Walking World” argued that “The African farmer largely inhabits a walking world…because walking is often the only mode of travel available: those who live in ‘off-road’ rural settlements.”

The availability of basic infrastructures can help to integrate remote rural areas where the majority of poor people live. This integration enables free movement of people between rural and urban centers and thus, people can be informed about availability or lack of opportunities in potential areas of migration. Infrastructure can only be considered an asset if it can facilitate provision of services that enable the poor to meet their limited needs. Porter (2002, 286) continues to make the following arguments on the state of physical capital in much of sub-Saharan Africa:

There is a substantial literature which highlights the low quality of the rural road network in Africa, the fact that rural roads (paved and unpaved) are defective not just due to poor design and construction but, above all, due to lack of proper maintenance and that this greatly increases vehicle operating costs. Rural transport charges are higher than any other region in the world. Villages in Zimbabwe, for instance, which have an average of one motorized vehicle per 300 people, with Sri Lanka, where the level is five times as great. They report transport charges for journeys of up to 30 km as up to two and a half times more expensive in Africa than Asia.

The SL framework can help highlight the importance of access to the right infrastructures that may enable people to secure positive livelihood outcomes. Priorities and needs of users can be established through participatory approaches. The framework encourages the provision of affordable infrastructure that meets immediate needs of users. Simultaneous skill and capacity building will be needed so that local people themselves can manage over the long term. Porter (2002, 288) also insists that, “Not
surprisingly, agricultural prices in some remote rural areas of Ghana have dropped because of increased transport costs associated with road deterioration.”

Access to infrastructure is an issue of concern because some costly infrastructure can be available but only be accessible by rich people, partly because of expensive user-fees or influence needed to monopolize and control access. This dissertation research has used participatory approaches to investigate whether the infrastructure supports a service. For example, a school building alone will mean nothing if there are no teachers or if it is located in an area that is inaccessible. This study also attempts to determine if the infrastructure is appropriate—whether the physical capital can meet needs of the people over the long-term. The sustainability of the service in question includes an analysis of the capital that can be adapted and upgraded as people need change.

Garnett et al. (2007, 8), though, do not see a direct correlation between physical capital and other forms of assets, especially in their following remarks:

[T]here is an underlying assumption that the creation of infrastructure generally increases the level of threat to natural capital values… Sometimes the lack of built capital is an explicit measure of the value of natural capital, as in the definition of wilderness as being largely devoid of human influence, e.g., the U.S. Wilderness Act of 1964.

Their arguments, however, have been critiqued by Leiserowitz et al. (2006, 423): “Many analyses of the human impact on life support systems make use of the ‘I = PAT’ identity. In this framework, environmental impact (I) is a function of population (P), affluence (A), and technology (T).”
Financial Capital

Financial capital includes financial resources used by people to achieve livelihood outcomes (Scoones 1998). It includes flows and stocks that contribute toward consumption and production. Financial capital as applied in the livelihood framework denotes the availability of cash or something equivalent that can support a livelihood. This study has explored the available stocks, including savings regarded as the most preferred form of financial capital due to its lack of liabilities. This source also may include livestock and jewelry. Financial capital takes into consideration availability of credit-granting institutions. This study also investigated the regular inflows of money, including pensions or remittances. These flows can only support livelihood if they are reliable.

Financial capital is both the least available to the poorest and the most versatile of all five assets (Moyo 2009). Financial capital can easily be converted into other assets depending on the available transforming structures and processes. Financial capital can be used directly to achieve livelihood outcomes, such as purchasing food that reduces food insecurity. This capital can be transformed, rightly or wrongly, into political influence that can inspire people to organize themselves in order to determine resource access. Moyo (2009, 131) makes the following observations regarding the state of financial capital in sub-Saharan countries, especially Ghana and Tanzania:

In more recent times, micro-credit organizations were developed in the 1960s to serve Africa and Asia’s needs for agricultural support, yet most Africans today still have very limited access to financial markets. In Ghana and Tanzania, for example, only about 5-6 per cent of the population has access to the banking sector, although some 80 per cent of households in Tanzania would be prepared to save if they had access to appropriate products and saving mechanisms.
Access to financial capital among poor people is being reached indirectly. First, organizations, when accessible, trusted, and known, can encourage people to save. Second, institutions can increase access to financial capital by overcoming barriers to entry that poor people face due to their lack of collateral. Institutions create an umbrella guarantee or transform people’s assets into collateral. Third, legislation can transform regulations and public policies so that they provide better safety nets to the poor.

Sometimes savings can take unconventional forms based on the culture and needs of the people. Pastoralists are likely to benefit from improved marketing systems that reduce risks of investing their savings in livestock more so than creation of a bank system. Institutional stability has a significant importance in micro-finance. People have to believe that financial organizations will last for a long time and continue to charge reasonable interest rates before they can entrust savings to them as well as make loan repayments. There are two important saving characteristics: a) productivity, referring to how much savings gain if left untouched, and b) liquidity or how easily savings can be converted to cash (Bohringer et al. 2003; Martinez-Alier 2003; DeFries et al. 2004; Dixon 2005).

Muhammad Yunus, a Bangladeshi national and recipient of the 2006 Nobel Peace Prize, has become the grandfather of what has been described as “banking for the poor;” that is, his innovation of lending to the poorest of the poor, “People whose only nominal personal wealth would probably be in the form of land, where the collateral is undocumented and legally unenforceable” (Moyo 2009, 126). “The genius behind
Yunus’s Grameen Bank (literally translated from Bengali as ‘Bank of the Village’) was in converting that trust into collateral” (Moyo 2009, 126).

Rural Education

Radical Notions

This section deals with the role of education not only in relation to social change but also in achieving sustainable livelihoods. The impact of education on economic development is very clear. Oyelaran-Oyeyinka and Barclay (2004, 120) make the following observation: “One of the key factors behind the phenomenal economic success of latecomers such as the South-East Asian economies was their emphasis on human capital formation and a dynamic system of innovation.”

Kassam (1994) insists that an innovative curriculum must be oriented to rural life. Learning takes place in context through exposure and interaction, rather than implementation of specific educational techniques. Lave and Wenger (1991) demonstrate that learning in context requires “legitimate peripheral participation,” such that learners are exposed to and hold legitimate positions of a particular process so that they can learn the skills that are required.

Various educational scholars have shaped my interests in curriculum development. Ralph Tyler (1949), who is widely considered one of the most influential theorists in curriculum planning, evaluation, and linkage had significance influence. Tyler’s analysis of curriculum content includes four basic groups in curriculum development that have strongly shaped the implementation of GOSES0. His four groups are: 1) defining necessary learning objectives; 2) establishing appropriate learning
experiences; 3) organizing learning experiences in order to establish a maximum cumulative effect; and 4) evaluating the curriculum as well as revising unsuccessful aspects. In fact, Tyler views a curriculum as yet another “science” where learning can be categorized into knowledge, skills, and values. He views education as a social institution with direct influence to the society as a whole. Tyler also views schools as yet another microcosm or instrument of democracy that enable students to function in a democratic society (Tyler 1949).

It is Tanzania’s Julius Nyerere and Brazil’s Paul Freire who remain key figures in action-oriented education. The two men were both active between the 1950s and 1970s, during the post-war international project of “development as outside intervention” (Rahman 1995). Their descriptions of development and conceptions of education conflict with those of the larger international community. For each of these writers, development was more broadly defined as part of a larger process of social change rather than a specific technical intervention aimed at dealing with “marginalized people.” They conceptualized education as a tool to uncover the material conditions and determine the steps for action, rather than as a space for transferring de-contextualized forms knowledge (Rahman 1995).

Here is the work of Nyerere and Freire during the period of post-WWII interventions and post-colonial struggles, which critiqued the top-down intervention and mainstreaming of participation. Each of these radical emancipatory theorists understood that development cannot be measured by economic growth alone (Rahman 1995). The development of the individual—particularly in expressing new consciousness—was
fundamental, although not the end-point in a larger process of transformation. While people engage in transformation of very specific conditions and in particular locations, such transformation is linked to larger struggles which affect and gain support of others beyond the site of engagement. Both Freire and Nyerere base their visions of transformation on recognition that poverty and other social ills are symptoms of oppression and engagement with a world system, rather than a result of marginality to this system as later theorists would suggest.

In contesting the commonly held notion that some people are marginalized and outside of the system, Freire makes us see participation as a process that goes far beyond bringing people into the “center.” In speaking of illiterate people, Freire (1986, 49) states:

These men (people), illiterate or not, are in fact not marginal. They are not “beings outside of,” they are “beings for another.” Therefore the solution to their problem is to become, not “beings inside of,” but men freeing themselves. In reality, they are not marginal to the structure, but oppressed men within it. They cannot overcome their dependency by incorporation into the very structure responsible for their dependency.

These men exist inside a social space that is connected to and shaped by actors who inhabit, produce, and maintain other spaces. These spaces and the people who inhabit them are constitutive of each other. Transformation of the so-called “marginalized space” required a transformation of the larger structure, which created the relationships of marginalization in the first place. The structure however could not push people into spaces; rather, “we must assume an agent had his reasons to put them there” (Freire 1986, 49). Transformation of our conditions changes not only our world, but also our relations to each other. As such, Freire upheld the possibility that the oppressed, in liberating their
minds through knowing and changing their conditions, could also be in a position to liberate their oppressors who existed in dialogic opposition. Freire (1998, 55) recognized that participation requires transformation in order to create possibilities and entails something that is core to our humanity.

Recognition of being in the world, with the world, with others, brings with it a sense of ‘being with,’ constitutive of who I am that makes my relationship to the world essential to who I am. My presence in the world is not so much of someone who is merely adapting to something “external,” but of someone who is inserted as if belonging essentially to it.

For Freire, participation meant being and engaging with each-other and the world. It is not simply a matter of adapting to current conditions, but rather knowing these conditions through a process of action and reflection. By transforming the world, we are transforming ourselves in relation to this world. As a dialogic process, personal change and knowledge makes possible the change for greater humanity. This capacity for transformation is central to what makes us human (Freire 1986, 1998; Freire and Macedo 1987). Humans always have the possibility for transformation of current conditions; such transformation requires initially a process of freeing oneself from the “oppressive reality that absorbs those within it and acts to submerge men’s consciousness” (Freire 1986, 40). This process begins with “unveiling the world of oppression” (Freire 1986, 40), which makes possible a commitment to its transformation. The process of becoming conscious, freeing oneself, is not a personal project of empowerment; rather, empowerment is a social act (Freire 1998, 53).

This consciousness is the result of both intellectual discoveries through dialogue and reflection as well as action. While Freire strongly believed in the capacity for
teachers to support and create space for dialogue and later transformation, only the oppressed can liberate themselves, and in doing so, restore the humanity lost by those who oppress. In liberatory education “the teacher is no longer merely one who-teaches, but one who is himself taught in dialogue with the students, who in turn while being taught, also teaches” (Freire 1986, 67). Knowledge is not a static product that can simply be transferred from a teacher to a student but rather the result of interaction, engagement, action, and reflection.

Freirean thought offers insight into the very problems of earlier top-down interventions. Freire argues that people and countries are very much inside and not marginal to a system of oppression. The very construct of underdevelopment as an isolated phenomenon is problematic and therefore any intervention aimed to close a gap that is only discursively constructed could not be seen as productive. For Freire, knowledge is constructed in community and not passed down by the elites as an object.

This dissertation argues that a sustainable livelihood can be achieved through building livelihood assets or capital. The existence of a co-intentional or problem-posing education system will be necessary in order to achieve sustainable livelihoods in western Tanzania. I also argue that education has historically been implicated through discourses of participation to promote and maintain a system that created marginality in the first place. Here, I start by exploring Nyerere’s approach to rural development in Tanzania through his *Ujamaa* system of villagization.
Ujamaa System of Rural Development

To examine Tanzanian society and its education system at present, we need some understanding of the historic and recent processes it has experienced. This section provides a brief look at the historical events that have shaped the country’s education system, the independence that created the nation itself, economic crisis, and structural adjustment. Under colonial rule by first the Germans, and then the British, the constructed entity of Tanganyika suffered greatly under colonialism as it was designed to provide a reservoir for labor- and resource-extraction. The livelihoods of many indigenous people therefore were dependent on and restricted by colonial powers.

British policies in Tanganyika determined where and how indigenous people would live, demanding pervasive segregation along racial and class lines, and the suppression of native African entrepreneurship (Lugalla 1997). Independence in 1961 led to a new beginning for the structure of Tanzanian society. As the first president of the nation, Nyerere advocated a populist vision of a decidedly “African” way of developing the country for the betterment of its people. His model of African socialism put forth a strong stance against dependence on industrialized nations, a return to rural values and livelihoods, and a truly egalitarian society united by a common language and vision of collective development. Nyerere’s ideas have been supported by Oyelaran-Oyeyinka and Barclay (2004, 121), especially with the following observation about the current African education system that is now seen as unsuitable for the Africans:

First, some researchers argue that the present education system in Africa is a legacy of colonialism. It seems that the metropolitan powers implemented a highly academic, subject-centered curriculum in Africa. This curriculum, with its focus on producing an academic elite, was largely irrelevant to Africa’s
development needs. The colonial governments also unsuccessfully attempted to introduce technical and vocational schools. However, African societies, partly influenced by the colonial elite, regarded academic education as the sole means of social and economic mobility.

Nyerere’s conceptualization of participation went far beyond bringing more people into or adapting to the current system. The colonial system of inequality he inherited after Tanzania gained independence in 1961 was incompatible with the goals of his African socialist system called *Ujamaa*. Any hope for equal participation was therefore predicated on transforming this system, which had privileged only a small minority of Tanzanians. Such transformation required Tanzanians to free themselves from the internalization of colonial oppression so that they could develop the capacity to actively participate in a national development project based on equality (Nyerere 1967a, 1973).

For Nyerere, education was meant to be the process of freeing oneself and communities from internalization of colonial oppression. Nyerere’s *Ujamaa* approach (Nyerere 1967b, 25) offered freedom for the individual “his right to live in dignity and equality with all others, his right to freedom of speech, freedom to participate in the making of all decisions which affect his life,” but none of these freedoms could be realized without economic and social development. Such development was a project of the nation of which individuals as collective communities were an integral part.

Self-reliance and development after independence was dependent on the promotion of widespread public services available to all communities. Nyerere’s government developed and implemented through the Education Act of 1978 a universal
primary education system, mandatory for all the country’s youth who would contribute to the betterment of society and the general quality of life.

The ethic of universal access was also expressed in the initiation of universal, nationalized health care and the promotion of employment opportunities in the public sector. Finally, Nyerere’s program of *Ujamaa* villagization, while a controversial failure in economic and environmental respects, was a part of his vision of an African nation model based on rural livelihoods and peaceful unity among Tanzania’s cultures.

Scott (1999) compares state development schemes across different contexts, devoting one chapter to the *Ujamaa* villagization campaign in Tanzania. He applies the same principles developed throughout the book to discuss how state rationality and “legibility” are at odds with the realities of complex societies. His work is very useful for its analysis of why well-intentioned development schemes doom themselves by “seeing like a state.” Hydén (1980) attempted to analyze Tanzania’s peasantry through a non-Western perspective. His method is essentially anthropological, using his own experience and interviews to challenge Western thinking on Africa. He examines the peasantry as a social force and discusses why the first ten years of socialism in Tanzania did not achieve expected development.

Yet, Nyerere’s vision and programs were praised across the continent because they put forth an African way of progressing through a socialist system that, at least rhetorically, was more in-line with traditional African cultures. While the *Ujamaa* villages may have disrupted lives and hurt cultivation, there are measures of the successes of the socialist state in Tanzania. The same state power responsible for the agricultural
failures generated a national pride, African pride, unity among the tribes, and an extremely stable and peaceful environment, despite sharing borders with several war-torn countries. Tanzanians to this day praise Nyerere despite his mistakes, and very commonly refer to him as *Mwalimu* or “Teacher,” and “Baba wa Taifa” or “The Father of the Nation.”

In the 1970s, the public services underlying Tanzanian unity and stability could no longer be maintained due to a number of internal and external factors including the decline of agriculture, which drastically reduced the country’s GDP, and the 1973 oil crisis, which restricted its ability to import basic necessities. With the 1980s came economic reforms, trade liberalization measures, and increasing external debts instituted by conditional agreements in World Bank and IMF development loans, which were taken out by the government as a necessary means of national survival. This rapidly reduced the already deteriorating quality and availability of public services, while simultaneously increasing the cost of living. Many government services, including health care and education, which used to be free to all now required “user fees.” Other sectors were privatized and were no longer held accountable for the quality of their service or their treatment of workers. One important result of this rapid economic transformation from a socialist framework to the adoption of free-market models and institutions was the noticeable exacerbation of social division and inequality among Tanzanians, which continues to the present.

Fighting poverty was a key concern for Nyerere and became a central goal of the *Ujamaa* system. Poverty was not addressed as a problem outside of or separate from the
challenge of transforming a colonial system rather poverty was addressed as a symptom of this very exploitation. Nyerere supported deliberate policies, both taxation and government pricing to transfer resources from producing sectors to the financing of social and productive capital in the rural areas. Additionally, recognizing that Tanzania had few large industries or potential investment, but had both labor and land, Nyerere went against most development strategies of the time by putting rural development rather than industrialization at the center of national development.

Nyerere was committed to reversing the traditional flow of wealth from the rural areas into the towns by making sure that the wealth produced actually benefited the workers who had produced the goods with their hands and their skills, rather than those who merely sold these goods. Rural development in Tanzania became the system through which all other governmental policies were implemented. Nyerere (1967a, 8) makes the following observations: “Rural development can’t be an extra tag onto the other policies of the government. Rural development must be a description of the whole strategy of growth, the approach to development, and the prism through which all policies are seen, judged, and given priority.”

**Role of the Outsider**

Nyerere believed strongly that people could not “be developed;” they could only develop themselves. “Freedom won by outsiders is lost to those outsiders, however good the intentions” (Nyerere 1974, 3). Just a year before he made these remarks, Nyerere (1973, 3) gave an even more compelling argument against the role of the outsider:
For while it is possible for an outsider to build a man’s house, an outsider cannot give the man’s pride and self-confidence and himself as a human being…..These things are developed through action, by making his own decisions and by his own full participation as an equal in the life of a community he lives in.

At the same time though, Tanzanians were encouraged to learn everything they could from outsiders as long as they judged and applied the new knowledge or technique according to the values and goals of Ujamaa.

Despite Nyerere’s and Tanzania’s attempts to create and maintain a fair and equitable socialist society, to double employment in the industrial sector from 1967-1973 (Campbell and Stein 1991), to obtain one of the highest literacy rates worldwide, and Nyerere’s rejection of IMF and World Bank structural adjustment policies, during the 1970s Tanzania experienced economic hardships due to famine and the world-wide oil crisis. As Ujamaa was based on a decentralized form of government, Nyerere was unable to control the implementation of his policies for equitable distribution. While some sectors benefited, many were undermined by the corruption of government officials. People developed their own strategies for survival and developed a strong private black market, which paralleled the national market system.

Nyerere’s rejection of the imposition of IMF and World Bank structural policies in 1979 was based on his beliefs that these two institutions fundamentally conflicted with socialist principles. However, as Tanzania’s informal markets developed, corruption spread, poverty rose, and the World Bank continued to negotiate with other Tanzanian leaders, the legitimacy of the ideologies which were the basis of Ujamaa became more difficult to sustain. The ideologies offered by the World Bank of free trade and privatization were initially welcomed by both urban and rural Tanzanians alike as an
alternative to what they had experienced as corruption and domination. Nyerere eventually stepped down as president in 1985. That same year, Tanzania agreed to accept loans and thus was forced to implement structural adjustment policies, which were conditions for these loans. The policies included privatizing the agricultural and transportation markets, cutting government support for education and health, and opening up the country to free trade.

**Education for Self-reliance**

Informal education is central to the SL framework. Curriculum is a vital component in the practice of freedom and can liberate oppressed people to transform their world. Cajete (1994) argues that indigenous knowledge has been deliberately eliminated and replaced by a Eurocentric educational system designed to modify behaviors of students through a “command and control” approach. He writes in favor of Native American education models, insisting that tribal education is well-suited to transform the embattled American education system by including an innovative curriculum that embraces life. Cajete further observes that indigenous-based curriculum has a tendency to include stories that are expressed through people’s experience, parables, myths, and local metaphors. Indigenous learning often encourages students’ learning by watching and doing. Learning is an iterative lifetime process. For indigenous learning, people become architects of their own future whereby information is invested anew with each passing generation. In fact, Cajete identifies indigenous education as a necessary foundation for indigenous life and the persistence of traditional culture.
Cajete insists that thinking the highest thought can only imply richly thinking of one’s self, one’s community, and one’s environment. His metaphor of wind in Navajo tradition implies that education is often based on language and oral communication. Cajete asserts that language has a tremendous power to express, inform, and educate society. He believes that humans are often influenced by a multitude of winds from the time they are born until their death. His interpretation of the connected rings of indigenous visioning starts with asking and ends with being; that is, from asking, seeking, making, having, sharing, celebrating, to being. In general, Cajete (1994, 24) defines education as an “art of process, participation, and making connection. Learning is a growth and life process; and Life and Nature are always relationships in process.”

Nyerere (1978) has written and spoken extensively on the role of adult education in development. Nyerere’s approach in “education for self-reliance” is based on his conviction that educational skills must liberate people and arouse their political consciousness. A liberating adult education is thought of as one that can inspire a desire for change. For Nyerere, education is a lifetime process; to live is to learn, and learning is a process of trying to live better.

Nyerere lists two groups of adult educators: generalists and specialists. The group of generalists includes political activists, educators, community development leaders, and religious leaders. Nyerere believed that these people cannot be politically neutral based on the very nature of their work and their ability to arouse the people and their consciousness. The second group of specialists includes a wide range of professions such as those in nutrition, health, child care, management, agriculture, and literacy. In fact,
Nyerere sees a teacher of adults as a leader who guides others through a journey which teacher and people must travel together. For him a teacher of adults is not someone trying to give others what he already possessed, but rather someone who is forever trying to help others to develop their own potential and capabilities.

During Nyerere’s 24-year reign in Tanzania, the rural areas were not spaces separate from the center; rather the *Ujamaa* system relied on a decentralized government that supported leadership within the villages. A philosophy of self-reliance coupled with statewide resource redistribution and land reform ensured that each village had the resources and skills to collectively provide education, health care, marketing strategies, and other needs. Self-reliance didn’t mean supporting oneself without the help of others; rather as long as individuals lived within the cooperative of the village and with the provisions of basic resources such as land, they could be relied upon to determine and realize their own priorities of development (Nyerere 1967a).

To support self-reliance, and to inculcate Tanzanians with ideologies aimed at undoing those brought by the British, Nyerere implemented a strong primary educational program in which schools became research centers where both community members as well as students could try out and observe new agricultural practices, share and exchange information, and practice marketing. Nyerere built on traditional forms of learning in which members of community learned through experience. He encouraged Tanzanians to learn from each new experience and process their knowledge according to the goals of the socialist state. In this case, in participating in schooling, students were participating
in building the larger community. As the rural areas were connected, participating at the local level also meant participating in building the nation.

**Emancipatory Education**

A school curriculum cannot be understood without a clear knowledge of educational objectives employed in a given educational institution. Eisner (1983) argues that clearly and specifically stated educational objectives can either hamper or help the meaning of instruction. The objectives of education should always be clearly specified for three reasons: 1) objectives can provide a curriculum roadmap; 2) objectives can help in the selection and organization of curriculum content; and 3) they make it easier to evaluate the curriculum’s outcomes. Eisner supports the development of educational objectives that foster curiosity and inventiveness. Eisner views a student as an art product and the teacher as a critic whose task is limited to discovering students’ talents. The role of a teacher is more than criticism—(s)he is also responsible for the improvement of the student as an artist and in the end, the teacher becomes an artist.

Human culture is transmitted inter-generationally through what Anyon (2004) refers to as a “hidden culture,” the discovery that more is learned in schools than normally mentioned in school curriculum and textbooks. In his “Social Class and the Hidden Curriculum of Work,” Anyon (2004) paints a vivid picture of how American students in different social class backgrounds are often rewarded for classroom behaviors based on different occupational strata—students from the working classes are encouraged to embrace docility and obedience, and those coming from the managerial classes are encouraged to undertake initiative and personal assertiveness. The knowledge and skills
leading to social power are made available to students from advantaged families and then
withheld from the students coming from the working classes. Indeed, most of the African
education system continues to have a legacy of colonialism.

*Role of Language*

Language can be an important barrier in achieving sustainable rural livelihoods in
Africa and is one of the significant ways by which humans both demonstrate their views
about their world, as well as negotiate new meanings. In order to achieve the
“decolonization of mentality” or “re-Africanization of mentality,” the use of indigenous
language is needed to “develop radical pedagogical structures that provide students with
the opportunity to use their own reality as a basis of literacy” (Freire and Macedo 2001,
198). It is this use of students’ language which enables them to develop their own voice
and build a positive sense of self-worth. Empowerment also involves enabling students to
interrogate and selectively adopt certain aspects of the dominant culture that are likely to
provide them with necessary tools to define and transform, not simply serve, their world.

To attain social unity, Nyerere advocated a national African language, Swahili.
The nationalization of the language through the expanded system of education made it a
tool for unifying the different tribes, religions, and ethnicities, which made-up the diverse
patchwork of Tanzanian society. The universal language furthermore “served to reinforce
the promotion of positive attitudes towards the respectability of rural life” (GOT 1983,
2). Thus, the nationalist ethic promoted a shift from a system of divisions along tribal
lines arbitrarily contained in a drawn-up nation-state, to the Tanzanian people, the
Tanzanian culture, the Tanzanian language, and the Tanzanian socialism that reflected
particularly African values. A new society was being born, in which all identifications
and divisions were stated as being secondary to the overall desire for pride and unity as a
free African nation that can develop itself in its own way.

Much effort has been made in trying to understand the source of
“misunderstanding” in intercultural interactions. During colonialism, educational systems
served to “inculcate the African natives with myths and beliefs that denied and belittled
their lived experiences, their history, their culture, and their language” (Freire and
Macedo 2001, 194). Additionally, schools became fountains designed to purify Africans
from “their deep-rooted ignorance, their ‘savage’ culture, and their bastardized language”
(Freire and Macedo 2001, 194), which could not be applied in academic settings. This
“deculturation” of natives into a new predefined colonial model created a “petit-
bourgeois class of functionaries who had internalized the belief that they had become
‘white’ or ‘black with white souls,’ and were therefore superior to African peasants, who
still practiced what was viewed as barbaric culture” (Freire and Macedo 2001, 194).

To summarize, the following can be a summary of the most important issues that
pertain to the three broad categories of literature review as used in this dissertation, that
is: emancipatory education, community-based conservation, and sustainable livelihoods.
Education is likely to have a significant influence in promoting sustainable livelihoods
especially among the world’s rural poor through creation and implementation of a
indigenous-based curriculum that immerse students in their local place and employ
various learning approaches such as cooperative, service-learning, project-based, peer-
assisted, and cross-age learning to accommodate students’ differing developmental
levels. Kassam (1994) stated in his analysis that an innovative curriculum must be oriented to rural life. Therefore, a new educational approach, which integrates theory with practice, is needed.

While education, as a form of human capital, is important but alone it cannot be the only key element in alleviating poverty. Poor households can remain poor unless they receive additional opportunities to diversify income in both on- and off-farm areas including securing formal jobs, creation and management of small businesses, or improvement in farm productivity. This is why projects and programs should be developed to help prevent people from falling into poverty while others are geared to lead people out of severe poverty.

Since people acquire knowledge in different contexts, through diverse learning styles and multiple intelligences, this new form of education for Kigoma Rural may need to employ various learning approaches such as cooperative, service-learning, project-based, peer-assisted, and cross-age learning to accommodate students’ differing educational needs. The curriculum may promote independent thought, critical thinking, and debate through discussion periods. With student-centered hands-on education, students will not only be able to set and accomplish goals for themselves but will be given the knowledge and ability to find solutions and create change within their communities.

Earlier discussion of community-based conservation implies a critique based on rather simplistic views of rural society as undifferentiated. Rhetoric of “community-based conservation” has gained prominence among economic development specialists and
environmentalists, yet such projects are often implemented from the top-down in Africa. This dissertation contends that only a truly bottom-up or “grassroots” approach has the potential to foster resilient livelihoods and environmental stewardship. The goal of this study has been focused on determinants of household resilience within a poverty-stricken farming community near Gombe Stream National Park in western Tanzania. The research purpose was to explore: 1) relationships between villagers and Gombe park management; 2) how groups and individuals view priority livelihood problems and solutions; 3) various attributes of households; and 4) perceived trends for household resilience and how these are related to natural, social, human, and financial capital as per the Sustainable Livelihoods Framework.

Thus, a new livelihood approach is needed to enhance understanding of concepts relating to community and wildlife sustainability, while ensuring that local people benefit from the land and the local resources through participation in environmental decision-making. It can also empower a diverse group of committed youth to improve cultural-diversity understanding, increase stability and peace, strengthen environmental and community relations, and lead the way to a sustainable future. This type of education can also provide local communities with access to resources, information, and services that will enhance understanding and foster partnerships among stakeholders. An emancipatory education for Kigoma Rural may include a school that uses the environment as a framework for an integrated curriculum, in order to teach community-based conservation and development strategies that promote environmental and
community sustainability; or one that trains African youth to pursue the fields of ecological management, wildlife conservation, and community development.
Table 2.1. Sustainable livelihoods framework (Source: DFID 2009)

<table>
<thead>
<tr>
<th>Trends</th>
<th>Shocks</th>
<th>Seasonality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population trends</td>
<td>Human health shocks</td>
<td>Of prices</td>
</tr>
<tr>
<td>Resource trends (including conflict)</td>
<td>Natural shocks</td>
<td>Of production</td>
</tr>
<tr>
<td>National/international economic trends</td>
<td>Economic shocks</td>
<td>Of health</td>
</tr>
<tr>
<td>Trends in governance (including politics)</td>
<td>Conflict</td>
<td>Of employment opportunities</td>
</tr>
<tr>
<td>Technological trends</td>
<td>Crop/livestock health shocks</td>
<td></td>
</tr>
</tbody>
</table>

Table 2.2. Sustainable livelihoods framework (Source: DFID 2009)

<table>
<thead>
<tr>
<th>Policies</th>
<th>Legislation</th>
<th>Institutions</th>
<th>Culture</th>
<th>Power Relations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macro</td>
<td>International agreements</td>
<td>Markets</td>
<td>Societal norms and beliefs</td>
<td>Age</td>
</tr>
<tr>
<td>Sectoral</td>
<td>Domestic</td>
<td>Institutions that regulate access to assets</td>
<td></td>
<td>Gender</td>
</tr>
<tr>
<td>Redistributive</td>
<td>‘Rules of game’</td>
<td>‘Rules of game’ within structures</td>
<td></td>
<td>Caste</td>
</tr>
<tr>
<td>Regulatory</td>
<td></td>
<td></td>
<td></td>
<td>Class</td>
</tr>
</tbody>
</table>
Table 2.3. A short summary of the sustainable livelihood dimensions (Source: Adapted from Ellis 1998)

<table>
<thead>
<tr>
<th>Capital Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial capital</td>
<td>Financial resources used to support livelihood objectives</td>
</tr>
<tr>
<td>Human capital</td>
<td>Skills, knowledge, ability, labor, good health</td>
</tr>
<tr>
<td>Physical capital</td>
<td>Basic infrastructure and producer goods (e.g., tools and equipment)</td>
</tr>
<tr>
<td>Social capital</td>
<td>Networks, relationships, group membership, social safety nets</td>
</tr>
<tr>
<td>Natural capital</td>
<td>Natural resource stock from which flows and services are derived</td>
</tr>
<tr>
<td>Processes</td>
<td>Policies and institutions influencing structures and individuals</td>
</tr>
<tr>
<td>Structures</td>
<td>Organizations of all levels with functions affecting livelihoods</td>
</tr>
</tbody>
</table>
Figure 2.1. Three main aspects covered in the literature review.
Figure 2.2. Sustainable livelihoods framework (Source: Scoones 1998).
Figure 2.3. Sustainable livelihoods framework (Source: Davies et al. 2008).
Figure 2.4. Sustainable livelihoods framework (Source: DFID 2009).

Key:
- H = Human Capital
- S = Social Capital
- N = Natural Capital
- P = Physical Capital
- F = Financial Capital
CHAPTER 3

STUDY REGION

As we approach the 21st Century the problems facing rural areas in developing countries like Tanzania are numerous and formidable. Social and economic services are deteriorating and proving to be unsustainable; school enrollment rates are declining; food situation is precarious; infant and maternal mortality rates continue to be high; unemployment is on the rise triggering off mass migration of youth from the rural areas into already overcrowded urban centers; in Kigoma Region, for example, land pressure is escalating and deforestation is going on at an alarming rate (GOT, 1998).

Kigoma Region

The Kigoma Region is situated in northwestern Tanzania. The following descriptive information is mostly from GOT (2007). The region comprises 5% of Tanzania’s land area and is located south of the equator on the eastern shore of Lake Tanganyika. The Kigoma Rural District is associated with the Great Rift Valley of western Tanzania [Figures 3.1(a,b), 3.2, 3.3]. It includes the eastern shores of Lake Tanganyika (Plate 3.1). Kigoma region has steep hills that rise sharply from Lake Tanganyika at 800 to 1,750 m above-sea-level (masl) in elevation. There are three major rivers, namely the Malagarasi, Luiche, and Ruchugi. Of Kigoma Region’s land area, 27% is arable and 45% is covered by forests (GOT 2007). Kigoma Region is endowed with world-class terrestrial and aquatic natural resources. Kigoma Region measures about 42,350 km² in total area and is home to the following world heritage environmental natural treasures:

First, Gombe Stream National Park (GSNP) measures 55 km² in area. Despite being the smallest and one of the most ecologically vulnerable parks in Tanzania, the
chimpanzees of GSNP have been made famous by the pioneering work of Dr. Jane Goodall.

Second, Mahale Mountains National Park (MMNP) measures 1,729 km² in area. It is also home to wild chimpanzees. With its roughly 800 chimpanzees, MMNP is an ecosystem that has also been used by the international community for primate research.

Third, Lake Tanganyika holds at least 15% of the global freshwater reserve and is the second deepest lake in the world (1.5 km deep.) The high quality of fresh water of Lake Tanganyika has made it home to many valuable species of aquatic life. The countries bordering on Lake Tanganyika include Tanzania, Burundi, Congo (DRC), and Zambia. About 48% of the lake constitutes Tanzania’s territorial waters and Kigoma region accounts for 80% of that share. Fourth, the Malagarasi River is the second largest RAMSAR site in Africa after the Okavango Delta in Botswana. This river feeds into Lake Tanganyika. Fifth, and finally, Moyowosi-Kigosi Wildlife Game Reserve measures 21,870 km² in area. It is one of the largest game reserves in Tanzania and is a home to diverse ecosystems and abundant wildlife. It is a destination site for world-class hunting safaris.

The region has a tropical climate with a main rainy season from October to May and a main dry season from June to September (Wilson et al. 2005). Climate is described by rainfall and temperature regimes. The annual rainfall varies from 600-1,500 mm and the mean daily temperature ranges from 25˚-28˚C (GOT 2007). The region’s vegetation consists of woodlands, bushed grasslands, and swamps. The Kigoma Region is one of the few places in Africa with suitable habitat for wild chimpanzees, mainly in the GSNP and
MMNP, as noted above. The Kigoma Rural District has a distinct seasonality concerning rainfall, but temperatures remain consistent. This is common in tropical settings. Data for 2003-04 indicate that monthly rainfall often exceeded 150 mm between December through April, but this dropped greatly for May to October (Figure 3.4). Mean monthly minimum temperatures recorded in 2003-04 only varied from 20º- 24º C while the daily maximum temperatures varied from 29º-36º C (Figure 3.5).

A resource endowment notwithstanding, the Kigoma Region is also a place of poverty for many thousands of Tanzanians. There are also thousands of refugees from the strife-torn nations of Central Africa (Burundi, Rwanda, and the DRC.) Many of these refugees have lived in the Kigoma Region for decades. They obtain food relief and also make heavy use of local natural resources (Fubusa 2005a). The refugees present several challenges. Coming from places where rape has been used as a weapon of war, they have special health concerns in addition to basic living needs. As of 2002, Tanzania hosted hundreds of thousands of refugees with a majority in Kigoma Region (Fubusa, personal observation).

Understanding the social history of Kigoma Region is important. The Kigoma Region includes Kigoma Urban District and Kigoma Rural District (Figure 3.2). The residents of Kigoma Region used to provide a labor reservoir for people to work on distant plantations during the colonial period. That history, in conjunction with Nyerere’s failed socialist policies, is among the factors influencing Kigoma’s impoverishment today. From colonialism to the present, Kigoma Region has relied on labor export and has not had the means to further develop its own local resources and infrastructure.
Kigoma Region thus remains markedly underdeveloped and is primarily still a source of labor for work opportunities in the northern town of Mwanza, either in the mines or in the manufacture of goods. However, marked change has very recently occurred in the Kigoma Region in terms of growth in Kigoma town as well as investment in all-weather roads and connecting the area to the national electricity grid; this is highlighted in Chapter 6. Kigoma Region is a significant trading center where trade routes to Zambia, Burundi, and the DRC meet and connect to other parts of Tanzania.

Gombe Stream National Park

The GSNP is one of few remaining parcels of native landscape in Kigoma Rural. A technical description of the forest and wildlife resources of GSNP is provided in Pusey et al. (2007), and most of these details are not repeated here. The site recently procured for the main campus of the Gombe School of Environment and Society (GOSESO) is near GSNP and is located in the heart of an area called Kitobe Forest. The acquisition of the parcel is described more fully in Chapter 6. Since the procurement, the GOSESO site in Kitobe forest has been protected from human use since 2007. Like much of the area occupied by people, the Kitobe Forest has long been subjected to high rates of tree felling, human-induced fires, and charcoal making (Fubusa, personal observation). The site remains dominated by low shrubs, but trees are beginning to recover in the GOSESO site (Fubusa, personal observation). A baseline inventory of flora and fauna at the GOSESO site is provided in Appendix A.

The GSNP is located at 4°40’ South, 29° and 38’ East in northwestern Tanzania, about 16 km north of Kigoma town near the northern shoreline of Lake Tanganyika.
Designated in 1943 as a national game reserve, and in 1968 as a national park, the GSNP largely contains a rainforest habitat in which chimpanzees and other primates live. The primatologist, Dr. Jane Goodall, and her field assistants have spent more than four decades in GSNP studying the behavior of wild chimpanzees and baboons. Pusey et al. (2007, 624) has put together the following summary on the ecology of GSNP:

A series of steep-sided valleys fall from the rift escarpment to Lake Tanganyika, with evergreen and semi-deciduous forest on the lower slopes and a mosaic of thicket, woodland, and grassland on the upper slopes. Although small, the park is rich in biodiversity, with elements of western Guinea-Congolean and Afro-montane forests and Zambesian miombo woodlands.

Since the primate research started in 1960 at GSNP, considerable amounts of behavioral and demographic data have been gathered on three communities of chimpanzees in Mitumba to the north, Kasekela in the center, and Kalande to the south (Greengrass 2000). This research project is the longest continuous study of any wild animal group in the history of Western science (Pusey et al. 2007). “Research from the GSRC (i.e., Gombe Stream Research Center) has resulted in 35 Ph.D. dissertations, over 400 papers, and 30 books” (Wikipedia 2010). The park also attracts researchers from numerous universities in western nations. The GSNP is “the first park created to protect chimpanzees” (Pusey et al. 2007).

Up until 1979, tourism was not allowed at GSNP because the park was still viewed as for resource protection suitable only for conservation and research (Fubusa 2002). During the late 1970s, public funds for GSNP were inadequate for continued support and the warden had to open the park to tourism to generate additional revenue. This was done by word of mouth, however, and not actively promoted by the government.
Gradually, more tourists began to arrive from Tanzania and other countries. Later, when tourism started to dramatically increase, it created some difficulties for GSNP officials. For example, up to 30 tourists would arrive in one day without a previous booking or prior notification to GSNP authorities (Fubusa 2002). Park officials decided to reduce the number of tourists by raising entrance fees, going from US $60 to $100 per day. This helped reduce the numbers of tourists. The added revenue, however, did not allow park authorities to improve tourist facilities (Fubusa, personal observation).

The GSNP has no ecological buffer zones and it is currently threatened by human encroachment from every side (Plate 3.2; Figure 3.6). Figure 3.6 in particular shows the park in relation to a probable human-induced fire in 2004 (the actual cause remains unclear). This 2004 fire began outside of GSNP to the southeast and burned a large portion of the park over 10 days. The southern tip of the park was almost completely destroyed by this fire. Only the central part of the park was spared (Figure 3.6).

Conflicts based on the use of natural resources in and around GSNP appear to have intensified in recent decades (Greengrass 2000). Local people feel that they have been denied access to suitable fishing grounds within the park’s shorelines because of a law passed in early 1998 that forbade people from fishing on the park’s shorelines (Greengrass 2000; also see Chapter 5). In addition, chimpanzees and other animals of GSNP frequently raid farm crops on the peripheries of the park. Other hostilities have also escalated including livestock trespass, human trespass for firewood and mushroom collection, wood theft, and illegal hunting using traditional weapons such as snares. Crop
raiding by wildlife from within the boundaries of the park has also increased tensions between local people and park authorities. Sometimes wildlife are found dead months later, and the cause of death is linked to poaching or snares. Many such events go without any investigation or arrests (Greengrass 2000).

The environmental history of GSNP suggests a persistent human influence on its ecology and vegetation. Banana plantations and palm trees within the park indicate that local people co-existed with wildlife for many years before the site became a game reserve in 1943. Oral histories given by tribal elders give more evidence of human influence on the park’s ecology (Fubusa, unpublished data). Local people grazed their livestock and tilled the soil for generations in the area. Remains of clay pottery that can easily be found throughout the park today indicate that local people, mostly the Waha, lived in the higher elevations for many years. In fact, Kasekela village, no longer inhabited, was located in the central part of the park. The location is now a center for both research and tourism facilities. The following account of Jane Goodall’s first day at GSNP in the summer of 1960 is yet another example of prior human settlement inside the park (Goodall 1971, 32):

We stepped ashore, splashing into the sparkling wavelets, and were greeted, with great ceremony, by the honorary headman of Kasekela village [now Gombe], old Idd Matata. He was a colorful figure with his red turban, red European-style coat over flowing white robes, and white beard. He made a long speech of welcome to us in Swahili, of which I understood only fragments, and we presented him with a small gift that David had advised us to buy for him.

The GSNP may be experiencing dwindling wildlife populations, most notably for the chimpanzees. In some reports, overall declines for chimp numbers on the order of 35% have been noted from 1960-2005 (Figures 1.1 and 3.7). Other studies covering
1996-2005 show a more stable population overall (Figure 3.8). Some local chimp communities may be worse off than others at GSNP in recent years (Figure 3.8). For example, the southern Kalande community may be in a rapid decline from 22 chimps in 1996 to seven by 2005. The northern Mitumba community shows little change over the same time period, while the centrally located Kasekela community has grown by 27% (from 40 to 55). These data suggest that GSNP had 80-90 chimps total in 2005.

People tend to have different personal attitudes concerning wild animals (Knight 2000). To Africans, animals can carry certain symbolic significance; some are shared and given, gifted and exchanged, traded and sold. To Africans, plants and animals are not seen as mere “resources” as they dynamically affect humans as well. The relations among the Africans, and between people and the forest, are always taken as personal, intimate, and shared. Many African cultures believe that the forest belongs to no one in particular; a forest is seen as everybody’s property. Some people see wild animals as a threat while others see them as needing protection. Usually, African villagers who actually suffer from animal predation and destruction due to crop-raiding are more likely to see the animal as a threat than Westerners, who might, as outsiders, see animals as “endangered species” and therefore feel they need protection (Knight 2000). To Africans, animals come to represent the outside interference, including interference orchestrated by the state and global forces (Knight 2000). In this perspective, conservation becomes a new form of social domination by dominant classes that are either from government or from Western societies and organizations. Conservation, therefore, can be greatly affected by people’s opinions of a national park and hence the animals that live within it (Knight 2000).
Livelihood options and strategies of people in Kigoma Rural are influenced by household composition, social networks, and decision-making (Fubusa 2006). Generalizations can be made about the economy and characteristics of households in Kigoma Rural (Fubusa, personal observations). First, households are both hierarchical and patriarchal. Second, great emphasis is placed on family lineage. Third, more and more households are becoming less polygynous because of economic hardships. Fourth, very limited households embrace nuclear kinships. Finally, households largely operate within a traditional, yet changing, rural economy. The central town of Kigoma has a current population of about 150,000 in 2010, and it is an important and growing urban location (see Chapter 6; Fubusa, personal observation). However, the districting of the region has separated Kigoma town from the surrounding countryside. Kigoma town occupies the Kigoma Urban District, as distinct from the Kigoma Rural District that is the central focus for this dissertation (Figures 3.1b, 3.2).

Households in Kigoma Rural are an important unit of production and consumption (Fubusa 2006). Livelihoods are influenced by many factors, and households are complex, resource-based units. According to Dovie et al. (2005, 88), “Because household activities revolve around the role of each household member and his/her various attributes (e.g., education, skills, social status), it will be instructive to determine how these, in turn, affect overall incomes.” Therefore, investigation of a household’s economy is important because it can reveal opportunities for development intervention, especially among the rural poor.
Rural households are typically aggregated in villages. These villages divide their land for residential and arable plots. Livestock grazing generally takes place on arable plots or open-access locations such as roadsides and other uncultivated sites. Individual title deeds for land are almost non-existent, much like the colonial system. Land in Tanzania is held in trust by the President on behalf of all citizens and is therefore public property (Ndayikeje, Kigoma District Land Officer, personal communication 2008). The federal government can issue 99-year leases to individuals and organizations. Rural land is demarcated according to local communities that are identifiable to village members. The use of this land is under the jurisdiction of village government, supervised by the village “headman.” Thus, villagers in Kigoma Rural occupy and gain access to land, but they are not deeded owners of land. They are only occupants. They lack personal control over land access and acquisition. This land management system raises questions as to who benefits from land management and what the incentives are for occupants to be good stewards of the land.

The main indigenous ethnic group in Kigoma is the Waha who live in about 300 villages throughout the region as of 2010 (Fubusa, personal observation). The administrative units include four districts: Kigoma Rural, Kigoma Urban, Kasulu, and Kibondo (Figure 3.2). According to GOT (1998), the Kigoma Rural had 273,390 people compared to Kigoma Urban that had 84,647 people. The total population in the Kigoma Region (including all four districts—urban plus rural) increased greatly from 1967 to 1988, nearly doubling over 20 years from 473,443 to 854,817 (GOT 1998). The regional population almost doubled yet again by 2002 to 1,679,109 (Table 3.1). If the data are
even crudely accurate, this gives an annual growth rate for the region from 1998-2002 on the order of 18%. This growth would thus likely include a large portion of immigrants and refugees.

With a population density of almost 23 people per km², the Kigoma Region is currently ranked eleventh in terms of population density in Tanzania. According to 2002 census data, Kigoma Rural had an average household size of 6.8 people (72,085 total households) compared to 5.6 people per household in nearby Kigoma Urban (26,066 total households). Table 3.1 illustrates these figures as well as population composition by gender for all Kigoma districts and Tanzania overall. The estimated total population of Kigoma Rural was on the order of 491,000 people according to GOT (2002).

The majority of the household economy in Kigoma Rural is based on small-farm production. Table 3.2 illustrates data from GOT (2007) that almost 65% of the work-eligible population in the entire region was in agriculture (farming or fishing). Almost 34% of the total population was formally unemployed or retired. Only 2% were identified in Kigoma Rural as office or industry workers. For Kigoma Rural, the pattern was similar. In agriculture for Kigoma Rural, males made up 47% of the working population, with females 53%.

Primary school enrollment for Kigoma Rural was reported as nearly 107,000 in 2004, with 52% boys and 48% girls. This was an increase in enrollment of 32% from 2002. More resolution is provided by recent retention and graduation data based on a seven-year curriculum. From samples of 4,220 to 6,126 first-year students covering initial

Secondary-school enrollment (six year curriculum including high school) in Kigoma Rural appears to dramatically drop off after primary school, according to GOT (2005). Considering the period 1998-2004, the enrollment in public secondary schools increased from 288 in 1998 to 1,015 in 2004. The percentage of male youths averaged 58% for this time period. The number of secondary schools has been reportedly low, but growing, in Kigoma Rural (GOT 2005). In 1995 there was one public (government) school and no private schools. By 2004 this had increased to seven public schools and five private schools. Considering the total population of Kigoma Rural was on the order of 490,000 people by 2004 (Table 3.1), the official data suggest that 22% were enrolled in primary school and 0.2% were enrolled in secondary school.

In terms of rural finance, data suggest a severe lack of lending capital and financial services in Kigoma Rural as well as the entire Kigoma Region (GOT 2007). In 2004 the entire Kigoma Region had only 11 registered savings and credit cooperatives (SACCOs), having 400 members and cash resources on the order of TShs. 28 M (i.e., USD $22,000). According to GOT (2007), Kigoma Rural had 19 marketing cooperatives with over 3,000 members, but other forms of cooperatives were largely absent.

There is limited government information on public health. There were over 100,000 reported cases of human disease in Kigoma Rural (GOT 2007). These were dominated by malaria (49%) and various respiratory, eye, and gastrointestinal infections (44%). The latter are indicative of poor hygiene. The officially reported mortality from
all of these ailments was low (41). Reported cases of HIV/AIDS and tuberculosis (TB) averaged about 100 and 375 per year for 2002-04 (GOT 2007). These official health statistics, however, are expected to miss many unreported cases of disease and undiagnosed deaths given that access to local clinics and physicians or nurses is poor (Fubusa, personal observation).

Agriculture, Livestock, and Fisheries in Kigoma Rural

The agricultural extension service is lightly staffed, with only 39 officers employed in recent years (GOT 2007). Six major food crops are reported by the government agricultural officials as grown in the Kigoma Rural. Table 3.3 shows area planted while Table 3.4 shows production, both for the period 1998-2004. In terms of area planted, the most abundant food crops by 2003-04 were cassava, maize, and beans, followed more distantly by banana, rice, and potatoes. In recent years the crop area has increased most dramatically for rice (+83%), cassava (+50%), beans (+27%), maize (+22%), and banana (+12%). The total area under crop production has steadily increased in Kigoma Rural. Between 2001 and 2004 the cultivated area grew by 27%. Local bananas are shown in Plate 3.3.

Changes in production for food crops often followed trends in planted area (Table 3.4). In terms of tons of yield, however, bananas were dominant, followed by cassava, rice, and maize. In terms of recent trends, the strongest growth in production has occurred for rice, with a four-fold increase between 2001 and 2004. Cassava has steadily increased between 1998 and 2004.
The four major cash crops grown in the Kigoma Rural include coffee, tobacco leaf, palm oil, and groundnuts. Table 3.5 shows planted area while Table 3.6 shows production, covering 1997-2004. In recent years, groundnuts and palm oil have dominated both area planted and production. The one crop that appears to show a long-term increase for both area planted and production is groundnuts. For 2003-04, the area planted to cash crops was only one-seventh of that for food crops. Likewise, production of food crops was over 42-times higher than that for cash crops. Cash crops thus appear to be much less important than food crops overall for Kigoma Rural in recent years.

There are five main types of livestock in Kigoma Rural. Livestock are numerically dominated by poultry (296,368 head) and goats (210,945 head), followed distantly by cattle (28,140 head), sheep (17,469 head), and pigs (4,703 head). Considering the total number of households at roughly the same period (72,085), this averages to four poultry, three goats, and less than one bovine, sheep, or pig per household. This suggests that the farming system is heavily crop dominated, with livestock only being an ancillary component.

Fisheries have historically been important in Kigoma Rural due to the proximity of Lake Tanganyika. According to GOT (2005), between 1998 and 2003 the number of registered fishermen has dropped from nearly 5,900 to about 1,400. The number of registered fishing vessels has also declined from over 2,600 to 346 over the same period. Total fishing revenue has varied from Tanzania Shillings (TShs.) 4.4 M in 1999 to TShs. 7.2 M in 2004; the average has been TShs. 5.6 M. Note that a conversion rate of TShs. 1,000 per USD in this time period means that TShs. 5.6 M was worth US $5,600).
Because much of the fishing is unregistered and hence illegal, the true picture of fisheries yield is unclear. There has also been a tightening of fisheries regulations by government and there is an increased prevalence of banditry on Lake Tanganyika fueled by refugees from strife in central Africa. Hence, less people are fishing (Fubusa, personal observation). The majority of small-scale fishers have access to open or semi-open fisheries that are controlled, in theory, by the Tanzanian, Burundian, and DRC governments. There are also traditionally controlled fisheries. Andrew et al. (2007, 230) identified various external and internal factors affecting small-scale fishers (SSF) in developing countries (including the Lake Tanganyika Region) as follows:

Events outside their sphere of influence dominate many SSF. External factors may include macroeconomic reforms, competition with industrial fisheries, ecosystem change, trends in world markets, fuel costs, infrastructure development or HIV/AIDS. In others, “internal” drivers such as excess fishing effort or habitat destruction may be more influential. When the former have a great impact, it makes less sense to try to manage the fishery solely through “conventional” management approaches, which ignore these externalities.

Allison and Horemans (2006, 758) maintain that “fishing communities (in poor countries) are characterized by overcrowded living conditions and inadequate services, low levels of education, and a lack of skills and assets (particularly land).” Moreover, Allison and Ellis (2001, 377) provide a good summary and recommendations on the state of fishing communities throughout developing countries: “In 1990, an estimated 28.5 million people made all or part of their living from fish production and capture…over 120 million people were involved in activities relating directly to capture, processing and sale of fish; 95% of them are in developing countries.”
Although not part of crop or animal agriculture per se, there have been efforts to plant trees in Kigoma Rural. This work has been conducted by schools, NGOs, and other organizations reported in GOT (2005). For six years of data collected between 1994 through 2004, an average of about 656,500 seedlings were planted. The low was 184,000 in 1994-05 and the high was 1.14 M in 2000-01. The most recent year (2003-04) indicated a low number of plantings (348,000). Overall, there is no information on the establishment success of these trees, so it is unclear if this activity has been sustainable, but it has received attention.
Table 3.1. Population of Tanzania and the Kigoma area according to gender and number of households. (Source: GOT (2007))

<table>
<thead>
<tr>
<th>Country/Region/District</th>
<th>Population (Number)</th>
<th>Households</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
<td>Total</td>
<td>Number</td>
</tr>
<tr>
<td>Country Total</td>
<td>16,910,321 (49%)</td>
<td>17,658,911 (51%)</td>
<td>34,569,232</td>
<td>6,996,036</td>
</tr>
<tr>
<td>Kigoma Region Total</td>
<td>807,859 (48%)</td>
<td>871,250 (52%)</td>
<td>1,679,109</td>
<td>242,533</td>
</tr>
<tr>
<td>Kibondo District</td>
<td>200,381 (48%)</td>
<td>214,383 (52%)</td>
<td>414,764</td>
<td>58,572</td>
</tr>
<tr>
<td>Kasulu District</td>
<td>299,506 (48%)</td>
<td>329,171 (52%)</td>
<td>628,677</td>
<td>85,810</td>
</tr>
<tr>
<td>Kigoma Rural District</td>
<td>237,342 (48%)</td>
<td>254,474 (52%)</td>
<td>490,816</td>
<td>72,085</td>
</tr>
<tr>
<td>Kigoma Urban District</td>
<td>70,630 (49%)</td>
<td>74,222 (51%)</td>
<td>144,852</td>
<td>26,066</td>
</tr>
</tbody>
</table>
Table 3.2. Population 10 years and older by gender, district, and occupation (Source: GOT 2007)

<table>
<thead>
<tr>
<th>Gender</th>
<th>District</th>
<th>Office</th>
<th>Agriculture</th>
<th>Industry</th>
<th>Unemployed</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Kasulo</td>
<td>3,163</td>
<td>55,168</td>
<td>1,354</td>
<td>32,070</td>
<td>91,728</td>
</tr>
<tr>
<td></td>
<td>Kibondo</td>
<td>2,053</td>
<td>29,043</td>
<td>572</td>
<td>17,311</td>
<td>48,979</td>
</tr>
<tr>
<td></td>
<td>Kigoma (R)</td>
<td>2,008</td>
<td>53,270</td>
<td>1,741</td>
<td>27,062</td>
<td>84,081</td>
</tr>
<tr>
<td></td>
<td>Kigoma (U)</td>
<td>3,142</td>
<td>9,545</td>
<td>3,829</td>
<td>10,083</td>
<td>26,554</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>10,366</td>
<td>147,026</td>
<td>7,496</td>
<td>86,481</td>
<td>251,369</td>
</tr>
<tr>
<td>Female</td>
<td>Kasulu</td>
<td>1,224</td>
<td>76,291</td>
<td>265</td>
<td>35,381</td>
<td>113,164</td>
</tr>
<tr>
<td></td>
<td>Kibondo</td>
<td>614</td>
<td>42,963</td>
<td>122</td>
<td>19,752</td>
<td>63,451</td>
</tr>
<tr>
<td></td>
<td>Kigoma (R)</td>
<td>502</td>
<td>61,053</td>
<td>388</td>
<td>29,539</td>
<td>91,482</td>
</tr>
<tr>
<td></td>
<td>Kigoma (U)</td>
<td>1,133</td>
<td>11,921</td>
<td>962</td>
<td>15,368</td>
<td>29,384</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3,473</td>
<td>192,228</td>
<td>1,737</td>
<td>100,043</td>
<td>297,481</td>
</tr>
</tbody>
</table>

All
**Table 3.3.** Estimated area (ha) under major food crops production in Kigoma Rural District from 1998 to 2004 (Source: GOT 2005)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize (<em>Zea mays</em>)</td>
<td>18,885</td>
<td>19,238</td>
<td>22,575</td>
<td>26,199</td>
<td>31,982</td>
</tr>
<tr>
<td>Rice (<em>Oryza sativa</em>)</td>
<td>5,423</td>
<td>6,920</td>
<td>7,220</td>
<td>7,592</td>
<td>13,905</td>
</tr>
<tr>
<td>Beans (<em>Phaseolus vulgaris</em>)</td>
<td>11,513</td>
<td>18,360</td>
<td>21,749</td>
<td>19,125</td>
<td>24,292</td>
</tr>
<tr>
<td>Cassava (<em>Manihot esculenta</em>)</td>
<td>19,950</td>
<td>19,570</td>
<td>20,723</td>
<td>26,394</td>
<td>39,649</td>
</tr>
<tr>
<td>Banana (<em>Ariena spp.</em>)</td>
<td>11,850</td>
<td>12,350</td>
<td>12,350</td>
<td>12,844</td>
<td>14,366</td>
</tr>
<tr>
<td>Potatoes (<em>Ipomoea sp.</em>)</td>
<td>8,143</td>
<td>9,775</td>
<td>8,640</td>
<td>13,732</td>
<td>10,646</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>75,764</td>
<td>86,055</td>
<td>93,257</td>
<td>105,886</td>
<td>134,841</td>
</tr>
</tbody>
</table>

**Table 3.4.** Estimated production (metric tonnes) of major food crops in Kigoma Rural District from 1998 to 2004 (Source: GOT 2005)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>22,473</td>
<td>25,971</td>
<td>33,860</td>
<td>35,120</td>
<td>40,799</td>
<td>35,186</td>
</tr>
<tr>
<td>Rice</td>
<td>6,000</td>
<td>15,916</td>
<td>18,050</td>
<td>15,943</td>
<td>1,260</td>
<td>48,668</td>
</tr>
<tr>
<td>Beans</td>
<td>9,256</td>
<td>8,996</td>
<td>11,638</td>
<td>15,300</td>
<td>20,719</td>
<td>19,470</td>
</tr>
<tr>
<td>Cassava</td>
<td>31,920</td>
<td>45,011</td>
<td>51,808</td>
<td>67,041</td>
<td>70,720</td>
<td>99,120</td>
</tr>
<tr>
<td>Banana</td>
<td>103,950</td>
<td>101,430</td>
<td>123,500</td>
<td>125,400</td>
<td>125,905</td>
<td>136,480</td>
</tr>
<tr>
<td>Potatoes</td>
<td>73,332</td>
<td>87,975</td>
<td>76,950</td>
<td>109,858</td>
<td>147,813</td>
<td>106,460</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>246,931</td>
<td>285,299</td>
<td>315,806</td>
<td>324,313</td>
<td>418,116</td>
<td>445,384</td>
</tr>
</tbody>
</table>

1For scientific names see Table 3.3
### Table 3.5. Estimated area (ha) under major cash crop production in Kigoma Rural District from 1998 to 2004 (Source: GOT 2005)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Coffee (Coffea spp.)</td>
<td>1,230</td>
<td>1,248</td>
<td>1,388</td>
<td>1,390</td>
<td>1,440</td>
<td>1,570</td>
</tr>
<tr>
<td>Tobacco (Nicotiana tabacum)</td>
<td>1,354</td>
<td>174</td>
<td>515</td>
<td>635</td>
<td>892</td>
<td>1,179</td>
</tr>
<tr>
<td>Oil Palm (Elaeis guineensis)</td>
<td>5,700</td>
<td>5,700</td>
<td>6,190</td>
<td>6,398</td>
<td>6,518</td>
<td>7,384</td>
</tr>
<tr>
<td>Groundnuts (Arachis hypogaea)</td>
<td>1,200</td>
<td>2,085</td>
<td>3,544</td>
<td>7,152</td>
<td>6,383</td>
<td>8,840</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9,484</strong></td>
<td><strong>9,207</strong></td>
<td><strong>11,637</strong></td>
<td><strong>15,575</strong></td>
<td><strong>15,233</strong></td>
<td><strong>18,973</strong></td>
</tr>
</tbody>
</table>

### Table 3.6. Estimated production (metric tonnes) of major cash crops in Kigoma Rural District from 1998 to 2004¹ (Source: GOT 2005)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Coffee</td>
<td>500</td>
<td>500</td>
<td>492</td>
<td>387</td>
<td>555</td>
<td>600</td>
<td>355</td>
</tr>
<tr>
<td>Tobacco</td>
<td>994</td>
<td>700</td>
<td>174</td>
<td>278</td>
<td>360</td>
<td>722</td>
<td>707</td>
</tr>
<tr>
<td>Oil Palm</td>
<td>3,600</td>
<td>2,800</td>
<td>2,800</td>
<td>3,900</td>
<td>5,438</td>
<td>5,404</td>
<td>5,400</td>
</tr>
<tr>
<td>Groundnuts</td>
<td>580</td>
<td>480</td>
<td>1,043</td>
<td>2,835</td>
<td>5,722</td>
<td>5,634</td>
<td>3,990</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,674</strong></td>
<td><strong>4,480</strong></td>
<td><strong>4,433</strong></td>
<td><strong>7,391</strong></td>
<td><strong>12,075</strong></td>
<td><strong>12,360</strong></td>
<td><strong>10,452</strong></td>
</tr>
</tbody>
</table>

¹For scientific names see Table 3.5
Figure 3.1 (a, b). Map of Tanzania and Lake Tanganyika region (Source: Lowry 2006).
Figure 3.2. Political map of western Tanzania showing four districts (Map Credit: Drew Rayburn).
Figure 3.3. Land cover map of western Tanzania. For district locations, see Figure 3.2. (Map Credit: Drew Rayburn).
Figure 3.4. Monthly rainfall of Kigoma Rural District, 2003-2004 (Source: Wilson et al. 2005).
Figure 3.6. Bushfires reported at Gombe Stream National Park, 2004 (Source: Wilson et al. 2005).
Symbols indicate maximum (squares) and minimum (circles) population estimates for each year. (Pusey et al. 2006)

**Figure 3.7.** Population estimates for chimpanzees at Gombe Stream National Park, 1965-2005. Squares or circles denote maximum or minimum values, respectively (Source: Wilson et al. 2005).
Plate 3.1. Lake Tanganyika shoreline inside Gombe Stream National Park (Photo Credit: Amanda Hamilton).
Plate 3.2. Landscape showing Mwamgongo village, north of Gombe Stream National Park. Note effect of park boundary on vegetation cover (Photo Credit: Jane Goodall Institute).
Plate 3.3. Local bananas grown in the lowlands at Kigoma Rural (Photo Credit: Yared Fubusa).
Plate 3.4. Local Ankole cattle raised in the uplands at Kigoma Rural (Photo Credit: Amanda Hamilton).
CHAPTER 4

GOSES0 PROJECT AND METHODOLOGY

“He who asks questions, cannot avoid the answers”
“One must talk little and listen much”

Study Area

The specific study area consists of approximately 6,000 km² in the Kigoma Rural region of western Tanzania (see Figure 3.1). The study area is bordered by Lake Tanganyika to the west, Burundi to the north, Kigoma town to the south, and Kasulu District to the east. Gombe Stream National Park (GSNP) is located on the eastern shores of Lake Tanganyika and occupies less than 1% (55 km²) of the study area.

As mentioned previously in Chapter 1, this research had qualitative and quantitative components. It occurred in two exploratory phases based on key informants and focus groups (2002 and 2005) as well as a confirmatory phase based on a household survey in 2006-07. The first exploratory phase included human subjects in the lowlands who resided in GSNP (employees, researchers, etcetera) or at villages within a few kilometers of GSNP. The second exploratory phase included human subjects who were recruited from a much larger area that included lowland and upland villages. This phase was intended to expand the scope of investigation. Field reconnaissance and past experiences of the author indicated that the study area needed to be stratified into lowland (lakeside) versus upland sites. The lowland farms, located within 10 km of GSNP, appeared older, smaller, and with fewer livestock. The upland farming areas, located within 11-60 km of GSNP, had been more recently occupied and separated from the
lowlands by a small mountain range; coffee and cattle seemed more prevalent in the uplands. The confirmatory phase was also conducted in the same lowland and upland locations as the second exploratory phase. Figure 4.1 provides an illustration of the study area overall with more local detail. Aspects of local climate and ecology have been reviewed in Chapter 3.

The following material starts with an overview of the rationale and vision for the creation of the Gombe School of Environment and Society (GOSESO). This research was designed, in part, to better inform the activities of GOSESO and that is why GOSESO is described first. The research methods then follow. There have been five phases of the GOSESO project, and these variously include development and research.

The GOSESO Model and Approach

The conceptual model for GOSESO demonstrates various phases from problem definition to adaptive management (Figure 4.2). The mission of GOSESO has been to generate widespread support to lay the groundwork for improving both human and wildlife prosperity through rural education. The core principles of GOSESO stem from the observation that welfare of wildlife in the Lake Tanganyika Region depends on the economic and social welfare of local people. The GOSESO project is described more fully in Chapter 6. It was intended that the research results from this dissertation would assist in the design of the GOSESO approach. The steps needed to achieve the research and development goals for GOSESO have been divided into six phases. These phases have been conducted over the past eight years (2002-10), in some cases preceding initiation of this doctoral research. The phases are briefly described below.
Phase I (Initial Exploratory Research Phase) was conducted in 2002. This was purely an exploratory research component based on Rapid Rural Appraisal (RRA) that focused on relationships between GSNP and the villagers living in the immediate vicinity of the park in the lowlands of Kigoma Rural District. Methods, results, discussion, and conclusions are presented elsewhere in Chapters 4, 5, and 6 of this dissertation.

Phase II (Second Exploratory Research Phase and Local Partnership Building) was conducted in 2005-06 (Fubusa 2005b). It consisted of research and development activities. A feasibility assessment for the GOSESO concept was conducted based on feedback from potential stakeholders and selection of a permanent field site for the GOSESO campus in the Kitobe Forest (Figure 4.1). This phase had a second exploratory research component that included focus groups and interviews of purposefully selected key informants. The scope was broader compared to the RRA and involved generating issues that pertained to local rural livelihoods over a larger study area that included the lowlands and uplands of Kigoma Rural District. An important goal was to refine or confirm perspectives generated from the RRA. Methods, results, discussion, and conclusions are presented elsewhere in Chapters 4, 5, and 6 of this dissertation.

Phase III (Ecological Inventory of Kitobe Forest) was conducted in 2007. It was a research phase, but not part of this dissertation work. The work consisted of a baseline inventory of indigenous flora and fauna of the Kitobe Forest site. It was carried out by a team of six local biologists commissioned by Fubusa. This work provides a foundation for future ecological restoration work and a context for environmental education at GOSESO (Fubusa 2007). However, because this effort was conducted by others, the
general approach and preliminary data sets are only provided for general reference in Appendix A.

Phase IV (Initial Organization of GOSESO) was conducted between 2005 and 2008. This is a development phase. Goals included crafting vision and mission statements for GOSESO, creating an institutional structure in both Tanzania and the USA, further cultivating a network of stakeholders, initial conceptualization of GOSESO educational and outreach programs, and finalizing land procurement for the campus. This phase is described more fully in Fubusa (2007). Because this phase was development only, it is only described here to help set project context in Chapter 6.

Phase V (Confirmatory Research Phase) was conducted in 2006-07. This was the last research phase that primarily sought to confirm or refute findings generated from phase II using randomly selected participants from rural households in the lowlands and uplands of Kigoma Rural. This involved information gathering using a stratified-random sample. Methods, results, discussion, and conclusions are presented elsewhere in Chapters 4, 5, and 6 of this dissertation.

Phase VI (On-going Organization of GOSESO). This is another development phase being conducted from 2008 to the present. This involves creation of infrastructure and staffing for GOSESO as well as recruitment of local students to attend an initial offering of formal coursework on the GOSESO campus. This phase also involves continuous efforts to further develop other programs. Because this phase is only development oriented, it is only described here to help set project context in Chapter 6.
Research Methods

**Qualitative and Quantitative Research**

Both qualitative and quantitative approaches have been employed for this dissertation research. A qualitative methodology has been used to understand and record how trends work from local perspectives and a quantitative methodology has been employed to record tangible measures of trends. Qualitative research includes more anthropological dimensions such as how humans make sense of the environment surrounding them. This symbolic interaction stems from the fundamental belief that humans are unique animals and that our human behavior depends on learning and not biological instinct. Humans communicate through symbols especially by the use of language and they also attach meaning or significance to symbols.

While a qualitative approach tends to be interpretive and discovers meaning people attach to phenomena, research using quantitative methods often measures quantities, amounts, frequency, and intensity of a variable. The quantitative method tends to put special emphasis on “the measurement of casual relationships between variables, and not processes. Inquiry is purported to be within a ‘value-free framework” (Denzin and Lincoln 1994, 4). Quantitative research is often ahistorical, lacks the context of political economy and social reality, and can be muddied by the researcher’s own biases in choosing and excluding variables or assigning dependency and independence variables. In short, quantitative research is far from infallible (C. Conte, USU, personal communication).
There are important differences in how theory is employed in qualitative versus quantitative research. While quantitative research begins with hypotheses and theories, qualitative research often ends with hypotheses and grounded theory. The use of theory under quantitative research is to build consensus or the norm, while theory application in qualitative research is to create pluralism or complexity. Adler and Adler (1994) argue that very few articles relying on qualitative theories have been published mainly because of the “lack” of validity. Their arguments are supported by Romesburg (2002) who seems to favor an approach with quantitative theories that will make students of natural resources think creatively, imaginatively, and abstractly instead of the current trend where the field seems to operate at the rate of the past. In fact, Romesburg seems to argue that theories in qualitative research tend to lack reliable knowledge because of unreliable research and this is what is causing many false laws that are based on a false foundation (i.e., false science producing false policies).

There are also important differences in how hypotheses are constructed, examined, and/or tested in qualitative versus quantitative research. While qualitative studies are often used to create hypotheses, those studies involving quantitative analysis tend to investigate a problem that allows a researcher to formulate and test a hypothesis. In quantitative research, a scientific theory explains data while under a qualitative approach the informants explain data through their experiences. As Romesburg (2002) further argues, the inductive method establishes reliable associations among many competing factors while retroduction is about theory formulation and often involves explanations or reason for facts based on circumstantial evidence like those used in courts.
of law. In a quantitative study, a researcher is likely to be concerned with how to interpret and report results in a language that his or her peers will understand, while in a qualitative study a researcher tries to translate participants’ cultural knowledge of a specific cultural description for his or her peers to understand.

The application of a qualitative research approach has enabled me to achieve in-depth information by asking follow-up questions and verifying information as given by respondents. Qualitative and quantitative research approaches also differ in how a “sample size” of observations or sample units could be estimated. Qualitative research was used to create sampling frames for the quantitative studies. As Warren (2001) argues, the main difference between quantitative and qualitative research is that under quantitative research, a representative sample can be drawn from a larger population and later be generalized to reflect the entire population in question. Under qualitative research, a sample can be chosen based on a number of factors: prior research design, sampling method, “snowball” or finding key informants.

A randomly selected set of sample units can effectively represent the entire population being studied in a way that a non-random sample cannot. A sample unit can be defined as an element or a set of elements, which can be considered for selection in a given sampling stage. The sampling design used in this study was influenced by scale, including sample units, target populations, and how response variables can be perceived and measured. For example, scale tends to affect our environmental perceptions; those that may appear to be sustainable at a small scale may have different features at larger
scales. Some situations that may be negatively perceived at a local scale may play a limited role at larger scales.

Another significant difference between qualitative and quantitative research is in how parametric or nonparametric statistics could be employed (Neuman 2003). Quantitative research design tends to include experimentation, description or estimation, and correlation. Nonparametric methods can be used with small sample sizes and parametric methods are often used when the statistical sample is large (e.g., n>100). However, parametric methods can occasionally be used in qualitative research if and only if large samples are involved (which is often unlikely). A parametric method is known to be very sensitive and often comes with more statistical power. Even in qualitative research, significant tests cannot be tested if the sample sizes become too small as parametric tests can only be employed under normality while a nonparametric does not always operate under normality because of no assumptions involved (Neuman 2003).

As previously mentioned, research was between 2002 and 2007. Approaches included use of a modified rapid rural appraisal (RRA), focus groups, key informant interviews, and household surveys. Secondary information was also collected via various archives and reports at the local and national levels. Personal observations were also important, as the author was born and raised in the area. Information was triangulated at the end to reduce bias associated with single-source methods (Patton 1990).

**Rapid Rural Appraisal**

The modified rapid rural appraisal (RRA) was conducted as an exploratory method during July and August of 2002. This was a time when I was trying to put my
prior educational and work experiences into a context where a future professional path could be charted. I had completed primary and secondary school in Tanzania, a bachelor’s degree in economics from Longwood College (Virginia), and a master’s degree in parks management at the University of Utah. I had also spent a number of years working with the Jane Goodall Institute (JGI) in outreach associated with the “Roots and Shoots” program. My professional focus at this time was thus solidly on the relationship between wildlife conservation and local people in Africa. This RRA was intended to be exploratory work—initiated solely by myself—to learn more about how local people related to GSNP. I was thinking that the results could inform my plans for future doctoral research and/or development priorities for Kigoma Rural.

The RRA approach is diagnostic. It allows researchers from outside a system to gain a quick, yet basic, understanding of issues and processes for a certain locality within a limited period of time. It typically has a systems view and values the triangulation of multiple sources of information (Beebe 2001). I decided to use a highly focused RRA that dealt with human/wildlife/park relations rather than one that dealt with very broad social or development issues. Also, rather than relying on quick, short quantitative surveys, I decided to take a more qualitative view and administer semi-structured interviews. The work was conducted by me and one other colleague working as a small team. The approach was certainly affected by the fact that I was born and raised in the area.

Interviewees in this case were selected from among the residents of four villages surrounding GSNP, plus an assortment of employees and visiting researchers associated
with the park. The villages were Mgaraganza, Bubango, Mtanga, and Mwamgongo (Figure 4.1). Fifty-one people were interviewed over one month. Forty were local residents while 11 were nonlocal Tanzanians (6) and foreigners (5) associated with GSNP. Interviews typically took from one to two hours each. The RRA approach typically contacts respondents that are easy to locate—it is non-random (Beebe 2001). I interviewed people that I encountered directly (intercept) or via referrals. For villagers, interviews were conducted in private situations at or near village markets. Park employees were either interviewed at the park or at other locations that were mutually agreeable. Confidentiality for interviewees was maintained.

The local people interviewed were largely small-holder farmers and fishermen with limited exposure to formal education. The park employees included park rangers and junior wardens. The foreigners were graduate students who were working at GSNP on a short-term basis. More details on the interviewees are provided in Chapter 5. The following checklist comprised six main interview themes.

1. Have you been to GSNP? (relevant to the villagers only)
2. How do you feel about GSNP? Whose park is this?
3. Do you benefit from GSNP? Who benefits most?
4. Are you satisfied with relations between GSNP and local villagers?
5. How could relations between GSNP and local villagers improve?
6. Why is deforestation occurring near the park? Why is wildlife declining?
Focus Groups and Key Informant Interviews

This was a qualitative, exploratory follow-up effort using different approaches. Three years had passed since the RRA. The concept of GOSESO had been initially established by 2004, and the provisional focus was on how GOSESO could better promote natural resource conservation among the people living in the vicinity of GSNP. It included a major emphasis on wildlife, centered on the preservation of chimpanzees. This perspective had been fueled, in part, by the RRA results from 2002 (Chapter 5). Funding had been secured to begin the creation of GOSESO based on this initial model (Fubusa 2007).

This effort included field seasons in 2005 and 2006. A local team of five Tanzanians was formed to confirm or reassess the viability of the basic concepts for GOSESO and start a process of building local partnerships with government agencies, NGOs, and community groups, as possible. The team included Fubusa as team leader, a local Kigoma resident who lacked formal education, an educator, a biophysical scientist, and a community development specialist.

Focus groups were one approach used in this stage. Focus groups have been defined as a qualitative research technique whereby information is collected on the basis of group interaction on a subject chosen by the researcher. One advantage of using focus groups is that this method helps to minimize social and cultural divides between researchers and participants (Morgan 2001, 154). Focus group methods have been widely used in the field of business and consumer marketing since the 1950s, but the technique began to be more widely used in the social sciences starting in the 1980s (Morgan 2001).
A more structured approach for focus groups tends to emphasize the perspectives of researchers. A less structured approach for focus groups tends to emphasize the perspective of the participants. A less structured approach is best suited when participants are particularly interested in the research topic and when their discussion comes with emotional involvement; “…methods are shaped by the social and historical contexts in which they are used…” (Morgan 2001, 154). It is often possible to find participants saying different things while speaking as individuals and then saying another while speaking as part of a group.

In contrast to the narrow emphasis of the RRA conducted in 2002, the focus groups had a broader purpose. We asked the participants to describe recent environmental and community changes in Kigoma Rural District, to identify major constraints or problems for their livelihoods, and propose realistic and sustainable solutions to overcome those constraints. We had no idea the extent that GSNP in general, or wildlife in particular, would form a foundation of the focus group sessions. The focus group sessions averaged about 8 hours in duration. Comments were written during the session and compiled soon after by the team. No audio recordings were made. The following talking points were used for each focus group:

1. Describe recent changes in the region;
2. Describe why these changes have occurred;
3. Describe the likely future for the region;
4. Identify major constraints that limit their situation;
5. Identify realistic and sustainable solutions to overcome constraints;
Twelve focus groups were convened with 10-12 participants each. These were conducted in two ways, as will be described. Prior to canvassing the villages, the team sought permission from the Kigoma District Council to invite each focus group participant. A copy of the protocol is shown in Appendix B. Training sessions were held to refine the team’s focus group approach.

Four of the focus groups were organized based on gender, age, and refugee status. These included one for village men, one for village women, one for village youths (males and females from 15-18 years old), and one for long-term residents who were international refugees. The team visited 12 villages in Kigoma Rural District. These included Bubango, Mgaraganza, Mtanga, Kagongo, Mahembe, Bitale, Kiganza, Mwandiga, Kwitanga, Mkongoro, Kalinzi, and Mwamgongo (Figure 4.1). Focus group participants were recruited from each of these villages and brought to the home of the team leader at Kiganza village near GSNP.

The other eight focus groups were organized based on livelihood specializations or classes of people that would mix gender and/or age groups in certain village locations. In Mkigo village in the uplands, the participants were successful coffee farmers (males and females that tended towards middle-age.) In Bubango village in the lowlands, the group involved successful palm-oil farmers (dominated by males, also middle-aged). In Kiganza village in the lowlands, the group was for youths aged 18-25 who were not involved in agriculture. Most of these young people were either still dependent on their farming parents or engaged in petty trade (this focus group was gender balanced). In Matendo village—the most remote village of the uplands—the participants were heavily
dominated by mature females, between 30-55 years old. They were “internal refugees” who were farmers who had migrated with their spouses from the lowlands near GSNP in pursuit of more land of higher fertility. In Kidahwe village in the uplands, the group included mature, household heads (males and females) pursuing varied economic interests such as farming and small business. In Mkongoro village in the lowlands, the group was similar to that of Kidahwe. In Kagongo village in the lowlands adjacent to GSNP, the group was a mix of farmers, business owners, and fishermen—dominated by mature males. In Kizenga village in the uplands, the group was similar to that of Kiganza above; youth-dominated but involved in agriculture (gender balanced).

The team leader chaired all focus group sessions. All team members were introduced at the start of each session, and had duties as recorders, facilitators, etcetera. The purpose of the sessions was explained. Consent of participants was obtained. Participants were informed as to how and why they were selected. They had been chosen because of their potential in forming opinions that might engineer sustainable social and environmental change in the area. The idea was to choose people who were eloquent and best able to define issues in a logical fashion. The team leader asked the participants not to politicize the meeting, but rather to concentrate on discussing the questions. In almost every meeting there was one participant who would open up his or her remarks on behalf of the group by thanking the team leader for his continuous desire to live and work with them and for his prior service to local communities.

In addition to the focus groups, there were 37 key-informant interviews conducted during the same time period. These interviews—typically from one to three hours each—
involved purposively chosen individuals or small groups of people who could speak to
the issues posed to the focus groups, but who would be expected to have more specialized
knowledge. A conversational style was used. The team conducted key informant
interviews with representatives from governmental and non-governmental organizations
as follows: 1) The Ministry of Education and Culture; 2) the Tanzania Institute of
Education; 3) Tanzania National Parks; 4) the University of Dar-Es-Salaam; 5) the
National Environmental Management Council; 6) the Kigoma District Council; 7) the
Head of Kwitanga Forest Reserve; 8) the Chief Park Warden at GSNP; 9) the Director of
the Teachers’ Union in the Lake Tanganyika Region; 10) the Jane Goodall Institute; and
11) leaders of local and regional government. The following are the five themes posed in
these interviews (see Appendix B for the protocol):

1. What are recent changes in Kigoma Rural? Are such changes for the “better” or
   the “worse?”
2. Why have these changes occurred?
3. What is the likely future of Kigoma Rural (optimistic vs. pessimistic)?
4. What are the major constraints facing rural people in the Kigoma Rural District to
   their efforts to improve their lives?
5. What development interventions, in your view, are most needed to overcome
   these constraints, and why?

The research approach used for key informant interviews followed Odendahl and
Shaw (2001) and Warren (2001). Consent was obtained. Key informants were chosen
based on their ability to communicate and their access to information. Oftentimes, the
key informants were native speakers with insider knowledge of their own social worlds. The unfolding social contexts in the interview process were also taken into consideration. Considerable skills on the part of interviewers were needed to extract information from these informants. Anonymity of respondents was assured. Interviews were held at locations where the respondent(s) felt most comfortable, whether this was at an office, residence, or social gathering place.

**Household Survey**

A survey was conducted among 96 rural households. The survey work had several objectives: 1) describe the households and farming systems; 2) confirm or refute results related to perceived community problems and solutions generated in the RRA, focus groups, and key informant interviews; and 3) investigate livelihood trends on a quantitative basis as related to trends in capital assets and other variables. The last objective was intended to provide an initial step in addressing the Sustainable Livelihoods framework (Scoones 1998), namely analysis of assets. The full framework has several more steps including policy analysis, impact assessment, and monitoring (Chapter 2). The full framework was beyond the scope of this dissertation. Problem solving and monitoring can be approached in other ways, and this is discussed in Chapter 6.

The survey instrument is shown in Appendix C. The survey consisted of 42 detailed questions in a semi-structured format. Some questions needed specific blanks to be filled in or rankings to be noted, while others required open-ended short answers. It began with collection of descriptive data for household heads and household residents.
These data included gender, ages, access to formal education, and languages spoken. Then there was a section to describe the farm in terms of discrete parcels, acreages, land tenure, number of years farmed, and dominant crops, animals, and use of wildland products. The third section described income and expenditure patterns over the past five years. The fourth section focused on perceived trends (either improving, unchanging, or worsening) for the household over the past five years.

The trend variables included integrative response variables and capital asset explanatory variables. The integrative response variables were thought to capture important elements of livelihood resilience and sustainability. They included: 1) quality of life; 2) ability of the household to recover from a serious problem or crisis; 3) confidence in the future; and 4) confidence in personal problem solving. These variables are not mutually exclusive; they attempt to assess similar issues in slightly different ways. The first two are more immediate in terms of time frame, while the last two are more speculative or looking towards the future. Similar variables have been used in other research attempting to assess perceptions of the rural poor in response to risk management interventions (Coppock 2010). The 16 capital trend variables were wide-ranging and grouped according to the following categories: 1) Natural capital, which included soil productivity, access to farmland, condition of the general environment, and livestock forage; 2) human capital, which included household health, ability of the household to perform manual labor, and the collective skills and knowledge of the household; 3) social capital, which included access to traditional social networks as well as access to contemporary institutions (clinics, schools, cooperative, extension offices,
etcetera); and 4) financial capital, which included trends in cash income, cash savings, livestock assets, and access to credit, markets, banks, and agricultural technology (seeds, fertilizers, etcetera).

Agricultural technology could have been categorized under natural capital in one sense, but since these items often have to be purchased or traded for, they have been included as more of an economic input under financial capital. Physical capital was not included, as this is related more to infrastructure (roads, electricity, etcetera) at a larger spatial scale (Chapter 2). Once each variable was scored by respondents as improving, unchanged, or worsening, there was an opportunity for respondents to give a short answer explaining the trend. There was a relatively stronger emphasis to capture how respondents explained the trend for quality of life, as well as realistic ways that quality of life trends could be enhanced (see questions 17 and 42 in the survey).

I participated in all surveys and was occasionally shadowed by male and female field assistants from the local communities. These assistants were valuable in helping with describing the purpose of the survey, obtaining consent, and gave insights for data interpretation. We went to great lengths to carefully explain all variables to the respondents. As will be shown, only a few household heads were female. However, in those cases where women were the primary survey respondent, having a female field assistant helped the process go more smoothly.

The survey used a stratified sampling approach. Some households were located in the lowlands—defined as being within 10 km of GSNP near the shores of Lake Tanganyika—or in the uplands, defined as being within 11-60 km of GSNP. A small
mountain range separated the lowlands and uplands (Figure 4.1). The survey was conducted over two field seasons, June through October 2006, and September 2007. Most local travel occurred on foot, by boat, or car to conduct the survey. Evenings were devoted to data checking and interpretation. The final sample consisted of 44 lowland and 52 upland residences. It was anticipated that the lowlands and uplands would exhibit varied land endowments, farming systems, and perceptions of livelihood sustainability and dynamics for the various capitals. This expectation was based on a general reconnaissance of the study area. For example, the uplands appeared less congested in terms of people and farms. Crop types seemed to change with subtle changes in elevation. Livestock seemed more visible in the uplands.

The 96 households occurred across 18 villages, with eight in the lowlands and 10 in the uplands (Figure 4.1). The villages were purposively selected from among the total of 32 to be representative of lowland and upland circumstances based on extensive pre-survey visits. Villages with helpful leadership that facilitated the work also were prioritized. As Table 4.1 indicates, these 18 villages are estimated to have an overall population of 100,590 or an average of 5,588 people per village. With an average of 6.8 people per household (GOT 2007), this translates into an estimated 821 households per village. Village leaders were used to help generate sampling frames of households. A systematic method was used to select the sample using an interval of 50 or 100 households depending on village size; the larger the size the larger the interval. The lowlands and the uplands were sampled to a similar degree in absolute terms. There was
insufficient information to markedly alter sampling effort between the two strata beyond the 45:55 split previously mentioned.

The primary respondent sought in the household survey was the household head or “key decision maker,” regardless of gender. If the household head was absent, another suitable adult could be surveyed. As Dovie et al. (2005, 90) argue, “Anyone who played a key role in settling the household/family was regarded as the household head whether or not he or she made significant contributions to the household.” There were certain cases where collective household interviews were employed when it became difficult to separate the role of respondents. Overall, finding suitable adult respondents at each home was not a problem. All contacted households except one agreed to participate once the purpose was clarified. This gave a refusal rate of 1%. None of the surveyed households had been included in any previous focus group or key informant process. Sorting households into adults versus children was based on age classes. The threshold of 18 years and above was used to categorize adults. Youths and children were categorized according to age class in the formal education system. Following completion of a survey, I walked around the farm in a casual manner to take further notes and attempt to visually confirm respondent remarks as possible.

It was initially estimated that a survey would take about three hours in one visit to complete, but this was quickly revised upwards. Overall, each survey required about 6 hours to complete. Two 3-hour sessions were used per household. The sessions were typically separated by several weeks. The first session covered description of the household and the farm, while the second session dealt with resilience and capital assets
scores and assessments as to what interventions could better promote local sustainability. I felt that the latter topics would be better addressed after respondents were allowed to think about their answers over an extended period of time.

In terms of statistical analysis, the Statistical Program for Social Sciences (SPSS version 17.0) was used. Data were cleaned and entered during 2008-09 at Utah State University. A discrete analysis comparing lowlands and uplands was planned. The opportunity to measure impacts of distance from GSNP on households was limited, however, because the lowland households were closer to Kigoma town and a major road compared to upland households, and it was not possible to collect spatial data (using GPS coordinates). Descriptive statistics focused on averages with standard errors, confidence intervals, pie charts, histograms, etcetera.

Some descriptive data sets posed greater problems than others. This was especially true for income levels. The procedure originally used was to have household heads identify the income category that best represented their annual cash income in Tanzanian shillings (TShs.) over the past five years (see question 14 in Appendix C). Unfortunately, when devising the categories, the overall income range appears to have been significantly underestimated. This resulted in about half of the respondents giving a cash income level that exceeded the upper limit of the response categories, namely greater than TShs. 200,000/= . This meant that the true upper-income category was imprecisely estimated and thus overall averages for the sample could not be reliably calculated based on the categorical data alone. This was compensated for, in part, by directly asking household heads in the second field season what their estimated annual
The final income estimate was based on n=63 households, which was a mix of respondents who gave direct estimates as well as those that gave categorical estimates that were less than TShs. 200,000/=.

Other analytical methods focused on the use of cross-tabs and chi square. Chi square was used in two ways. Distributions of categorical responses for lowland versus upland households were compared and contrasted. If distributions did not differ, data could be lumped together for further analysis. The null hypothesis was that the uplands and lowlands would not significantly differ. One alternative hypothesis was that the uplands would prove to have more positive trends in terms of the resilience variables than the lowlands. This would be due to more positive trends in natural capital, given the uplands appeared to be occupied more recently, looked more productive and natural resources could be more available and of higher quality (previously mentioned above).

The next analyses involved relating trends in the four resilience variables with each other using crosstabs. The idea here was to see to what extent resilience variables were similar. Similarity among resilience variables matters because it helps identify if variables were redundant or not. Both chi-square and gamma statistics were used in these crosstab analyses. The gamma statistics were especially informative because they indicate whether directional trends (improving, unchanged, worsening) between variables were similar. Redundancy among resilience variables is not a negative result because redundancy can indicate that the variables are indeed measuring similar issues.

The next analyses involved relating trends in each of the four resilience variables with explanatory variables. This approach used binary logistic regression. Each of the
four resilience variables was to be related to capital variables and a few other variables of interest from the survey. Binary logistic regression was used because the response variables were categorical and the explanatory variables were categorical as well as continuous.

Explanatory variables first had to be screened for possible inclusion in the binary logistic models. This was because the heavy reliance on categorical data and the relatively modest overall sample size (n=96) imposed constraints on the numbers of explanatory factors in any given model. Screening was done separately for 19 categorical versus five continuous variables.

The 19 categorical variables included the 16 previously mentioned capital variables plus research site (lowland, upland), gender of household head (male, female), and educational level of the household head (none, primary, secondary, tertiary). The six continuous variables included total income (n=63), age of household head, time spent farming (years), farm size (hectares) as a proxy for land wealth, and off-farm wage income or cash remittances as proxies for livelihood diversification.

Screening results are shown in Chapter 5, but some details on the procedures are provided here. For categorical variables, screening was conducted by comparing chi square statistics, gamma statistics, conceptual redundancy among variables, and variation in distributions among improved, changed, and worsening categories. For the continuous variables, screening was conducted for means using t-tests between response categories. If t-tests were significant, then a variable could pass the screening procedure because it exhibited possibly useful variation.
Overall, the binary logistic models were used to explore the quantitative data. The qualitative findings from the focus groups and key informants, as will be shown in Chapter 5, indicated that negative livelihood trends were generally perceived in both the lowlands and uplands sites. The participants cited a wide variety of factors—including poverty, overuse of resources, lack of governance, and a degrading environment—for the overall trends. It was thus unclear whether natural, human, social, or financial capital would emerge as the most important explanatory factors from the quantitative approach; the null hypothesis would be that each category of capital assets would be equally important in affecting trends. One alternative hypothesis was that human and social capital may emerge as the most important factors explaining variation in resilience; if this emerged the educational or outreach programs for GOSES could be better tuned to such needs and possibly expanded relative to other programs. Use of short-answer trend explanations directly from the survey could also prove useful in sorting out the final results.
Table 4.1. Descriptions of sampled villages in Kigoma Rural, 2008

<table>
<thead>
<tr>
<th>Locale</th>
<th>Village Name</th>
<th>Total Population</th>
<th>Total Households</th>
<th>Sampled Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowland¹</td>
<td>Bubango</td>
<td>5,082</td>
<td>745</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Changabwimba</td>
<td>4,158</td>
<td>611</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Chankele</td>
<td>2,269</td>
<td>334</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Kagongo</td>
<td>5,130</td>
<td>754</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Kiganza</td>
<td>5,320</td>
<td>782</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Mgaraganza</td>
<td>5,796</td>
<td>852</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Mkongoro</td>
<td>6,497</td>
<td>955</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Mwandiga</td>
<td>8,750</td>
<td>1,288</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>8</td>
<td>43,002</td>
<td>6,321</td>
</tr>
<tr>
<td>Upland²</td>
<td>Kalinzi</td>
<td>6,808</td>
<td>1,001</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Kamara</td>
<td>5,623</td>
<td>827</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Kidahwe</td>
<td>7,056</td>
<td>1,037</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Kizenga</td>
<td>4,628</td>
<td>681</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Mahembe</td>
<td>7,465</td>
<td>1,098</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Matendo</td>
<td>5,663</td>
<td>833</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Mkabogo</td>
<td>5,470</td>
<td>804</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Mkigo</td>
<td>4,559</td>
<td>670</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Nyamhoza</td>
<td>4,441</td>
<td>653</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Simbo</td>
<td>5,875</td>
<td>864</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>10</td>
<td>57,588</td>
<td>8,468</td>
</tr>
<tr>
<td>Grand Total</td>
<td></td>
<td>18</td>
<td>100,590</td>
<td>14,789</td>
</tr>
</tbody>
</table>
Figure 4.1. Sketch map of the study area in Kigoma Rural District (Source: Fubusa and Lowry 2010).
Figure 4.2. Conceptual model for the Gombe School of Environment and Society starting from problem definition to adaptive management (Source: Fub usa 2006).
Plate 4.1. A typical neighborhood of village households in the lowlands (Photo Credit: Yared Fubusa).
Plate 4.2. Close up of Kitobe Forest in Kigoma Rural (Photo Credit: Amanda Hamilton).
Plate 4.3. Focus group in the uplands of Kigoma Rural (Photo Credit: Wayne Turner).
Plate 4.4. Key informant in the uplands of Kigoma Rural. He is a successful coffee farmer (Photo Credit: Yared Fubusa).
CHAPTER 5
RESULTS AND DISCUSSION

“Knowledge is like a garden; if it is not cultivated, it cannot be harvested.”
--African Proverb

This chapter includes all research results and related discussion. It is a lengthy chapter. The research is organized with the qualitative work first, with the quantitative survey work coming afterwards. Following presentation of all research results there is a final comprehensive discussion section.

Rapid Rural Appraisal

The Rapid Rural Appraisal (RRA) was conducted in July and August of 2002 and was used to give local people a chance to voice their opinions about Gombe Stream National Park (GSNP). The RRA was conducted among four villages near the park, plus among some park management officials and expatriates who lived inside the park. The four villages were Mgaraganza, Bubango, Mtanga, and Mwamgongo. As noted previously, 51 people were interviewed for the RRA. The following results are organized according to the checklist of questions in Chapter 4.

The nationalities of the respondents were broken out as 46 Tanzanians and five expatriates (North Americans and Europeans). Of the Tanzanians, 40 were local residents (largely farmers and fishermen) living just outside of GSNP, while six were employees of GSNP living inside park boundaries who were not originally from Kigoma Region. The expatriates were comprised of one graduate student from Pennsylvania State University, two graduate students from the University of Minnesota, and two field research scientists...
from Europe—all from 23-55 years old and English speakers. The local Tanzanian residents typically had little formal education and spoke Kiha and Kiswahili. The park staff had more formal education (secondary and high school diplomas) than the locals and spoke Kiswahili and English. The age range of the Tanzanians overall was wide—from 15-80 years old. Other details of the interviewed population are shown in Chapter 4.

Because of this mix of interviewees, the RRA findings shown here are primarily focused on the Tanzanians and secondarily as to whether they were farmers or fishermen (henceforth lumped together and called villagers), park staff, or expatriate researchers. The villagers were split evenly between males and females while the other groups were all males except for two expatriates who were female.

**Have You Been to GSNP? (relevant to villagers only).** This question was only relevant to the 40 villagers. The majority (26 or 66%) of the respondents had visited GSNP once or more in their lifetime. Nine had visited GSNP to fish at Lake Tanganyika, noting that this activity had been recently restricted by park management. Some villagers had been to GSNP to visit friends or relatives who worked there or to briefly watch television in a lounge area. About eight had been to GSNP for “official” reasons, such as participating in tours or school-related trips. Only three villagers had been at GSNP to earn income from short-term casual employment. **How Do You Feel About GSNP? Whose Park is This?**

This question was also just asked of the 40 villagers. The majority (24 or 61%) felt that GSNP was owned by Westerners from Europe and North America as well as Tanzanian park officials. Respondents assumed park officials came from elsewhere in Tanzania. A second group of respondents (9 or 22%) perceived that the
central government of Tanzania owned the park. Another seven (17%) felt that local people owned the park.

A clear majority of respondents (26 of 40 or 66%) had a favorable opinion toward the park overall, but their opinion of park management was negative. There was an apparent difference in how males versus females viewed the park. Half of the village males (10 of 20) liked GSNP in their proximity, but only five females (5 of 20) shared that view. The majority of interviewees (24 or 60%) overall liked the park because of the “positive aspects” of the wildlife. They saw the chimpanzees as unique animals and viewed them with a great sense of pride. People liked having the park nearby for its scenic beauty and cultural significance. They also liked the park for its international reputation and saw it as part of their heritage. Some further elaboration to this question is mixed with other questions below.

*Do You Benefit From GSNP? Who Benefits Most?* This question also did not apply well to park officials and expatriates who were “already benefitting and living” inside GSNP. However, they were asked the question, regardless, and they answered with respect to benefits for local people rather than themselves. About 40% of the park staff and expatriates (4 of 11) cited various types of assistance that the park had given to nearby villages. This included provision of school desks and other school-related items, and assistance with building classrooms.

The majority (9 or 64%) of the 14 villagers who disliked GSNP (from the previous question) said this was because only people from distant places benefitted from the park, and the park did not hire locals. Some respondents in this group also disliked
GSNP because local people had not been involved in park management and felt marginalized for a long time. They disliked the park authorities for denying them suitable fishing grounds along the park shorelines because they felt this created economic harm.

About 10% of the 40 villagers blamed park management for the decline of chimpanzees at GSNP. They commented that chimpanzees were found in abundance before GSNP was designated as a game reserve in 1943, and during that time people lived side-by-side with chimpanzees in peace and harmony. This group of four people also questioned the significance of the national park in wildlife conservation. They stated that during the years before Gombe became a national park, people could graze their livestock alongside chimpanzees and the number of chimpanzees was in the hundreds, if not thousands. One young woman at Mtanga village went as far as saying: “Poaching is a new threat to animals of GSNP which seems to escalate as officials tighten park laws.” Another older man in his early 70s at Mwamgongo village stated: “If the local population intended to wipe out the wildlife of GSNP, they would have done so long ago, leaving nothing to protect.”

Economically, the overwhelming number of villagers (39 or 98% of 40) felt that tourism at GSNP was insignificant in their lives because villages received no share of park revenues, a pattern existing for decades. One young man at Mtanga village simply stated: “We just see tourists come and go. We do not know how many tourists visit GSNP every year, and it seems like park officials have no intention of informing us how much our park is making on a yearly basis, let alone getting us even 1% of that sum of money.”
The potential impacts of tourism among residents were viewed as diverse by the village respondents. While residents were generally very supportive of having more tourists in their villages (39 or 98% of 40), a few felt that tourism could bring problems as well as benefits, such as a rising cost of living due to price increases, drug use, litter pollution, and introducing a more accelerated pace of life.

At the time of this RRA, human health care in the four villages appeared to be facing a severe lack of medical supplies or dispensaries (Fubusa, personal observation). Mgaraganza village alone had a population of over 5,000 people, but lacked a single health center. One elderly man at Mgaraganza village showed his emotion when explaining how far they have to walk when they get sick: “Sometimes we have to walk half a day in order to get just an aspirin; GSNP officials do not seem to have fulfilled their promise of helping us build a health center in our village. They lied to us several years ago by telling us to collect stones and sand to build a clinic and we never saw them again. They made us look like fools.”

*Are You Satisfied With the Relations Between GSNP and Local Villagers?* The daily lives of villagers and local workers at GSNP tend to be intertwined, and this has created an unofficial relationship among them. In fact, support staff or casual workers at GSNP seem to benefit more from the local people surrounding the park than the villagers benefitting from the park itself (Fubusa, personal observation.) For example, people working at GSNP attend churches and mosques at nearby villages, and their children sometimes attend village schools. Together they occasionally form amateur soccer teams in the evenings. Park staff purchase provisions including charcoal from local markets,
and maize grown by park staff is milled using machines found in neighboring villages. Unlike previous questions, this one was uniformly asked of the villagers, park staff, and expatriates. The responses are more clearly segregated as follows.

Villager Views: Locals often view the existing relationship in a negative light. A few locals blame park staff for using “bad language” and harassing them in various ways. Some rangers reportedly talk to villagers in an abusive manner as though the villagers were “sub-human.” At least two respondents (of 40) reported serious abuses, including beatings of people caught inside the park without permission. Other problems reported were threats of rangers using guns\(^1\) if people are caught inside the park.

Some villagers expressed their anger toward certain laws they consider biased. For instance, park rangers are said to be inflexible when they catch local people in the park because they do not allow any negotiation. Also, if livestock cross the park border, the owner is forced to pay a huge fine. However, if wild animals from the park raid farms in nearby villages, there is no compensation. Crop raiding by wild animals from GSNP clearly affects crop production in villages surrounding the park (Fubusa, personal observation). Sometimes crop destruction can be complete. One can easily see destroyed farms while traveling by boat or foot along park boundaries.

Additionally, some local people have started to see chimpanzees as murderers. In 2002 alone there were three incidents of local people and researchers being attacked by

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\(^1\) The definition of poaching by the Tanzania National Park Authority is very broad and general. This observation is supported by Neumann (1998, 203) in a similar study of Arusha National Park in northern Tanzania who argues that a native Tanzanian can be categorized as a poacher simply by stepping over the boundary line without specific permission.
chimpanzees and baboons. Some of the women interviewed said that they were afraid to venture near the park alone for the fear of being raped by male chimpanzees. In May 2002, a chimpanzee named Frodo captured a human infant from the back of her mother and killed her as the child and mother were heading to GSNP to see the woman’s husband, who worked as a staff member. Another old man was bitten to death by a group of orphan chimpanzees at Kitwe Sanctuary only two and a half hours by boat from GSNP. There have been complaints that chimpanzees hunt and kill livestock for food; especially lambs and goat kids. One 26-year-old woman from Mtanga village described how she became terrified each time she saw chimpanzees feeding on palm nuts near her home: “Chimpanzees are very aggressive and tough animals. They are known to rape women and kill our babies, and they can be bad for our poor economy because of crop raiding.”

Restrictive laws at GSNP have caused villagers to devise their own deceitful ways of entering and exiting the park. Most of the poaching events at GSNP seemed to happen at night. Poachers often reportedly make kills late in the evening or just before dark. Firewood collection within the borders of GSNP normally happens during evening hours as well when the rangers are settled in their park quarters, home villages, or at the beach socializing. Two villagers described how easy it can be for anybody to sneak into the forest and cut down highly valued tree species to use as poles for their new houses; some of these trees are only found within park boundaries. The locals also agree that poaching at GSNP is easy because of the rugged terrain and low numbers of park rangers who make infrequent patrols.
Five villagers interviewed suggested that some of their village leaders might be cooperating with local people to hunt animals at GSNP. This is a form of community-based resistance to certain park policies that are perceived by people to violate local economies. It is very likely that some poaching incidents at GSNP take place with the knowledge of local people (Fubusa, personal observation). In fact, some local people probably knew poachers within their villages, as well as the methods they used, but were unwilling to disclose details. This reluctance appears to stem from their resentful attitudes about the park; respondents often felt that park authorities only care about the animals and rain forest and not the people surrounding the park.

Although chimpanzees have been absent outside of GSNP for many years, chimpanzees were said to frequently leave the park to raid crops on the peripheries of park borders, especially near Mtanga, Mgaraganza, and Bubango villages. Some respondents in these villages reported that chimpanzees traveled as much as three kilometers south and one kilometer east of the park. One man from Bubango village maintains: “Chimpanzees, after all, do not know the boundaries of the park and feel free to go wherever they can find shelter and food.” Some locals reported seeing chimpanzees and other wildlife near their homes. Some have complained about the enormous loss of their crops because of destruction done by chimpanzees, baboons, and other animals of GSNP. Chimpanzees in the southern range of the park are even known to nest at nearby villages, usually in places at the Ngelwe escarpment near Mtanga village. Farm plots having oil palm and mangoes were cited by several respondents to be the main reasons
why chimpanzees are attracted to leave park boundaries, yielding negative relationships with local people.

At least four respondents from Mtanga and Bubango villages talked about the need of villagers to defend themselves against the “invasion” of animals from GSNP. They have considered keeping packs of dogs and using traditional weapons, such as spears, in order to prevent animals from raiding their crops. Given the increasing number of people living on the edges of the park, plus the coming of hundreds and thousands of refugees from the war ravaged countries of Burundi, Rwanda, and the Congo, the situation can be expected to get worse.

Park Staff and Expatriate Views: All park staff and expatriates (total of 11) accused local people of not following park regulations. Park authorities tended to see villagers as ignorant due to their lack of enthusiasm toward park laws. The park authorities saw villagers as potential poachers and blamed them for the decline of the chimpanzees and other wildlife. In addition, local people were accused of failing to report the activities of poachers from their communities.

Other hostilities were reported to have escalated including livestock trespassing, human trespassing for firewood and mushroom collection, wood theft, and illegal hunting using traditional weapons such as snares. Added to this was the fact that GSNP has no ecological buffer zone and is threatened by human encroachment from every side. The majority of expatriates reported that the local people were poaching for the bushmeat trade. One British expatriate maintained: “Sometimes chimpanzees are found dead
months later and the cause of death is linked to poaching with snares. Many such events go without investigation or arrests.”

How Could Relations Between GSNP and Local Villagers Improve?

Villager Views: The overwhelming majority of people interviewed (71% of 40) felt that GSNP should extend more benefits to local people. These benefits included bringing more economic projects to the villages; providing credit to local people, and supporting local recreational sporting events. People in this group felt that GSNP should provide services to the people, share park revenues, help neighbors, and construct a road joining surrounding villages and other parts of the region. It also included bringing money to the villages, “punishing” wildlife when they kill or injure humans or damage crops, and involve local people in park planning. They believed that involving local people in budget planning would encourage them to help protect GSNP wildlife and their habitat.

The second major group of respondents (60% of 40) felt that GSNP should provide jobs to local people as well. This includes temporary and permanent jobs such as assisting with wildlife research, service as park rangers, service as local environmentalists, cutting paths for tourists and researchers to use, and serving as porters for foreign film crews. Some would like to see GSNP promote human health by building more dispensaries and clinics among villages on the edges of the park. People who would like to see GSNP offering jobs to local people also wanted GSNP to help sponsor talented poor children from adjacent villages to attend secondary and higher educational institutions in Tanzania. Some respondents wanted GSNP to build schools, both primary
and secondary schools, in their villages, and they would like to get clean water from GSNP in order to reduce stomach related diseases that come because of drinking dirty water.

A few respondents said they would like park officials to allow local people to collect firewood or dead limbs from the park, and allow them to hunt small animals found on the edges of the park for subsistence. They would also like the park to build administrative centers in villages in order to make local people involved in protecting animals and their habitats. Many people wanted GSNP to allow people to start fishing along the lake shore (within park boundaries) once again. They wanted GSNP to ensure that animals in the park are well protected from poachers. In fact, many local people interviewed were concerned about the safety of animals at GSNP, primarily because of the infrequent patrols done by the few park rangers. A very small number of local people wanted GSNP authorities to reduce entrance fees for Tanzanian and expatriate tourists in order to attract more foreign currency that would be shared between the park and local people. Only 15% of 40 thought that the management of GSNP should do nothing different than it has been.

Many respondents said they would like to see more tourists come see the splendor of GSNP, and nearly all (98% of 40) liked the idea of receiving tourists in their villages. At the time of this RRA, no tourists to GSNP were visiting nearby villages (Fubusa, personal observation). If they were to do so, it could be a source of economic stimulus that could help compensate for the loss of access to natural resources that GSNP has caused. Some local people argued that the income generated from tourism could help
convince policymakers and the public to better protect the chimpanzees of GSNP and their habitats.

Park Staff Views: At the time of this study in 2002, salary payments to rangers were irregular, which undermined ranger morale and appeared to hinder park management (Fubusa, personal observation.) For instance, park rangers earned only about US $50 per month, and some were forced to depend on the goodwill of local people for survival. They had no means of supplementing their income because home gardening and animal husbandry are not allowed within the park. The rangers thus cannot produce their own food in the park, which means they must either grow it outside park boundaries or buy it from local villages or Kigoma town. The latter is a 2.5 hour boat-ride from GSNP (or about 16 km). The Tanzania National Park Authority does not like to see rangers personally cooperating with the local people out of fear that such ties could lead to collaborative poaching efforts (Fubusa, personal observation). One informal report at GSNP (Fubusa, personal observation) has suggested that park rangers do not report all violations, and they may collaborate with villagers to hide the identities of local lawbreakers. In fact, in this RRA it was noted by some respondents that some park staff consider it a demotion to be assigned to work at GSNP in relation to other national parks in the country. This is because some believe that GSNP is very remote from essential public services.

Expatriate Views: Although GSNP is the smallest national park in Tanzania, it is covered with thick forests that can allow poachers to easily come and go undetected. It was noted that the thick forest and rugged terrain are a challenge for many park rangers
who are not used to patrolling in such difficult conditions. Many park rangers reportedly find it difficult to patrol GSNP (Fubusa, personal observation). At least two expatriates acknowledged that it is difficult to patrol GSNP because of its boundary irregularities and inaccessibility due to rugged mountains, steep valleys, and the rugged coastline of Lake Tanganyika. Plus, many park rangers were reported to be in poor physical condition.

The four expatriates interviewed suggested that there were certain circumstances in which tourism at GSNP should be actively discouraged to protect the chimpanzees and to allow field research to carry on without interference. They argued that initially GSNP should have been declared a “special biodiversity hotspot” for conservation and research and not for tourism. They noted that GSNP has a significant national and international importance and, therefore, tourism should have been limited in the very early stages of park development. They suggest that this can still be done through the use of access permits and land-use planning programs. The GSNP is regarded by the world community as a World Heritage Site and, therefore, most appropriate to discourage tourism altogether.

*Why is Deforestation near the Park? Why is Wildlife Declining?*

Villager Views: Numerous answers were given about reasons for the apparent deforestation around the GSNP boundaries. Nearly 28% of 40 respondents believed that people felled trees to get wood for subsistence and trade. Timber is used to build houses, wood is used for charcoal, and firewood is important for sale. Another reason is that the locals need firewood for cooking or drying fish from Lake Tanganyika. This group of respondents felt that poverty causes deforestation because poor people have no
alternative means to find fuel and building materials. A few people in this group perceived that they would continue to cut down trees because there was still plenty of space for all to live and use resources. Bushfires were another reason for deforestation, as mentioned by several respondents. Bushfires cause deforestation because there are times when people simply set fire in the forest to get fresh grasses for grazing their livestock, to get suitable and unobstructed hunting patches, or to clear habitats for snakes and other animals considered dangerous. While many fires are purposefully set for practical reasons, some are set just for “fun.”

Lack of access to education was noted by 22% of the 40 respondents to be directly linked with deforestation because people felt that there was a lack of adequate environmental knowledge among most local people. The benefits of maintaining forests are not widely known. People in this group also felt that people cut down trees because they do not perceive value in living trees, or they have no incentives to protect the environment. Poor agricultural methods were noted by 17% of respondents as being one of the leading causes of deforestation, primarily due to shifting agricultural or slash-and-burn methods.

Another group of local respondents (33% of 40) believed that increased human population growth and resource-based conflict were other causes of deforestation. Some respondents felt that deforestation near GSNP is more severe now because of the refugees; a high influx of refugees from neighboring Burundi, Rwanda, and the Democratic Republic of the Congo in recent decades has maximized the rate of
deforestation according to these respondents. Some, however, still felt that park officials were to blame for deforestation.

Park Staff Views: The central argument made by park staff concerning over-exploitation of natural resources was inadequate law enforcement; more of a military approach was needed. Mutual cooperation with the locals was not viewed as important to protect resources.

More information about park staff views had to be found in various reports to augment interview information. This was because some park staff declined my invitation to interview. It became obvious from these reports that the profile of lawbreakers at GSNP varied with the type of offense, age of the lawbreaker, and gender. Minor infringements such as collection of mushrooms or firewood were likely to be carried out by women who were also known to move in groups. On the other hand, infringements committed by men seemed to be relatively more serious such as hunting wildlife using packs of dogs, snares, and even guns. Men also committed minor infringements such as livestock trespass, even though normally children tend to be herders while livestock owners tend to be adult males. Men were likely to move through GSNP individually or in small groups. However, it was observed that crimes committed at GSNP were normally minor ones: firewood collection, grazing trespass, fishing trespass, and cutting grass for roofing (Fubusa 2002). For example, on 21 January 2000 a ranger confiscated fishing nets from villagers from Mwamgongo who were fishing on Kalande beach. On 12 June 2000 a woman cutting firewood was caught by rangers (Fubusa, personal observation).
There are no known records taken by park officials about hunting at GSNP (Fubusa, personal observation). The hunting pressure, though, seemed to increase at GSNP before crop harvest times that occurred from April to May. Some interviewees, though, argued that the last heavy rains during these months kept hunters and grazing livestock away from the park. Hunting was also expected to be low during the agricultural season because most of the labor force is needed to work the farms. Other respondents expected to find hunting pressure to be high after harvest time when many people have less work on the farm. Hunting pressure was more likely to increase during times of food shortage or during droughts or floods. In previous times when fishing in Lake Tanganyika was abundant, there were fewer reported poaching events in the park since people had access to enough food and were too busy with the fishing industry.

Expatriate Views: Nearly all expatriate respondents cited the number one reason for the decline in the number of chimpanzees to be the growing number of refugees from the war-torn countries of Burundi and the Democratic Republic of the Congo. Refugees were reported by this group of respondents to care less about the environment and animals than the local Tanzanians. The refugees are said to be quick to purposely set bush fires. Refugees reportedly love bushmeat as a traditional food, and Congolese refugees are more likely to eat chimpanzees and other primates due to cultural preferences. The GSNP is in a strategic location because Kigoma, a neighboring town, is a famous port in Lake Tanganyika. Kigoma town has had an established trade route between Burundi, Democratic Republic of the Congo, Tanzania, and Zambia. One respondent insisted:
“Since 1996 rumors have proliferated concerning bushmeat for sale within Kigoma town, and it would be naïve to think that such animal trade does not exist.”

The main focus for all expatriates was protection of chimpanzees, and less significance was placed on other wildlife species at GSNP. Expatriates maintain that rapid deforestation around GSNP has eliminated a substantial amount of chimpanzee habitat, leaving only fragmented patches of forest surrounding the park. Farms, fields, and villages surround the park on all sides with the exception of the western lakeshore. Chimpanzee habitat at GSNP is thus threatened by the expansion of agriculture and human settlement (Goodall 1988, 254). The lack of buffer zones surrounding GSNP has escalated deforestation, especially to the east and south. The rift escarpment in the southern range is much lower in elevation, and the area has accommodated a growing number of people, mostly refugees from the war ravaged neighboring countries of central Africa who live on the edges of the park.

Bushfires were singled out as another leading cause of deforestation. Field reports from GSNP researchers (Fubusa, unpublished data) indicate that from September to October of 1999 there were four forest fires in the southern range of the park. One expatriate insisted: “Bushfires can be good for rejuvenation of the park’s vegetation, but fires near the end of the dry season could be devastating to animals and their habitats.” Moreover, the village population sizes around GSNP are very high, even when compared to other parts of Tanzania (Fubusa, personal observation). Another expatriate maintains: “This is largely due to high fertility rates among local women and improvements in health care services.” The population in the Mwamgongo village, to the north, has nearly
tripled in the last three decades, and this could be one of the leading reasons for the declining number of chimpanzees in the northern range of the park. “Over the last 40 years, chimpanzee populations have declined by nearly 35% in GSNP, largely as a result of poaching, human population growth, contagious disease from humans, and habitat loss.”

According to GOT (2007), villages along the northern shoreline of Lake Tanganyika had the largest family sizes in Tanzania. The population of some villages has almost tripled in the last three to four decades (Fubusa, personal observation). One main reason is the immigration of refugees. One wildlife specialist expatriate argues: “At low population density, people can live without damaging the natural environment that sustains them; without causing erosion, deforestation, pollution, or drying up rivers. At high densities, the risk is much greater. Aerial photographs showing areas inside the park and outside areas demonstrate that wooded areas have been cut down very drastically outside park boundaries.” The same respondent continued to maintain that: “Just a few years ago, these deforested areas attracted rainfall and encouraged streams to flow cleanly throughout the year.”

Nearly all expatriate respondents who specialized in wildlife biology and behaviors cited contagious diseases from humans as yet another major threat to chimpanzees of GSNP that could help explain their dwindling number. “Contagious diseases can be passed between humans and animals, and/or between animals to animals; that is, between livestock and animals. Chimpanzees can catch nearly all-human contagious diseases.”
The problem of contagious diseases might be more serious at GSNP due to the fact that chimpanzees have been habituated to researchers since 1960. One experienced field researcher expatriate who has been at GSNP for decades stated: “Some chimpanzees of GSNP are extremely tame in the presence of humans, and this makes them susceptible to human diseases. They can come too close to people.” He added that chimpanzees are immune to diseases carried by the local people surrounding the park, but not to viruses, parasites, or other forms of disease carried by tourists from distant countries, such as Europe and America. For instance, a handkerchief left in the forest by a tourist and later chewed by a chimp may prove to be disastrous to the chimpanzee community at GSNP forest. A sneeze can be extremely dangerous because it can transmit a virus by up to several meters away and this could prove hazardous, especially if a tourist is standing close to a chimpanzee. Most of the contagious diseases chimpanzees contact comes from either researchers or tourists. A new law at GSNP prohibits people from urinating, defecating, or eating in the forest. Chimpanzees of GSNP are known to steal things from tourists, such as hats or clothing, and start chewing them.

Focus Groups and Key Informant Interviews

An inventory of the topics mentioned in the four focus-group sessions based on age, gender, and refugee status is shown in Table 5.1. An inventory of topics mentioned in the eight other focus-group sessions based on village residence and livelihoods are shown in Tables 5.2 (a,b). For Table 5.1, the topics of education, environment, population, poverty, and social cohesion were often discussed across all four focus groups. The topics of fisheries and the rural-urban interface were much less commonly
mentioned. For the village-specific patterns, there was a common emphasis on education, agriculture, and population (Tables 5.2a,b). The environment was more often mentioned in the uplands compared to the lowlands, however, and social cohesion appeared to be less mentioned in the lowlands. As with the first four focus groups, the topics of fisheries and the rural-urban interface were uncommon.

Summaries of 37 key informant interviews are also shown in Appendix B. Similarities among results for both the focus groups and key informants were high. They had been asked the same questions (Chapter 4). Therefore, the main findings are summarized together below.

First, environmental degradation is perceived to be happening at an alarming rate. This is occurring in various ways, including: 1) Forests and natural vegetation cover have declined; 2) once-abundant mushrooms and native fruit trees have disappeared; 3) there is a severe shortage of drinking water because many water sources have dried out; 4) the quantity of annual rainfall has decreased significantly; 5) once abundant fish in local rivers and Lake Tanganyika are now in short supply; 6) wildlife that once roamed around villages has declined significantly due to shrinking habitat and poaching; and 7) farm land has lost its fertility. One especially influential key informant made the following summary:

Environmental change is due to increase in population and it is tremendous—more trees have been cut down for charcoal and firewood, fishing using illegal equipment has increased, hence destroying breeding areas of fish. Fish harvest has gone down and the price of fish at the retail level has gone up. Serious environmental degradation is coming as a result of deforestation or illegal fishing.
Second, various reasons were given to explain the environmental changes: 1) food shortages due to lowering of soil fertility; 2) lack of entrepreneurship among villagers; and 3) lack of education and information that has limited the ability of people to adapt to a changing world. One informant noted: “The world has changed fast, while the people of Kigoma have not changed. For example, in the past people used to grow their own crops, but now the cash economy is the way of life.” Add to the list: 4) lack of income diversification techniques; 5) a trend for youths to be less inclined to assist the elders with agriculture; 6) a general economic decay due to lack of credit for villagers, lack of knowledge on sustainable agriculture and forestry, a poor formal education system that prepares youth to abandon rural areas and migrate to big cities; 7) the government favors urban versus rural development; and 8) a growing belief in witchcraft that negatively affects human relations and slows economic initiatives. For example, older people are no longer perceived as advisers but more as “wizards”—many of them are isolated and depressed; educated locals can be forced to abandon their villages for the fear of dying from witchcraft, especially escalated by jealous villagers. Add to the list 9) gradual loss of traditional norms, rules, and regulations that were used to protect natural areas.

One key informant gave the following general assessment:

Economics of the environment in the rural area have changed. For example, the cost of transportation has gone up due to high prices of fuel, and this has led to high prices of most commodities. For a normal person to survive, they have to increase their income. Sometimes this involves destruction of the environment by selling more charcoal as people can no longer afford imported kerosene.

Another assessment is given by a key informant: “There is a severe lack of seriousness from the government; no new road has been constructed in the entire Kigoma Region
since Tanzania became independent from the British in 1961.” Another key informant said:

Environmentally, it has changed for the worse. There is much degradation of the soils, forests, and environment. There have been projects proposed to assist, but it is just paperwork and no action. People have not been successful in coping with the high pace of degradation. Examples are now widespread—see the bare hills and the drying up of many water sources. Historically, people of Kigoma have never been empowered and, instead, they have always been used as cheap labor elsewhere in Tanzania.

Third, respondents identified various future changes if recent trends do not change: 1) All rivers will dry out due to lack of rainfall; 2) natural forests and vegetation cover will perish because of deforestation; 3) some plant species and wildlife will become extinct; 4) environmental degradation will create a new generation of refugees and will therefore instigate a growing internal displacement of people in search of food, water, and shelter. Another key informant gave the following optimistic observation: “Prices of petroleum are now so high in the last two years; agricultural energy through palm oil provides new hope for Kigoma. Palm oil can be described as the best energy crop possible.” Another informant gave the following observation on population to explain future changes:

There will be an internal migration among the able-bodied of Kigoma Region in search of “greener pastures” outside. The Kigoma Region will continue to be a labor reserve region. Even people who are assigned to work in the region by the central government from Dar Es Salaam tend to see it as a “demotion. We are going to become a ghost region.

Yet, one key informant gives the following optimistic assessment of the future trend: “Kigoma has an immense human capital as the region has many hard-working people in agriculture and formal sector jobs. The suitable geographical location will likely make
the region a very important economic zone and a corridor link for much of East and Central Africa.”

Fourth, various reasons were given by respondents as major obstacles for improving livelihoods in Kigoma. These can be consolidated as: 1) poverty is a constraint because of the lack of capital, income diversification techniques, entrepreneurship, and agricultural expertise; 2) there is a growing lack of compassion for one another—for example, helping each other in development activities like education is no longer a priority among villagers; 3) the lack of reliable sources of energy for domestic purposes; 4) lack of a productive agriculture and local base for trade and marketing; 5) a general lack of education; 6) interaction between poverty and environmental degradation has increased the risk of human epidemic diseases; 7) there is a lack of clean water in suitable quantities; 8) corruption in education and the legal systems; 9) poor technology; 10) growing tendencies for people to steal from each other due to their difficult living conditions; and 11) a general lack of good governance and leadership. One key informant lists the following obstacles:

First, poor infrastructure, especially roads. Second, the farmers of the region are facing poor marketing systems for their crops. Third, there is a continuous lack of adult education; what people really need is skills, not formal education since the education system of Tanzania produces irrelevant research and a lack of action. Fourth, there is a lack of inventiveness as people are not working hard enough to invent or improve their way of living. For instance, most people are lazy, they do not like work. They want to work very little, and they talk too much. This is creating poverty.

Fifth, the following is a list of interventions or solutions given by focus group respondents: 1) Education should be given to all in academic and vocational schools. Educational campaigns should be implemented in villages, suburbs, wards, divisions,
districts, regions, and country at large. There should be a program that will engage people in development seminars and workshops; 2) professionals should be encouraged to return and work in their villages alongside those without formal education; 3) local people should be educated about the link between environmental and community degradation. People should be discouraged to cut trees indiscriminately, burn forests, make charcoal, destroy water sources, practice poor peasantry activities, and instead, people should be informed about other alternatives to generate income; 4) the government should extend public services to rural areas instead of the current trend of only helping people in urban areas; 5) people should be encouraged to share costs in education sectors instead of helping each other only in times of weddings and funerals; 6) there must be a reduced gap between people with formal education and those without formal education through methods such as mentoring; 7) employment opportunities to villagers should be extended to as many people as possible; 8) extending adult education that includes even people without formal education, but with significant knowledge on real world issues, can bring a significant change; 9) training centers should be made available in each village and locality focused on different development issues; 10) using peer innovation to alleviate poverty through self employment; 11) frequent seminars and workshops should be extended to the villagers as often as possible. For example, seminars for women on how to use modern cooking materials can help to stop the ongoing over-exploitation of local forests.

Lastly, the following is a summary of interventions or problem solutions given by key informants as being needed for the Kigoma region. First, improve infrastructure,
especially roads or bridges. “If a member of Parliament dies, it takes 100 million Tanzanian shillings in three months to conduct another political campaign, but the same government does not fix a broken bridge.” Second, improve marketing and processing facilities. For example, most sardines are fished during the rainy season and the current drying mechanism is very poor, hence more fish get rotten and there is a loss of income to fishermen. Third, provide access to information that is relevant to the daily livelihoods of an average person. Fourth, government should stop talking too much with very nice proposal write-ups but doing very little for farmers. Politicians are now detached from the reality. Finally, banks do not give loans to small farmers. For instance, farmers in Tanzania cannot get a bank loan as the set-up of almost all banks in the country does not permit a small-scale farmer to access bank loans. Seventy percent of farmers do not get any bank support.

Household Survey

Objectives, hypotheses, and methods for the household survey have been described in Chapter 4. The study site is shown as Figure 4.1. The sample ended with a total of 96 households, with 44 from the lowland area and 52 from the upland area. Prominent in the survey objectives was simply getting a baseline description of rural households. Beyond this, some of the major research emphases are briefly repeated below.
Household and Farming System Descriptions

Based on the focus groups and key informant results, the random nature of the household survey was intended, in general, to test the hypothesis of a downward trend in all major forms of capital assets (i.e., human, natural, social, financial) and hence a downward trend in livelihood resilience (i.e., quality of life, ability to solve problems, etcetera). It was also intended to test that household heads would perceive that interventions concerning rural education were important, and that GSNP would not be a prominent factor in problem solutions. The lack of mention of GSNP in the focus groups and key informant interviews was notable in this regard. Finally, the survey would test some hypotheses related to the idea that upland households might be more resilient than lowland households because of variation in natural capital (Fubusa, personal observation; Chapters 3, 4). The use of binary logistic regression would allow further quantitative exploration of the data with regards to which variables best explained variation in resilience responses.

Household Features

Household Heads

Descriptors for household heads were typically similar between lowland and upland locations (Table 5.3). There were no statistical differences ($P \geq 0.05$) in age due to location or gender according to the 95% confidence intervals. Statistical assessment could not be made for the percentage data. Only the overall patterns will thus be highlighted here. Eighty-six percent of household heads were males. On average, male and female
household heads were middle-aged, but with a very high range of age variation (over 60 years—23 to 86). No head of household had exposure to tertiary education. Twenty percent of household heads overall reported no access to formal education in their past, and the percentage appeared higher for the sampled females (46%) than for the sampled males (16%). Male heads also appeared to have a higher rate of access to primary education than the females (81% vs. 46%). Only 4% of household heads had attended any secondary school at all. The first language of all respondents was overwhelmingly Kiha (Table 5.3).

All Household Members

Overall, there were 708 individuals counted for the 96 households with a 50:50 gender division (Table 5.4). The average household size, overall, was 7.4 persons, with no significant variation (P≥0.05) between lowland (7.3) versus upland (7.5) sites (Table 5.4). In terms of access to formal education only household members aged six years and above were considered (for a subtotal of 569 persons overall—see the bottom row under Formal Education). About 7% of this group reportedly had access to secondary education across both locations, while 78% had access to primary education. The remainder of 15% reported no access to formal education. Gender appeared to affect access to education when the entire household was considered; more females (23%) in the sample lacked access to any formal education compared to the males (8%). Kiha again was clearly the dominant first language for entire households, followed distantly by Kiswahili. The “other” potential first languages were English and Arabic. No respondents spoke English
as their first language even though English is one of the two national languages of Tanzania (Kiswahili is the other).

Table 5.5 summarizes age categories by gender for the households. The age distributions were similar for the upland and lowland sites, so highlights here emphasize the combined data (see bottom row of table). Overall, 67% of the household population was ≤22 years old. The largest single category (33%) was the primary school age (i.e., 7-15 years old) that was evenly split between boys and girls. Forty-four percent were dependents aged ≤15 years (42%) or ≥66 years (2%). People within the “productive” age classes of 16-65 years of age (namely, those who are legally able to work in the formal economy) added to 44%. Overall, the percentages of household members eligible to attend primary, secondary, or tertiary educational institutional—according to the Tanzanian system—was 33, 15, and 10%, respectively (Table 5.5). The age distribution for the tabular data is also shown as bar graphs in Figure 5.1 (a,b). This clearly illustrates a youth-dominated population with a high growth potential. That the percent of the population ≤6 years old appears markedly less than that for children aged 7-15 years across both sexes is unexplained. This could be because of increased mortality rates of children under the age of 5 years.

Farming Systems

**Land Ownership and Cultivated Crops**

Considering all 96 households, no household head reported that they “owned” their land. No one had a title deed. The central government of Tanzania owns all land in the country (Chapter 3). Farmers in Kigoma Rural gain access to land via traditional,
village-level mechanisms of indigenous collective ownership. Members of the household gain access to land through an extended patriarchal system mediated by village authorities. Surveyed households had land access rights that were either inherited or acquired via rental agreements or informal “purchase.” Crop production is the aspect of land use that is “privately owned” and it is crop-producing potential of a land parcel that determines how a rental or access price is negotiated. Elites can gain access to official title deeds via connections and corruption (Fubusa, personal observation).

Table 5.6 illustrates farming duration and access to land resources. Data are shown for 96 or 95 sampled households. The smaller sample size reflects omission of an outlier that reported 22 hectares, a figure far above the rest of the population. The distribution with or without the outlier is shown in Figure 5.2 (a,b). There was a marked and significant difference in the duration of farming between the lowland and upland farms. The lowland farms had existed for 3.4-times longer than the upland farms (27 versus 8 years, on average). The range in farming duration for the lowlands varied by 68 years, while that for the uplands varied by 27 years. This verifies that the uplands have been occupied by farming for a shorter period of time compared to those in the lowlands, an impression provided by the site reconnaissance conducted prior to the survey (Fubusa, personal observation).

Overall, there was an average of almost four shambas (isolated farm parcels) per household (Table 5.6). The range in the number of shambas varied from one to six, similar between lowland and upland sites. The shambas were usually distributed within the land of the home village. The total number of shambas recorded was 358 across all 96
households. Of these, the majority were accessed via inheritance or informal purchase. Based on the sample size of \( n=95 \), the average size of farms varied from 2.4 hectares (lowlands) to 3.2 hectares (uplands). This was not a statistically significant difference according to a 2-tailed t-test. The overall average was 2.8 hectares per farm. Considering household size (Table 5.4) the land resource averaged 0.33 hectares per person in the lowlands and 0.43 hectares per person in the uplands. Overall, the average was 0.38 hectares per person. Despite similarity in average land holdings, the variation in land access was very high for both lowland and upland sites (over 100-fold overall; see minimum and maximum figures in Table 5.6).

Table 5.7 illustrates land access according to gender. There was a trend overall that indicated that male household heads had access to 67% more farmland, on average, than female household heads (3.0 versus 1.8 hectares), but this was not significant \((P>0.12)\) according to results from a 2-tailed t-test. This trend was more apparent for the lowlands compared to the uplands, but the small sample size for female household heads requires caution in interpretation.

Most of the agricultural productivity of sampled households takes place in small home gardens and field plots. Crop production is a primary task of women, children and the elderly. Tables 5.8 to 5.10 give plant crops ranked as most important, second-most important, or third-most important by respondents in the lowland and upland areas. Information was also collected on the purposes of each crop (i.e., on-farm food consumption, generation of cash income, or “other” purposes.) The data are also shown in pie charts for Figure 5.3 (a-c) that aggregate rankings and makes patterns easier to see.
For the lowlands, there were 12 plant crops listed in the top three ranks overall. There were five tree crops, three root crops, three cereal grains, and others. When rank weights were added up, oil palm (35% of weighted ranks) and cassava (27%) were dominant followed by maize (13%), beans (9%), and sweet potatoes (Figure 5.3(a)). For the uplands there were 10 plant crops, and all were the same as in the lowlands. The dominance pattern changed, however (Figure 5.3(b)). Cassava (31% of weighted ranks) dominated, followed by maize (17%), coffee (17%), and oil palm (13%). Beans (7%) and sweet potatoes were ranked as less important.

The crop mix for both lowlands and uplands combined is shown in Figure 5.3 (c). Overall, cassava was top ranked (29%), followed by oil palm (23%), maize (15%), coffee (10%), beans (8%), and bananas (6%). Crops typically served multiple purposes, but oil palm reportedly had the most balanced use for food, cash income, and other uses (Tables 5.8 to 5.10). The farming system appeared quite diverse. The composite data for importance of crops that supports Figure 5.3(a-c) is shown as Table 5.11.

Livestock

The data indicated that the role of livestock keeping is emphasized more in the upland area compared to the lowland area. The types of livestock totaled six species overall, a much less diverse assortment compared to the plant crops. Animals included ruminants, poultry, and rabbits. Overall, poultry were producers of meat and eggs. Goats, sheep, and rabbits yielded meat. Cattle provided meat, milk, and manure. Animals tended to be managed using low-input means. All species were noted to forage freely in and near
their farms, yet a mix of foraging and confinement for all major species was also commonly reported.

Tables 5.12 to 5.14 give livestock ranked as most important, second-most important, or third-most important for the lowland and upland areas. Information was also collected on the purposes of each species (i.e., on-farm food consumption, generation of cash income, or “other” purposes.) The data are also shown in pie charts for Figure 5.4 (a-c) that aggregates the rankings and makes patterns easier to see. Table 5.15 shows the data used in the pie charts. For the lowlands, there were three major livestock species commonly listed in the top three ranks overall. When importance rankings were added up, chickens dominated (51%), followed by goats (39%), and ducks (8%) (Figure 5.4(a)). For the uplands there were six commonly mentioned livestock species. The dominance pattern changed, however (Figure 5.4(b)). Chickens again were most important (42%), followed by goats (27%), cattle (13%), and ducks or turkeys (6%).

The livestock mix for both lowlands and uplands combined is shown in Figure 5.4 (c). Overall, chickens were top ranked (46%), followed by goats (32%), and cattle (8%). Livestock typically served multiple purposes. These purposes included food production, cash income, and service as financial reserves. Table 5.16 gives figures for numbers of livestock per household. In general, livestock holdings were modest in both the lowland and upland areas.
**Wildland Resources**

The data indicated that hunting and gathering of wildland resources was limited. However, bias may be suspected to be pronounced in this case as several forms of hunting and gathering are illegal and thus unlikely to be reported in a general survey.

Tables 5.17 to 5.19 list the hunted and gathered resources as ranked from most important, second-most important, to third-most important for the lowland and upland areas. The data are also shown in pie charts for Figure 5.5 (a-c) that aggregate the rankings and makes patterns easier to see. Data supporting the pie charts are shown in Table 5.20. The patterns for lowlands and uplands were very similar, so only the composite will be noted here (Figure 5.5c) Overall, firewood was regarded by far as the most important wildland product (49% of important ranks). Medicinal plants and mushrooms (for food) followed distantly at 13% each. All other reported products were minor.

**Income and Expenditures**

Figure 5.6 illustrates annual income estimates reported by 63 respondents. Problems with use of income categories required the procurement of precise estimates for a smaller number of households (Chapter 4). Overall, the average cash income for lowland and upland households combined was Tanzania shillings (TShs.) 214,000/= per household per year or USD 178.00 per household per year based on a conversion of TShs. to USD at a rate of TShs. 1,200/= per USD 1.00 (Fubusa, personal observation). The data suggest that the lowermost 28% of households in this subsample (18 of 63) had a cash income on the order of TShs. 55,833/= or USD 46.53 per household per year, or
USD 0.13 per household per day. At the upper end, the uppermost 30% of the households (19 of 63) had a cash income on the order of TShs. 471,579/= or USD 392.98 per household per year, or USD 1.07 per household per day. The uppermost 30% thus had about 8.2-times the reported cash income of the lowest 28%.

Table 5.21 and Figure 5.7(a-c) shows allocation of income for the households. Overall, the patterns were similar between lowlands and uplands. About 70% of income came from sales of crops, livestock, and livestock products. The other sources were minor. Table 5.22 and Figure 5.8 (a-c) shows allocation of expenditures for the households. Overall, the patterns were similar between lowlands and uplands. Nearly 40% of expenditures were for food, followed by much lower proportions for household items, child education, or health care. Other categories were very minor. When comparing these income and expenditure data it appears that many of the respondents were selling some of their agricultural production to buy food off-farm. They thus do not appear to be classical subsistence farmers that consume all production for their survival. In general, these income and expenditure data should be interpreted with caution. In-kind income, in particular, was probably underestimated because respondents may have had difficulty quantifying the magnitude of their domestic consumption of home-grown foods and other materials (Fubusa, personal observation).
Patterns for crosstabs of resilience variables and the four categories of capital variables are shown in Table 5.23. Overall, considering 20 variables across the two sites, a worsening trend was observed for the vast majority of responses. The main purpose of Table 5.23 is to illustrate variation due to site. There was not much variation due to site. Four variables were used to assess resilience, including quality of life, crisis recovery, future confidence, and personal problem solving. Only one (crisis recovery) was affected by site. The perceived ability to recover from crisis tended to be more on the improving trend for the uplands (P=0.001) compared to the lowlands. Natural capital had four variables and, of these, only livestock forage proved significant (P=0.013) by site, suggesting slightly better trends for the lowlands. The five variables for human and social capital are shown together. Again, only one of these (access to contemporary institutions) approached significance (P=0.063) according to site. Finally, seven variables were used to assess financial capital, but only one (credit access) approached significance (P=0.088).

Supplemental information for social capital, namely the traditional networks and contemporary institutions accessed by respondents, is shown in Table 5.24. Overall, traditional networks and institutions were more commonly reported, with 59 to 74% of respondents saying they were involved in one or two. The traditional networks included kinship or other ethnic groups. The contemporary institutions included cooperatives, schools, churches, etcetera.
Patterns for crosstabs of resilience and capital variables, aggregated over the two sites, are shown in Table 5.25. Overall, perceptions of worsening trends were noted for all four resilience variables as well as 13 of 16 capital variables. All worsening trends were statistically significant \( (P \leq 0.042) \). Considering the three capital variables that were not worsening, land access was noted by 46% of households not to have changed in the past 5 years. For skills and knowledge, the percent of households that noted improvement (42%) was similar to that noting a worsening (40%). Use of social networks was the only capital variable perceived to have improved for a majority (66%) of households. The most negative trend assessments were for things like soil productivity (92%), general environmental trends (83%), and access to credit, savings, and banks (81-89%). Capital items that were worsening, but to a lesser degree, included access to institutions (50%) and markets (51%).

Patterns for crosstabs among resilience variables are shown in Table 5.26. The results indicated two things. First, there was some dissimilarity in response patterns between any two variables according to Pearson’s chi-square tests \( (P<0.001) \). However, the highly significant gamma statistics \( (P \leq 0.001) \) indicated that there were positive, ordinal relationships between each pair of variables. What this says is that the four resilience variables were highly inter-related in logical ways. For example, a high quality of life was associated with a higher perceived ability to recover from crisis, a higher confidence in the future, and a higher ability to solve problems.

Patterns for crosstabs among resilience, capital, and other categorical variables are shown in Table 5.27. These data were used to screen categorical explanatory variables for
each of the four resilience variables. This would help to prioritize explanatory variables for inclusion in final binary logistic-regression models. Screening was necessary because the categorical data and the modest sample size (n=96) imposed limits on the numbers of variables that could be effectively used in binary models (S. Durham, USU, personal communication).

Screening of data in Table 5.27 was conducted using several criteria. These included: 1) Significance of the Pearson’s chi-square statistic; 2) significance of the gamma statistic; 3) potential redundancy between two or more explanatory variables; and 4) variation in response distributions among improved, same, and worsened categories (see Table 5.25.) The initial threshold value was $P \leq 0.10$. The idea behind comparing variation in response distributions was that explanatory variables need to exhibit variation that could be useful in explaining variation in the resilience variables (S. Durham, USU, personal communication). For example, under quality of life, bank access gave significant P values for both chi square and gamma (Table 5.27). However, bank access was perceived by nearly all (89%) respondents as worsening (Table 5.25). This made bank access unlikely to yield much explanatory power for quality of life.

The screening yielded the following results. For quality of life, the top group of explanatory categorical variables included, in rough order: 1) Cash income; 2) household labor; 3) agricultural technology; 4) skills and knowledge; 5) land; and 6) household health. For crisis recovery, the top group was: 1) Cash income; 2) skills and knowledge; 3) agricultural technology; 4) land; 5) research site (uplands versus lowlands); and 6) livestock number. For the last two resilience variables the lists became longer. For future
confidence, the top group was: 1) Cash income; 2) household health; 3) household labor; 4) skills and knowledge; 5) social networks; 6) agricultural technology; 7) soil productivity; 8) environmental trend; 9) market access; 10) contemporary institutions; and 11) livestock number. For problem solving, the top group was: 1) Cash income; 2) skills and knowledge; 3) household labor; 4) agricultural technology; 5) household health; 6) bank access; 7) land access; 8) soil productivity; 9) livestock number; 10) contemporary institutions; 11) soil productivity; and 12) cash savings.

Continuous variables were also screened for possible model inclusion. The variables considered were: 1) Actual income (n=63); 2) age of household head; 3) time spent farming (years); 4) farm size (hectares) as a proxy for land wealth; 5) off-farm income (as a proxy for income diversification); and 6) remittance income (as another proxy for income diversification). Again, these variables were assessed using t-tests to compare patterns across the categories of resilience variables. If a t-test was significant for a variable, the variable could be considered for inclusion in the final binary logistical regression model (S. Durham, USU, personal communication). We examined P values under assumptions of either equal or unequal variances. To improve ease of interpretation, both resilience and categorical explanatory variables were re-shuffled from three categories down to two. Improved-plus-same were added together with worsened left as its own category.

For quality of life t-tests, the only significant variable was age of household head (P≤0.016). In this case the mean (±SE) for the improved-plus-same category was younger (43.4±2.35; n=30) compared to the worsened category (50.4±1.54; n=62). All others
were insignificant ($P \geq 0.088$). Age of household head was thus added to the quality of life binary regression model. For crisis recovery, none of the continuous variables were significant ($P \geq 0.195$) and hence none were added to this binary model. For future confidence, the significant variables were again age of household head ($P \leq 0.043$) and also farm size (hectares; $P \leq 0.019$). All others were insignificant ($P \geq 0.13$). For age, the mean ($\pm SE$) for the improved-plus-same category was younger ($44.7 \pm 1.93; n=38$) compared to the worsened category ($50.2 \pm 1.78; n=53$). For farm size, the mean ($\pm SE$) for the improved-plus-same category was less ($2.0 \pm 0.24; n=38$) compared to that for the worsened category ($3.1 \pm 0.34; n=54$). Both variables were added to the future confidence binary regression model. For problem solving, the significant variables were again age of household head ($P=0.001$) and farming duration (years; $P=0.05$). All others were insignificant ($P \geq 0.107$). For age, the mean ($\pm SE$) for the improved-plus-same category was younger ($43.5 \pm 1.72; n=41$) compared to the worsened category ($51.9 \pm 1.84; n=50$). For farming duration, the mean ($\pm SE$) for the improved-plus-same category was less ($21.5 \pm 1.67; n=41$) compared to that for the worsened category ($26.7 \pm 2.05; n=50$). Both of these variables were added to the problem solving binary regression model.

The final binary regression-model results for all four resilience variables revealed some similarities in outcomes. For quality of life (Table 5.28) a total of seven explanatory variables were examined. Results revealed that only access to labor ($P=0.003$) and cash income ($P=0.001$) emerged as significant. The interpretation from the Wald statistics is that a positive unit change in access to labor (from worse to improved) made it about nine-times more likely that a respondent would also perceive an improved or stable
quality of life versus a worsening trend for quality of life. A positive unit change in cash income made the same relationship about 11-times more likely.

For crisis recovery (Table 5.29) seven explanatory variables were examined. Results revealed that cash income ($P < 0.001$) and study site ($P = 0.001$) emerged as significant. The interpretation from the Wald statistics is that a positive unit change in either cash income or a change from lowlands to uplands made it about 16- or 11-times more likely, respectively, that a respondent would also perceive an improved or stable ability to recover from crisis, versus a worsening trend for crisis recovery.

For future confidence (Table 5.30) 13 explanatory variables were examined because more were justified based on the screening criteria. Results revealed, however, that only cash income ($P = 0.023$) and skills and knowledge ($P = 0.025$) emerged as significant. The interpretation from the Wald statistics is that a positive unit change in either cash income or skills and knowledge made it roughly five-times more likely that a respondent would also perceive an improved or stable level of future confidence versus a worsening trend for future confidence.

For problem solving (Table 5.31), again a larger total of 11 explanatory variables was examined. Results revealed that skills and knowledge ($P = 0.014$) and cash income ($P = 0.015$) emerged as significant. The interpretation from the Wald statistics is that a positive unit change in either cash income or skills and knowledge made it about six-times more likely that a respondent would also perceive an improved or stable quality of life versus a worsening trend for problem solving.
Overall, the binary logistic-regression results clarified the relative importance of certain explanatory variables for explaining positive trends in perceived resilience. In general, previous results from the qualitative studies were confirmed by these survey findings in terms of the predicted primary attributes for improving livelihood sustainability, namely improvements to income, skills and knowledge, and household labor. Figure 5.9 illustrates this concept with a Venn diagram.

Household Resilience and Trends in Capital Variables—Qualitative Approaches

Quality of life trend received the most attention in soliciting short answers from respondents. Overall, 19% of n=96 respondents indicated that quality of life over the past five years had improved for their households, while 13% felt it was unchanged. About 68% felt quality of life had worsened (refer back to Table 5.25). Question 18 of the survey (see Appendix C) gave respondents a chance to explain the trend they observed for quality of life with short answers. Overall, a total of 156 comments were received on this. These comments were broken out as 33 explaining improvement in quality of life), 10 (unchanged quality of life), and 113 (worsening quality of life). Table 5.32 lists the major response categories. Because only a few reasons were given to explain why quality of life had stayed the same, a major reason quality of life had improved for the 18 respondents was improved farm or crop productivity; adoption of cash crops and improved housing were also noted as particularly important. A major reason that quality of life had declined for 65 respondents was worsening farm or crop productivity. Poor
human health, declining labor resources, and higher costs of living were also mentioned (Table 5.32).

Reasons for trends in the three other resilience variables and the 16 capital variables are shown in Table 5.33. Overall, 882 comments were provided. Most comments (545 or 62%) explained worsening trends, while 215 (24%) explained improving trends. Only 122 comments (14%) explained unchanged circumstances. Highlights are mentioned here.

Improved circumstances overall were often related to improved access to land (30 responses or 14%), greater social cohesion (30 responses), higher incomes (26 responses), adoption of new systems for cash crops or livestock keeping (25 responses), improved human health (14 responses), increased access to agricultural inputs (11 responses), and whether respondents had joined organizations such as agricultural cooperatives (10 responses; Table 5.33).

Worsening circumstances were more often related to poverty and lack of income (119 responses or 22%), declining access to labor, poor health, and aging (91 responses), lack of credit and bank access (64 responses), low farm productivity (44 responses), lack of markets and poor commodity prices (43 responses), environmental degradation (34 responses), poor access to extension services (20 responses), and poor access to agricultural inputs (19 responses; Table 5.33).

Finally, question 42 of the survey (Appendix C) gave respondents a chance to explain what one realistic thing they would emphasize to improve their quality of life. Overall, a total of 132 comments were received on this. The main message was that
nearly half of respondents wanted more assistance to agriculture (Table 5.32).
Interestingly, issues concerning GSNP were not mentioned once in the qualitative materials.

Discussion

Rapid Rural Appraisal: Relations Between GSNP and Local People

Despite that the interviewees were selected non-randomly at only four villages in the lowlands (adjacent to GSNP) and from among a small assortment of park staff and researchers, the RRA provided useful background information.

Although the majority of local villagers had positive feelings towards the natural heritage of GSNP, there was ample fear and mistrust of park management. Villagers often viewed the park laws to be unfair and the attitudes of park staff demeaning. Meanwhile, park authorities accused the local people of being backward and, in some cases, criminals. Crop raiding by wild animals from GSNP had also increased tensions between local people and park authorities. Natural resource conflicts appeared to be escalating, and perceptions of degradation or decline of the GSNP forest and associated wildlife were common. Local people felt that they had been denied access to suitable fishing grounds along the park’s shorelines. Villagers blamed park officials for failing to deliver benefits associated with GSNP to their local communities and criticized park management for not responding to their needs. As such, the GSNP was viewed as being oblivious to local needs. Many villagers felt that those who benefitted most from GSNP tended to be tourists and other people from Western countries of Europe and North
America, plus a select few from privileged groups in northern Tanzania. These results illustrated an abundance of tension between local people and park officials and expatriate researchers on the other. Despite the fact that the local people had a traditional fondness for the environment and wild animals in the area, the conservation efforts of the park management were not appreciated. The key factor seemed to be lack of local sharing of park benefits. The general pattern observed here is similar to that for conservation sites and local populations elsewhere (Neumann 1998).

Population growth in and around GSNP is expected to be a major factor in human relations with the park. As the population increases, there is a greater demand for space while the development of forest, range, and agriculture is intensified. Local peoples’ opinions toward protected areas can change due to a number of respondent factors including age, gender, and location of residence (Vaske and Donnelly 1999).

For example, crop raiding by wildlife on lands adjacent to protected areas is common. Siex and Struhsaker (1999) conducted a study in Jozani Forest Reserve that demonstrated various conflicts between coconut farmers and the highly endangered red colobus found only in Zanzibar, Tanzania. The conflicts arise because coconuts are an important source of food for the red colobus monkeys and, at the same time, a main source of income and nutrition for the people of Jozani area. Economically, on the other hand, red colobus monkeys are the main source of tourism in Zanzibar, and tourism is becoming the single most important source of foreign exchange currency on the island. Some wildlife at GSNP are known to travel as much as several kilometers outside park boundaries (Greengrass 2000). Chimpanzees in the south end of the park are known to
nest at nearby villages (Greengrass 2000). Palm and mango trees have been cited by several respondents to be the main reasons why chimpanzees are attracted from the park. Understanding how wildlife impacts farmers’ lives requires an understanding of farmers’ perspectives. Crop losses to wildlife are not just an economic drain on farming households. Losses can generate other costs to household members, including: 1) An increased need to guard fields, which creates labor bottlenecks in certain seasons, 2) disruption of schooling because children are needed to help guard family fields, 3) increased risks of injury from wildlife, and 4) increased risk of contracting diseases (e.g., malaria) if people are required to guard their fields at night (Hill 2004).

The roots of polarization between local communities and the guardians of protected areas run deep. Tanzania is an excellent case-in-point. Conservation efforts in Tanzania and other African nations have traditionally been inspired by visions of Africa as Earth’s “Last Eden,” with its abundance of wildlife and picturesque natural scenery. Such environmental narratives have their origins in European colonial discourses of nature, which continue to shape cultural perceptions of the African continent today (Chapter 2). The main idea behind community-based conservation is that local people should benefit from natural resources found in their proximities in order to have an incentive to preserve them. Community-based conservation also involves creating the political framework whereby local people are included in decision-making processes. Community-based conservation contrasts with the more traditional legacy in which local populations were viewed as part of the problem to conservation efforts (Chapter 2).
Elsewhere in Africa the notion of benefit sharing is being adopted through the passage of legislation and protests. Local people throughout the world have engaged in protests against park authorities demanding a share of resources from their national parks by using a number of strategies that range from passive to active resistance. Passive resistance approaches generally include blockades, sit-ins, demonstrations, and boycotts (Hitchcock 2002). Indigenous people have blockaded entrances to national parks as demonstrated by Malaysia’s Penan and Namibia’s Hai in 1997, and some have taken their cases to courts as done by the Huaorani people in Ecuador against the Texaco oil company (Hitchcock 2002). Severe conflicts between national park management and local people have led to governmental suppression of uprisings in some locations. There is an aspect of racism and elitism in the administration and operation of many national parks throughout Africa (Neumann 1998, Neuman 2003).

European colonialists originally established many parks in Africa, and local people clearly see parks as being maintained almost exclusively for the benefit of outsiders under the umbrella of many repressive African government regimes. Conservation, therefore, could mean many different things to people from various cultures. There are fundamental questions that have to be asked: Conservation of what and for whom? How will conservation be implemented? Major shifts in agrarian policy among poor nations have often been brought by resistance in the form of collective noncompliance to rules and regulations by local people (Scott 1986). This may have some bearing on the situation at GSNP. Such noncompliance can be difficult to deal with.
Animals in Africa are used symbolically and politically by human groups in conflict with each other (Knight 2000). Madden (2004, 249) insists that “Human-wildlife conflicts can escalate when local people feel that the needs or values of wildlife are given priority over their own needs, or when local institutions and people are inadequately empowered to deal with conflict.” In fact, Madden (2004, 249) continues to maintain that “If protected-area authorities fail to address the needs of the local people or to work with them to address such conflict adequately, the conflict intensifies and becomes not only conflict between humans and wildlife, but also between humans about wildlife.” Such human-wildlife conflicts tend to hinder wildlife conservation initiatives and often impair the economic and social well-being of local people. All these factors tend to reduce local support for conservation as well as impeding conservation and development efforts meant to offset more general “costs” of living near a protected area. Madden (2004, 249) defines a human-wildlife conflict as one that can occur when “…needs and behavior of wildlife impact negatively on the goals of humans or when the goals of humans negatively impact the needs of wildlife. These conflicts result “when wildlife damages crops, injures or kills domestic animals, or threatens or kills people.”

Neumann’s (1998) book *Imposing Wilderness* presents the case of Arusha National Park in northern Tanzania as the battleground that highlights the ongoing politico-ecological conflicts facing much of contemporary Africa. Neumann does not view the conflict between park managers and peasant communities living on the edges of the park as being simply the case of poverty, population increase, and lack of education. Rather, his main argument is that we should see such conflicts in their historical contexts
that date back to the beginning of African colonialism. In fact, Neumann argues that
African meanings and material access to nature were displaced since the day colonialists
began to impose their own European ideal of “pristine” wilderness. As Neumann (1998,
187) insists, “Listening to voices of Meru Villagers who live and farm on the edge of
Arusha National Park, we can learn something of the essence of local resistance to park
policies, of local standards of justice, and about the ways in which state policies and
officials are seen to violate these standards.” Neumann’s work is not simply a “historical”
message. Rather, it explains the contemporary politics governing park management not
only in Tanzania, but also in much of Africa. Historical marginalization has been at the
root of most people-wildlife conflicts throughout Africa. The problem is escalating in
countries like Tanzania where many people do not trust park authorities. Political
activists in northern Tanzania have gone as far as saying that “policies (of national parks)
are violations of human lives” (Neumann 1998, 6). Neumann also argues that the rise in
democratization and state repression, the weakening of central governments, population
growth, and socioeconomic strains are pushing the park’s stakeholders (peasants,
grassroots activists, politicians, and social scientists) to question the value of national
parks within their proximity.

Other scholars have questioned whether biodiversity protection and rural
development are truly compatible in developing countries (Adams et al. 2004). Projects
that combine biodiversity conservation and development can be seen as being
“overambitious and underachieving.” The framework proposed by Adams et al. (2004)
offers four ways of looking at environmental protection versus poverty reduction: 1)
poverty and conservation are separate policy realms; 2) poverty is a critical constraint on conservation; 3) conservation should not compromise poverty reduction; and 4) poverty reduction depends on living resource conservation. Ultimately, wildlife conservation or preservation stems from people placing a value on wildlife that exceeds, for example, the value of continued resource exploitation. Faced with sheer survival, most local Tanzanians have little choice but to continue day-to-day activities that can lead to habitat loss, reduction in biodiversity, and environmental deterioration.

In contrast to the previous discussion, not all relations between protected areas and local people are entirely negative. For example, Schelhas et al. (2002), working in the Dominican Republic, observed that the high quality of local drinking water that emanated from a protected area was mentioned by the indigenous people as the main benefit they received, especially when potable drinking water was otherwise scarce. Schelhas et al. (2002) acknowledged that while clean water may have explained some of local people’s respect for protected-area boundaries, it was only one aspect of a positive mutual relationship. The peaceful coexistence in this setting was explained as related to three factors, namely ecological benefits (above), the sharing of economic returns, and the long history of the protected area (Schelhas et al. 2002). In general, this is much unlike the situation at GSNP.

The disconnection between tourism and local communities around GSNP is large. Tourists who visit appear to desire top accommodations. They travel to Kigoma town, reside in exclusive hotels, travel to GSNP by boat and helicopter and, once in the park, they stay at high quality lodgings (Fubusa, personal observation). At the time of this
research, all of the tourist facilitation was operated by nonlocals. These patterns are logical and typical of deluxe safari-style procedures for wildlife-based tourism in Africa. There are other models for “rural or cultural tourism” that could inform or diversify this approach and give more local benefits. For example, Mason and Cheyne (2000) list five features of rural tourism: it must be located in rural areas, it needs to be functionally rural, it usually is small scale, it emphasizes traditional cultures, and it needs to be largely under local control. Some local people in the RRA would like to have more of a reciprocal relationship with GSNP rather than being excluded. Tourism that benefits more parties in the area would have more positive impacts on the people through job creation, increased tax revenue, boost civic pride, preserve heritage centers, and provide exposure to international visitors. The overwhelming number of local people feel that expanded local tourism would be a positive thing.

Scholars often advocate for combining community development processes and conservation, especially in areas such as GSNP where human communities face relentless poverty. Garnett et al. (2007, 1) noted: “…[A]s the ratio of humans to landscape productivity increases, the emphasis on external investment may need to shift from natural resource extraction to knowledge-based industries that do not remove resources from the immediate environment.” Such views are in favor of overcoming biophysical constraints through knowledge-based industry capable of creating a reliable market for the promotion of biodiversity, “either for its utilitarian values in terms of ecosystem services such as the capture of greenhouse gases and maintenance of water quality, or as an aesthetic end in itself” (Garnett et al. 2007, 2). Wittemyer et al. (2008) studied
accelerated human population growth on the edges of protected areas that combine conservation with economic development. Pairing conservation of protected areas with economic development in rural areas that are far away from protected areas was seen as an important tool for improving rural livelihoods, while simultaneously reducing negative human effects on these protected areas. Wittemyer et al. (2008, 125) noted:

Such advanced landscape planning, in concert with effective protected areas management, may maintain and increase the benefits of protected areas for rural people while also ensuring those benefits do not result in unsustainably heavy use of the flora, fauna, and processes protected areas endeavor to sustain.

To improve relations between GSNP and local people, incentives are needed that benefit all parties. One idea is a program of agricultural compensation. Such programs are commonly attempted to compensate livestock owners for losses to predators in the USA (Coppock, personal communication) or to snow leopards in Central Asia (Mishra et al. 2003). For the latter case, insurance regulations were reached mutually through extensive discussions between park management and villagers, whereby villagers have their representatives in a village-appointed council. “Villagers contribute monthly premiums toward insuring livestock. The International Snow Leopard Trust is helping strengthen the corpus of this cooperative fund until it becomes self-sustaining (expected to take 2-3 years)” (Mishra et al. 2003, 1516). This insurance program is reducing livestock predation. Other scholars note management programs to mitigate forest resource conflicts require better understanding of how local people use and value resources (Klooster 2000).

Revenue sharing should be considered as a new method of conservation practice, because it could help to reduce conflicts between local people and park management at
GSNP. Park authorities should work hard to win the trust and goodwill of local people. Local people deserve to benefit from revenues generated in their park. Park authorities should stop seeing GSNP as merely something that is threatened by land-hungry local people. Local people are also involved in shaping conditions inside the park. Doing otherwise will force people to think that resource scarcity is directly related with the presence of a park that has been fenced off and does not provide any direct benefits in their lives. The future of wildlife at GSNP cannot be separated from the future of local people who have surrounded the park for generations. The survival of wildlife at GSNP will continue to depend on the goodwill of the local people. If any conservation program in and around GSNP is to be successful, it must move away from single species conservation, come to terms with the perceptions and practices of local people, and encourage local participation on the basis of specific socio-economic and ecosystem contexts. Successful conservation programs in and around GSNP would be ones that make local people believe that GSNP still belongs to them and that it is they who actually own the park. Both park authorities and the local people should work together to make GSNP and surrounding villages a better place for future generations.

It was this formative experience from the RRA that led me to want to focus more on community-based conservation problems in Kigoma Rural. The GSNP appeared to be a classical example of the disconnection between a park and the indigenous people, leading to a risky outcome for conservation. The literature review in Chapter 2 attests to my interest in this area for research and development. This provided the foundation ideas for GOSESO (Chapters 4, 6).
**Focus Groups and Key Informants: Broader Perspectives on Local Issues**

Overall, the results from the 12 focus groups and 20 key informants were notable for their uniformity. This was almost regardless of location (uplands or lowlands), gender, age, and livelihood. While this is somewhat of a surprise, the reason is probably that the questions used as talking points were exceedingly broad and not necessarily framed to specifically elicit gender- or location-specific insights (Appendix B). The local system properties, problems, and opportunities seem to be well known by respondents. The connection of ecological dynamics with the fate of local societies is obvious.

Respondents noted the recent system decline in terms of environmental, economic, and social decay. People had detailed ideas as to what was causing these trends. The causes were dominated by proximal human factors, including poverty, lack of education, over extraction of resources, high population, shifting generational attitudes, as well as ultimate effects of poor governance from regional and national levels. People typically viewed the future in a negative way, but a few saw positive trends such as need for youth to emigrate and reduce local pressure as well as value of some local crops (palm oil, coffee). People saw obstacles as poverty—lack of capital, income, entrepreneurism; social decay; agricultural deficiencies, poor technology, corruption, poor infrastructure; need for skill development and vocational training, especially for adults; need for government investment in infrastructure. In the big picture, GSNP was not viewed as a critical issue related to regional problem solving. This was a marked departure from the community-based conservation issues that were revealed from the RRA in 2002. Interestingly, the mention of GSNP was never made in the focus groups or
key informant interviews. This was because the investigation was broadened as to spatial scale and the debate broadened as well. The GSNP only occupies about 2% of the landscape in this study area (Chapter 4). It is also notable that there were key gaps in the debates concerning traditional mainstays to the livelihoods such as fishing. Results from the focus groups and key informants illustrated the challenges and needs of the people of Kigoma Rural. The overall impression is that Kigoma Rural is suffering from high population growth and severe neglect by the government.

The qualitative findings were also supported by causal observations of the research team. These indicated a widespread deterioration of water resources, for example. In almost every sampled village, once-permanent streams had apparently become seasonal or dried up all together. This seemed more severe in the lowlands than the uplands.

The lack of government investment is obvious. The entire Kigoma Region has no access to the national electricity grid. Only one-third of the study villages had access to intermittent potable water pumped from a highland river near the border of Tanzania and Burundi and distributed to the public through taps. All roads were ungraded and unsealed, and were in poor condition. Poor infrastructure limits farming households in Kigoma Rural access to suitable and competitive markets elsewhere in Tanzania and in neighboring countries negatively impacting their livelihoods. Porter (2002) and Malley et al. (2009) noted the vital importance of infrastructure to local commerce.

The people have limited access to credit for various reasons. One is because there is a lack of micro-credit organizations willing and able to engage the poor in Kigoma
Rural. This is a typical situation in sub-Saharan Africa (Moyo 2009). In fact, Moyo notes that only about five to six percent of the population in Tanzania have access to the banking sector, although some 80% of households would be prepared to save if they had access to appropriate products and saving mechanisms.

Lack of education in Kigoma Rural was directly linked with environmental and community degradation by the respondents. They felt that many residents were not well enough informed to make appropriate decisions. For example, some felt that local people cut down trees because they either do not perceive their longer-term value, or they have no incentives to otherwise protect the environment. Lack of information and education was perceived as one of the leading causes of local decline.

Lack of education can be broadly connected to lack of government support in topics such as agricultural extension. Bohringer and Ayuk (2003) noted the declining significance of national extension services throughout southern Africa. They observed that smallholder farmers needed two forms of support, namely “hard” support (such as seeds or tools) and “soft” support (in terms of training, education, and information). Nath and Inoue (2008) also mentioned that lack of official support caused many agricultural projects to fail in Africa.

Only a few research participants from the lowlands were still involved in small-scale or subsistence fishing in Lake Tanganyika. Small-scale fishing in Lake Tanganyika appears to be unsustainable. The region also seems to lack any formal institutions to assist in the marketing or management of fish. Such institutions are important (Allison and Ellis 2001). This is remarkable given the traditional of importance of fishing in the
lowlands of Kigoma Rural. Fishing communities in Kigoma Rural appear to be politically voiceless and disorganized and are exposed to numerous job-related risks. Andrew et al. (2007) note the potentials and problems of small-scale fishers in developing countries.

Human migration to mitigate local problems was mentioned by respondents. This migration can take several forms. One is the movement of people from the more-crowded lowlands to the less-crowded highlands. Another is a rural-to-urban migration, where people go to Kigoma town and other major urban areas to find work. DeSoto (1989) points out that contrary to slower urban growth in developed countries, urban areas in many developing countries have grown faster. The Kigoma Rural District is experiencing a number of “push” and “pull” factors leading to more rural-to-urban migration. Examples of “push” factors include a shortage of arable land as well as fewer services and ways to gain income in rural areas. This is also influenced by unequal inheritance of land (often based on gender), lack of political influence, lack of cash crops, and environmental degradation and natural shocks such as prolonged dry seasons, multi-year droughts, and occasional flooding. “Pull” factors include real or perceived employment opportunities, better educational services, and greater access to markets.

Results suggest the following general observations. First, local people did not regard their livelihoods as sustainable. This challenge appeared to be most acute adjacent to GSNP where human population density may be higher and there are more limitations on per capita resources. Second, participants overwhelmingly believed that their ability to increase and diversify their incomes was most limited by a lack of government support that could equip them with a spectrum of practical skills for economic development. Such
skills are needed if entrepreneurial activity is to capture the potential economic benefits of the region’s natural and agricultural resources. Finally, both local people and decision makers responded favorably to the possible role of new institutions and organizations in helping design and implement concepts geared toward improving local livelihoods. Their future participation in such organizations or institutions was seen as an important factor that could help the people gain access to resources and training, which, in turn, could determine to a large extent the difference between their success and failure.

The idea that human-dominated ecosystems in sub-Saharan African have degraded in terms of the soils or biota is not new. Local people often perceive that rapid population growth, over-extraction of resources, poor governance, and related factors are responsible (Coppock 1994; Desta et al. 2004; Gebru et al. 2009; Huckett 2010).

A practical study by Krishna et al. (2004) is a case in point. Working in Kenyan villages, this study characterized system and population features much like what has been observed by discussants and informants in Kigoma Rural. They noted that entry to—and escape from—poverty is a dynamic condition for households they studied. Some climb out of poverty and others fall into poverty. This study appears unusual in that the researchers wanted to clarify the specific practical means (micro-scale) and policies (macro-scale) that could jointly assist households to leave poverty traps. They employed a participatory research approach. They recommended ways of diversifying household income through creation of jobs in formal and informal sectors, extension services, reduction in farming costs, as well as involvement of the poor through various petty trades. The study also cites various income diversification entry barriers such as poor
skills, lack of contacts and capital access, and unequal access to assets. This all resonates well with the views given by participants in Kigoma Rural. Similarly, Coppock (2010) outlines a participatory approach in the Ethiopian rangelands that has led to direct community impact via peer-to-peer inspiration and learning, improving access to basic education, practical skills development, and enhanced linkages for livestock producers to domestic and export markets.

In one sense, the economic development of a rural community is an example of organizational dynamics. Folke et al. (2005) argue that organizational learning occurs among formal and informal institutions. The ability of a human-dominated system to adapt to a changing environment requires leadership. Folke et al. (2005) argued in favor of “learning by doing” among a diverse body of stakeholders and the need to find a clear balance between centralized and decentralized control. This perspective is shared by Coppock (2010) where iterative problem solving was based on a sequence of stakeholder feedback forums.

In 1998, renowned Ghanaian economist George Ayittey published his straight-talking book titled *Africa in Chaos*. Ayittey maintains that Africa cannot be developed by ignoring its traditional sector, nor can this sector be developed without understanding how it works. The book explores how to craft uniquely African solutions to African problems; one that starts from the “bottom-up”—not from the “top-down.” He demonstrates how the blueprint for Africa’s economic rejuvenation can be found in its own backyard; that is, in its own indigenous institutions. Ayittey sees Africa’s salvation as one that can only be reached by building upon its own indigenous institutions.
Dambisa Moyo (2009, 33) adds, “Yet another explanation put forward for Africa’s poor economic showing is the absence of strong, transparent and credible public institutions—civil service, police, judiciary, etcetera.”

One major result from the focus groups was the recognition that building human and social capital to address problems was vital. This perspective has been previously noted by various scholars. For example, Glick and Sahn (2000, 63) have taken a special interest in the role of human capital to eradicate poverty in Africa by insisting that low levels of human capital are always considered to be a major impediment to “economic growth and the elimination of poverty in sub-Saharan Africa.” Glick and Sahn continue to insist that “recent studies of several African countries document the existence of returns in the labor market to investments in education for both men and women.” Oyelaran-Oyeyinka and Barclay (2004, 119) took a similar stance: “…poor technology flow to poor countries is a result of poor human capital endowment… the presence of large stocks of human skills tends to boost economic growth…”

Both direct and indirect support of human capital accumulation happen when people are willing and capable of investing in their human capital through training sessions, formal schools, or gaining access to preventive medical services. A more indirect support of human capital is necessary when adverse structures and processes, like policies and social norms that deny girls education, are in place. A good indirect method of promoting education can be achieved through reduction in the drudgery of day-to-day activities that enable people to have extra time for education and one that ensures that they can make better use of education. Specialist training, not general education, can only
be effective as long as trainers have relevant information. In fact, De Janvry and Sadoulet (2001, 479) have reached the following conclusion: “We observed that a key determinant of success in participating in the more remunerative off-farm activities is education.”

There is a close relationship between social and other forms of assets or capital. Social capital, like other forms of capital, should be taken as a good in and of itself with a particular significance to the well-being of people through identity, honor, and belonging. Bebbington (1999, 2039) argues that “Within this broader (SL) framework, particular attention has been placed on one of the five assets identified as constitutive of livelihood strategies: social capital.” Social capital has several direct impacts on other forms of capital. Trust and reciprocity can lower overall costs of working together. Economic relations can increase both income and savings—a financial capital. Various studies have suggested that communities with increased social capital tend to be wealthier. Social capital has also been used to eradicate problems associated with a “free ride”—thus improving the management of natural capital and help to maintain shared physical capital. Creation and sharing of a new innovation through social networking can create knowledge.

The analysis of social capital may be discernible in the long-term, sometimes beyond project resources and sometimes this analysis cannot be quantifiable. The role of social capital as a proactive approach to adaptation process was summarized by Eriksen et al. (2005, 303) as follows:

Developing social capital, social relations and institutions, particularly related to formal and informal access to local natural resources, strengthening local biodiversity, arresting the declining diversity and availability of indigenous
plants, as well as enhancing the value added, marketing and income opportunities of indigenous plant-based activities…

Social capital has a tendency to be self-reinforcing, but it can be destroyed, though unintentionally, through interventions imposed on people without any regard for the elderly. Attempts to build social capital can be achieved by focusing on strengthening local institutions directly (through capacity building or leadership building) or indirectly by creating a democratic atmosphere. Apart from its primary objective of empowerment, social capital can also be achieved as a by-product of other activities (such as, through participatory research designed to develop and test technologies that may eventually develop their own life). Bebbington (1999, 2022) insists that “peoples’ assets are not merely means through which they make a living: they also give meaning to the person’s world.”

Garnett et al. (2007) insist that “… when people are living in extreme poverty, it will usually be more important to invest in their health and education and in the productivity of their agriculture than in the protection of their forests.” Garnett et al. (2007) further maintain that “when their material needs are adequately met, then the quality and sustainability of their lives may be better achieved by investing in their natural capital, for example, amenity and/or nature reserves.”

**Household Survey: Confirming Results from Qualitative Study**

**Description of Households**

Overall, the target population can be summarized as follows. Household heads tended to be middle-aged males having little education beyond primary school. Only 13%
of household heads were females, and trends suggest these females may have had less access to formal education than their male counterparts. The other household residents tended to be dominated by youths and children. The average household size of 7.4 is similar to data from GOT (2007) which put the average household size of Kigoma Rural at 6.8. Although there was no significant evidence from the survey that the lowlands differed from the uplands in terms of household size, GOT (2007) noted that villages near GSNP had the largest family size in Tanzania. The GOT (2007) showed the average household size in Tanzania to be 4.9, while the entire Kigoma Region had an average of 6.9, with local districts varying from Kasulu (7.3) to Kigoma Urban (5.6).

The observation that males were so often the resident head of household is increasingly unusual for rural Africa in general, and Tanzania in particular. This is because males often leave home to seek employment and leave spouses to tend farms and families (Lowe 1986). The pattern observed in the survey may have resulted from several factors. One is that males remain at home because Kigoma Rural has traditionally been economically isolated from the rest of the nation (Chapter 3). Another is that, in some cases, men may stay at home because of local opportunities in agriculture or fishing.

Although adults appeared to lack wide access to secondary education, their children appeared to have greater access to primary education than their parents had. This may be indicative of recent improvement in the availability of primary schools (Chapter 4). The Kigoma Rural district appears to have generally poor secondary-school enrollment. In addition, western Tanzania has traditionally not had any tertiary educational institutions. This low level of formal education is indicative of a low level of
human capital. Illiteracy appeared common among adult participants in this survey, for example. This is consistent with results from Oyelaran-Oyeyinka and Barclay (2004, 132) who examined the role of human capital and systems of innovations throughout Africa: “…economic development is significantly correlated with society’s human capital…a lag of 25-35 years exists between the initial investment in primary and secondary education.”

Although this study did not quantify fertility rates, it is notable that much of sub-Saharan Africa is undergoing a demographic transition to lower fertility (from 6.5 to 5.5 children per woman) mainly because of improved health care that has reduced mortality rates (Makinwa-Adebusoye 2001). According to GOT (2007), fertility rates for Kigoma Region have been among the highest in Tanzania. A key informant suggested that lingering high fertility rates may be due to factors including lack of indigenous educational institutions, persistent traditional beliefs, and poverty that prevents people from seeking family planning inputs. In addition, more children may still be seen as a net economic advantage (Makinwa-Adebusoye 2001). A few households (<10) in the sample of 96 appeared to be polygynous. Members of polygynous families in Kigoma Rural live together but operate separate incomes and livelihood activities.

Women were uncommon as household heads in the study area. As a related point, it is unclear the extent that women are effectively included in household decision making. Traditional beliefs seem to negatively influence women’s decision-making, especially in the affairs of access to education, resources, and inheritance. Makinwa-Adebusoye (2001,6) observes that the patriarchal hierarchical and polygynous organization of many
African households tends to perpetuate the low status of women in African societies; “the bottom line is that women and their children are legal property of the husband.”

Description of the Farming Systems

In terms of farming systems, the general patterns observed in the survey have been common elsewhere in similar African rural settings. Farm plots are relatively small, crops can be diverse, livestock can be relatively rare, farm plots may be widely distributed over the landscape, and wildland products are harvested to supplement farm-based livelihoods (Dovie et al. 2005; Huckett 2010). There were several indications that the farming systems of the uplands differed from those in the lowlands. Namely, the upland systems appeared to have more coffee, maize, and ruminant livestock. The lowlands appeared to have more cassava and emphasis on palm oil. These were only data trends, however, and would need to be confirmed in a more rigorous, larger survey.

Land tenure was clearly dominated by traditional forms of ownership and management. None of the households in the survey had a formal title deed to their land. This lack of title deeds is one reason for misuse of land and underlies lack of access to commercial credit because land cannot be used by farmers as collateral. Transferability of land from one generation to the next can also be limited. Lack of individual title deeds may make the majority of people insecure because farmers will fear losing their traditional lands to outsiders who can gain title deeds through corrupt official means.

Similar observations were made by Deininger and Ali (2008, 869) among farming communities in Uganda. They noted that “Land-attached investment is critical to ensure economic growth, poverty reduction, and sustainable natural resource management in the
world’s least developed countries.” They also observed that “…historical factors left a large share of land users with only occupancy rights while ownership rested with the (often absentee) landlord.” The situation is further complicated by the lack of institutions capable of securing property rights and enables farmers to make a long-term investment in the land they use. Deininger and Ali (2008, 871), for example, argued that

> [a]dding the right to transfer land to others, either through rental or sale, will encourage investment as it makes it easier to liquidate and recoup the full value in case of exogenous shocks… [I]t allows the use of land as collateral, thereby reducing the transaction cost of credit access.

As will be described later in this discussion, the lack of individual title deeds to land may be forcing farmers in Kigoma Rural to resort to more reliance on forms of social capital that help the poor to promote communal land access by building local political control. The use of social capital as a form of resource control seems to be more applicable as people become increasingly vulnerable. A similar finding was reached in a South African study conducted by Maluccio et al. (2000, 57):

> [T]he notion of social capital has some resonance with the traditional South African institution of ubuntu; a conceptualization of humanness that means, ‘I am because you exist’. It is seen as an expression of community life and collective responsibility and invokes notions of caring for and sharing with each other.

In Kigoma Rural, communal control over land has been severely eroded by government policies that have taken land away from traditional institutions and transferred it to the central government via the government-imposed Ujamaa system of rural development of the late 1960s. Maluccio et al. (2000, 57) has also observed similar trends in South Africa: “…ubuntu was severely eroded by the enforcement of the pre-
1994 apartheid legislation and the imposition of institutions designed to ensure the political control of African communities.”

Some comments on crops are appropriate. Plots closer to the home base tended to be reserved for staple food crops such as sweet potato, groundnuts, maize, millet, beans, sorghum, and bananas. Palm oil was the dominant cash crop in the lowlands while coffee was a widely grown cash-crop in the uplands. Despite this diversity, cassava was the most important crop overall and thus cassava merits more discussion.

At the time of the survey, cassava was widely cultivated in Kigoma Rural on low-quality soils, often in plots more distant from the home base. The wide-spread cultivation of cassava among villages in both the lowlands and uplands is because the crop is widely perceived as being productive in less-fertile soils and demands less labor than other food crop options. Cassava also has a reputation for being a reliable food crop even during droughts. Fermont et al. (2008) observed that farmers in Ghana and Benin tend to use cassava as a fertility-regenerating strategy. Fermont et al. (2008, 240) observed that in Uganda and Kenya, cassava was “the first or second most important staple food and generates on average one-fifth of crop income, although industrial demand for cassava is limited.” Fermont et al. (2008, 247) noted similar observations as have been made in this study, namely that declining soil fertility, and not labor or food shortage, was apparently the primary trigger for a dramatic increase in cassava acreage throughout sub-Saharan Africa in the last three to four decades.

The most frequently reported reason for declining crop productivity in the study area was declining land fertility, as will be detailed. Another reason given was the rising
price of commercial fertilizers. A similar finding was reported by Malley et al. (2009) who observed that the low incomes of farmers in eastern Tanzania were the leading reason most could not afford to buy mineral fertilizers. Given the resource pressure and economic isolation characteristic of Kigoma Rural, it can be speculated that lack of access of commercial fertilizers is important there as well. Other field observations made it clear that the local farming systems receive little government support. No agricultural extension services were observed in any of the 20 villages where research was conducted.

Livestock on sampled farms were surprisingly rare, but estimates from this survey are generally confirmed by government statistics (Chapter 4). Livestock can be a minor component of farming systems, but they can play synergistic roles in terms of farm management, human nutrition, and wealth creation (Jahnke 1982). Livestock keeping is also widely known to be important in many cultures for dowry payments, other cultural rituals, with some products used as traditional medicines (Malley et al. 2009, 177). Salem and Smith (2008, 175) argue, “In the developing world, livestock are the key to security for many smallholder farmers and are often used as indicators of wealth.” Additionally, livestock are widely used to pay school tuition, cover other emergencies such as funerals or weddings, and also provide seed money to establish and operate small businesses.

Given the limited access to natural resources and declining crop productivity facing farming households in Kigoma Rural, the interaction of crop production and livestock keeping is becoming both complimentary and competitive. For instance, lack of
adequate lands for grazing prevents people from keeping large livestock, such as cattle. This has been observed in similar systems elsewhere (Jahnke 1982).

Use of Wildland Resources

By far, the most important wildland resource used by households in the study area was firewood. All other products were much less valued. One caution is that survey respondents may have been concerned that use of wildland products could be viewed negatively by the research team because certain forms of hunting and gathering—especially within protected areas—is illegal.

The lack of importance of fish in the survey is very notable. Fish from Lake Tanganyika may be under-reported in terms of relative importance if respondents did not perceive these fish to be “wildland products.” In contrast, fish from streams, rivers, or ponds were probably recognized as wildland products. It may also be, as previously mentioned, that the lack of fish in the survey was due to long-term degradation of fishing resources.

Wildland products can be important to rural households in many rural African settings. For example, Dovie et al. (2005, 338) reporting on work in South Africa noted that “…natural resource harvesting is prominent… and is regarded as a rural safety net, especially in adverse times, such as droughts, retrenchment, or death of a primary wage earner.” Coppock (1994) noted the importance of wildland products during drought in African pastoral systems.

The research team observed that, especially between agricultural seasons, farming communities in Kigoma Rural tend to eke out a living that can be subsidized by
alternative, wildland foods. Harvesting of wildland fruits such as mangoes and peas during such tough times can help boost food security. Women and children reportedly especially benefit from harvest of wildland fruits. This survey was conducted during the dry season of a “near-normal” rainfall year. Thus, vital patterns of wildland product harvest that occur in other types of years may have been missed. Also, the research team has observed that frequent bushfires and locally severe deforestation (i.e., especially for charcoal, agricultural expansion, brick-making, and fuelwood) is reducing the quantity and diversity of wildland resources. Jama et al. (2008) reached a similar observation on the general state of wildland resources in East Africa: “Studies in communal lands in eastern Kenya found species density to be more abundant in sparsely populated areas due to less clearance from cultivation, fires and destruction…by livestock.” Jama et al. (2008, 171) recommend a renewed emphasis on protection of wildland resources in Africa.

Household Income and Expenditures

The data on absolute income were limited (n=63). Challenges of collecting adequate data on income are reviewed in Chapter 4. The general range of income, however, appeared consistent with official figures for rural western Tanzania (GOT 2005.) Overall, the income-allocation data indicated that crop sales were by far the greatest income source (48 to 68%) in both the lowland and upland sites, followed distantly by off-farm income and revenue from livestock plus livestock products. In-kind income was probably underestimated. Dovie et al. (2005, 88) maintain that this is a common challenge for collecting income data. They noted that “Generally, only cash
income sources have been considered, but much valuable economic activity does not require the exchange of money.”

The data on expenditure allocation suggested that most money was spent on food (34-40%), followed distantly by expense for household items, child education, and health care (all from 13-15%). It seems that, in general, the households sold crop produce and used much of the income to buy other foods from the market. This is a common pattern for similar farming systems (Dovie et al. 2005). The Kigoma farmers in the study area are therefore not subsistence-oriented; they do not produce merely to consume home-grown products on-farm. There was also little evidence of barter trade.

There were insufficient data to indicate that there was an effect of the gender of the household head on income. Evidence from elsewhere in the developing world indicates that male-headed households often have more income than female-headed households (Maluccio et al. 2000).

The data did not indicate a high level of income diversification in the surveyed households. In other rural African systems livelihood diversification is an important mechanism to promote rural livelihoods (Dovie et al. 2005; Coppock 2010). There appears to be some effort devoted to generation of off-farm income, but the topic requires further study. Widening income opportunities and access to off-farm jobs and income among a wide range of rural people in Kigoma has the potential to promote more sustainable livelihoods. In a study conducted among rural households in Kenya and Tanzania, Eriksen et al. (2005, 297) concluded: “The degree of vulnerability depended, to a great extent, on the ability of individuals to specialize successfully.” In the survey only
three to seven percent of income in the uplands and lowlands, respectively, was reportedly from the sale of wildland products. Despite what these data imply, the research team was aware that the opportunistic harvest of wildland products seemed widespread, including collection of medicinal plants, grass for thatching, bushmeat, home construction materials, and woodland reeds. This may represent in-kind consumption that was likely underreported in an income sense.

The connections among gender, income, and income diversification were not explored in this research but merit future attention in Kigoma Rural. Gender also seems to be a gap in the sustainable livelihood framework (Chapter 2). A few general observations made by the research team are worth noting here. For one, men in the study area were more likely to be involved in skillful jobs such as carpentry, managing small shops, and running other small businesses. Eriksen et al. (2005, 299) noted a similar pattern in a study conducted in Tanzania and Kenya. They observed that “charcoal burning and brick making, as well as high-intensity casual labor, were full-time activities for some men (in a farming system) during drought.” In Kigoma Rural, women who headed households are likely to face a shortage of extra time needed to pursue off-farm activities such as petty business (i.e., shop keeping, tailoring) or involvement in long-distance trading; they are very involved in simply running their homes. Less traditional access to formal education is another factor that has probably restricted females from pursuing off-farm activities. Eriksen et al. (2005, 300) argued that “the heavy burden of labor for women who bear the brunt of responsibility for many agricultural tasks, such as fuelwood and water collection, environmental management, and domestic work, means
women’s time is severely constrained.” This implies that female-headed households could be less amenable to diversification. However, other authors have recently shown how—given strategic inputs—women can be aggressive entrepreneurial leaders in other rural African settings (Coppock 2010).

Remittance income in the study area was reportedly a very low proportion of total income. Remittance income may grow in importance, however. In Kigoma town, for example, more and more *wamachinga* from the rural areas are found. *Wamachinga* is a new social category representing rural youth who have come to urban areas as itinerant petty traders (Lugalla 1997). In Kigoma town they sell everything from food to clothing, electronics, household goods, and automotive supplies. The role of remittances to Africa’s total economy was highlighted by Moyo (2009, 133):

> Remittances make an important and growing contribution to relieving poverty…there are around 33 million Africans living outside their country of origin… In total, emigrants represent almost 5 percent of Africa’s total population, and they are yet another source of money to help fuel Africa’s development.

Dovie et al. (2005) in South Africa and DeJanvry and Sadoulet (2001) in Mexico suggested that incomes from off-farm activities accounted for a large share of total income for rural dwellers. This suggests that rural poverty reduction in western Tanzania could include ways to increase household incomes through participation in off-farm activities, especially among those with limited access to productive land. Although this survey had two study sites that differed in their proximity to Kigoma town, assessing the influence of the town on the households was not a research objective and thus not part of the design. In future work, such effects could be studied. Proximity to an urban area can
be important in affecting participation in off-farm activities (DeJanvry and Sadoulet 2001).

The income and expenditure data were intended to capture the past five years and thus annual and seasonal variation. However, given the survey was conducted just after the harvesting season, it is likely that the perceptions of respondents were heavily influenced by the immediate situation—income from crop sales may have been biased upwards. Unfortunately, the survey did not segregate income from food versus cash crops. In future research details of agricultural complexity could be studied. For example, the relationships between cash and food crops remain to be clarified. For example, other African studies show how various crops collectively contribute to maintaining farm income (Orr and Mwale 2001).

The failure of the state to provide the most basic services has led to a situation where 90% of household incomes in all of Tanzania have come from the informal economy (Tripp 1997). Particularly in Kigoma Rural, which has been drastically affected by the lack of public services, the informal economy has become dominant. The informal economy is perhaps the most visible reality of village life.

Sustainable Livelihoods: Resilience and the Roles of Various Capitals

Resilience Variables

As previously reviewed in Chapter 2, Scoones (1998) views a sustainable livelihood as one that can recover from shocks and stresses, return to its normal condition, and do so without undermining the well-being of natural environments.
Scoones argues that sustainable livelihoods tend to create the following results: increased numbers of working days, reduced poverty, improved well-being, and enhanced human capabilities. The sustainability side will likely generate livelihood adaptation, decreased vulnerability, enhanced resilience, and an improved natural resource base. Allison and Ellis (2001, 379) noted: “The most robust livelihood system is one displaying high resilience and low sensitivity; while the most vulnerable displays low resilience and high sensitivity.” Folke et al. (2005, 443) define resilience as the “capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks.”

Chambers and Conway (1992, p. 140) define stresses as cumulative and continuous pressures facing people and ecosystems, such as seasonal shortages and a declining natural resource base. Their definition of shocks suggests sudden and sometimes unpredictable impacts to producers including flood, fire, or drought. On the other hand, Ellis (1998) has defined coping as one that includes the ability to maintain consumption in times of disaster; which may include drawing on savings, using food stocks, sales of livestock, or access to gifts from relatives and friends. Certain individuals or households can reduce vulnerability by employing a number of tactics such as income diversification or increasing assets to act as a shield in time of loss (Chambers and Conway 1992).

The four resilience variables used in this study reflected resilience attributes noted by Scoones (1998). They were based on the perceptions of respondents. They included: 1) Quality of life, 2) ability to recover from a crisis, 3) confidence in the future, and 4)
ability to solve future problems. These have been defined in the methods section of Chapter 4. The time frame used to assess trends in these variables was the five years previous to the survey dates. The variables were used to capture the resilience concept from several similar perspectives. The variables were shown to be related in an ordinal fashion using chi square and gamma statistics. These specific variables have not been commonly used in previous livelihood sustainability literature. They have been successfully used, however, in other recent research projects in eastern Africa (Coppock 2010).

The four resilience variables were understood by the survey respondents. The research team made a strong effort to define the terms in every case. After implementing the survey, it became clear that the last two resilience variables were regarded as being more speculative than the first two. This was reflected in the screening process for the binary logistic models. Future confidence and future ability to solve problems had about twice the number of possible explanatory variables than did quality of life or crisis recovery. Discussion of the factors that most affected resilience follows the next section.

*Capital Variables*

Capital variables have been previously defined in Chapter 2. Overall, the survey data indicated a worsening trend for most capital variables. This was the case for both research sites. This provides quantitative support for the focus group and key informant phase of the research.

The most striking negative trends were perceived for soil productivity and the general environment, as well as for economic indicators such as access to credit, savings,
and banks. There were also notable perceived declines for human and social capital, especially in the case of human health, ability to provide labor, and access to modern institutions. However, there were more varied trends in the realms of access to skills and knowledge and social networks; respondents perceived mixed trends for access to skills and knowledge. Although access to modern institutions had reportedly declined, access to traditional social networks had improved.

It can be speculated that the worsening of natural capital is ultimately related to human population growth, poverty, and lack of education, and more proximally related to over-extraction of resources and lack of use of modern agricultural inputs such as chemical fertilizers and appropriate pesticides. This pattern was mentioned in the focus groups and by key informants, and has been often reported elsewhere (Lowe 1986). In contrast, the worsening access to credit, savings, and banks is harder to explain because it could be argued that local access to these factors has always been very limited. There are local savings and credit organizations (SACCOs), but they may still be viewed as rare in rural areas. The short-answer portion of the survey revealed that most perceive that access to rural financial institutions is very lacking.

The varied pattern for access to skills and knowledge is also more challenging to explain. About the same proportion of respondents (42%) perceived improved access versus worsening access (40%). The short-answer portion of the survey revealed that those who saw skills and knowledge improving had gained access to various types of informal or formal education. Those who said skills and knowledge were the same or worsening noted that access to extension, in particular, was either unchanged or
insufficient. This suggests that there may be high spatial variation in access to extension services in the study area.

Other positive factors related to improved skills and knowledge observed by the research team—but not mentioned in the survey—include increased use of radios, cell phones, and television. There has been a recent increase in access to primary schools for children. Negative factors were more clearly indicated in the focus group and key informant results. They prominently include poverty (that can limit easy access to electronics), lack of access to vocational training, and poor infrastructure that restricts market information and development.

The varied perceptions of access to modern institutions and social networks can be explained in several ways. Again, modern institutions included schools, churches, clinics, banks, etcetera. Social networks were based on indigenous relationships involving kinship, residential location, collective action, etcetera. Scoones (1998) put special emphasis on formal or informal social institutions and networks. Scoones defined these as “social cement” which enables stakeholders to interact and exercise power, and this can often determine adaptive ability to changing circumstances (Chapter 2). The data indicated that modern institutions most used by respondents included agricultural cooperatives, local savings and credit options, and extension services, although reported use seemed minor. Social networks most used by respondents included those founded on local traditions, such a kin-related or residence-related. Worsening per-capita access to institutions can be explained by the low government investment in local services given the rapid growth in the population. However, this may not be true for all service sectors;
it appears, for example, that growth in local primary schools has occurred. The same may
not be said, however, for clinics, banks, etcetera.

The social capital, or people’s mutual trust and reciprocity, is probably being used
more by the people of Kigoma Rural as a means to increase their capacity to cope with
worsening situations. Similar trends have been observed. Eriksen et al. (2005, 289) noted,
“Customary safety nets, in terms of the economic, social and political networks and the
processes that affect them, are particularly important for coping strategies in sub-Saharan
Africa… at any point in space and time.” In fact, Lyon (2000, 664) insists, “Social capital
is the infrastructure …namely networks, norms and trust that facilitate co-operation and
co-ordination … identified at different scales, from the micro-institutional level to more
macro scales … [T]rust is an integral part of what is termed social capital.” The social
capital is also being used as another form of insurance, especially given severe lack of
insurance opportunities available to the poor households. This takes many forms. Carter
and Maluccio (2003, 1148) explain this approach as follows, “…following a simple
precautionary savings strategy, individual households can self-insure against covariant
shocks, or any other kind of economic loss, and achieve relatively smooth consumption.”
This form of informal insurance mechanisms may be helping poor households in Kigoma
Rural to stabilize or increase their incomes through legal mechanisms put in place by the
people themselves. For example, Carter and Maluccio (2003, 1148) make the following
observation about the qualification of households to enter this insurance program,
“…households willing to insure one another informally share similar livelihoods and
living standards.” But Carter and Maluccio (2003, 1161) also continue to insist that
“Exclusion from bridging social capital might be most severe in societies where class, social identity, and area of residence are all highly correlated” (p. 1148) and that “…households in communities with more groups, our proxy for social capital, are able to weather idiosyncratic shocks more easily.” The role of indigenous institutions is emphasized by Davies et al. (2008, 63) in his application of sustainable livelihoods approach among Australian desert aboriginal. Davies et al. found that “Action research approaches that use the sustainable livelihoods approach with these groups and that carry the political will to resolve institutional conflicts are likely to return strongest outcomes.”

**Relationships Between Resilience and Capital Variables**

The main research questions and hypotheses that relate to this section have been previously introduced in Chapter 4. The following discussion will be organized according to these questions and hypotheses.

First, it was expected that there would be an overall perceived decline for each of the resilience and capital variables over the preceding five years. This was predicted based on the focus group and key informant results. This has proven to be true for each of the resilience variables as well as 12 out of 16 capital variables. The four exceptions among the capital variables were all significant in terms of chi square, but varied in terms of the observed distributions among improved, same, and worsened categories. Land access differed in that the majority of respondents (46%) stayed the same. As just stated, skills and knowledge was dominated by improved (42%) and worsened (40%). Access to social networks was the only variable dominated by improved (66%).
It makes sense that land access was seen as largely “steady” over the time frame examined. Even if per capita land access was being reduced by population growth, it would take some time to be perceived. The other two variables have been previously discussed.

The binary logistic regression results provided the final sorting of possible explanatory variables for resilience. The sustainable livelihoods framework did not provide the means to predict how one group of capitals might explain patterns of resilience over another; results would tend to be site specific. It can be imagined that in one circumstance natural capital could be most critical, while economic capital could prevail in another. However, in this case it was predicted that human and social capital would generally emerge as most important, again according to focus group and key informant findings (Chapter 4).

Simply, the odds of an improving or stable livelihood resilience (i.e., as measured by perceived quality of life, crisis recovery ability, problem solving ability, and level of future confidence), over a worsening trend, are enhanced by higher cash incomes followed by increased access to skills and knowledge. Apart from these two critical, intersecting variables, the ability to perform manual labor and the study sites (uplands, lowlands) were also important for quality of life and crisis recovery, respectively.

These explanatory variables are inter-related. An increased income can assist livelihood resilience in many fundamental ways. It can enable a household to secure better access to food, health, shelter, hired labor, and almost any other local aspect of life. Increased access to skills and knowledge could afford enhanced access to income-
generating opportunities. Both of these factors have been linked to resilience or general and improvement in human welfare in other studies (Coppock 2010). The ability of a household to perform manual labor can be very important in a setting like Kigoma Rural. As one key informant summarized, “the most important capital of a household is its ability to do manual labor.” The ability to conduct labor can allow the access to food and income; the key role of labor for the poor to prosper has been noted by previous investigators (Lowe 1986).

The effect of research site on crisis recovery remains as the least explained factor at this point. The indication was that the respondents from the uplands perceived they had relatively more crisis-recovery ability compared to their peers in the lowlands. This provided some support for the hypothesis that the uplands would be more resilient than the lowlands, but overall the distinction was weak considering all four resilience variables. As previously mentioned, the uplands and lowlands were probably greater in terms of their similarities than their differences. A more intensive and targeted survey-sampling regime may have illustrated more important differences between the two sites than are evident at this time.

Why might crisis-recovery ability be improved in the uplands relative to that for the lowlands? The quantitative data did little to clarify this question. The per capita access to land did not appreciably differ, and this was expected to be important following a brief reconnaissance of the area prior to the survey. Perceptions of trends for soil productivity also did not vary much between the two sites. It had been expected, that because the uplands had been more recently occupied compared to the lowlands, the
trends for soil productivity and related natural resources would be different. Livestock resources only appeared to subtly vary between the sites, with the uplands showing a minor degree of more livestock influence. It is clear that such issues require technical measures beyond survey research. It could be speculated, however—assuming that land access, soils, and livestock are similar between sites—that other factors could have influence. For example, in the uplands, coffee was more common than in the lowlands. Income from coffee could play a role in improved ability to recover from crisis.

**Perspectives on Problem Solving**

Overall, the quantitative results focused on the need for more income, more skills and knowledge, and more labor to improve livelihood resilience. While the qualitative (short-answer) results supported some of the quantitative results in general, the short-answers provided a clearer picture of what sector local development should mostly focus on—namely agriculture. Strengthening skills, knowledge, labor, and associated inputs in support of a more robust agriculture seems to be the complete message. Again, improving the natural environment was not commonly mentioned as a direct priority. The GSNP was notable by its absence in the final debate.
### 5.1. Focus group summary for participants based on age, gender, and refugee status, largely from the lowlands

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1 Government/corruption/other external forces such as refugees
2 Education system (information; curriculum/leadership; governance)
3 Environmental degradation (native trees species; alternative energy sources; safe drinking water; wildlife decline; natural resources; rivers drying up; decreased rainfall)
4 Farming systems (information; technology; soil fertility; livestock; food security)
5 Financial capital (credits and loans; cooperative groups; small businesses; income diversification techniques)
6 Fisheries (quantity; quality)
7 Market and Entrepreneurship (research; capacity building; information; government intervention)
8 Physical capital (roads; electricity; communication system; water services)
9 Population (human growth; disease outbreaks; health services; nutrition)
10 Poverty/economic opportunities
11 Rural-urban interface
12 Social cohesion (individuality; traditional beliefs; gender; institutions; property rights)
Table 5.2(a). Focus group summary for participants based on village residence and livelihoods from the lowlands

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Note: X indicates presence; blank indicates absence.
1 Government/corruption/other external forces such as refugees
2 Education system (information; curriculum/leadership; governance)
3 Environmental degradation (native trees species; alternative energy sources; safe drinking water; wildlife decline; natural resources; rivers drying up; decreased rainfall)
4 Farming systems (information; technology; soil fertility; livestock; food security)
5 Financial capital (credits and loans; cooperative groups; small businesses; income diversification techniques)
6 Fisheries (quantity; quality)
7 Market and Entrepreneurship (research; capacity building; information; government intervention)
8 Physical capital (roads; electricity; communication system; water services)
9 Population (human growth; disease outbreaks; health services; nutrition)
10 Poverty/economic opportunities
11 Rural-urban interface
12 Social cohesion (individuality; traditional beliefs; gender; institutions; property rights)
Table 5.2(b). Focus group summary for participants based on village residence and livelihoods from the uplands

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</tbody>
</table>

Note: For each category, X indicates a focus on that topic.
1. Government/corruption/other external forces such as refugees
2. Education system (information; curriculum/leadership; governance)
3. Environmental degradation (native trees species; alternative energy sources; safe drinking water; wildlife decline; natural resources; rivers drying up; decreased rainfall)
4. Farming systems (information; technology; soil fertility; livestock; food security)
5. Financial capital (credits and loans; cooperative groups; small businesses; income diversification techniques)
6. Fisheries (quantity; quality)
7. Market and Entrepreneurship (research; capacity building; information; government intervention)
8. Physical capital (roads; electricity; communication system; water services)
9. Population (human growth; disease outbreaks; health services; nutrition)
10. Poverty/economic opportunities
11. Rural-urban interface
12. Social cohesion (individuality; traditional beliefs; gender; institutions; property rights)
Table 5.3. Description of surveyed heads of households in terms of gender, age, formal education, and first language skills

<table>
<thead>
<tr>
<th>Locale</th>
<th>Gender</th>
<th>No. of Household Heads</th>
<th>Age (years)</th>
<th>Formal Education</th>
<th>First Language</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Avg.±SE</td>
<td>Min.</td>
<td>Max.</td>
<td>None</td>
</tr>
<tr>
<td>Lowland</td>
<td>Male</td>
<td>37(84%)</td>
<td>50 ± 1.9</td>
<td>27</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>7(16%)</td>
<td>47 ± 2.8</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>44(100%)</td>
<td>49 ± 1.7</td>
<td>27</td>
<td>72</td>
</tr>
<tr>
<td>Upland</td>
<td>Male</td>
<td>46(88%)</td>
<td>48 ± 1.8</td>
<td>23</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>6(12%)</td>
<td>44 ± 9.1</td>
<td>24</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>52(100%)</td>
<td>48 ± 1.9</td>
<td>23</td>
<td>86</td>
</tr>
<tr>
<td>Total</td>
<td>Male</td>
<td>83(86%)</td>
<td>49 ± 1.4</td>
<td>23</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>13(14%)</td>
<td>45 ± 4.3</td>
<td>24</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>96(100%)</td>
<td>48 ± 1.3</td>
<td>23</td>
<td>86</td>
</tr>
</tbody>
</table>

1The lowlands were located within 10 km of GSNP while the uplands were located between 11 and 50 km from the park.
2No respondent had exposure to tertiary (college) education. Tabular data indicates partial or full enrollment in the designated category.
3Other potential first languages were English and Arabic. No respondents spoke English.
4Standard error
Table 5.4. Description of all residents of surveyed households (hh) from the lowlands and uplands of Kigoma Rural District in terms of gender, age, formal education, and first language skills

<table>
<thead>
<tr>
<th>Locale (n)</th>
<th>Residents</th>
<th>Gender</th>
<th>Number</th>
<th>Avg.</th>
<th>Formal Education</th>
<th>First Language</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>173(54%)</td>
<td>3.9</td>
<td>None</td>
<td>10(7%)</td>
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<tr>
<td></td>
<td></td>
<td>Female</td>
<td>146 (46%)</td>
<td>3.3</td>
<td>Primary</td>
<td>116(82%)</td>
</tr>
<tr>
<td>Lowland</td>
<td></td>
<td>Total</td>
<td>319(100%)</td>
<td>7.2</td>
<td>Secondary</td>
<td>16(11%)</td>
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<tr>
<td>(n=44)</td>
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<td></td>
</tr>
<tr>
<td>Upland</td>
<td></td>
<td>Male</td>
<td>181(47%)</td>
<td>3.5</td>
<td>None</td>
<td>12(9%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td>208(53%)</td>
<td>4.0</td>
<td>Primary</td>
<td>120(85%)</td>
</tr>
<tr>
<td>(n=52)</td>
<td></td>
<td>Total</td>
<td>389(100%)</td>
<td>7.5</td>
<td>Secondary</td>
<td>9(6%)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>Male</td>
<td>354(50%)</td>
<td>3.7</td>
<td>None</td>
<td>22(8%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td>354(50%)</td>
<td>3.7</td>
<td>Primary</td>
<td>236(90%)</td>
</tr>
<tr>
<td>(n=96)</td>
<td></td>
<td>Total</td>
<td>708(100%)</td>
<td>7.4</td>
<td>Secondary</td>
<td>25(2%)</td>
</tr>
</tbody>
</table>

1The lowlands were located within 10 km of GSNP while the uplands were located between 11 km and 60 km from GSNP. The “number” is the cumulative figure for a given gender category across all households in a given locale. The row numbers organized by Formal Education or First Language may not add to the corresponding number of residents. This gap is comprised of infants and other very young children.

2No respondent had exposure to tertiary (college) education. Tabular data indicates partial or full enrollment in the designated category. Exposure to primary or secondary education is based on residents aged 7 years and above (n=569 overall).

3The “other” first language was English and Arabic. The second language was commonly Kiswahili. No respondents spoke English as their first language.

4Averages calculated from numbers of all individuals divided by the number of households. Standard errors thus not available.
Table 5.5. Description of all residents (including household heads) of surveyed households from the lowlands and uplands of Kigoma Rural District in terms of gender and age distribution

<table>
<thead>
<tr>
<th>Locale</th>
<th>Gender</th>
<th>Age Category (yrs)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowland (n=44)</td>
<td>Male</td>
<td>31 (18%)</td>
<td>63 (36%)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>18 (12%)</td>
<td>47 (32%)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>49 (15%)</td>
<td>110 (34%)</td>
</tr>
<tr>
<td>Upland (n=52)</td>
<td>Male</td>
<td>39 (22%)</td>
<td>57 (31%)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>50 (24%)</td>
<td>70 (34%)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>89 (23%)</td>
<td>127 (33%)</td>
</tr>
<tr>
<td>Total (n=96)</td>
<td>Male</td>
<td>70 (20%)</td>
<td>120 (34%)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>68 (19%)</td>
<td>117 (33%)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>138 (19%)</td>
<td>237 (33%)</td>
</tr>
</tbody>
</table>

1The lowlands were located within 10 km of GSNP while the uplands were located between 11 and 60 km from GSNP.

2People could attend primary, secondary, or tertiary schools in the age categories as shown
Table 5.6. Descriptions of farmland area, number of farm parcels, and duration of farming for surveyed households from the lowlands and uplands of Kigoma Rural District¹

<table>
<thead>
<tr>
<th>Locale</th>
<th>N</th>
<th>Farm Area (ha.)</th>
<th>Parcels (no.)</th>
<th>Duration (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowland</td>
<td>44</td>
<td>2.4±0.51</td>
<td>0.4</td>
<td>22.0</td>
</tr>
<tr>
<td></td>
<td>42</td>
<td>1.9±0.19</td>
<td>0.4</td>
<td>5.8</td>
</tr>
<tr>
<td>Upland</td>
<td>52</td>
<td>3.2±0.36</td>
<td>0.2</td>
<td>11.2</td>
</tr>
<tr>
<td>Total</td>
<td>96</td>
<td>2.8±0.29</td>
<td>0.2</td>
<td>22.0</td>
</tr>
<tr>
<td></td>
<td>94</td>
<td>2.7±0.22</td>
<td>0.2</td>
<td>11.3</td>
</tr>
</tbody>
</table>

¹Land is accessed via rental or traditional means. No title deeds occur. Farm parcels are also called shambas.

Table 5.7. Descriptions of farmland access (hectares) according to gender for surveyed households from the lowlands and uplands of Kigoma Rural District¹

<table>
<thead>
<tr>
<th>Locale</th>
<th>Gender (n)</th>
<th>Farmland (ha.)</th>
<th>Avg. ± E⁴</th>
<th>Min.</th>
<th>Max.</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Avg. ± E⁴</td>
<td>Min.</td>
<td>Max.</td>
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</tr>
<tr>
<td>Lowland</td>
<td>Male (35)²</td>
<td>2.1±0.22</td>
<td>0.4</td>
<td>5.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female (7)</td>
<td>1.1±0.29</td>
<td>0.4</td>
<td>2.2</td>
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</tr>
<tr>
<td>Upland</td>
<td>Male (46)</td>
<td>3.3±0.36</td>
<td>0.2</td>
<td>11.2</td>
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<tr>
<td></td>
<td>Female (6)</td>
<td>2.6±1.55</td>
<td>0.5</td>
<td>9.6</td>
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</tr>
<tr>
<td>Total</td>
<td>Male (81)²</td>
<td>3.0±0.33</td>
<td>0.2</td>
<td>11.2</td>
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</tr>
<tr>
<td></td>
<td>Female (13)</td>
<td>1.8±0.55</td>
<td>0.4</td>
<td>11.2</td>
<td></td>
</tr>
</tbody>
</table>

¹Land is accessed via rental or traditional means. No title deeds occur.
²Revised estimates that include the landholder with 22 ha yield 2.6±0.58 ha for males in the lowlands and 3.0±0.33 ha for males overall. The maximum land holdings is then to 22.0
Table 5.8. First-ranked agricultural crops and their uses among surveyed households from the lowlands and uplands of Kigoma Rural District

<table>
<thead>
<tr>
<th>Crop</th>
<th>Lowland (n=44)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Upland (n=52)</th>
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<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Food</td>
<td>Cash</td>
<td>Other</td>
<td>Number</td>
<td>Food</td>
<td>Cash</td>
<td>Other</td>
<td>Number</td>
<td>Food</td>
</tr>
<tr>
<td>Cassava</td>
<td>8(18%)</td>
<td>8(100%)</td>
<td>0</td>
<td>4(50%)</td>
<td>16(31%)</td>
<td>15(94%)</td>
<td>6(38%)</td>
<td>9(56%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil Palm</td>
<td>26(59%)</td>
<td>24(92%)</td>
<td>14(54%)</td>
<td>11(42%)</td>
<td>11(20%)</td>
<td>11(100%)</td>
<td>9(82%)</td>
<td>5(46%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pineapple</td>
<td>1(2%)</td>
<td>1(100%)</td>
<td>1(100%)</td>
<td>1(100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maize</td>
<td>3(7%)</td>
<td>3(100%)</td>
<td>1(33%)</td>
<td>1(33%)</td>
<td>5(10%)</td>
<td>5(100%)</td>
<td>0</td>
<td>2(40%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coffee</td>
<td>1(2%)</td>
<td>1(100%)</td>
<td>1(100%)</td>
<td>1(100%)</td>
<td>17(33%)</td>
<td>17(100%)</td>
<td>17(100%)</td>
<td>12(71%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beans</td>
<td>3(7%)</td>
<td>3(100%)</td>
<td>0</td>
<td>1(100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potatoes</td>
<td>1(3%)</td>
<td>1(100%)</td>
<td>0</td>
<td>0</td>
<td>1(2%)</td>
<td>1(100%)</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peanuts</td>
<td>1(2%)</td>
<td>0</td>
<td>0</td>
<td>1(100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bananas</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2(4%)</td>
<td>0</td>
<td>0</td>
<td>1(50%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1For example, in the lowlands, oil palm was ranked as the most important crop by 26 of 44 respondents (59%). Crop uses in total usually exceed 100% because they are often multi-purpose. “Other” uses of crops included service as medicine, cultural items, as fuel, or to supplement soil fertility.
<table>
<thead>
<tr>
<th>Crop</th>
<th>Lowland (n = 44)</th>
<th></th>
<th></th>
<th></th>
<th>Upland (n = 52)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Food</td>
<td>Cash</td>
<td>Other</td>
<td>Number</td>
<td>Food</td>
<td>Cash</td>
<td>Other</td>
</tr>
<tr>
<td>Cassava</td>
<td>18(41%)</td>
<td>18(100%)</td>
<td>3(17%)</td>
<td>5(28%)</td>
<td>18(35%)</td>
<td>18(100%)</td>
<td>3(17%)</td>
<td>7(39%)</td>
</tr>
<tr>
<td>Oil Palm</td>
<td>4(9%)</td>
<td>4(100%)</td>
<td>2(50%)</td>
<td>1(25%)</td>
<td>3(6%)</td>
<td>3(100%)</td>
<td>2(50%)</td>
<td>3(100%)</td>
</tr>
<tr>
<td>Pineapple</td>
<td>1(2%)</td>
<td>1(100%)</td>
<td>1(100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Maize</td>
<td>7(16%)</td>
<td>7(100%)</td>
<td>0</td>
<td>4(57%)</td>
<td>6(12%)</td>
<td>6(100%)</td>
<td>0</td>
<td>5(83%)</td>
</tr>
<tr>
<td>Coffee</td>
<td>1(2%)</td>
<td>0</td>
<td>1(100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Beans</td>
<td>4(9%)</td>
<td>4(100%)</td>
<td>0</td>
<td>1(25%)</td>
<td>8(15%)</td>
<td>8(100%)</td>
<td>0</td>
<td>6(75%)</td>
</tr>
<tr>
<td>Potatoes</td>
<td>4(9%)</td>
<td>4(100%)</td>
<td>0</td>
<td>3(75%)</td>
<td>2(4%)</td>
<td>2(100%)</td>
<td>0</td>
<td>1(50%)</td>
</tr>
<tr>
<td>Peanuts</td>
<td>1(2%)</td>
<td>1(100%)</td>
<td>0</td>
<td>1(100%)</td>
<td>1(2%)</td>
<td>1(100%)</td>
<td>0</td>
<td>1(100%)</td>
</tr>
<tr>
<td>Bananas</td>
<td>1(2%)</td>
<td>1(100%)</td>
<td>0</td>
<td>0</td>
<td>13(25%)</td>
<td>13(100%)</td>
<td>0</td>
<td>9(69%)</td>
</tr>
<tr>
<td>Oranges</td>
<td>1(2%)</td>
<td>1(100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Wheat, Millet</td>
<td>1(2%)</td>
<td>1(100%)</td>
<td>0</td>
<td>0</td>
<td>1(2%)</td>
<td>1(100%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mangoes</td>
<td>1(2%)</td>
<td>1(100%)</td>
<td>1(100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

For example, in the lowlands, cassava was ranked as the most important crop by 18 of 44 respondents (41%). Crop uses in total usually exceed 100% because they are often multi-purpose. “Other” uses of crops included service as medicine, cultural items, as fuel, or to supplement soil fertility.
<table>
<thead>
<tr>
<th>Crop</th>
<th>Lowland (n = 44)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Upland (n = 52)</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Food</td>
<td>Cash</td>
<td>Other</td>
<td></td>
<td>Number</td>
<td>Food</td>
<td>Cash</td>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Cassava</td>
<td>7(21%)</td>
<td>7(100%)</td>
<td>2(29%)</td>
<td>1(14%)</td>
<td></td>
<td>10(23%)</td>
<td>10(100%)</td>
<td>4(40%)</td>
<td>1(14%)</td>
<td></td>
</tr>
<tr>
<td>Oil Palm</td>
<td>3(9%)</td>
<td>3(100%)</td>
<td>1(33%)</td>
<td>0</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pineapple</td>
<td>1(3%)</td>
<td>1(100%)</td>
<td>0</td>
<td>0</td>
<td></td>
<td>1(2%)</td>
<td>0</td>
<td>1(100%)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Maize</td>
<td>9(27%)</td>
<td>9(100%)</td>
<td>0</td>
<td>3(33%)</td>
<td></td>
<td>24(55%)</td>
<td>24(100%)</td>
<td>9(38%)</td>
<td>3(33%)</td>
<td></td>
</tr>
<tr>
<td>Coffee</td>
<td>1(3%)</td>
<td>0</td>
<td>1(100%)</td>
<td>1(100%)</td>
<td></td>
<td>1(2%)</td>
<td>1(100%)</td>
<td>0</td>
<td>1(100%)</td>
<td></td>
</tr>
<tr>
<td>Beans</td>
<td>6(18%)</td>
<td>6(100%)</td>
<td>1(17%)</td>
<td>1(17%)</td>
<td></td>
<td>4(9%)</td>
<td>4(100%)</td>
<td>3(75%)</td>
<td>1(17%)</td>
<td></td>
</tr>
<tr>
<td>Potatoes</td>
<td>3(9%)</td>
<td>3(100%)</td>
<td>0</td>
<td>0</td>
<td></td>
<td>2(5%)</td>
<td>2(100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Peanuts</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td>1(2%)</td>
<td>1(100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bananas</td>
<td>1(3%)</td>
<td>1(100%)</td>
<td>1(100%)</td>
<td>1(100%)</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Wheat, Millet</td>
<td>1(3%)</td>
<td>1(100%)</td>
<td>0</td>
<td>0</td>
<td></td>
<td>1(2%)</td>
<td>1(100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

1For example, in the lowlands, maize was ranked as the most important crop by 9 of 44 respondents (27%). Crop uses in total usually exceed 100% because they are often multi-purpose. “Other” uses of crops included service as medicine, cultural items, as fuel, or to supplement soil fertility.
Table 5.11. Combined importance rankings for lowland and upland crops for 96 households in Kigoma Rural District\(^1\)

<table>
<thead>
<tr>
<th>Crop Species</th>
<th>Lowland</th>
<th>Upland</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Amount (%)</td>
<td>Amount (%)</td>
<td>Amount (%)</td>
</tr>
<tr>
<td>Cassava</td>
<td>67(27%)</td>
<td>94(31%)</td>
<td>161(29%)</td>
</tr>
<tr>
<td>Oil Palm</td>
<td>89(35%)</td>
<td>39(13%)</td>
<td>128(23%)</td>
</tr>
<tr>
<td>Pineapple</td>
<td>6(2%)</td>
<td>1(1%)</td>
<td>7(1%)</td>
</tr>
<tr>
<td>Maize</td>
<td>32(13%)</td>
<td>51(17%)</td>
<td>83(15%)</td>
</tr>
<tr>
<td>Coffee</td>
<td>6(2%)</td>
<td>52(17%)</td>
<td>58(10%)</td>
</tr>
<tr>
<td>Beans</td>
<td>23(9%)</td>
<td>20(7%)</td>
<td>43(8%)</td>
</tr>
<tr>
<td>Potato</td>
<td>14(6%)</td>
<td>9(3%)</td>
<td>23(4%)</td>
</tr>
<tr>
<td>Peanuts</td>
<td>5(2%)</td>
<td>3(1%)</td>
<td>8(1%)</td>
</tr>
<tr>
<td>Bananas</td>
<td>3(1%)</td>
<td>32(11%)</td>
<td>35(6%)</td>
</tr>
<tr>
<td>Oranges</td>
<td>2(1%)</td>
<td>0</td>
<td>2(1%)</td>
</tr>
<tr>
<td>Wheat, Millet</td>
<td>3(1%)</td>
<td>3(1%)</td>
<td>6(1%)</td>
</tr>
<tr>
<td>Mangos</td>
<td>2(1%)</td>
<td>0</td>
<td>2(1%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>252(100%)</td>
<td>304(100%)</td>
<td>556(100%)</td>
</tr>
</tbody>
</table>

\(^1\)Amounts were calculated from the columns of Tables 5.8, 5.9, and 5.10. For items ranked “first,” “second,” or “third” the number of observations were multiplied times three, two, or one to get a weighted average overall. For example, the lowlands value for cassava was obtained from \((8 \times 3) + (18 \times 2) + (7 \times 1) = 67\). The relative importance percentage was calculated as \((67/252) = 27\%\).
Table 5.12. First-ranked livestock species and their uses among surveyed households from the lowlands and uplands of Kigoma Rural District

<table>
<thead>
<tr>
<th>Livestock</th>
<th>Lowland (n = 42)</th>
<th>Upland (n = 52)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Food</td>
</tr>
<tr>
<td>Chickens</td>
<td>25(60%)</td>
<td>23(92%)</td>
</tr>
<tr>
<td>Goats</td>
<td>14(33%)</td>
<td>7(50%)</td>
</tr>
<tr>
<td>Ducks</td>
<td>2(5%)</td>
<td>2(100%)</td>
</tr>
<tr>
<td>Sheep</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cattle</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rabbits</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

1For example, in the lowlands, chickens were ranked as the most important livestock species by 25 of 42 respondents (60%). Livestock uses in total usually exceed 100% because they are often multi-purpose. “Other” uses of livestock included servicing as an insurance for the household, as bridal dowry, etcetera.
Table 5.13. Second-ranked livestock species and their uses among surveyed households from the lowlands and uplands of Kigoma Rural District

<table>
<thead>
<tr>
<th>Livestock</th>
<th>Lowland (n = 42)</th>
<th>Upland (n = 52)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Food</td>
</tr>
<tr>
<td>Goats</td>
<td>16 (38%)</td>
<td>13 (81%)</td>
</tr>
<tr>
<td>Cattle</td>
<td>1 (2%)</td>
<td>1 (100%)</td>
</tr>
<tr>
<td>Chickens</td>
<td>10 (24%)</td>
<td>8 (80%)</td>
</tr>
<tr>
<td>Ducks</td>
<td>4 (10%)</td>
<td>4 (100%)</td>
</tr>
<tr>
<td>Pigs</td>
<td>1 (2%)</td>
<td>0</td>
</tr>
<tr>
<td>Sheep</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Turkeys</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dogs</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

1For example, in the lowlands, goats were ranked as the second most important livestock species by 16 of 42 respondents (38%). Livestock uses in total usually exceed 100% because they are often multi-purpose. “Other” uses of livestock included servicing as an insurance for the household, as bridal dowry, etcetera.
Table 5.14. Third-ranked livestock species and their uses among surveyed households from the lowlands and uplands of Kigoma Rural District

| Livestock | Lowland (n = 42) | | | Upland (n = 52) | | |
|-----------|------------------|------------------|------------------|------------------|------------------|
|           | Number | Food | Cash | Other | Number | Food | Cash | Other |
| Goats     | 1(2%)  | 1(100%) | 1(100%) | 1(100%) | 2(4%)  | 1(50%) | 1(50%) | 2(100%) |
| Chickens  | 2(5%)  | 2(100%) | 0 | 2(100%) | 4(8%)  | 4(100%) | 1(25%) | 3(100%) |
| Ducks     | 1(2%)  | 1(50%) | 2(100%) | 1(50%) | 1(2%)  | 1(100%) | 1(100%) | 0 |
| Sheep     | 0      | 0 | 0 | 0 | 3(6%)  | 1(33%) | 3(100%) | 3(100%) |
| Cattle    | 0      | 0 | 0 | 0 | 1(2%)  | 1(100%) | 0 | 1(100%) |
| Ducks     | 0      | 0 | 0 | 0 | 1(2%)  | 1(100%) | 1(100%) | 0 |
| Other birds | 0 | 0 | 0 | 0 | (2%)  | 1(100%) | 0 | 0 |

1For example, in the lowlands, chickens were ranked as the third most important livestock by two of 42 respondents (5%). Livestock uses in total usually exceed 100% because they are often multi-purpose. “Other” uses of livestock included servicing as an insurance for the household, as bridal dowry, etcetera.
Table 5.15. Combined importance rankings for lowland and upland livestock for 96 households in Kigoma Rural District\(^1\)

<table>
<thead>
<tr>
<th>Livestock Species</th>
<th>Lowland</th>
<th>Upland</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicken</td>
<td>97(51%)</td>
<td>94(41%)</td>
<td>191(45%)</td>
</tr>
<tr>
<td>Goats</td>
<td>75(39%)</td>
<td>60(26%)</td>
<td>135(32%)</td>
</tr>
<tr>
<td>Ducks</td>
<td>15(8%)</td>
<td>7(3%)</td>
<td>22(5%)</td>
</tr>
<tr>
<td>Sheep</td>
<td>0</td>
<td>27(12%)</td>
<td>27(6%)</td>
</tr>
<tr>
<td>Cattle</td>
<td>0</td>
<td>30(13%)</td>
<td>32(8%)</td>
</tr>
<tr>
<td>Turkey</td>
<td>0</td>
<td>6(3%)</td>
<td>6(1%)</td>
</tr>
<tr>
<td>Pigs</td>
<td>0</td>
<td>4(1%)</td>
<td>4(1%)</td>
</tr>
<tr>
<td>Other</td>
<td>4(2%)</td>
<td>8(3%)</td>
<td>6(1%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>191(100%)</strong></td>
<td><strong>232(100%)</strong></td>
<td><strong>423(100%)</strong></td>
</tr>
</tbody>
</table>

\(^1\) Amounts were calculated from the columns of Tables 5.12, 5.13, and 5.14. For species ranked “first,” “second,” or “third” the number of observations were multiplied times three, two, or one to get a weighted average overall. For example, the lowlands value here for chickens (97) was obtained from \((25\times 3) + (10\times 2) + (2\times 1) = 97\). The relative importance percentage was calculated as \((97/191) = 27\%\).
Table 5.16. Numbers of livestock per household (hh) for selected animal species<sup>1</sup>

<table>
<thead>
<tr>
<th>Locale</th>
<th>Species</th>
<th>No.&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Avg./hh&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Min.&lt;sup&gt;4&lt;/sup&gt;</th>
<th>Max.&lt;sup&gt;4&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowland</td>
<td>Chickens</td>
<td>10</td>
<td>4.6</td>
<td>0</td>
<td>27</td>
</tr>
<tr>
<td>(n=42)</td>
<td>Goats</td>
<td>16</td>
<td>1.4</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Sheep</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Cattle</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Upland</td>
<td>Chickens</td>
<td>20</td>
<td>3.8</td>
<td>0</td>
<td>21</td>
</tr>
<tr>
<td>(n=52)</td>
<td>Goats</td>
<td>12</td>
<td>1.2</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Sheep</td>
<td>6</td>
<td>0.5</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Cattle</td>
<td>9</td>
<td>0.8</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>All</td>
<td>Chickens</td>
<td>30</td>
<td>4.2</td>
<td>0</td>
<td>27</td>
</tr>
<tr>
<td>(n=94)</td>
<td>Goats</td>
<td>28</td>
<td>1.3</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Sheep</td>
<td>6</td>
<td>0.3</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Cattle</td>
<td>9</td>
<td>0.4</td>
<td>0</td>
<td>12</td>
</tr>
</tbody>
</table>

<sup>1</sup> Most abundant livestock species only
<sup>2</sup> Number of households having the species.
<sup>3</sup> Average number of each species for all households, including those that have none.
<sup>4</sup> Minimum and maximum number of each species across all households.
**Table 5.17.** First-ranked wildland products and their uses among surveyed households from the lowlands and uplands of Kigoma Rural District\(^1\)

<table>
<thead>
<tr>
<th>Wildland Product</th>
<th>Lowland (n=42)</th>
<th></th>
<th></th>
<th>Upland (n=52)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Food</td>
<td>Cash</td>
<td>Other</td>
<td>Number</td>
<td>Food</td>
<td>Cash</td>
</tr>
</tbody>
</table>
| Fish                  | 2(5%)  | 2(100%) | 0    | 0     | 4(8%)  | 2(100%) | 1(50%) | 1(50%)  
| Grass                 | 1(2%)  | 1(100%) | 0    | 0     | 1(2%)  | 0     | 1(100%) | 0        
| Charcoal              | 2(5%)  | 2(100%) | 0    | 0     | 0      | 0     | 0      | 0        
| Medicinal plants      | 2(5%)  | 2(100%) | 0    | 0     | 2(4%)  | 2(100%) | 0      | 0        
| Firewood              | 22(52%) | 21(99%) | 1(5%) | 0     | 35(67%) | 34(97%) | 1(3%)  | 0        
| Wild honey            | 1(2%)  | 0     | 1(100%) | 0 | 1(2%)  | 1(100%) | 0      | 0        
| Mushrooms             | 6(14%) | 5(100%) | 1(17%) | 0     | 1(2%)  | 1(100%) | 0      | 0        
| Soil\(^3\)           | 4(10%) | 0     | 0     | 4(100%) | 1(2%)  | 0     | 1(100%) | 0        
| Minerals/gemstones     | 0      | 0     | 0     | 0     | 2(4%)  | 2(100%) | 0      | 0        
| Animal products\(^4\) | 0      | 0     | 0     | 0     | 1(2%)  | 1(100%) | 0      | 0        
| Timber                | 0      | 0     | 0     | 0     | 3(6%)  | 0     | 3(100%) | 0        
| Wild plants\(^5\)     | 0      | 0     | 0     | 0     | 2(4%)  | 2(100%) | 0      | 0        

\(^1\)For example, in the lowlands, firewood was ranked as the most important wildland product by 22 of 42 respondents (52%). Uses for any given wildland product can exceed 100% because they are often multi-purpose.

\(^{2}\)“Other” uses for fish include medicinal.

\(^{3}\)Soil was used to make bricks, pottery, medicines, etcetera.

\(^{4}\)Animal products included bush meat, fish from rivers or ponds, animal parts used for medicine, etcetera. Note that fish from Lake Tanganyika are “fish” listed above.

\(^{5}\)Wild plants included grass for thatching, fruit and tubers for food, fiber for weaving, etcetera.
Table 5.18. Second-ranked wildland products and their uses among surveyed households from the lowlands and uplands of Kigoma Rural District

<table>
<thead>
<tr>
<th>Wildland Product</th>
<th>Lowland (n=42)</th>
<th></th>
<th></th>
<th></th>
<th>Upland (n=52)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Food</td>
<td>Cash</td>
<td>Other</td>
<td>Number</td>
<td>Food</td>
<td>Cash</td>
<td>Other</td>
</tr>
<tr>
<td>Grass</td>
<td>3(7%)</td>
<td>3(100%)</td>
<td>2(67%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Charcoal</td>
<td>5(12%)</td>
<td>5(100%)</td>
<td>0</td>
<td>0</td>
<td>5(10%)</td>
<td>5(100%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Medicinal plants</td>
<td>8(19%)</td>
<td>5(63%)</td>
<td>0</td>
<td>0</td>
<td>6(12%)</td>
<td>6(100%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Firewood</td>
<td>12(29%)</td>
<td>12(100%)</td>
<td>1(8%)</td>
<td>0</td>
<td>7(13%)</td>
<td>7(100%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mushrooms</td>
<td>8(19%)</td>
<td>8(100%)</td>
<td>0</td>
<td>0</td>
<td>6(12%)</td>
<td>6(100%)</td>
<td>1(17%)</td>
<td>0</td>
</tr>
<tr>
<td>Mineral/gem stones</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8(15%)</td>
<td>7(88%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Wild honey</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2(4%)</td>
<td>2(100%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Animal products</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2(4%)</td>
<td>2(100%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Wild plants</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1(2%)</td>
<td>1(100%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Timber</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1(2%)</td>
<td>1(100%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Fruits</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1(2%)</td>
<td>1(100%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Fish</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1(2%)</td>
<td>1(100%)</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

1For example, in the lowlands, firewood was ranked as the second most important wildland product by 12 of 42 respondents (29%). Uses for any given wildland product can exceed 100% because they are often multi-purpose.
2Animal products included bush meat, fish from rivers or ponds, animal parts used for medicine, etcetera. Note that fish from Lake Tanganyika are “fish” listed above.
3Wild plants included grass for thatching, fruit and tubers for food, fiber for weaving, etcetera.
Table 5.19. Third-ranked wildland products and their uses among surveyed households from the lowlands and uplands of Kigoma Rural District1

<table>
<thead>
<tr>
<th>Wildland Product</th>
<th>Lowland (n=42)</th>
<th>Upland (n=52)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Food</td>
</tr>
<tr>
<td>Fish</td>
<td>2(5%)</td>
<td>2(100%)</td>
</tr>
<tr>
<td>Grass</td>
<td>1(2%)</td>
<td>1(100%)</td>
</tr>
<tr>
<td>Charcoal</td>
<td>2(5%)</td>
<td>0</td>
</tr>
<tr>
<td>Medicinal plants</td>
<td>6(14%)</td>
<td>4(100%)</td>
</tr>
<tr>
<td>Firewood</td>
<td>4(10%)</td>
<td>4(100%)</td>
</tr>
<tr>
<td>Wild honey</td>
<td>1(2%)</td>
<td>1(100%)</td>
</tr>
<tr>
<td>Mushrooms</td>
<td>3(7%)</td>
<td>3(100%)</td>
</tr>
<tr>
<td>Wild plants2</td>
<td>1(2%)</td>
<td>1(100%)</td>
</tr>
<tr>
<td>Soil3</td>
<td>3(7%)</td>
<td>0</td>
</tr>
<tr>
<td>Termites</td>
<td>1(2%)</td>
<td>1(100%)</td>
</tr>
<tr>
<td>Timber</td>
<td>3(5%)</td>
<td>2(100%)</td>
</tr>
<tr>
<td>Fish</td>
<td>1(2%)</td>
<td>1(100%)</td>
</tr>
<tr>
<td>Mineral/gem stones</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

1For example, in the lowlands, firewood was ranked as the third most important wildland product by 4 of 42 respondents (9%). Uses for any given wildland product can exceed 100% because they are often multi-purpose. Note that fish from Lake Tanganyika are “fish” listed above.
2Wild plants included grass for thatching, fruit and tubers for food, fiber for weaving, etcetera.
3Soil for brick making, pottery, medicine, etcetera.
Table 5.20. Combined importance rankings for lowland and upland wildland products for 96 households in Kigoma Rural District

<table>
<thead>
<tr>
<th>Wildland Products</th>
<th>Lowland</th>
<th>Upland</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish</td>
<td>7(3%)</td>
<td>6(3%)</td>
<td>13(3%)</td>
</tr>
<tr>
<td>Grass</td>
<td>10(5%)</td>
<td>3(1%)</td>
<td>13(3%)</td>
</tr>
<tr>
<td>Charcoal</td>
<td>18(8%)</td>
<td>13(6%)</td>
<td>31(7%)</td>
</tr>
<tr>
<td>Medicinal plants</td>
<td>26(12%)</td>
<td>33(15%)</td>
<td>59(13%)</td>
</tr>
<tr>
<td>Firewood</td>
<td>94(44%)</td>
<td>120(53%)</td>
<td>214(49%)</td>
</tr>
<tr>
<td>Mushrooms</td>
<td>37(17%)</td>
<td>20(9%)</td>
<td>57(13%)</td>
</tr>
<tr>
<td>Wild honey</td>
<td>4(2%)</td>
<td>7(3%)</td>
<td>11(3%)</td>
</tr>
<tr>
<td>Soil</td>
<td>15(7%)</td>
<td>3(1%)</td>
<td>18(4%)</td>
</tr>
<tr>
<td>Other</td>
<td>4(2%)</td>
<td>20(9%)</td>
<td>24(5%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>215(49%)</strong></td>
<td><strong>225(51%)</strong></td>
<td><strong>440(100%)</strong></td>
</tr>
</tbody>
</table>

1Amounts were calculated from the columns of Tables 5.17, 5.18, and 5.19. For items ranked “first,” “second,” or “third” the number of observations were multiplied times three, two, or one to get a weighted average overall. For example, the lowlands value here for firewood was obtained from (22x3) + (12x2) + (4x1) = 94. The relative importance percentage was calculated as (94/215) = 44%. 


Table 5.21. Allocation of income among various sources for lowland and upland households in Kigoma Rural District

<table>
<thead>
<tr>
<th>Income Source</th>
<th>Lowland (n=44)</th>
<th>Upland (n=52)</th>
<th>All (n=96)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ± SE³</td>
<td>Percent</td>
<td>Mean ± SE³</td>
</tr>
<tr>
<td>Crop sales</td>
<td>9.7±0.80</td>
<td>48</td>
<td>13.7±0.61</td>
</tr>
<tr>
<td>Livestock sales</td>
<td>1.9±0.26</td>
<td>9</td>
<td>2.2±0.25</td>
</tr>
<tr>
<td>Wild product sales</td>
<td>1.4±0.33</td>
<td>7</td>
<td>0.6±0.16</td>
</tr>
<tr>
<td>Off-farm income</td>
<td>3.1±0.67</td>
<td>15</td>
<td>2.2±0.45</td>
</tr>
<tr>
<td>Remittances</td>
<td>1.7±0.36</td>
<td>9</td>
<td>0.7±0.20</td>
</tr>
<tr>
<td>In-kind</td>
<td>2.4±0.53</td>
<td>12</td>
<td>0.9±0.35</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>20.0</td>
<td>100</td>
<td>20.0</td>
</tr>
</tbody>
</table>

1See Chapter 4 and Appendix C for method. The index had an upper limit of 20.0 and a lower limit of 0.0.
2Where crops include cash and food crops; livestock includes live animals and animal products; wild products include hunted and gathered materials; off-farm income includes wages, salaries, and pensions for people living on site as well as rental fees for farm land used by others; remittances include income received from people associated with the household who live off-farm; and in-kind income includes the value of all things produced by the household and consumed on-site.
3Standard error
Table 5.22. Allocation of expenditures among various categories for lowland and upland households in Kigoma Rural District

<table>
<thead>
<tr>
<th>Expenditure Category</th>
<th>Lowland (n=44)</th>
<th>Upland (n=52)</th>
<th>All (n=96)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ± SE³</td>
<td>Percent</td>
<td>Mean ± SE³</td>
</tr>
<tr>
<td>Purchased food</td>
<td>8.0±0.46</td>
<td>40</td>
<td>6.7±0.39</td>
</tr>
<tr>
<td>Household items</td>
<td>2.6±0.21</td>
<td>13</td>
<td>2.9±0.19</td>
</tr>
<tr>
<td>Farming supplies</td>
<td>1.5±0.24</td>
<td>8</td>
<td>2.5±0.33</td>
</tr>
<tr>
<td>Education for children</td>
<td>2.9±0.43</td>
<td>15</td>
<td>2.7±0.37</td>
</tr>
<tr>
<td>Education for adults</td>
<td>0.0±0.00</td>
<td>0</td>
<td>0.0±0.00</td>
</tr>
<tr>
<td>Health care</td>
<td>2.8±0.28</td>
<td>14</td>
<td>3.0±0.27</td>
</tr>
<tr>
<td>Gifts and transfers</td>
<td>0.6±0.26</td>
<td>3</td>
<td>0.7±0.08</td>
</tr>
<tr>
<td>Leisure</td>
<td>0.5±0.08</td>
<td>2</td>
<td>0.6±0.09</td>
</tr>
<tr>
<td>Savings</td>
<td>0.2±0.08</td>
<td>1</td>
<td>0.4±0.18</td>
</tr>
<tr>
<td>Loan payments</td>
<td>0.5±0.10</td>
<td>2</td>
<td>0.5±0.11</td>
</tr>
<tr>
<td>Other</td>
<td>0.4±0.15</td>
<td>2</td>
<td>0.0±0.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>20.0</strong></td>
<td><strong>100</strong></td>
<td><strong>20.0</strong></td>
</tr>
</tbody>
</table>

¹See chapter 4 and Appendix C for method. The index had an upper limit of 20.0 and a lower limit of 0.0
²Where household items included clothing and miscellaneous items; farming supplies were for crop and animal production.
³Standard error
Table 5.23. Crosstabs of perceived resilience and capital variable trends by site (lowlands, uplands) of surveyed households for 2001-2006 in Kigoma Rural District

<table>
<thead>
<tr>
<th>Variable</th>
<th>Zone</th>
<th>Statistics</th>
<th></th>
<th></th>
<th></th>
<th>Chi-square</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lowland (n=40-42)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Improved</td>
<td>7(17%)</td>
<td>6(14%)</td>
<td>29(69%)</td>
<td></td>
<td>11(21%)</td>
<td>6(12%)</td>
</tr>
<tr>
<td></td>
<td>Same</td>
<td>6(14%)</td>
<td>3(7%)</td>
<td>33(79%)</td>
<td></td>
<td>20(39%)</td>
<td>11(22%)</td>
</tr>
<tr>
<td></td>
<td>Worsened</td>
<td>2(5%)</td>
<td>2(5%)</td>
<td>38(90%)</td>
<td></td>
<td>2(4%)</td>
<td>1(2%)</td>
</tr>
<tr>
<td>Quality of life</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Crisis Recovery</td>
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<tr>
<td>Future confidence</td>
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<td>Soil productivity</td>
<td></td>
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</tr>
<tr>
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<td></td>
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<tr>
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<td>Livestock forage</td>
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<td></td>
</tr>
<tr>
<td>Household health</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Labor ability</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Skills and knowledge</td>
<td></td>
<td></td>
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<tr>
<td>Social networks</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Access to institutions</td>
<td></td>
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</tr>
<tr>
<td>Cash income</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Livestock holdings</td>
<td></td>
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</tr>
<tr>
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<td>Credit access</td>
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<tr>
<td>Saving access</td>
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<td>Banking access</td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

\(^1\)The first four variables are resilience variables. The second four represent natural capital, the next five represent human and social capital, and the last seven represent economic capital. Chi-square tests were conducted by contrasting the lowland responses (numerators) versus the upland responses (denominators). The null hypothesis assumes identical distributions. A significant chi-square indicates variation between sites.
Table 5.24. Traditional and non-traditional networks and institutions available to help household members

<table>
<thead>
<tr>
<th>Zone</th>
<th>Traditional</th>
<th>Non-traditional</th>
<th>Zone</th>
<th>Traditional</th>
<th>Non-traditional</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Frequency (%)</td>
<td>n</td>
<td>Frequency (%)</td>
<td></td>
</tr>
<tr>
<td>Lowland (n=44)</td>
<td></td>
<td></td>
<td>Upland (n=52)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>16(36%)</td>
<td>5(11%)</td>
<td>0</td>
<td>11(22%)</td>
<td>6(12%)</td>
</tr>
<tr>
<td>1</td>
<td>14(32%)</td>
<td>31(71%)</td>
<td>1</td>
<td>16(31%)</td>
<td>20(39%)</td>
</tr>
<tr>
<td>2</td>
<td>12(27%)</td>
<td>7(16%)</td>
<td>2</td>
<td>22(43%)</td>
<td>15(29%)</td>
</tr>
<tr>
<td>3</td>
<td>1(2%)</td>
<td>1(2%)</td>
<td>3</td>
<td>None</td>
<td>10(20%)</td>
</tr>
<tr>
<td>4</td>
<td>1(2%)</td>
<td>None</td>
<td>4</td>
<td>1(2%)</td>
<td>None</td>
</tr>
<tr>
<td>6</td>
<td>None</td>
<td>None</td>
<td>6</td>
<td>1(2%)</td>
<td>None</td>
</tr>
</tbody>
</table>
Table 5.25. Crosstabs of perceived resilience and capital variable trends for lowlands and uplands households combined for 2001-2006 in Kigoma Rural District\(^1\)

<table>
<thead>
<tr>
<th>Category</th>
<th>Variable (n)</th>
<th>Trend</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Improved</td>
<td>Same</td>
</tr>
<tr>
<td><strong>Resilience</strong></td>
<td>Quality of life (93)</td>
<td>18(19%)</td>
<td>12(13%)</td>
</tr>
<tr>
<td></td>
<td>Crisis recovery (93)</td>
<td>26(28%)</td>
<td>14(15%)</td>
</tr>
<tr>
<td></td>
<td>Future confidence (92)</td>
<td>26(28%)</td>
<td>12(13%)</td>
</tr>
<tr>
<td></td>
<td>Problem solving (92)</td>
<td>21(23%)</td>
<td>20(22%)</td>
</tr>
<tr>
<td>**Natural Capital</td>
<td>Soil fertility (91)</td>
<td>4(4%)</td>
<td>3(3%)</td>
</tr>
<tr>
<td></td>
<td>Land access (92)</td>
<td>24(26%)</td>
<td>42(46%)</td>
</tr>
<tr>
<td></td>
<td>Environment (93)</td>
<td>13(14%)</td>
<td>3(3%)</td>
</tr>
<tr>
<td></td>
<td>Livestock forage (93)</td>
<td>20(22%)</td>
<td>24(26%)</td>
</tr>
<tr>
<td><strong>Human and Social Capital</strong></td>
<td>Household health (93)</td>
<td>24(26%)</td>
<td>9(10%)</td>
</tr>
<tr>
<td></td>
<td>Labor ability (93)</td>
<td>20(22%)</td>
<td>9(10%)</td>
</tr>
<tr>
<td></td>
<td>Skills and knowledge (93)</td>
<td>39(42%)</td>
<td>17(18%)</td>
</tr>
<tr>
<td></td>
<td>Social networks (91)</td>
<td>60(66%)</td>
<td>14(15%)</td>
</tr>
<tr>
<td></td>
<td>Access to institutions (92)</td>
<td>16(17%)</td>
<td>26(28%)</td>
</tr>
<tr>
<td><strong>Economic Capital</strong></td>
<td>Cash income (91)</td>
<td>17(19%)</td>
<td>15(17%)</td>
</tr>
<tr>
<td></td>
<td>Livestock number (92)</td>
<td>19(21%)</td>
<td>11(12%)</td>
</tr>
<tr>
<td></td>
<td>Ag tech (93)</td>
<td>24(26%)</td>
<td>6(7%)</td>
</tr>
<tr>
<td></td>
<td>Credit (91)</td>
<td>9(10%)</td>
<td>8(9%)</td>
</tr>
<tr>
<td></td>
<td>Cash savings (92)</td>
<td>4(4%)</td>
<td>10(11%)</td>
</tr>
<tr>
<td></td>
<td>Market access (80)</td>
<td>29(36%)</td>
<td>10(13%)</td>
</tr>
<tr>
<td></td>
<td>Bank access (90)</td>
<td>2(2%)</td>
<td>8(9%)</td>
</tr>
</tbody>
</table>

\(^1\)The chi-square tests were conducted assuming a null hypothesis with an even distribution of expected responses across the three trend categories. A significant chi-square indicates a departure of observed from expected results. The degrees of freedom equals 2 in all cases.
Table 5.26. Crosstab statistics among resilience variables for lowland plus upland households in Kigoma Rural District$^1$

<table>
<thead>
<tr>
<th>Variable</th>
<th>Quality of Life</th>
<th>Crisis Recovery</th>
<th>Future Confidence</th>
<th>Problem Solving</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$X^2$ p $\gamma$ p</td>
<td>$X^2$ p $\gamma$ p</td>
<td>$X^2$ p $\gamma$ p</td>
<td>$X^2$ p $\gamma$ p</td>
</tr>
<tr>
<td>Quality of Life</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crisis Recovery</td>
<td>31.82 0.000 0.78 0.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Future Confidence</td>
<td>26.32 0.000 0.734 0.000</td>
<td>23.37 0.000 0.528 0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem Solving</td>
<td>33.73 0.000 0.705 0.000</td>
<td>31.07 0.000 0.662 0.000</td>
<td>72.50 0.000 0.857 0.000</td>
<td></td>
</tr>
</tbody>
</table>

$^1$Where Pearson’s Chi-square is based on 4 degrees of freedom for 90 – 93 valid cases overall. The Chi-square compares observed versus expected cell counts. The Gamma statistics varies from -1.0 to 1.0 and assesses ordinal properties between variables. A value closer to 1.0 indicates a positive relationship while a value closer to -1.0 indicates a negative relationship. The $P$ values vary from 0.000 (i.e., <.001) to .001. The shaded areas include diagonal and off-diagonal cells. The diagonal cells compare variables with themselves and need not contain data. The shaded off-diagonal cells would duplicate the un-shaded off-diagonal cells.
Table 5.27. Crosstab statistics among resilience, capital, and other variables for lowland plus upland households in Kigoma Rural District

<table>
<thead>
<tr>
<th>Capital Variable Trends</th>
<th>Quality of Life</th>
<th>Resilience Variable</th>
<th>Problem Solving</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$X^2$</td>
<td>$\gamma$</td>
<td>$p$</td>
</tr>
<tr>
<td>Household Health</td>
<td>8.72</td>
<td>0.069</td>
<td>0.483</td>
</tr>
<tr>
<td>Manual Labor</td>
<td>33.61</td>
<td>0.000</td>
<td>0.757</td>
</tr>
<tr>
<td>Skills &amp; Knowledge</td>
<td>16.67</td>
<td>0.002</td>
<td>0.503</td>
</tr>
<tr>
<td>Soc. Network Access</td>
<td>16.70</td>
<td>0.002</td>
<td>0.273</td>
</tr>
<tr>
<td>Cash Income</td>
<td>44.97</td>
<td>0.000</td>
<td>0.731</td>
</tr>
<tr>
<td>Livestock Number</td>
<td>4.10</td>
<td>0.393</td>
<td>0.285</td>
</tr>
<tr>
<td>Trad. Instits. Access</td>
<td>3.01</td>
<td>0.556</td>
<td>0.131</td>
</tr>
<tr>
<td>Soil Productivity</td>
<td>9.75</td>
<td>0.045</td>
<td>0.585</td>
</tr>
<tr>
<td>Land Access</td>
<td>14.78</td>
<td>0.005</td>
<td>0.453</td>
</tr>
<tr>
<td>Livestock Forage</td>
<td>4.48</td>
<td>0.345</td>
<td>0.182</td>
</tr>
<tr>
<td>Environment</td>
<td>6.14</td>
<td>0.189</td>
<td>0.486</td>
</tr>
<tr>
<td>Ag Tech. Access</td>
<td>21.64</td>
<td>0.000</td>
<td>0.503</td>
</tr>
<tr>
<td>Credit Access</td>
<td>10.62</td>
<td>0.031</td>
<td>0.335</td>
</tr>
<tr>
<td>Cash Savings</td>
<td>10.44</td>
<td>0.034</td>
<td>0.478</td>
</tr>
<tr>
<td>Market Access</td>
<td>4.47</td>
<td>0.346</td>
<td>0.078</td>
</tr>
<tr>
<td>Bank Access</td>
<td>14.30</td>
<td>0.006</td>
<td>0.625</td>
</tr>
<tr>
<td>Research Site</td>
<td>0.42</td>
<td>0.811</td>
<td>-0.072</td>
</tr>
<tr>
<td>Gender of HoH</td>
<td>0.63</td>
<td>0.730</td>
<td>0.225</td>
</tr>
<tr>
<td>Education of HoH</td>
<td>7.93</td>
<td>0.094</td>
<td>0.570</td>
</tr>
</tbody>
</table>

1Where Pearson’s Chi-square is based on 4 degrees of freedom for 80 – 93 valid cases overall. The Chi-square ($X^2$) compares observed versus expected cell counts. The Gamma statistics ($\gamma$) vary from -1.0 to 1.0 and assesses ordinal properties between variables. A gamma value closer to 1.0 indicates a positive relationship while a value closer to -1.0 indicates a negative relationship. The $P$ values in all cases vary from 0.000 (i.e., $<0.001$) to 0.723. To screen variables for inclusion in further models we used $P \leq 0.20$. The “other” variables included research site (lowland or upland), and gender and education level of heads of households (HoH).
Table 5.28. Quality of life binary logistic regression results

<table>
<thead>
<tr>
<th>Variables in the equation</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
<th>95% C.I. for EXP(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HOUHELTH2(1)</td>
<td>-.095</td>
<td>.664</td>
<td>.021</td>
<td>1</td>
<td>.886</td>
<td>.909</td>
<td>.247</td>
</tr>
<tr>
<td>MANLAB2(1)</td>
<td>2.194</td>
<td>.735</td>
<td>8.915</td>
<td>1</td>
<td>.003</td>
<td>8.974</td>
<td>2.125</td>
</tr>
<tr>
<td>SKILKNOW2(1)</td>
<td>.439</td>
<td>.669</td>
<td>.430</td>
<td>1</td>
<td>.512</td>
<td>1.551</td>
<td>.418</td>
</tr>
<tr>
<td>CASHINC2(1)</td>
<td>2.306</td>
<td>.709</td>
<td>10.584</td>
<td>1</td>
<td>.001</td>
<td>10.038</td>
<td>2.501</td>
</tr>
<tr>
<td>LNDSIZ2(1)</td>
<td>-.336</td>
<td>.721</td>
<td>.217</td>
<td>1</td>
<td>.641</td>
<td>.715</td>
<td>.174</td>
</tr>
<tr>
<td>AGTECH2(1)</td>
<td>-1.063</td>
<td>.772</td>
<td>1.895</td>
<td>1</td>
<td>.169</td>
<td>.345</td>
<td>.076</td>
</tr>
<tr>
<td>HeadAge</td>
<td>-.009</td>
<td>.027</td>
<td>.106</td>
<td>1</td>
<td>.745</td>
<td>.991</td>
<td>.941</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.836</td>
<td>1.549</td>
<td>1.404</td>
<td>1</td>
<td>.236</td>
<td>.160</td>
<td></td>
</tr>
</tbody>
</table>

1Variable(s) entered on step 1: HOUHELTH2, MANLAB2, SKILKNOW2, CASHINC2, LNDSIZ2, AGTECH2, HeadAge. Where HOUHELTH2 is household health, MANLAB2 is manual labor, SKILKNOW2 is skills and knowledge, CASHINC2 is cash income, LNDSIZ2 is size of farm land, AGTECH2 is access to agricultural technology, and HeadAge is age (years) of household head.
Table 5.29. Crisis recovery binary logistic regression results

<table>
<thead>
<tr>
<th>Variables in the Equation</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
<th>95% C.I. for EXP(B)</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MANLAB2</td>
<td>.666</td>
<td>.721</td>
<td>.854</td>
<td>1</td>
<td>.355</td>
<td>1.947</td>
<td>.474</td>
<td>7.994</td>
<td></td>
</tr>
<tr>
<td>SKILKNOW2</td>
<td>.917</td>
<td>.669</td>
<td>1.879</td>
<td>1</td>
<td>.170</td>
<td>2.502</td>
<td>.674</td>
<td>9.285</td>
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</tr>
<tr>
<td>CASHINC2</td>
<td>3.233</td>
<td>.800</td>
<td>16.319</td>
<td>1</td>
<td>.000</td>
<td>25.359</td>
<td>5.283</td>
<td>121.725</td>
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</tr>
<tr>
<td>LIVSTONUM2</td>
<td>-.589</td>
<td>.760</td>
<td>.602</td>
<td>1</td>
<td>.438</td>
<td>.555</td>
<td>.125</td>
<td>2.459</td>
<td></td>
</tr>
<tr>
<td>LNDSIZ2</td>
<td>.210</td>
<td>.788</td>
<td>.071</td>
<td>1</td>
<td>.790</td>
<td>1.233</td>
<td>.263</td>
<td>5.779</td>
<td></td>
</tr>
<tr>
<td>AGTECH2</td>
<td>-.125</td>
<td>.799</td>
<td>.025</td>
<td>1</td>
<td>.875</td>
<td>.882</td>
<td>.184</td>
<td>4.226</td>
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</tr>
<tr>
<td>Area</td>
<td>-2.413</td>
<td>.738</td>
<td>10.680</td>
<td>1</td>
<td>.001</td>
<td>.090</td>
<td>.021</td>
<td>.381</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-2.523</td>
<td>1.921</td>
<td>1.726</td>
<td>1</td>
<td>.189</td>
<td>.080</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

1Variables entered on step 1: MANLAB2, SKILKNOW2, CASHINC2, LIVSTONUM2, LNDSIZ2, AGTECH2, Area. Where MANLAB2 is manual labor, SKILKNOW2 is skills and knowledge, CASHINC2 is cash income, LIVSTONUM2 is livestock number, LNDSIZ2 is size of farm land, AGTECH2 is access to agricultural technology, and Area is uplands or lowlands.

Table 5.30. Future confidence binary logistic regression results

<table>
<thead>
<tr>
<th>Variables in the Equation</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1a</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TotalHa</td>
<td>.391</td>
<td>.194</td>
<td>4.079</td>
<td>1</td>
<td>.043</td>
<td>1.479</td>
</tr>
<tr>
<td>HOUHELTH2(1)</td>
<td>-.311</td>
<td>.665</td>
<td>.218</td>
<td>1</td>
<td>.640</td>
<td>.733</td>
</tr>
<tr>
<td>MANLAB2(1)</td>
<td>-.050</td>
<td>.739</td>
<td>.005</td>
<td>1</td>
<td>.946</td>
<td>.952</td>
</tr>
<tr>
<td>SKILKNOW2(1)</td>
<td>-1.796</td>
<td>.786</td>
<td>5.224</td>
<td>1</td>
<td>.022</td>
<td>.166</td>
</tr>
<tr>
<td>CASHINC2(1)</td>
<td>-1.825</td>
<td>.797</td>
<td>5.249</td>
<td>1</td>
<td>.022</td>
<td>.161</td>
</tr>
<tr>
<td>LIVSTONUM2(1)</td>
<td>-1.529</td>
<td>.779</td>
<td>3.854</td>
<td>1</td>
<td>.050</td>
<td>.217</td>
</tr>
<tr>
<td>TRADORG2(1)</td>
<td>-.742</td>
<td>.651</td>
<td>1.297</td>
<td>1</td>
<td>.255</td>
<td>.476</td>
</tr>
<tr>
<td>AGTECH2(1)</td>
<td>-.025</td>
<td>.821</td>
<td>.001</td>
<td>1</td>
<td>.976</td>
<td>.976</td>
</tr>
<tr>
<td>MRKTAS2(1)</td>
<td>-.325</td>
<td>.627</td>
<td>.268</td>
<td>1</td>
<td>.605</td>
<td>.723</td>
</tr>
<tr>
<td>Constant</td>
<td>1.892</td>
<td>.788</td>
<td>5.774</td>
<td>1</td>
<td>.016</td>
<td>6.635</td>
</tr>
</tbody>
</table>

1Variables entered on step 1: TotalHa, HOUHELTH2, MANLAB2, SKILKNOW2, CASHINC2, LIVSTONUM2, TRADORG2, AGTECH2, MRKTAS2. Where TotalHa is farmland as a proxy for wealth, HOUHELTH2 is household health, MANLAB2 is manual labor, SKILKNOW2 is skills and knowledge, CASHINC2 is cash income, LIVSTONUM2 is livestock number, TRADORG2 is traditional organizations, AGTECH2 is access to agricultural technology, and MRKTAS2 is market access.
Table 5.31. Problem solving binary logistic regression results

<table>
<thead>
<tr>
<th>Variables in the Equation</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HOUHELTH2(1)</td>
<td>.393</td>
<td>.701</td>
<td>.315</td>
<td>1</td>
<td>.575</td>
<td>1.482</td>
</tr>
<tr>
<td>MANLAB2(1)</td>
<td>-1.018</td>
<td>.774</td>
<td>1.732</td>
<td>1</td>
<td>.188</td>
<td>.361</td>
</tr>
<tr>
<td>SKILKNOW2(1)</td>
<td>-1.957</td>
<td>.798</td>
<td>6.013</td>
<td>1</td>
<td>.014</td>
<td>.141</td>
</tr>
<tr>
<td>CASHINC2(1)</td>
<td>-1.878</td>
<td>.776</td>
<td>5.865</td>
<td>1</td>
<td>.015</td>
<td>.153</td>
</tr>
<tr>
<td>LIVSTONUM2(1)</td>
<td>-1.422</td>
<td>.874</td>
<td>2.646</td>
<td>1</td>
<td>.104</td>
<td>.241</td>
</tr>
<tr>
<td>TRADORG2(1)</td>
<td>-1.095</td>
<td>.666</td>
<td>2.707</td>
<td>1</td>
<td>.100</td>
<td>.334</td>
</tr>
<tr>
<td>AGTECH2(1)</td>
<td>.705</td>
<td>.855</td>
<td>.680</td>
<td>1</td>
<td>.410</td>
<td>2.024</td>
</tr>
<tr>
<td>HeadAge</td>
<td>.039</td>
<td>.037</td>
<td>1.080</td>
<td>1</td>
<td>.299</td>
<td>1.040</td>
</tr>
<tr>
<td>max_years_farmed</td>
<td>.006</td>
<td>.029</td>
<td>.044</td>
<td>1</td>
<td>.833</td>
<td>1.006</td>
</tr>
<tr>
<td>BNKAS2</td>
<td>.635</td>
<td>1.336</td>
<td>.226</td>
<td>1</td>
<td>.635</td>
<td>1.887</td>
</tr>
<tr>
<td>LNDSIZ2</td>
<td>.478</td>
<td>.753</td>
<td>.404</td>
<td>1</td>
<td>.525</td>
<td>1.614</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.919</td>
<td>2.974</td>
<td>.095</td>
<td>1</td>
<td>.757</td>
<td>.399</td>
</tr>
</tbody>
</table>

1 Variable(s) entered on step 1: HOUHELTH2, MANLAB2, SKILKNOW2, CASHINC2, LIVSTONUM2, TRADORG2, AGTECH2, HeadAge, max_years_farmed, BNKAS2, LNDSIZ2. Where HOUHELTH2 is household health, MANLAB2 is manual labor, SKILKNOW2 is skills and knowledge, CASHINC2 is cash income, LIVSTONUM2 is livestock number, TRADORG is number of traditional organizations, LNDSIZ2 is size of farm land, AGTECH2 is access to agricultural technology, and HeadAge is age (years) of household head, max years farmed is duration of farming, and BNKAS2 is bank access.
Table 5.32. Compilation of short-answer reasons concerning quality of life trends or interventions for 96 households in Kigoma Rural District

<table>
<thead>
<tr>
<th>Trend or Intervention</th>
<th>Variable</th>
<th>No. of remarks</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved</td>
<td>Adopt cash crops</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Improved housing</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Improved crop productivity</td>
<td>13</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>Other(^1)</td>
<td>9</td>
<td>27</td>
</tr>
<tr>
<td>Worsening</td>
<td>Poor farm productivity</td>
<td>35</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Lack of labor</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>High living costs</td>
<td>18</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Poor markets</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Poor health</td>
<td>20</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Other(^2)</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td>Intervention</td>
<td>Support agriculture</td>
<td>62</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>Support education</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Provide credit</td>
<td>14</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Improve markets, infrastructure</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Improve environment</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Other(^3)</td>
<td>14</td>
<td>11</td>
</tr>
</tbody>
</table>

\(^1\)Includes livestock, education, markets, income, credit, social support, reforestation
\(^2\)Includes theft, lack of social cohesion, poverty, bad weather, lack of water, lack of credit, population growth, etcetera.
\(^3\)Includes improved housing, promote wildland resources, improve local trade, etcetera.
**Table 5.33.** Compilation of short-answer reasons for perceived trends for resilience and capital variables for 96 households in Kigoma Rural District

<table>
<thead>
<tr>
<th>Variable</th>
<th>Improved</th>
<th>Same</th>
<th>Worsened</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crisis Recovery (lowlands)</td>
<td>Health improved (1), gained access to money (2)</td>
<td>No crises occurred (1)</td>
<td>Labor/health constraints (6), lack of cash income (5), low farm productivity (1)</td>
</tr>
<tr>
<td>Crisis Recovery (uplands)</td>
<td>Health/labor improved (3), more cash income (3), higher farm productivity (2), more social cohesion (1), improved education (1), improved housing (1), other (2)</td>
<td>No crises occurred (4), continued poverty (3)</td>
<td>Poverty (5), lack of cash income (3), low soil productivity (2) poor health (2)</td>
</tr>
<tr>
<td>Future Confidence</td>
<td>Increased social rank in the village (3), adoption of coffee, pineapple, palm oil (3), more cash income (2), improved housing (1), improved education (1), more food (1), improved health (1)</td>
<td>Good reputation (1), continued poverty (1), lack of markets (1), unfavorable weather (1), same farm productivity (1)</td>
<td>Lack of cash income (25), low farm productivity (6), poor health (4), educational costs (1), living costs (1)</td>
</tr>
<tr>
<td>Problem Solving</td>
<td>Increased cash income (7), more self-reliance (2), adopting coffee and cassava (1), livestock (1), improved land access (1), social cohesion (1)</td>
<td>Continued poverty/low income (7), lack of markets (1)</td>
<td>Poverty/lack of cash income (17), poor health (2), low farm productivity (2), need social support (1)</td>
</tr>
<tr>
<td>Soil Productivity</td>
<td>Agriculture inputs more available (1)</td>
<td>Farm productivity the same (1)</td>
<td>Lack of soil productivity, poor soil quality (25), lack of agricultural inputs (7), limited land access (6), too many palm oil trees (1)</td>
</tr>
<tr>
<td>Variable</td>
<td>Improved</td>
<td>Same</td>
<td>Worsened</td>
</tr>
<tr>
<td>------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Land Access</strong></td>
<td>Able to purchase/access more land (12), adopted cassava, avocado, coffee (2), stable family size (1)</td>
<td>Continued access to land (11), same farm productivity (2), land fragmentation to children (2)</td>
<td>Sold land/decreased access (9), educational costs (2), population growth (2), drought (1), lack of cash income (1)</td>
</tr>
<tr>
<td><strong>Household Health</strong></td>
<td>Has village health insurance (6), increased food production (3), improved cash income (1), access to nutritional education (1), other (1)</td>
<td>Health situation stable (3)</td>
<td>Poor health, lack of health insurance, death (28), low farm productivity (1), lack of cash income (1), other (1)</td>
</tr>
<tr>
<td><strong>Household Labor</strong></td>
<td>Able to hire labor/labor improved (4), procured more land (1), adopted cash crops (1), increased access to cash income (1)</td>
<td>Labor unchanged (3), same farm productivity (1), same cash income (1), same access to agricultural inputs (1), adoption of cash crops (1)</td>
<td>Lack of labor/children grown and left home (20), aging/poor health (10), poverty/lack of cash income (4), low farm productivity (1), increasing costs of agriculture (1)</td>
</tr>
<tr>
<td><strong>Skills and knowledge</strong></td>
<td>Access to outreach/practical seminars (9), access to education (11), improved labor (3), access to agricultural inputs (3), growing coffee (1)</td>
<td>Access to agricultural extension service has been the same (5), farm inputs the same (1), knowledge from extension (1)</td>
<td>No education in extension services (10), poverty and lack of income/capital (3), too many dependent young people (1), poor health (1)</td>
</tr>
<tr>
<td><strong>Social Networks</strong></td>
<td>Improved social networks (22), improved cash income (1), farm cooperatives formed (1)</td>
<td>No change in social networks (10), poverty (2)</td>
<td>Worsening social networks (6), poverty/lack of income (2), low farm productivity (1), lack of labor (1)</td>
</tr>
<tr>
<td>Variable</td>
<td>Improved</td>
<td>Same</td>
<td>Worsened</td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Contemporary Organizations</td>
<td>Formation of social groups (6), credit and savings groups (4), medical support/education/funeral support improved (3), farming cooperatives/labor (1), no change (1)</td>
<td>Poverty, income still the same (4), stable social ties (5), collaborate during ceremonies, farming (2)</td>
<td>Poverty and low income (12), social decay (6), decreased labor (1), death of household member (2) lack of savings an credit (1)</td>
</tr>
<tr>
<td>Cash Income</td>
<td>Adopted new agricultural systems--coffee, pineapple (4), Increased cash, improved management of family budgets (3), diversified income—shops, fish ponds (2), improved markets and prices (1)</td>
<td>Poverty, low income (5), Need capital for agriculture (1), lack of markets (1)</td>
<td>Lack of labor (10), poor health (4), poverty/lack of cash income (8), low farm productivity (1), lack of farm inputs (1), drought (1), high educational costs (1), increased living costs (1), lack of social security (1)</td>
</tr>
<tr>
<td>Livestock Number</td>
<td>Started keeping livestock (11), improved livestock markets (1), improved animal health service (3)</td>
<td>Do not have livestock (1), low cash income (1), no change in chickens (1), Low farm productivity (1)</td>
<td>Lack of livestock forage (13), livestock diseases/poor health (8), poverty/low income (4), imporved housing (1)</td>
</tr>
<tr>
<td>Access to Agricultural Technology</td>
<td>Improved agricultural extension service, seminars (9), more availability of agricultural inputs (7), more cooperatives (2), improved veterinary services (1)</td>
<td>No extension officer (2), lack of agricultural inputs (1), same educational level (1)</td>
<td>No agricultural extension services (12), lack of agricultural inputs (10), loss of soil fertility (1), limited access to land(1)</td>
</tr>
<tr>
<td>Access to Credit</td>
<td>Improved access to credit (5), improved education (1), member of a cooperative (1)</td>
<td>There has never been access to credit (7)</td>
<td>Lack of credit (25), poverty/low incomes (4), lack of banks (1)</td>
</tr>
<tr>
<td>Variable</td>
<td>Improved</td>
<td>Same</td>
<td>Worsened</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Cash Savings</td>
<td>Improved income and savings (3), diversified household economy (1)</td>
<td>Poverty, low income (4), poor technology (1), low farm productivity, savings used for health costs (1)</td>
<td>Poverty, low income, lack of savings, credit (28), high education costs (2), low farm productivity (2), health problems (2), lack of agricultural inputs (1)</td>
</tr>
<tr>
<td>Market Access</td>
<td>Markets improving, better process (4), cooperatives more available (1)</td>
<td>Markets are limited (3), same prices (1)</td>
<td>Lack of markets (31), low prices (11), coffee industry exploitation (3), lack of credit (2)</td>
</tr>
<tr>
<td>Bank Access</td>
<td>---</td>
<td>No banks (5)</td>
<td>No banks/mobile banks (32), lack of savings (3), low farm productivity (1)</td>
</tr>
<tr>
<td>Livestock Forage</td>
<td>Improved access to open village land for grazing (13), procured new grazing land (3), population growth (1)</td>
<td>Village has enough land for forage (7), lack of enough land (1)</td>
<td>Lack of land for forage (13), population growth and expansion of crop agriculture (9)</td>
</tr>
<tr>
<td>Environmental Trend</td>
<td>Bushfires now limited (3)</td>
<td>---</td>
<td>Deforestation, bush fires, soil erosion, firewood collection, poor farming practices (34), drying up of water sources, drought (6), lack of rainfall (3), limited education (2), overpopulation (2)</td>
</tr>
</tbody>
</table>
Figure 5.1(a,b). Age distribution by gender for (a) lowlands and (b) uplands for 96 surveyed households of Kigoma Rural District.
Figure 5.2. Farm size distribution for 94 surveyed households of Kigoma Rural District.
Figure 5.3 (a-c). Important crops for the (a) lowlands, (b) uplands, and (c) combined for 96 surveyed households in Kigoma Rural District.
Figure 5.4 (a-c). Important livestock for the (a) lowlands, (b) uplands, and (c) combined for 96 surveyed households in Kigoma Rural District
Figure 5.5 (a-c). Important wildland resources, hunted or gathered, for the (a) lowlands, (b) uplands, and (c) combined for 96 surveyed households of Kigoma Rural District
Figure 5.6. Annual cash income for 63 surveyed households from the lowlands and uplands of Kigoma Rural District.
Figure 5.7 (a-c). Allocation of cash and in-kind income for the (a) lowlands, (b) uplands, and (c) combined for 96 surveyed households of Kigoma Rural District
Figure 5.8 (a-c). Allocation of cash expenditures for the (a) lowlands, (b) uplands, and (c) combined for 96 surveyed households in Kigoma Rural District
Figure 5.9. Venn diagram showing key explanatory factors revealed for household resilience from the binary logistic regression results. The four resilience variables are shown at the corners and the key explanatory factors are given inside the diagram. When a factor overlaps more than one resilience variable, it emerged as statistically significant for these. For example, skills and knowledge was a key explanatory factor for both problem solving and future confidence, but not for crisis recovery or quality of life.
Chapter 6
Conclusions and Practical Implications

Major Research Conclusions

The preliminary research in 2002 revealed the highly polarized relations between park management and local residents. This is a typical situation for protected areas in Africa. There is little documentation as to whether these polarized relations have subsequently improved or not. These findings encouraged a focus on community-based conservation in the early stages of my doctoral program.

Increasing the scale of enquiry and broadening the debate, however, to more general development issues revealed that GSNP was not viewed as a key issue for local problem solving in Kigoma Rural. Certainly improving relations between park management and local residents matters but GSNP is not the centerpiece. Participants in focus groups and key informant interviews noted systemic declines in social and ecological attributes across the board and achieved a wide consensus regardless of age, gender, location, and livelihoods on what the critical problems were and how they might be confronted. The major problems were seen as rapid environmental and social decay. Perceived causes included human population growth, poor governance, lack of public services, and too much pressure on ecological systems. Solutions were seen as a need for options to deliver more practical forms of education, economic development, and public service delivery. The problems and solutions echo results using qualitative methods in Kenya, Ethiopia, and elsewhere.
Survey results for a randomly selected sample of 96 households largely confirmed the qualitative results. Households and farming systems were described. While many factors were relevant to resilience, resilience was statistically affected by only a handful of trend variables including income, skills and knowledge, labor, as well as study site. The survey was exploratory in that declines over time in most forms of capital were expected. One alternative idea, related to GOSES, was that effects of human or social capital could be most prominent in affecting resilience. The quantitative survey results broadly confirmed that natural, social, human, and financial capital was declining. The local systems are definitely vulnerable (Scoones 1998; DFID 2009).

The binary logistical results clarified that human and financial capital had dominant influences on resilience patterns, but neither social nor natural capital emerged. Thus, not all forms of capital contributed equally to resilience in this study. The Sustainable Livelihoods framework in itself does not allow one to predict which form of capital may be the weakest links—this would be specific to any given system. This survey work in Kigoma Rural gives an example where there is variation in the contributions of capital to resilience. This may be the most important conceptual contribution of this study. One problem may be, however, that our measures of resilience are not acceptable to all investigators. This is a previously recognized challenge of the Sustainable Livelihoods framework in general (Chapter 2).

Results also confirmed the prediction that upland sites would offer some improved aspects of resilience (crisis recovery) compared to lowland sites, but why remains open to debate. The uplands have been confirmed in this research to have been
occupied for a shorter period of time compared to the lowlands. It is speculated that there is active internal migration between the lowlands and uplands. The survey team observed more vacated homes in the lowlands during sampling. It is speculated that some farmers have moved from the lowlands to the uplands in search of improved natural capital in the form of soil fertility and land access. This may be unlike patterns described by Wittemyer et al. (2008) where high-attraction places like GSNP draws more local people in close as a result of employment or enhanced ecosystem services. It is also speculated that crisis recovery was enhanced in the uplands because of higher incomes and greater farm productivity. This in turn, may be related to incorporation of cash crops such as coffee, the most dominant cash crop in the uplands. The short-answer survey results gave some support to this idea.

Collation of qualitative respondent remarks from the survey confirmed earlier work from focus groups and key informants that GSNP would not emerge as important to local problem solving. Another interpretation of this outcome, based on the earlier RRA results, could be that because local people may not see themselves as stakeholders of GSNP, the park was not considered to be relevant. It just did not occur to respondents.

Finally, interventions such as support to agriculture and its associated markets, infrastructure, and financial support systems, in total comprised almost three-quarters of the short-answer responses answering the question “how to improve quality of life?” It is speculated that more development attention to improving profitability from cash crops such as coffee, oil palm, and livestock may be needed—also noted in short-answer
remarks. In contrast to agriculture, education intervention was only added to 10% of the comments.

The quantitative survey results and the qualitative survey results thus gave varied answers in one sense. The binary logistic results said human and financial capital mattered for resilience over five years, while the short-answers indicated that the people wanted more support to agriculture rather than education. These answers are actually tied together. Support to agriculture prominently included strengthening skills and knowledge via practical education, as well as improved access to micro-finance, markets, and infrastructure (roads). Strengthening agricultural systems would therefore increase household resilience. This research is thus only a initial step in a longer local process of moving from analysis to action (Parris and Kates 2003).

Gender is also important, although it did not emerge as a core area of this study. Women were only a minority (13%) of household heads in the survey sample. It remains unclear how gender affects resource access. Adult females appear to lack similar access to formal education as adult males. This information may give a basis for further research on gender and sustainable livelihoods here.

Local development strategies must embrace a multi-pronged approach. It is likely that a strategy must be initially founded on strengthening agriculture to take advantage of emerging markets afforded by a recently completed highway. This new event is described below. Improvement in agriculture, as well as forging stronger links between the farming communities and urban communities (i.e., Kigoma town) would have a focus on building a more diverse array of income and assets for rural households. Education—especially
honoring practical skills in topics such as micro-credit and small business management—is fundamental to this empowerment process (Bohringer et al. 2003; Dovie et al. 2005; Pretty et al. 2003; Krishna et al. 2004; Shiferaw et al. 2007; Jama et al. 2008; Zachary 2008; Coppock 2010). It is attention to such livelihood and human welfare details that then makes conservation and stewardship involving GSNP possible. Some development priority could be paid to lowland residents in the proximity of GSNP to attempt to better mesh development and local conservation goals.

While the overall strategy for community change can be envisioned in such ways, GOSESO must be a facilitator of change, not the director of change. The potential of community power for change is unleashed through grass-roots participatory processes. There is evidence that community-directed change has immense potential when properly used (Lelo et al. 2000; Coppock 2010).

In this sense GOSESO could become even more of an indigenous institution than originally envisioned when informed by this research. The role of indigenous institutions in rejuvenating African livelihoods was put forward by Harvard Professor Dani Rodrik, who argued that such institutions are the foundation of sustainable futures. As Moyo (2009, 34) notes, “institutions can close as much as three quarters of the income gap between nations with the best and those with the worst institutions.” The GOSESO could use authentic community participation (Lelo et al. 2000; Coppock 2010) to strengthen informal indigenous institutions that the survey revealed have been of increasing importance when the society is under stress. This process could assist local people to then envision linkages between conservation and livelihoods. This micro-level approach
should be supplemented by attention to constraining polices at the macro-level (Shiferaw et al. (2007).

The last objective of this dissertation is to determine how research results can better inform the mission and operations of the GOSESO. Again, GOSESO has been conceived as an educational and community-based institution, previously introduced in Chapter 4. Details such as the acquisition of a site in Kitobe Forest for the GOSESO campus have also been introduced in Chapter 4 and Appendix A. The next section provides a brief update on the GOSESO concept and progress from 2005 through April 2010.

Before the background and progress for GOSESO is reviewed, it needs to be stated that much change is now suddenly occurring in the Kigoma Region. When the field work for this dissertation was being conducted just two years ago, Kigoma Region did not have one paved road. Kigoma Region also was unique because it was the only district in Tanzania to still be unconnected to the national electrical grid. All this is becoming history quickly. There have been massive investments in construction of all-weather roads and grid connectivity in the past year. Thus, GOSESO needs to prepare for the opportunity to serve as an important facilitator of local change. It is an exciting time.

Practical Implications

GOSESO Background

The GOSESO was founded in 2005 to facilitate a more community-oriented approach to bridge human prosperity with wildlife conservation at Gombe Stream National Park (GSNP). The vision of GOSESO has been to foster a new generation of
Africans—both locally and elsewhere—who are inspired by environmental stewardship, community self-help, and economic sustainability. Its mission is to generate widespread support to lay groundwork for improving both human and wildlife prosperity through education for rural Africans that promotes self-reliance, economic and cultural vitality, human health, and peace. The original core principals of GOSESO stemmed from the fact that the survival of wildlife in the Lake Tanganyika Region depends on the improving livelihood circumstances for the indigenous human populations who surround them. Therefore, the idea has been that GOSESO would help build human and social capital to better promote sustainable rural livelihoods and protect indigenous natural resources. The original concept for GOSESO was stimulated by the challenges faced by GSNP in parallel with the urgent need to provide a sense of hope and well-being to masses of impoverished people living adjacent to the park. The idea was that for GSNP to survive there must be a new social contract between park management and the indigenous human communities. Local people must see benefits of conservation for such efforts to succeed.

A set of objectives for GOSESO was developed in 2005. These include: 1) create and operate a residential school that uses the environment as a framework for an integrated curriculum, in order to teach community-based conservation and development strategies that promote environmental and community sustainability; 2) train African youth to pursue the fields of ecological management, wildlife conservation, and community development; 3) provide local communities with access to resources, information, and services that will enhance understanding and foster partnerships among stakeholders; 4) contribute to societal change through educational programs that aim to
stop the spread of human and wildlife disease; 5) empower a diverse group of committed youths to improve cross-cultural understanding, increase prospects for stability and peace, strengthen environmental and community relations, and lead the way to a more sustainable future; and 6) enhance understanding of concepts related to community and wildlife sustainability, while ensuring that local people benefit from the land and local resources through participation in environmental decision making. Through experiential training in environmental education, the long-term goal of GOSESO has been to create future leaders who are more conscious of the environment-community relationship. The GOSESO graduates would form a local, national, and international corps dedicated to strengthening connections among nature, culture, and community vitality.

In sum, the GOSESO has been envisioned as an educational and facilitating change agent. On-campus and off-campus components are part of the plan. The on-campus component includes establishing an educational curriculum implemented in a formal classroom setting (the “School within Walls”), which is targeted for teenaged youths seeking ways to augment secondary-school experiences. An ultimate enrollment of 200 students and 15 faculty members is planned by 2015 for the “School within Walls.” The on-campus component is also envisioned to include a project headquarters, residences for about half of the students, as well as facilities for hosting workshops dealing with issues related to the GOSESO mission. Near the campus are demonstration sites for innovative agricultural and natural resource management practices covering three ha. The off-campus component (the “School without Walls”) is the vehicle for
outreach and community engagement. This component would connect with a far larger local audience than the classroom setting.

The GOSESO project has been described as the “first serious indigenous-led organization in western Tanzania” (Fubusa 2006.) It has been incorporated in both Tanzania and the USA. The GOSESO website can be viewed at www.goseso.org for many details not covered here. The GOSESO has been developed via several phases that have been previously described (Chapter 4).

There is a business plan for GOSESO. The plan has been developed to draw funding for GOSESO from tuition paid by students enrolled in the “School within Walls” and by soliciting grants and other support from private and public sources worldwide. Ancillary income may be generated from other activities such as a study abroad program, community-based eco-tourism, as well as from sales of products associated with the agricultural and natural-resource demonstration sites.

**GOSESO Progress**

The various phases for GOSESO have resulted in progress on several fronts (www.goseso.org). Over the past five years, grassroots support has been generated, stakeholders have been engaged, and seed funding obtained. The two non-profit institutions have been created, with strategic plans developed. Land for the campus has been secured. About 20% of the planned classrooms and residential facilities have been constructed at this writing. The Kitobe Forest campus is guarded by 16 GOSESO rangers. Protection allows the locale to begin to recover from previous heavy use by local communities. The ecological recovery patterns already underway can serve as
demonstrations for forest restoration. A tree nursery was also started in 2007. Initial plans for outreach programs concerning agriculture and natural resources have been drawn up and funding support is being sought.

For partnership building, GOSESO has worked with numerous governmental and non-governmental agencies, both in Tanzania and abroad. Several governmental and non-governmental organizations in Tanzania have agreed to become formal GOSESO partners. These include The Kigoma District Council, Tanzanian Ministry of Education and Vocational Training, Tanzania Institute of Education, the National Environment Management Council in Tanzania, the University of Dar-Es-Salaam, the Chief Warden of Gombe Stream National Park, Tanzania National Park Authority, Kiganza Village Council, the Jane Goodall Institute, and 32 local village governments.

Progress in the governance of GOSESO will be briefly highlighted. In 2007, GOSESO was officially incorporated to become the core of a non-profit institution based in Tanzania. Several organizational and legal steps were taken, including establishment of a Trust Deed. A team of Tanzanian lawyers was commissioned to draft the GOSESO Constitution in July 2006. This Constitution details, among other things, the responsibilities of the Board of Trustees. Over 50 potential candidates for the GOSESO Board of Trustees were interviewed. Six were recruited to serve on the Board, with four as founding members and two as ordinary members. The GOSESO project has also been incorporated in the USA as a 501(c) tax-exempt non-profit organization. Fubusa is the Executive Director for both GOSESO-Tanzania and GOSESO-USA. This includes responsibilities for all international communications and local program oversight. The
GOSESO-USA entity complements its sister organization in Tanzania. Article III, Section 9, of the GOSESO bylaws makes the Executive Director a lifetime board member of GOSESO-USA. The Board of Directors and a local Community Council in Kigoma are the two main governing bodies of GOSESO. Other details regarding governance for GOSESO can be found at [www.goseso.org](http://www.goseso.org).

To procure the Kitobe Forest site, the local government and citizenry of Kiganza village was engaged in 2006. The Kitobe Forest, like so many forests in the Lake Tanganyika Region, was once home to abundant wildlife, but now suffers from growing human populations and heavy use of natural resources. High consumption of firewood to feed brick-kilns for home construction and cooking fires has devastated much of the forest and wreaked havoc on local water supplies mostly involving the Mungonya River, which flows from GSNP through the heart of Kitobe Forest. The Mungonya River is currently acting as the only wildlife corridor linking Kitobe Forest and GSNP.

For the “School within Walls,” the first class of 22 students was matriculated in July 2009. The class consists of 12 young women and 10 young men between the ages of 16 and 19. These students have been taught by a team of three full-time, local teachers. The students have embarked on a standard government curriculum to prepare for national college-entrance examinations. This initial approach will be modified in the future to include a stronger emphasis on community development and environmental issues and link via service learning projects and related activities to the “School without Walls.”

Both the “School within Walls—and the “School without Walls”—are in their infant stages. Informing how each progresses needs to have a solid footing based on
research. Research is the ingredient this dissertation provides. Beginning to mesh the two is much of the remaining subject matter for this chapter.

Implementing GOSESO still requires considerable support from donors. Achievements to-date have resulted from collective efforts of supporters. No one person can support the GOSESO vision alone. The vision will only be realized through collective effort. A famous Swahili phrase states: “Little by little we will fill the cup.”

School Within Walls

The results from this dissertation most strongly relate to the “School Without Walls.” While concepts for both the “School Within Walls” and the “School Without Walls” relate to the theory regarding emancipatory education reviewed in Chapter 2, it is especially true for the former. The key points from that review included problems created by traditional formal educational institutions in Africa, such as the creation of marginality and a Eurocentric focus. Alternatively, education can be used as a greater liberating force.

It is envisioned that studies for the “School Within Walls” will be based on a mix of material from the national curriculum as well as other demand-driven topics that pertain to the broad vision of GOSESO that has been previously described. Use of the national curriculum would allow the school to be officially certified. It is also planned that an innovative pedagogy will be employed. The curriculum needs to promote independent thought, critical thinking, and debate in cultivating future leaders and change agents. A “horizontal” educational approach will be employed whereby teachers and students learn together. Students need to be provided with the skills to better reinvent his or her world. Apple (1990, 27) argues that “reality is socially constructed” and that the
relationship between curriculum and society is often reciprocal. Carr (1993) sees a curriculum as an important problem of culture and society and argues that the link between the two needs to be publicly debated. It is hoped that students from diverse local and regional backgrounds would be attracted to attend. The strategic location of GOSESO near international borders could be fortuitous. Connections forged among international students could eventually promote more understanding, stability, and peace in the region.

The “School within Walls” needs to fund itself and hence be demand-driven. This process will take time. The offerings at the school must satisfy student customers and their parents. The school may therefore need to compete with other private institutions that will probably develop elsewhere in the Kigoma Region (Chapter 3).

School Without Walls

The “School Without Walls” offers a wide scope for educational innovation and community impact. It is concluded that a promising way to move forward would be to initially model community engagement based on the experiences of the Pastoral Risk Management (PARIMA) project in southern Ethiopia and north-central Kenya from 2000 to 2009 (Mutinda et al. 2007; Coppock 2010). The PARIMA project in southern Ethiopia has been estimated to have directly or indirectly affected about 13,800 local people (Coppock 2010). The PARIMA project in Southern Ethiopia and Northern Kenya is a livelihood diversification approach involving pastoral risk management.

The sister project in north-central Kenya (Baringo) began in 2006 among a smaller community of agro-pastoralists, but positive impact happened quickly (Mutinda
et al. 2007). An important question is why impact occurred, given that development agencies have worked in these areas for decades. The Ethiopian population was highly marginalized from the outside world, but the Kenyan population was much less marginalized. Yet outcomes have been similar. Coppock (2010) proposes that the main reason for success in these cases is the common-sense approach and the shared value systems of the teams that engaged the local people. Community leadership, trust building, and extensive follow-through have characterized both situations. It appears to have made a difference.

The process began with the proper or innovative uses of participatory methods. In the case of southern Ethiopia, Participatory Rural Appraisal (PRA), a classic methodology originally developed in Kenya (Lelo et al. 2000) was initially employed along with transporting local women leaders across the international border to meet with innovative women’s groups in the northern Kenya. Chambers (1994) maintains that PRA includes various approaches and methods designed to empower local people in the process of sharing, enhancing, and analyzing their own knowledge of life and conditions, the process which must include local people’s planning and acting. The dominant behaviors of outside researchers to ignore the knowledge of local people in conducting research is the reason which may explain why it has taken so many years (starting only in the 1990s) for PRA approach to emerge, grow, and spread. The RRA has had three main origins. The first came as the dissatisfaction with anti-poverty biases, i.e., of brief rural visits by the professionals from urban areas. It is also called “rural development tourism.” The second was the disilluision with the usual process of questionnaire surveys and their
analysis of results. The third was somehow positive because people wanted to use a method that would involve cost-effective methods. Despite the proximity, the Kenyans and Ethiopians were from the same ethnic group (Boran), but the Kenyans seemed decades ahead of the Ethiopians in terms of their use of collective action and microfinance to lift themselves out of poverty. The mix of PRA results and peer inspiration in the Ethiopian case provided the initial forces for impact (Coppock 2010).

In the case of Baringo, a group of potential entrepreneurs was carefully screened from among 169 interviewees overall from several targeted communities. A group of 12 entrepreneurs were selected based on the following characteristics (Mutinda et al. 2007): 1) they tended to be poorer, 2) they were self-motivated, 3) they were innovative, 4) they could serve as community role models and leaders, 5) they had a willingness to cost-share in pilot projects, and 6) they tended to be younger, energetic, and have basic literacy skills. The 12 entrepreneurs were then taken on a five-day tour to meet with innovative communities in neighboring Mwingi District. Peer inspiration was thus a major part of the initial process for the Kenyan team (Mutinda et al. 2007). The Kenyan team—from Egerton University—was mentored in their efforts by the team that previously created impact in Ethiopia.

A core tenet of the GOSES0 mission rests on the notion that educating and training rural people will yield long-term sustainable livelihoods. This includes an implementation of environmentally responsible agriculture, advancing the goal of environmental protection in a culture that is dependent on direct use of natural resources.
Pretty et al. (2003) propose an assets-based model of agricultural systems for developing countries and one based on establishing demonstration farms as agricultural research sites, how to enable poor rural farmers to improve food production through learning by doing, these farmers can adopt new practices and technologies among themselves, and how to improve food production through farming systems by using sustainable agriculture as a tool of nature conservation. Pretty et al. (2003) continue to maintain that agricultural demonstration farms can help to improve natural, social, and human capital. This study by Pretty et al. (2003) demonstrates that reaching agricultural sustainability involves the use of indigenous-based approach in order to build the capacity of people to work together in creating new ideas of reducing agricultural and environmental problems including irrigation, watershed, and pest and credit management. The approach uses locally available technologies and practices that result into new configurations of vertical and horizontal social relations, new management skills, ingenuity, and indigenous innovation. This application of sustainable social relations can endure even during times of uncertainty. Agricultural sustainability can be achieved through learning by doing approach to create new skills, confidence and awareness. The approach has reduced emigration of people from rural areas to townships. As Pretty et al. (2003) have shown, exploitation of local natural resources has been reduced as a result. Improved food production and access has enabled poor rural people to become better off, more organized socially, access external power structures and services, and increase their choices in life.

GOSESO has a strong commitment to village outreach. We host demonstration and outreach sites illustrating relevant agricultural technologies and improved natural
resource management practices. Initially, peer-led workshops will be organized to facilitate dialogue among local stakeholders. These sites will provide local communities access to resources, information, and services that promote ecologically informed gardening practices and will develop partnerships among local stakeholders. Products from these demonstration sites will be used to generate income to support other GOSESO projects. The program will introduce local people to current environmentally sustainable agriculture techniques such as integrated farming, livestock and poultry management, vegetable gardening, fisheries and aquaculture, honey collection, and agro-forestry. Villagers will also learn state-of-the-art methods to reduce soil erosion, maintain soil fertility and water quality, and effectively utilize agricultural wastes.

The research and development model employed by the Pastoral Risk management (PARIMA) project includes various collective action and human-capacity building programs among poverty-stricken, semi-settled pastoralists in southern Ethiopia. A general pathway of problem-solving was reached through extensive interactions with stakeholders whereby team members of the PARIMA project were given tools to respond to evolving needs as stakeholders encountered new challenges (Coppock 2010).

A bottom-up, rather than top-down, approach enabled the PARIMA beneficiaries—mostly women—to become empowered via 59 collective action groups. The project outcomes were astonishing. For the last 10 years not a single collective-action group failed. Groups eventually merged to form cooperatives. Tezera et al. (2008) made the following summary about the role of PARIMA: “Creating sustainable impacts via collective action and capacity building requires time, patience, and skill—it is not a
quick fix. The process of taking raw, illiterate volunteers and transforming them into functional and sustainable groups took two to three years on average.” They added, “In our case, achieving impact required a new way of organizing and implementing a project, with research and development in full partnership.”

As a result of this process, a step-wise model for local capacity building was created. It resembles a pyramid, with each step symbolizing a constraint to be overcome. In this pyramid, inspiration through peer-to-peer provides the base, followed by a process of improving basic literacy and numeracy, offering short courses that provide skills and knowledge in topics such as small business management, group leadership dynamics, marketing, etcetera. The next layer provides training in micro-finance (savings and credit). The last layer connects the collective action groups with market opportunities. The final product affected at least 13,800 people and generated over USD 647,000 in micro-loan capital.

This experience in southern Ethiopia may offer lessons for successful implementation and management of the GOSESO “School without Walls.” As Coppock (2010, 31) insists, the key elements for PARIMA included attention to:

1) intervening on a small scale; 2) authentic participation and impact; 3) partnership building; 4) women in development; 5) capacity building; 6) peer-to-peer learning; 7) market linkages and networking; 8) respect for local cultures; 9) conflict management; and 10) creating cooperatives based on voluntary, well-managed transitions.

These lessons have also been supported by Garnett et al. (2007) who maintain that “…successful integrated community development projects require an understanding of existing environmental and social trajectories, as well as action research and the use of
both local and external knowledge.” This also requires the involvement of all significant stakeholders in planning appropriate measures as well as in determining standards of success.

The study conducted by Krishna et al. (2004) on escaping poverty and becoming poor among 20 villages in Kenya did address not only the methodology of addressing poverty in rural Africa, but also offers more realistic policy interventions. The study employed an empowering participatory research approach through training, tracking the trend of poverty, and singling out ways of ending poverty. The study also recommended several stages of progress methodology. The initial recommended step involves a meeting with a diverse group representative of different segments of a community including older community members who can speak knowledgeably about the past and the intervening period. Another step is to define “poverty” collectively, including what it means for some household in the community to be regarded as poor. This deep inquiry can help to ascertain the true combination of reasons and to adopt a comparative perspective while conducting these inquiries through classifications of households into four categories: 1) poor ago and poor now (remained poor); 2) poor then and not poor now (escaped poverty); 3) not poor 25 years ago and poor now (became poor); and 4) not poor then and not poor now (remained not poor). The fifth and final step included further verification of reasons for change or stability by consulting outside independent sources for cross-check and verification.

Likewise, the GOSESO framework can provide African solutions to African problems starting from the “bottom-up.” The GOSESO framework is linked to a
sustainable livelihoods approach. It can build on strengths of the local people while still considering indigenous institutions as “social cement” which enables stakeholders to exercise power.

If an approach similar to PARIMA could form the basis for “School without Walls,” the approach could begin with a few sites where communities would volunteer to be subjects in a Participatory Rural Appraisal (PRA; Lelo et al. 2000). The PRA approach can involve over a week of intensive diagnosis and ranking of community problems, opportunities, and sustainable solutions that result in a community-action plan (CAP). In the case of GOSESO, this could involve bringing in unbiased outsiders trained in PRA to facilitate initial implementation. Malpractice in the use of PRAs is a common problem and results from biased implementation and inability to follow through and fund CAPs (Coppock 2010). For GOSESO to be credible in terms of PRA, the local team needs to be well-trained, responsive to community ideas, and have secure funding for CAPs before PRAs begin.

The six phases of this dissertation research suggest several practical implications for GOSESO: 1) the importance of local people defining their future; 2) the need to increase attention from “School Within Walls” to “School Without Walls” in order to promote agriculture and markets for neighboring villages; 3) the need for engagement to empower local people; 4) mixing local knowledge with human capacity building; 5) promotion of resilience founded on improving agriculture and linking to new markets; 6) demand driven skills and knowledge; 7) the need to capture new opportunities related to changes in infrastructure; 8) good governance at both micro- and macro- level; 9)
resilient, confident households that are more able to dialogue about natural resource
conservation; and 10) the need to bridge human prosperity with wildlife conservation.

The GOSESO framework can provide African solutions to African problems starting
from the “bottom-up.” The GOSESO framework is linked to a sustainable livelihoods
approach, one that builds on strengths of the local people while still considering
indigenous institutions as “social cement” which enables stakeholders to exercise power.
As one famous African proverb insists, “The best time to plant a tree is 20 years ago. The
second best time is now.”

Synthesis

Sustainability and Resilience

Results from this study of Kigoma Rural partially agree with Scoones’ SL
framework. For those research subjects who have failed to improve their well-being in
recent years, it appears as though this is due to their inability to protect their existing
assets or capital, their limited ability to identify or turn what potential assets they have
into a means to enhance their livelihoods. The relative lack of public services has also
limited the ability of the people to mitigate poverty despite their seemingly abundant
local resources. For Kigoma Rural, a sustainable livelihood framework needs to be one
that is capable of addressing the following issues: 1) Diversified assets for people to build
livelihoods; 2) the ability of people to access, defend, and sustain their assets; and 3) how
poor rural people are able of turning their assets into livelihoods.

Walker et al. (2004, 5) defines resilience as “the capacity of a system to absorb
disturbance and reorganize while undergoing change so as to still retain essentially the
same function, structure, identity, and feedbacks.” Walker et al. (2004) also see resilience as the ability to create new systems of economic, ecological, and social structures when the old systems become untenable. Linking this concept to Scoones (1998), it could be said that a sustainable livelihood must be resilient. But considering both terms, it may be inaccurate to say that a given livelihood is sustainable only if the means of making a living stays the same. In other words, a sustainable livelihood for a Kigoma farmer may be more broadly defined as to the ability of that person to maintain or improve living standards, and not necessarily exactly how this existence is achieved.

For example, a farmer’s livelihood in young adulthood may be based on 100 percent farming, and then this percentage may decline as other activities are added over time, if the local economy becomes more diverse. The key is that the person was able to maintain himself or herself by being flexible and adaptable. Thus, many processes could contribute to a sustainable livelihood. On one hand, actions that improve farming could enhance sustainability. Actions that improve the ability of the person to diversify into other activities could also enhance sustainability.

Another challenge from Scoones’ (1998) SL framework is the idea that a sustainable livelihood is one that can recover from shocks. An example of such shocks from Kigoma might include drought effects on plant crops, death of a key family member, or losses of livestock to sudden disease epidemics. These shocks matter, but it is noteworthy from the research results that most people have difficulty simply sustaining themselves day to day, week to week, or month to month, irrespective of “crisis events.” Sustainability concepts need to be broadened to include the ability to successfully endure
the routine challenges of finding enough food, income, and fuel. It is problems associated with routine challenges that undermine the integrity of natural resources at Kigoma, namely intensive cultivation that reduces soil fertility and increases soil erosion, the need for cooking fuel that leads to deforestation, or the need for traditional medicine that contributes to over-pick of certain wild plants.

Considering these points, a sustainable household in rural Kigoma can be described based on literature already described in previous chapters in conjunction with the research findings. A sustainable household would be able to grow or purchase sufficient food, have access to potable water, have enough income to cover life’s routine necessities as well as accumulate some savings, and have a reliable source of fuel, especially for cooking and heating the hearth.

If the household farms, then the basis of farming needs to be conducted in a way whereby soil structure and nutrient content is maintained and a level of dependence on inputs to do so can be realistically kept up. Farming intensity needs to be appropriate for the area, with proper use of fallowing and tillage that helps preserve soil integrity. If fertilizer inputs are needed, then this should come from crop residues, manure, or other household waste. Whatever chemical fertilizers or herbicides are used must be justified by the economy of the crop and the ability of the household to maintain those inputs over time. Priority crops should be diversified as appropriate to help the family balance economic and ecological risks. The skills and knowledge of farmers need to be strengthened to promote innovation and adaptation to a changing world. The number of family members dependent on farm resources needs to be kept in balance with the
sustainable productive potential of the specific farmed area. This implies that if family members are in a surplus, they need to emigrate or the land area must be expanded or the standard of living will decline.

If the household has off-farm sources of income or sustenance, the picture for sustainability becomes more complex. More people can be supported on a farm if off-farm linkages are present. It is probably unrealistic for a modern-day rural household to be totally dependent on farm productivity if there is hope to prosper. Some linkage to the off-farm sector is important. Such linkages can benefit overall household sustainability as long as the off-farm economy can reliably absorb household members or yield returns and risks that complement those found on-farm. Some aspects of off-farm sustainability (such as macro-economic change) are beyond the control of households, but then so are some aspects of on-farm sustainability (environmental variation and macro-economic change). The key to promoting a sustainable household involvement off-farm seems to be in the realm of education and skill development that affects the marketability of household members.

The on-farm and off-farm components are united as a concept because they both offer means to generate commodities and income that meet basic household needs. Growing cassava for food or income and having a job to generate income are both examples of this connection. Households require some other things for sustainability that may not be so neatly categorized, and these represent an interface with natural resources under more complicated conditions of access. A household needs fuel to cook, clean water to drink, and medicine to promote health. Ideally, fuel could be purchased from a
well-regulated source, water could be obtained from a viable public water system, and medicine could be purchased at a dispensary. Observations in Kigoma, however, indicate these inputs can be difficult to obtain for several reasons. Many households lack the income to routinely purchase fuel, so fuel wood or charcoal are regularly obtained from woody plants that either occur on larger farm holdings or in areas of common village access that are apparently unregulated. As Plate 3.2 has shown, sites of common village access are especially subject to environmental degradation. In some respects, the margins of GSNP represent sites of common access to wildland resources, although attempts are made to restrict this access by park authorities (Chapter 5). Similarly, households may lack income to purchase medicines from formal outlets, so harvesting key plant or animal products from common access zones is the major option in that case.

It is thus the need for certain wildland products that connects households to non-agricultural landscapes. Current levels of harvest of wildland products contribute to environmental destruction, and this destruction can connect back to farming by compromising watersheds and ecosystem services. But, households need access to fuel and medicine to be sustainable and resilient themselves. So, in the big picture, the farming, wildland, and local urban situations are all inter-linked. All must be considered in the promotion of a sustainable and resilient system in Kigoma Rural. Production and conservation would be part of any long-term solution. This would be true for both the agriculture and wildland system components.

The previous discussion primarily deals with sustainability and resilience of households. What about sustainability and resilience for the community or region as a
whole? Are the dynamics for the community the sum total for all households? Are the dynamics for the region the sum total for all communities? Research presented here offers some insights into how sustainability and resilience might vary between the upland and lowland communities, for example. Results suggested that upland households perceived that they were more able to respond to crisis over recent years than did lowland households, but the source of this variation was unclear. One idea is that recent adoption of coffee as a cash crop in the uplands might be an explanatory factor. This translates well into the concept that added income from coffee could improve household resilience attributes.

Differences between the communities are as follows. For the uplands, land access may be a little higher per capita, and consequently, larger livestock more abundant. The local environment appears to allow for more emphasis on coffee. There was no reserved area in the uplands like GSNP. For the lowlands, land access may be a little lower per capital, with more congestion and resource use that excludes larger livestock. The local environment appears to allow for more emphasis on oil palm as a cash crop. The GSNP is a focal point of the lowlands landscape, despite that most lowlanders did not see GSNP as a means to help solve local problems. There are perhaps more gaps in information when comparing the uplands and lowlands than there are solid answers. For example, it is unclear the extent to which common access lands occur in both sites. It is also unclear as to how such lands are managed, or their ecological conditions, in either case. One speculation would be that the common access lands in the lowlands are more challenged by environmental degradation, although this requires further investigation. This
prediction would be explained by the observation form this research that the uplands have been occupied by people for a shorter length of time; another possibility is that village management systems or land use pressures differ. The lowlands are also closer to a growing Kigoma town, and this may provide more off-farm employment opportunities for lowlanders. Kigoma town could also be a source of heightened demand for wildland products.

It is thus likely that while the principles of sustainability or resilience would not differ between households from the lowlands or uplands, the resource components that each household relies on probably differ in terms of quantity and quality. For example, the elements of agricultural sustainability could differ between the two locations because predominant crops and livestock appear to differ. Further research would be required to assess aspects of farm management that would vary as a result of differences in soils, landscapes, and commodities. Technical prescriptions for sustainability could vary in each case. The elements of off-farm sustainability could also differ given the lowlands are in closer proximity to any educational or employment opportunities of Kigoma town as compared to the uplands. Finally, the elements of wildland sustainability could differ between the uplands and lowlands. The lowlands have more oil palm, and old palm fronds are a major, renewable source of fuel. The lowlands also have GSNP, which is certainly a source of fuel, whether legal or not. The lowlanders contribute disproportionately to resource use at GSNP compared to those living in the uplands. The lowlanders also are in closer proximity to Lake Tanganyika, and the fisheries there have probably played a more vital role in the fate of lowland people in the past. The
degradation of the fishery in recent decades has probably reduced the important of the lake as a wildland resource today.

The hypothesis that sustainability (or resilience) differ between the uplands and lowlands remains to be adequately tested. The situation is made more complicated, however, by the reality that the lowlands and uplands are not isolated from each other. It is likely that residents of each zone have important social, economic, and resource-based connections to the other zone.

The sustainability of the region needs to be considered at another scale of resolution. As reviewed in Chapter 3, the Kigoma Rural and adjoining districts have been long neglected by the Tanzanian government in terms of development investment. Only very recently has this pattern begun to change. It could be speculated that, compared to other, more modern districts of Tanzania, Kigoma Rural could be viewed as less sustainable and less resilient overall. A growing population in Kigoma Rural has not had the benefit of public services that other districts have enjoyed. One way to examine questions of district-level sustainability or resilience would be to look at district-level statistics concerning vital statistics involving population features (child mortality, morbidity, and lifespan), income, health, and agricultural productivity.

**Recommendations and GOSESOS as a Change Agent**

This dissertation has led to the following specific recommendations for further investigation and outreach to solve problems among the residents of Kigoma Rural. Research results are only an initial step in a long, iterative process. Research results are
not definitive but can be re-examined and refined over time. Research results give a broad set of indications as to what targeted problem-solving outcomes might look like, but this is a situation of uncertainty. The level of uncertainty has risen because of the recent changes in infrastructure that have occurred in the district. The district is not the same today as it was a few years ago when this research was conducted. In general, it may be expected that most problems would focus on how to enhance returns to agriculture and hence incomes. Higher incomes are central to improving household sustainability and resilience. The solutions for such problems may involve improving access to technology and markets as well as building new skill sets among people and creating or strengthening local institutions. The “School without Walls” is the primary component of GOSES0 that would be the means to implement the following activities.

First, funds need to be secured to support CAPs that result from the use of PRAs. It is unknown what CAPs would cost, but recent experiences of PARIMA in Kenya and Ethiopia suggest that a typical CAP could cost US $3,000 each, not including community match on the order of 25%. Three pilot PRAs could be conducted in the uplands and lowlands separately. If it is assumed that each of six CAPs cost US $3,000, then the funding base should be on the order of US $18,000.

Second, village-based, open-ended PRAs need to be conducted using a standard methodology, and this should involve outside experts to assist a GOSES0 team with implementation and analysis of results. Open-ended PRAs would allow problem identification to flow more freely in each case. It would be most useful if each PRA was conducted among communities that represented certain strata of local society. For
example, in the lowlands one PRA could be conducted with a fishing village, one with a village adjacent to GSNP, and another more distant from both the lake and GSNP. In the uplands, which has a more expansive and variable landscape, the villages chosen could vary in terms of distance from Kigoma town or the lake, or vary in terms of the environmental suitability for the production of critical crops, such as coffee or cassava. These PRAs would not be segmented with regards to the age or gender of local citizens. The pool of participants would be open to all members of a given village. They need to be inclusive, not exclusive.

Third, CAPs from each PRA would be prepared. These proposals would be compared and contrasted with each other. If the CAPs show important similarities, they may illustrate common solutions to local problems. Such solutions may be village-specific, specific to the uplands or lowlands, or be generalizable across sites. The scale of problem-solving may thus vary from the village to a district level. An example of a local solution might be how to improve resource-based relations among a set of neighbors. An example of a site-based solution might be how to create a local cooperative to improve the value added or localized marketing prospects for a key commodity mostly found in that site such as fish (lowlands) or coffee (uplands). Another site-based solution could involve how to improve relations between GSNP and local people living on the margins of the park (lowlands). An example of a district-based solution might be how to create a multi-purpose cooperative that assists local residents in the marketing of several commodities to meet demand coming from another district.

Fourth, and finally, CAPs would be implemented and outcomes tracked.
Experience elsewhere suggests that needs shift over time as constraints are alleviated. Ultimately, more funding and technical support could be needed as ambitions of participants change over time.

Well-conceived and properly implemented PRAs can reveal many systemic connections that are involved in local problem solving. The examples above emphasize a commodity focus for simplicity. Things become more complex, however, if a community identifies the need to improve an ecosystem service. For example, say a PRA reveals that an uplands community most needs to improve access to the quantity of potable water. This may reveal problem solutions that require a reassessment of the traditional rules and enforcement pertaining to the harvest of woody plants from a vital common access area that also constitutes a community watershed. The solution may require that a community impose and enforce new rules on access to fuel wood, provide a means for production of certain fast-growing trees on more of a commercial basis, and begin a process of ecological restoration of degraded sites with an aim to restore water retention and suitable patterns of water yield. Another result could be the creation or strengthening of new social institutions to regulate resource use. There are traditional institutions that regulate resource use, especially at the village level (Chapter 3). But it remains unclear the extent that such institutions are able to cope with growing populations and hence mitigate severe pressures on natural resources. Ideally, modern national institutions would fill the gap as monitors of natural resource use. However, except for GSNP, there appears to be a vacuum of external regulators as regional or national governments lack the resources to give effective oversight.
If income and agricultural productivity (for food and income) are the biggest current problems in the area—as indicated by this research—it is likely that primary issues involving short-term enhancement of income or crop yields would emerge from the PRA process. Secondary issues involving the enhancement or sustainability of ecosystem services would be less likely to be a priority. Once income or crop productivity improves, then secondary issues could be logically tackled. But, as previously mentioned, such primary and secondary issues are ultimately linked when the need for system sustainability and resilience are considered. It is most desirable that the connections between primary and secondary issues are emphasized in the process of conducting open-ended PRAs, and if more funds are needed to deal with secondary issues down the road, then these should be obtained and a long-term process supported.

However, if the open-ended PRAs do not clearly establish the linkages between primary and secondary issues, it is also possible to then implement some sectoral PRAs in certain situations that emphasize situations where secondary issues must be dealt with. A case in point could be to locate communities where local deforestation has become a well-recognized crisis, for example. A sectoral PRA allows for problem-identification to be constrained (Lelo et al. 2000). Sectoral PRAs can be targeted to deal with any specific problem. Examples included how to promote womens’ health in a particular community, or how to improve management of a critical watershed, etcetera. The problem is that a sectoral PRA may be targeted at an issue that lacks consensus (or at least a majority view) that can constrain the community commitment to find and implement solutions.
Proper use of PRA is a challenge, but it can lead local residents on a pathway towards a more sustainable and resilient future by embracing a process of “learning by doing” (Chambers 1983, 1994; Pretty et al. 2003). The process can unite bottom-up with top-down and modern ideas with indigenous perspectives.

GOSESO would be an effective vehicle to launch participatory work. The initiation of PRAs can be followed up by research once new questions are generated. As Klooster (2000, 281) maintains, “Participation, decentralization, and community involvement are central stage topics in current development debates over the management of forests and other renewable natural resources.” Garnett et al. (2007, 1) maintains that “…successful integrated community development projects require an understanding of existing environmental and social trajectories as well as action research and the use of both local and external knowledge.” This also requires the involvement of all significant stakeholders in planning appropriate measures as well as in determining standards of success. The GOSESO framework is born out of a sustainable livelihoods approach that builds on the strengths of the people, while still considering indigenous institutions as “social cement” which enable stakeholders to exercise power.

The role of GOSESO would be service as a facilitator or change agent. Rogers (2003) defines a change agent as someone who can act as a bridge linking an innovative agency with a target social system. Change agents engage in several functions including serving as an advocate for change, a discoverer of problems, a creator of an environment that stimulates information sharing, and a facilitator of innovation adoption.
GOSES0 would need to develop a “participation team” that is well-versed in implementing PRAs and CAPs, as well as the theory and practice of adoption/diffusion of innovations. This would be part of the “School Without Walls” component. Patterns and insights gained could then be put into some of the curriculum of the “School with Walls” component. Some relevant technical perspectives that are demand-generated could be suitable for the classroom.

Experience with step-wise capacity building in rural Ethiopia shows the high value of non-formal education (Coppock 2010). Use of PRA was followed by implementation of demand-driven short-courses that offered training in fundamental literacy and numeracy, principles of cooperative development, group leadership dynamics, small-business management, entrepreneurship, micro-finance, bookkeeping, agricultural product marketing, and value chains. If such interventions emerge as important in the CAPs, the GOSES0 “School with Walls” could serve as the venue for classroom-based training.

It has been planned that the GOSES0 “School Within Walls” would offer a formal curriculum that focuses on topics pertaining to development and environmental stewardship (www.goseso.org). This has yet to be developed, however. As previously mentioned (this chapter), the first group of matriculated students in the “School within Walls” has been studying the regular Tanzanian curriculum in anticipation of national placement exams. Whatever is offered via the “School with Walls,” it needs to be demand-driven in order to survive. Further speculation on this is beyond the scope of this dissertation.
Where Does Gombe Stream National Park Fit in?

To reiterate, it appears that GSNP is “only on the radar” of the local people who live on its margins. Even then, when open-ended methods are used to describe priority problems and offer solutions, GSNP did not emerge. In this sense, the local people do not see GSNP as “part of their world” per se; it is “owned by outsiders for the benefit of outsiders.” Yet having said this, all indications are that the GSNP is an island increasingly under threat from people living on the margins. The GSNP would benefit from improved relations with locals that could reduce illicit resource use. The locals could benefit from various forms of benefit sharing that GSNP could offer. The question of where GSNP fits in the local or regional picture of problem solving remains to be seen. It could be revealed from the use of PRA, especially for those communities that reside near the park borders. Staff from GSNP could be invited to observe open-ended PRAs held in local communities. Alternatively, a joint sectoral PRA on natural resource management could be conducted with GSNP and local villages as collaborators. For GSNP to participate as a stakeholder in problem solving ventures, it is likely that GSNP would need to have an incentive. This incentive could focus on how to reduce resource depredations on the park margins.
Plate 6.1. Example of GOESO lodgings at Kiganza Village (Photo Credit: Yared Fubusa).
Plate 6.2. Classroom session for GOSESO “School Within Walls” (Photo Credit: Yared Fubusa).
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APPENDICES
APPENDIX A.

INVENTORY OF KITOBE FOREST FLORA AND FAUNA
Baseline Inventory of Flora and Fauna of Kitobe Forest, 2007 Field Report

Background

The Kitobe Forest is the headquarters of the Gombe School of Environment and Society (GOSESO) and site for its environmental restoration and economically sustainable enterprise in western Tanzania. The forest is conveniently located less than ten miles north of Kigoma town, which is linked to East and Central Africa via port, airport, and railway. The 3,000-acre Kitobe Forest is a fertile, mountainous rift valley land within walking distance to Gombe Stream National Park and Lake Tanganyika in Tanzania. The GOSESO project has a legal ownership of almost 600 acres in the heart of the Kitobe Forest. The Kitobe Forest is part of the greater Lake Tanganyika ecosystem (including Gombe Stream National Park), an area with miombo woodlands—known as habitat for chimpanzees and other primates in Tanzania. While the Kitobe Forest is not immediately contiguous with Gombe Park, villagers have reported several primate sightings in the forest. In fact, the majority of primates in the Lake Tanganyika Region now live in unprotected areas, outside national parks.

The Kitobe Forest was once home to abundant wildlife but is now facing environmental decline due to continuous consumption of firewood for cooking and brick-kilns. As forests in the region continue to decline, the forests of adjacent Gombe Park are bearing immense pressure due to human survival activities. GOSESO is spearheading a grassroots initiative to enlist and engage the citizenry and local government in establishing the Kitobe Forest as a model for environmental restoration and economically
sustainable enterprise. A baseline inventory of the flora and fauna of the entire Kitobe Forest will provide a foundation for future restoration work.

**Method**

A team of six local biophysical scientists conducted an inventory of flora and fauna of Kitobe Forest using transect sampling. The field study was conducted during the month of July 2007 through sight-identification and sample collection from three transects running North-South of the entire Kitobe Forest. The research team collected samples or identified: 1) Plants, 2) Birds, 3) Reptiles and 4) Mammals.

**Results and Discussion**

**Plants**

Samples of each species found in the vegetation surveys were collected and catalogued. Each tree species was identified by local and scientific name, and a general plant list for the Kitobe Forest area was compiled. The survey identified at least 63 plant species, which perform a diverse array of ecological roles within the greater Kitobe ecosystem. The combination of grasslands, shrub lands, and scattered trees in Kitobe Forest form a mosaic of discrete habitat types. This diverse physiography, combined with the variety of human-induced pressures on the land, will provide an excellent setting for teaching about ecological concepts with a focus on human-environment relations.

**Birds**

Sightings, nests, and other bird activity along transects formed the basis for bird identification. Fifty-seven bird species were identified in the Kitobe area. The majority of
sightings occurred in the riparian corridor along the Mungonya River. Several species were also found in grassland habitat on the site. The large number of bird sightings is a positive assessment of overall ecosystem health in spite of many threats. The diversity of bird species has the potential to facilitate GOSESOS-led programs in education and eco-tourism.

**Mammals and Reptiles**

Sightings, signs, and tracks were used to identify mammals and reptiles. In addition, historical information from local people living in and adjacent to Kitobe Forest was utilized to add details documenting changes in abundance and distribution. The research team has identified 13 species of mammals and reptiles in the forest, ranging from velvet monkeys and wolves to reptiles such as cobras and black and green mambas.

**Recommendations** (of the research team to GOSESOS)

This field inventory of flora and fauna has documented 63 plant species, 57 bird species, and 13 species of mammals and reptiles. The Kitobe Forest is covered by shrubs that remained after long period of tree felling in the area. The lowland near Mungonya River has better soils that support oil-palm and mango trees. This lowland seems to be the very essential component of the Kitobe Forest ecosystem due to more naturally growing trees and/or shrubs occurring in the area. Sightings of birds were greater in the areas around this lowland, presenting its contribution in uniting habitat mosaics composing grassland, shrubland and riverine forest. The forest offers a resilient ecosystem that supports diverse life forms of flora and fauna. Such a combination makes this forest area an interesting portion for conservation of nature in the GOSESOS area.
The existing patterns of natural vegetation in Kitobe Forest exhibit evidence of humans transforming landscapes through resource exploitation. Protection would enable the tree canopy and understory to regenerate, soil fertility to increase, and water quality to improve restoring ecosystem functions. Healthy land would better support the human society that depends on local resources for survival, especially in this poverty-stricken and very populated region of Tanzania. The restoration of Kitobe Forest offers many benefits to local communities. The forest 1) is an essential part of regional water catchments and improves water quality; 2) provides local communities with a remarkable source of medicinal plants; 3) is a good source of wild fruits, 4) provides natural beauty in the area; and 5) has cultural value to the indigenous peoples of the area.

GOSESOS must initiate restoration projects including the reintroduction of various endemic trees to increase the diversity of the local ecosystem within the Kitobe Forest. One way of doing this would be to create a nursery that uses plant propagation and seed collection to grow saplings and seedlings. Additional restoration work could be done through assigning a small number of local people, also known as Forest Rangers, whose job will be to ensure no one sets fire, hunts, or cuts indigenous vegetation and the project will have to continue enforcing these protective regulations for at least five years to enable full forest recovery.

The research team also advises GOSESOS to adopt a beekeeping project as a tool of ecological restoration and promoting sustainable rural livelihoods in the region. Apart from production of honey, the African bees are important for pollinating agricultural crops and fruit trees, thereby improving the quality of the habitat for wildlife. In
conclusion, as the Kitobe Forest restoration efforts continue, it is our hope that more and more wildlife, including apes and primates, will move back into the forest. The GOSES Project has a potential to use the forest to demonstrate a responsible, sustainable use of resources that can be replicated throughout Tanzania, the balance of Africa, and indeed, worldwide.

Kitobe Forest has a potential to become an important habitat for other wildlife, including lions, bushbucks, duikers, baboons, monkeys, zebras, hyenas, birds, and many more. This area also represents a unique opportunity to pursue the restoration of deforested lands that once served as habitat for chimpanzees. The creation of a wildlife corridor linking the Kitobe Forest and Gombe Park could be possible in years to come. Such a corridor could be quite important in helping the fast-declining population of chimpanzees and other primates in western Tanzania. [As an update, October 2008: Four new species of mammals and birds have migrated into the forest since GOSES Project began restoring the forest following this inventory conducted almost one year ago. Local people and forest rangers have reported seeing antelope, baboons, a leopard, and flamingos.]
Table A.1. Plant species inventory for Kitobe Forest conducted in 2007

<table>
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<tr>
<th>No.</th>
<th>Scientific Species Name</th>
<th>Local Name</th>
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Table A.2. Bird species inventory for Kitobe Forest conducted in 2007

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<td>PASSERIFORMES</td>
<td>STURNIDAE</td>
</tr>
<tr>
<td>10</td>
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<td>Ininga</td>
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<td>COLUMBIDAE</td>
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<tr>
<td>11</td>
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<td>Colius striatus</td>
<td>Umuheza</td>
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<td>COLIIDAE</td>
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<td>COLUMBIDAE</td>
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<td>14</td>
<td>Red-nacked Spurfowl</td>
<td>Francolin afer</td>
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<td>Lilac breastd bee-eater</td>
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<td>16</td>
<td>African Pied Wagtall</td>
<td>Motacilla aguimp</td>
<td>Kanyamanza</td>
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<td>17</td>
<td>Grey headd sparrow</td>
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<td>Mujoli</td>
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<td>African fish eagle</td>
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<td>19</td>
<td>Red-billed quelea</td>
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<td>APODIDAE</td>
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<td>Malika</td>
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<td>ESTRILIDIAE</td>
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<td>Mdodaguzi</td>
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<td>PICIDAE</td>
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<td>PASSERIFORMES</td>
<td>---</td>
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<td>Black headed heron</td>
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<td>31</td>
<td>Long crested Eagle</td>
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<td>Samnsono</td>
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<td>African goshawk</td>
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<td>ACCIPITRIDAE</td>
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<td>Swallow tailed kite</td>
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<td>ACCIPITRIDAE</td>
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<td>White-bellied Canary</td>
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<td>Agahululizye</td>
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<td>Golden Weaver</td>
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<td>Inchululizye</td>
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<td>PLOCEIDAE</td>
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<td>37</td>
<td>Red-billed Firefinch</td>
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<td>Agataka</td>
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<td>ESTRILDIDAE</td>
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<td>Black-headed weaver</td>
<td>Ploceus cucullatus</td>
<td>Induli</td>
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<td>Ikinyetamba</td>
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<td>STURNIDAE</td>
</tr>
<tr>
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<td>Violet-backed Starling</td>
<td>Cinnyricinclus leucogaster</td>
<td>Intongegwa</td>
<td>PASSERIFORMES</td>
<td>STURNIDAE</td>
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<tr>
<td>42</td>
<td>---</td>
<td>---</td>
<td>Umtamigwa</td>
<td>PASSERIFORMES</td>
<td>---</td>
</tr>
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<td>43</td>
<td>Nightjar</td>
<td>Caprimulgus spp</td>
<td>Ikibhugabhuge</td>
<td>CAPURIMULGIFORMES</td>
<td>CAPURIMULGIDAE</td>
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<td>44</td>
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<td>Mzirayeye</td>
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<td>Ikinyamajigo</td>
<td>PASSERIFORMES</td>
<td>---</td>
</tr>
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<td>46</td>
<td>---</td>
<td>---</td>
<td>Kimutengu</td>
<td>PASSERIFORMES</td>
<td>---</td>
</tr>
<tr>
<td>47</td>
<td>---</td>
<td>---</td>
<td>Iftwanke</td>
<td>---</td>
<td>---</td>
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<td>Robin-Chat</td>
<td>Cossypha spp</td>
<td>Insalama</td>
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<td>MUSCICAPIDAE</td>
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<tr>
<td>49</td>
<td>---</td>
<td>---</td>
<td>Umubhilango</td>
<td>PASSERIFORMES</td>
<td>---</td>
</tr>
<tr>
<td>50</td>
<td>Laughing dove</td>
<td>Steptopelia senegalensis</td>
<td>Kamtunguru</td>
<td>COLUMBIFORMES</td>
<td>COLUMBIDAE</td>
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<tr>
<td>51</td>
<td>Bishops</td>
<td>Euplectes spp</td>
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<td>PASSERIFORMES</td>
<td>PLOCEIDAE</td>
</tr>
<tr>
<td>52</td>
<td>Hammerkop</td>
<td>Scopus umbretta</td>
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<td>CICONIIFORMES</td>
<td>CICOPIDAE</td>
</tr>
<tr>
<td>53</td>
<td>---</td>
<td>---</td>
<td>Igitabhila</td>
<td>PASSERIFORMES</td>
<td>---</td>
</tr>
<tr>
<td>54</td>
<td>Prinia</td>
<td>Prinia spp</td>
<td>Ikudye</td>
<td>PASSERIFORMES</td>
<td>CISTICOLIDAE</td>
</tr>
<tr>
<td>55</td>
<td>African-Paradise Flycatcher</td>
<td>Terpsiphone viridis</td>
<td>Msambi</td>
<td>PASSERIFORMES</td>
<td>TROGONIDAE</td>
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<tr>
<td>56</td>
<td>---</td>
<td>---</td>
<td>Umubhilango</td>
<td>PASSERIFORMES</td>
<td>---</td>
</tr>
<tr>
<td>57</td>
<td>Pied crow</td>
<td>Corvus albus</td>
<td>Ikibliombo</td>
<td>PASSERIFORMES</td>
<td>CORVIDAE</td>
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</tbody>
</table>
Table A.3. Mammal species inventory for Kitoibe Forest conducted in 2007

<table>
<thead>
<tr>
<th>No</th>
<th>Common Name</th>
<th>Scientific Species Name</th>
<th>Local Name</th>
<th>Scientific Order Name</th>
<th>Scientific Family Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vervet monkey</td>
<td><em>Chlorocebus pygerythrus</em></td>
<td>Tumbili</td>
<td>PRIMATE</td>
<td>COLOBIDAE</td>
</tr>
<tr>
<td>2</td>
<td>Rat</td>
<td><em>Rattus sp.</em></td>
<td>Panya</td>
<td>RODENTIA</td>
<td>MUROIDAE</td>
</tr>
<tr>
<td>3</td>
<td>Hare</td>
<td><em>Lepus sp.</em></td>
<td>Sungura</td>
<td>LAGOMORPHA</td>
<td>LEPORIDAE</td>
</tr>
<tr>
<td>4</td>
<td>Bat</td>
<td>---</td>
<td>Popo</td>
<td>CHIROPTERA</td>
<td>---</td>
</tr>
<tr>
<td>5</td>
<td>Squirrel</td>
<td>---</td>
<td>Kicheche</td>
<td>RODENTIA</td>
<td>SCIURIDAE</td>
</tr>
<tr>
<td>6</td>
<td>Jackal</td>
<td><em>Canis sp.</em></td>
<td>Mbweha</td>
<td>CARNIVORA</td>
<td>CANIDAE</td>
</tr>
<tr>
<td>7</td>
<td>Duiker</td>
<td>---</td>
<td>Nsha</td>
<td>ARTIODACTYLA</td>
<td>BOVIDAE</td>
</tr>
</tbody>
</table>

Table A.4. Reptile species inventory for Kitobe Forest conducted in 2007

<table>
<thead>
<tr>
<th>No</th>
<th>Common Name</th>
<th>Scientific Species Name</th>
<th>Local Name</th>
<th>Scientific Sub-Order Name</th>
<th>Scientific Family Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chameleon sp.</td>
<td>---</td>
<td>Kinyonga</td>
<td>SAURIA</td>
<td>Chamaeleonidae</td>
</tr>
<tr>
<td>2</td>
<td>Other lizard spp.</td>
<td>---</td>
<td>Mjusi</td>
<td>SAURIA</td>
<td>---</td>
</tr>
<tr>
<td>3</td>
<td>Cobra sp.</td>
<td><em>Naja sp.</em></td>
<td>---</td>
<td>SERPENTES</td>
<td>ELAPIDAE</td>
</tr>
<tr>
<td>4</td>
<td>Puff adder</td>
<td><em>Bitis arietans</em></td>
<td>---</td>
<td>SERPENTES</td>
<td>VIPERIDAE</td>
</tr>
<tr>
<td>5</td>
<td>Black mamba</td>
<td><em>Dentroaspis polylepis</em></td>
<td>---</td>
<td>SERPENTES</td>
<td>ELAPIDAE</td>
</tr>
<tr>
<td>6</td>
<td>Green mamba</td>
<td><em>Dentroaspis angusticeps</em></td>
<td>---</td>
<td>SERPENTES</td>
<td>ELAPIDAE</td>
</tr>
</tbody>
</table>
APPENDIX B.

FOCUS GROUPS AND KEY INFORMANT DOCUMENTATION
Hujambo! My name is ______________ and I am conducting research with farmers in Kigoma Rural District. I am a student at Utah State University in the United States. The purpose of this work is to learn about the condition of farmer’s lives in our district and propose helpful ideas to address problems. I have an interview with 6 questions for you. Your answers to my questions are confidential and will not be shared with anyone. I will appreciate your complete and honest answers. You will never be personally identified with your specific responses. My visit with you should take about 1-2 hours. I would like your permission to record this interview. If I record the interview it is only to be clear on what you have told me. If at any point during the interview there is something you would like me to keep confidential please let me know and I will turn off the tape recorder and make note of this for write-up purposes. Any record of the interview will be stored under lock and key. After the work is written-up the original notes and tapes will be disposed of to protect your privacy. You are, however, free to not participate in this interview. Finally, I cannot promise that any benefit will directly come to you or the people of Kigoma Rural as a result of this interview.

Name of Interviewee: _______________________________________________

Gender of Interviewee: _______________ Age of Interviewee: ________

Current Official Position of Interviewee and Length and Details of Relevant Job Experiences:

How Does This Person Know About Kigoma Rural District:

Date of Interview: ___________________________

Place of Interview: ___________________________

Questions:
1. What are some recent environmental, social, and economic changes that you have seen in Kigoma Rural? [For each change, is that a change for the better or for worse? Why do you feel that way?]  

[Probe: Any other changes? Until they say NO!]

2. Why, in your opinion, have these changes occurred? [For each change in Question 1]

3. What, in your opinion, is the likely future of Kigoma Rural and why?

4. What do you think is the likely future for the district? [Probe for at least two possible views on how they see the future of Kigoma Rural District (one optimistic, one pessimistic):

(a) Optimistic future

(b) Pessimistic future

5. What, in your view, are the major constraints facing rural people in Kigoma Rural District to improve their lives?

6. What development interventions, in your view, are most needed to overcome these constraints and why?

THE END
FIRST MEETING (for rehearsal as a pilot)

The first meeting was for rehearsal as a pilot, to provide a roadmap to see whether anything would need to be modified in the four upcoming, more inclusive interviews. The eight attendees came from the village where the potential site of GOSES will be built. This meeting was informal in nature; however, the ideas and contributions proved to be significant and therefore the research team has incorporated them into this final report. The meeting started at 2:42 p.m. on July 11, 2005.

1. Recent changes:

- Villagers are facing food shortage.
- Environmental degradation is now happening at an alarming rate.
  - Forests and natural vegetation covers have perished.
  - The once abundant mushrooms and native fruit trees in the village have become extinct.
  - There is now a severe shortage of drinking water because many sources of water have dried out.
  - Quantity of rainfall has decreased significantly.
  - The once abundant fish in the local rivers and Lake Tanganyika are now in short supply.
  - Wildlife that once roamed free in and around their village has declined significantly.
- Land has lost soil fertility.
• There is a growing lack of compassion among villagers.

• There is a rising outbreak of pandemic diseases such as malaria and cholera.

• There is continuing human population growth despite rampant poverty and disease.

2. **Why have these changes occurred?**

• Food shortage due to the lack of soil fertility

• Lack of entrepreneurship among villagers.

• Lack of education and information has limited the ability of people to adapt to a changing world.
  
  o The world has changed fast while people have not changed. For example, in the past people used to grow their own crops, but now cash economy is the way of life.

• Lack of income diversification techniques and also youth do not support agricultural practices.

• Economic decay due to:
  
  o Lack of credits and loans for the villagers
  
  o Lack of knowledge on sustainable agriculture
  
  o Poor education system in Tanzania prepares educated youth to abandon their rural areas and migrate to big cities in Tanzania in search of “modernity.”
  
  o The government favors people in cities and has shown very little concern for the rural people.

• Growing witchcraft beliefs affect human relations and slow down many economic initiatives.
For example, older people are no longer perceived as advisers, but as wizards. They are isolated and depressed.

Educated locals are forced to abandon their villages for the fear of dying from witchcraft especially escalated by some jealous villagers.

- Traditional norms, rules, and regulations that were used to protect natural forests are no longer practiced.

3. Future changes:

- All rivers will dry out due to lack of rainfall.
- Natural forests and vegetation covers will perish because of deforestation.
- Some plant species and wildlife will become extinct.
- Environmental degradation will create a new generation of refugees and will therefore instigate a growing internal displacement of people in search of food, water, and shelter.

4. Main obstacles facing them:

- Poverty because of lack of capital, income diversification techniques, entrepreneurship, and agricultural-related expertise
- Growing lack of compassion for one another; for example, helping each other in developmental activities like education is no longer a priority among villagers.
- Lack of resources limits access to education and information.

5. Realistic and sustainable solutions to these obstacles:

- Education should be given to all in academic and vocational schools. Educational campaigns should be implemented in villages, suburbs, wards, divisions, districts,
regions, and country at large. There should be a program that will engage people in development seminars and workshops.

- Professionals should be encouraged to return and work in their villages alongside those without formal education.
- Local people should be educated about the link between environmental and community degradation. People should be discouraged to cut trees indiscriminately, burn forests, make charcoal, destroy water sources, practice poor peasantry activities, and instead, people should be informed about other alternatives to generate income.
- The government should extend social services to rural areas instead of the current trend of helping only people in urban areas.
- People should be encouraged to share costs in education sectors instead of helping each other only in times of weddings and funerals.
- There must be a reduced gap between people with formal education and those without any formal education through methods such as mentoring.
- Employment opportunities to villagers should be extended to as many people as possible.

**SECOND MEETING (YOUTH ONLY)**

This youth focus group interview was conducted at Bitale Secondary School on Saturday, August 8, 2005, at 10:06 a.m. The 12 participants in this group came from many villages both near and far away from Gombe Stream National Park, and ranged from 15 to 18 years old. Prior to this, the team had a brief meeting with some teachers and the Headmaster at the school to get them informed about the research mission. The Headmaster
instructed student representatives to express their views without any fear. The Principal Investigator asked all teachers to leave the room so that students could feel free to express themselves without any fear.

1. Recent changes in the village:

- Environmental degradation, such as deforestation, has caused the decline in the rate and consistency of rainfall. Also, many sources of water have dried out
- Parents do not see the importance of sending their children to school, and for those who would like to have their kids educated, many cannot afford to pay the $50 annual school fee because of their poverty.
- There is a growing economic decay.
- Worsening economic and environmental conditions have caused a growing gap between youth and elders. In the past, elders could sit around the campfire and tell stories to the youth, but now this is no longer happening. Children now get their knowledge from western-based videos and music.
- People are now involved in divisive politics.
- More and more people are now dying, especially from such diseases like malaria and HIV/AIDS.

2. Why have these changes occurred?

- Explosive human population growth
- Lack of serious educational institutions in the region
- The absence of alternative means of energy has forced a growing number of people to depend on trees for firewood and charcoal.
• Shifting cultivation is another reason causing deforestation.

• Creation of new roads has destroyed many natural forests.

• Globalization has destroyed many local ways of life. The new trend can be seen by the way a new generation of Africans has abandoned African ways of life, and instead, embraced western styles of dress.

• Much local wildlife has gone extinct in the villages because of a growing number of local people and refugees from the neighboring war-torn countries who hunt and trap wildlife.

3. Future changes:

• There will be an expansion of the desert in the next ten or twenty years to come.

• The Africans will have lost completely their traditional ways of life, including their tribal language and music.

• Poverty will multiply.

• Selfishness, greed, and lack of respect among people will increase.

• The ongoing lack of education will create a new generation of ignorant people.

• There will be an outbreak of diseases due to environmental degradation.

• The ongoing decline in volumes and quality of water in many local rivers will pose many challenges to the people.

4. Main obstacles facing villagers:

• Lack of reliable source of energy for domestic purposes

• Poverty especially in the absence of productive agriculture and local trade

• Lack of education
• Diseases
• Lack of clean and enough quantities of water

5. **Realistic and sustainable solutions to these obstacles:**

• Serious public awareness building is needed because education is the most powerful weapon one can use to change the world.
• Farmers will need markets for their products.
• More independent research on issues facing the people should be conducted.
• Villagers should have access to credits and loans.
• Improved health services to the people
• There must be increased institutional and governmental cooperation, especially among African countries.
• People should be willing to change their local traditions.
• Interactive field trips among villagers
• Education based on natural resources should be extended to the people.

6. **Do you know anyone who has become successful? Why?**

• One banana farmer became successful after implementing sustainable agricultural techniques, and then was lucky to get a good market for him to sell his bananas. Additionally, he had basic knowledge on how to save his money in the bank.
• One natural healer became very successful for inventing a traditional machine that could process local drugs.
• Other people with good knowledge on savings became successful through trade.
7. Can education be a solution? If so, how and why?

They all respond, YES!

- Improve the quality of education by increasing the quality of teachers and creating a library in the area.
- There must be adult education through informal education. For example, some classes can be provided outside under the mango trees during evening hours.
- The Ministry of Education and Culture in Tanzania should introduce hands-on courses, especially on agriculture, book-keeping, and commerce.
- There should be practical education especially among science courses.

THIRD MEETING (MALES ONLY)

The meeting started at 4:30 p.m. on July 14th and involved highly knowledgeable men giving their opinions. This group was very diverse; there were youth and elders, rich and poor, and educated and uneducated. The total of 12 men from 12 villages around Gombe National Park attended.

1. Recent changes in the village:

- Many schools have been built but quality of education has declined: Less qualified teachers, not enough books, etcetera.
- Environmental and human degradation have increased significantly and this can be seen through the following indicators:
  - Forests ever known have perished in highlands and lowlands
  - Increased shortage of rainfall and unfertile soil
- Poverty is at an alarming rate
- Increasing environmental pollution
- Outbreak of diseases especially malaria and HIV/AIDS pandemic
- Decline in the number of wildlife
- Rivers have dried up

- Increase in poverty
- Lack of education in the issues in the world such as in technology and natural resources
- Lack of financial sources
- Health and water services have declined significantly
- Scientists and park rangers at Gombe National Park seem to care only about the plight of wildlife, especially chimpanzees, and not enough attention is given to the plight of Africans in the area
- No single community-based conservation program that focuses revenues locally and fairly among villagers; all programs are controlled by outsiders and the revenues generated in the name of helping people in this region do not stay in the area (economic leakage).

2. Why have these changes occurred?

- Increased poverty as a result of: loss in soil fertility, lack of modern agricultural technology, and poor infrastructures
- Marginalization of villagers by the government and private institutions
- Lack of adequate mass education and information to the villagers
• Lack of credits and loans to the villagers. For example, people have property that has no entitlement to act as collateral on mortgages; farms owned by the people do not have title deeds that can be used to secure small loans.

• Youth are not ready to inherit the manual work of the farm often done by their parents.

• Corruption, especially among public officials

• Government is not responsible enough to its citizens

3. **Future changes:**

• Poverty will multiply

• Lack of human compassion will cause people to lead unhappy lives.

• Tanzania National Parks (TANAPA), in collaboration with other private institutions, may order people who live in villages adjacent to Gombe National Park to move to other places.

• Environment will be degraded at high rates.

4. **Main obstacles facing them:**

• Poverty as a result of lack of income diversification and economic infrastructure

• Poverty and environmental degradation have increased the outbreak of human epidemic diseases.

• No markets for villagers to sell their farm products

• Corruption in education and court systems

• Lack of education to the public

• No reliable transportation and communication system in the region
5. **Realistic and sustainable solutions to these obstacles:**

- Education should be given priority to all citizens in academic and vocational schools.
- Some issues will require in-depth research.
- Educational campaigns should be implemented in villages, suburbs, wards, divisions, districts, and the regions.
- Loans should be provided in different economic sectors like fishing, agriculture, and businesses.
- Environmental and humanitarian education should be introduced; people should be discouraged to cut trees indiscriminately, burn forests, and encouraged to grow the industry of charcoal, stop the ongoing destruction of water sources, and avoid poor peasantry activities.
- Establishing cooperative groups will help to enhance rural economy.

6. **Do you know anyone who has become successful? Why?**

- Educated people have become successful through employment upon their graduation.
- Livestock keepers and some farmers in Mahembe village became successful for their involvement in sustainable agriculture and animal keeping using local medicines.
- Those who participated in business became successful.

7. **Can education be a solution? If so, how and why?**

They all respond: YES! This is how education can be a solution:

- Extending adult education that includes even people without formal education, but with significant knowledge on real world issues, can bring a significant change.
• Training centers should be made available in each village and locality focused on different development issues.

• Using peer innovation to alleviate poverty through self employment

• Frequent seminars and workshops should be extended to the villagers as often as possible. For example, seminars for women on how to use modern cooking materials can help to stop the ongoing over-exploitation of local forest.
The fourth meeting was held on July 15 at 2:38p.m. It involved highly knowledgeable 10 women representing 10 villages around Gombe National Park.

1. Recent changes in the village:
   - Decline and inconsistent rainfall and other related environmental problems.
   - The decay of traditional customs and rituals where now young people seem to embrace western cultures.
   - Women have started to recognize their basic human rights.
   - There is now a growing rural economic decay and also a significant lack of proper markets for farm products.

2. Why have these changes occurred?
   - Poverty has led to cutting of trees to enable people to overcome construction needs and also to get woods for charcoal and firewood.
   - The absence of education has resulted in severe environmental degradation.
   - Poor agricultural technology.

3. Future changes:
   - The expansion of desert which is now visible will become severe as environmental destruction worsens.
   - Old people will start constructing tales for the youth about the once abundant wildlife that roamed free near their village only decades ago.
   - Poverty will be at an alarming rate.
   - There will be an explosive human population growth.
4. Main obstacles facing villagers:

- Rampant poverty facing many villagers
- Lack of education that brings environmental and economic challenges
- Outbreak of diseases due to worsening economic opportunities
- Lack of capacity building opportunities for the people
- Government corruption

5. Realistic and sustainable solutions to these obstacles:

- There must be a shift in attitudes and priorities among people.
- Men should be educated on issues about gender equity. A father should know that a mother has her God-given human rights equal to that of his, and vice versa, within the family and community at large
- If possible, some women should be willing to sacrifice husbands who strictly control women’s development gains.
- More economic opportunities need to be put in place in order to boost local economies.
- Education should be extended to all in academic and vocational schools.
- Loans and credits should be provided to people in order to enhance local economies.
- There should be improved health and water services to all villages.
- There should be an increased environmental education especially tree planting awareness in order to reduce the current shortage of firewood.

6. Do you know anyone who has become successful in life? Why?
• People who have participated in agriculture and animal keeping
• Those with formal education have made significant progress when compared to many who invested in businesses without any education.

7. Can education be a solution? If so, how and why?

They all respond: YES!

• Improve the Tanzanian core curriculum in order to include hands-on activities.
• Improve the quality of education among teachers.
• Increase tree planting campaigns.

FIFTH MEETING (REFUGEES ONLY)

This meeting started at 3:15pm on July 16, 2005 and comprised of citizens by naturalization, those who came to Tanzania as refugees, but who have been embraced by the Tanzania government, and the citizens as their own. They came from the war-torn countries of the Democratic Republic of Congo, Rwanda, and Burundi. There was perfect attendance; 12 participants representing 12 villages around Gombe National Park attended.

1. Recent changes in the village:

• Increases in the cost of health care
• There is now an increased exploitation of wildlife and their habitat especially in many highland and lowlands.
• Ethics and guardianship to youth have fallen significantly.
• Quality of education has deteriorated compared to some years back; many graduates now have hard time mastering some comprehensive basic skills including reading, writing, and speaking.

• Poor soil fertility has resulted in a growing food shortage.

• Poor economy has caused too much human suffering.

• Yared Fubusa himself is a great change in recent years; other educated people often abandon their home villages and choose to migrate to big cities like Dar-Es-Salaam in search of modernity. Fubusa has decided to come and work with villagers besides of his western-based education.

• Lack of capital to peasants and farmers has significantly reduced crop and animal husbandry

• Farmers and fishermen have no reliable markets to sell their products.

2. Why have these changes occurred?

• Poverty among people is the leading cause.

• Corruption in the government

• Lack of programs that would be morally focused instead of monetarily focused

• Lack of basic agricultural technology

• Hard to find financial support; often not enough support from governmental or non-governmental organizations

• People are not willing to make sacrifices.

• Lack of qualified personnel who would like to come and work with people at the grassroots level.
3. Future changes:

- Environmental degradation will be a big problem, especially with destruction of wildlife and their habitats, water sources will all disappear, and fish in local rivers and Lake Tanganyika will go extinct.
- Poor environment and lack of economic opportunities will be multiplied by a growing refugee problem.
- People will become increasingly poor.

4. Main obstacles facing villagers:

- Poverty
- Lack of education denies people the ability to employ themselves.
- Environmental degradation and poor nutrition
- Disease outbreak
- Lack of proper markets for the farm products
- Corruption in the government system
- Poor technology
- Growing theft tendencies among people due to poor living conditions
- Lack of good governance and leadership

5. Realistic and sustainable solutions to these obstacles:

- Education should be given to all in academic and vocational schools. Educational campaigns should be implemented in villages, suburbs, wards, divisions, districts, regions and country at large. This should also include engaging people in development seminars and workshops.
Loans and credits should be provided to local people engaged in different economic sectors like fishing, agriculture, and small businesses.

Villagers should be enabled to work in cooperative groups in order to enhance their local economies.

Communities should be given a chance according to their geographic location and environment. For example, those who live on the shores of Lake Tanganyika could be assisted to conduct sustainable fishing and those who live in remote small villages could receive information and services in sustainable agriculture.

Government should implement and enhance permanent and reliable infrastructures like tarmac roads, provide pure and clean water, and provide reliable markets to enhance local and regional economies.

6. Do you know anyone who has become successful? Why?

- People who have participated in agriculture and animal keeping.
- Issa Mwakalambile of Mwandiga village became a successful businessman after securing a loan.
- Educated people, like Yared Fubusa, have become successful in life because of their easy access to information by using technology and their formal education.

7. Can education be a solution? If so, how and why?

They all respond: YES!

- Adult education should be extended to villagers especially on how to secure and manage finances or loans.
• Numerous seminars and workshops should be given to villagers on how to increase soil fertility and also environmental conservation.
Phase VI Focus Group

Summaries for lowland and upland of Kigoma Rural

The following focus groups were organized according to different criteria compared to those in phase II. Unlike phase II where focus groups were organized as village men, village women, village youths, and refugees, these were organized more based on livelihood specializations or classes of people that would mix gender and/or age groups. Eight villages were sampled. Those in the lowland area were Bubango, Kiganza, Mkongoro, and Kagongo. The upland area also had equal number of villages: Mkigo, Matendo, Kidahwe, and Kizenga

Location: Bubango Village

Zone: Lowland

Date: September 20, 2006

Target: The group involved successful palm-oil farmers (dominated by males, also middle-aged).

1. Recent changes:
   - Improved wildlife habitats
   - Development especially in terms of housing
   - Adoption of new form of agriculture systems
   - Social capital is improving through the formation of various agricultural groups; self-reliance
   - More demand in education

2. Why have these changes occurred?
   - A shift in livelihood activities from one based on fishing to agriculture
• Education
• Environmental conservation

3. Future changes:
• Increased costs in agricultural inputs
• Poor soil fertility
• Overpopulation
• Lack of enough veterinary services
• Poverty

4. Main obstacles facing them:
• Lack of education
• Poor agricultural systems
• No financial capital
• Lack of marketing opportunities

5. Realistic and sustainable solutions to these obstacles:
• More emphasis in agriculture because most of the people depend on agricultural activities through training
• Improved infrastructure
• Adequate access to markets
• Education

Location: Kiganza Village
Zone: Lowland
Date: September 24, 2006

Target: The group was for youths aged 18-25 who were not involved in agriculture. Most of these young people were either still dependent on their farming parents or engaged in petty trade (this focus group was gender balanced).

1. Recent changes:
   - More educated people
   - Improved housing
   - Improved health services
   - Poor agricultural productivity

2. Why have these changes occurred?
   - The village now has many educated youth
   - Improved housing
   - More people are engaged in agricultural productivity
   - The village now has a dispensary

3. Future changes:
   - Lack of institutions
   - More health problems
   - Poor infrastructure
   - Lack of economic opportunities
   - Poverty
   - Emigration to other places with better opportunities

4. Main obstacles facing them:
• Poor infrastructure
• Lack of education
• Poor human health
• Lack of agricultural extension services and inputs
• Lack of markets

5. Realistic and sustainable solutions to these obstacles:

• Improved infrastructure can change the entire people's livelihoods, i.e. roads and electricity
• Improve education sector in order to educate community
• Improve markets
• Improved investment in local farming systems

**Location:** Kagongo Village

**Zone:** Lowland

**Date:** June 26, 2006

**Target:** The group was a mix of farmers, business owners, and fishermen—dominated by mature males.

1. **Recent changes:**

• More desire for education

2. **Why have these changes occurred?**

• Good government policy

3. **Future changes:**
• Things will change for good because the government is willing to intervene
• Sustainable development
• If the central government continues to lack interests in the region

4. **Main obstacles facing them:**

• Soil infertility
• Lack of financial capital and markets
• Refugees from war-torn countries
• Poor infrastructures

5. **Realistic and sustainable solutions to these obstacles:**

• Credits and loans
• Improve infrastructures

**Location:** Mkongoro Village

**Zone:** Lowland

**Date:** June 26, 2006

**Target:** The group included mature, household heads (males and females) pursuing varied economic interests such as farming and small business.

1. **Recent changes:**

• Increased number of schools; people see the importance of education
• Poor health care due to lack of medicine and qualified experts
• Improved poverty
• Serious environmental degradation
2. Why have these changes occurred?
   - Modern buildings; government has employed more teachers
   - Poverty due to lack of education, government support, and markets
   - Lack of environmental education; no alternatives for charcoal-making

3. Future changes:
   - The lives of people will improve because of the available education, technology, and citizenry participation
   - Good governmental policy; current government has good plans for the people. Improved infrastructure will boost agricultural markets
   - Corruption will never end and instead, multiply

4. Main obstacles facing them:
   - Poverty
   - Illiteracy
   - Lack of outside information or technology

5. Realistic and sustainable solutions to these obstacles:
   - Rural education is needed
   - Capacity building through credits
   - Reduced corruption
   - Involve people in each development strategy from planning to implementation
   - Improve marketing strategies especially those that bring foreign currency

Location: Mkigo Village
Zone: Upland

Date: September 19, 2006

Target: The participants were successful coffee farmers (males and females that tended towards middle-age.)

1. Recent changes:

   • Land no longer fertile
   • Rainfall has changed seasons, plus lack of rainfall
   • Native tree species now rare
   • Clouds used to be familiar and at that there was plenty of water in the village. This trend has changed. The village is now facing lack of water
   • They have moved from one to three primary schools; there is a desire to get more education
   • There is poor infrastructure
   • Villagers now produce one of the best coffee in the world but still lack adequate agricultural inputs

2. Why have these changes occurred?

   • Environmental degradation due to widespread bushfire is washing top soil
   • Lack of education especially in agricultural systems; poor animal husbandry system; poor education system
   • Poor financial capital
   • Lack of markets
• Human population growth
• Government neglect
• Peer influence has helped more people to afford corrugated iron sheet
• Shortage of food

3. Future changes:
• A drug-addicted generation
• Depopulation due to infectious diseases, such as AIDS/HIV
• Hard times to those without education; there will be increased desire to get education

4. Main obstacles facing them:
• Poor human health due to severe lack of health centers
• Shortage of adequate energy sources

5. Realistic and sustainable solutions to these obstacles:
• Emphasize education
• Provide enough drinking water
• Provide agricultural inputs

Location: Matendo Village
Zone: Upland
Date: September 22, 2006
**Target**: The most remote village of the uplands—the participants were heavily dominated by mature females, between 30-55 years old. They were “internal refugees” who were farmers who had migrated with their spouses from the lowlands near GSNP in pursuit of more land of higher fertility.

1. **Recent changes**:
   - A new primary school has been constructed in the village
   - Access to a new village market
   - Lack of soil fertility

2. **Why have these changes occurred?**
   - A new primary school
   - Poor farming systems
   - Poor human health system

3. **Future changes**:
   - Poor soil productivity
   - Poor human health
   - Lack of access to markets
   - No infrastructure
   - Hunger and poverty

4. **Main obstacles facing them**:
   - No agricultural extension services and other agricultural support
   - No infrastructure
• No access to markets

5. Realistic and sustainable solutions to these obstacles:

• Improve infrastructure
• Support of agricultural extension services
• Promote human health services
• Promote animal husbandry
• Improve education

Location: Kizenga Village

Zone: Upland

Date: October 5, 2006

Target: The group was for youths aged 18-25 who were not involved in agriculture. Most of these young people were either still dependent on their farming parents or engaged in petty trade (this focus group was gender balanced).

1. Recent changes:

• While village forests have declined or disappeared, more and more individuals are taking initiatives privately to protect forests
• Local traditions continue to favor boys in education
• Lack of education
• poverty

2. Why have these changes occurred?
• People are starting to know the meaning of environmental protection for both social and economical gains
• Education of boys only because parents believe that girls are likely only to benefit other families when married and then move to her husband’s family
• Lack of education
• Lack of financial capital in savings and credits

3. Future changes:
• Shortage of reliable rainfall
• Climate change likely to change seasons
• Degradation of indigenous cultures
• Overpopulation
• More people will seek education
• Degradation of traditional norms and traditions

4. Main obstacles facing them:
• Poor rural healthcare; no easy access to hospital
• Declined quality of education
• The village is now endangered by influx of refugees, the UN agencies has put people in forest because of European “pristine” wildlife attitude and this has changed indigenous cultures and environment
• Poor infrastructures
• Lack of markets
• Shortage of reliable power
• Degradation of indigenous cultures

5. **Realistic and sustainable solutions to these obstacles:**

• Promote human health
• Improve education
• Protect environment
• Protect indigenous cultures
• Improve infrastructures of the region in roads and reliable power
Location: Kidahwe Village

Zone: Upland

Date: August 6, 2007

Target: The group included mature, household heads (males and females) pursuing varied economic interests such as farming and small business.

1. Recent changes:
   - Food shortage
   - Poverty
   - Poor quality of education
   - Lack of reliable human health

2. Why have these changes occurred?
   - Lack of financial capital in savings and credits
   - Lack of economic capital, savings, credits, loans, and agricultural inputs
   - While human population has grown but number of schools is not enough
   - Poverty
   - Poor healthcare

3. Future changes:
   - Modernity is happening in housing, roads, schools, etc
   - Human population increase
   - People will be forced to work together to overcome constraints
   - People will choose to become selfish

4. Main obstacles facing them:
• Lack of education
• Lack of financial capital

5. **Realistic and sustainable solutions to these obstacles:**

• Education

• Introduce credits with low interest rates

**Phase VI Focus Group Summaries for lowland and upland of Kigoma Rural**

The following focus groups were organized according to different criteria compared to those in phase II. Unlike phase II where focus groups were organized as village men, village women, village youths, and refugees, these were organized more based on livelihood specializations or classes of people that would mix gender and/or age groups. Eight villages were sampled. Those in the lowland area were *Bubango, Kiganza, Mkongoro,* and *Kagongo.* The upland area also had equal number of villages: *Mkigo, Matendo, Kidabwe,* and *Kizenga.*

**Location:** Bubango Village

**Zone:** Lowland

**Date:** September 20, 2006

**Target:** The group involved successful palm-oil farmers (dominated by males, also middle-aged).

1. **Recent changes:**

• Improved wildlife habitats
• Development especially in terms of housing
• Adoption of new form of agriculture systems
• Social capital is improving through the formation of various agricultural groups; self-reliance.

• More demand in education.

2. Why have these changes occurred?

• A shift in livelihood activities from one based on fishing to agriculture.

• Education.

• Environmental conservation.

3. Future changes:

• Increased costs in agricultural inputs.

• Poor soil fertility.

• Overpopulation.

• Lack of enough veterinary services.

• Poverty.

4. Main obstacles facing them:

• Lack of education.

• Poor agricultural systems.

• No financial capital.

• Lack of marketing opportunities.

5. Realistic and sustainable solutions to these obstacles:

• More emphasis in agriculture because most of the people depend on agricultural activities through training.

• Improved infrastructure.
• Adequate access to markets
• Education

**Location:** Kiganza Village

**Zone:** Lowland

**Date:** September 24, 2006

**Target:** The group was for youths aged 18-25 who were not involved in agriculture. Most of these young people were either still dependent on their farming parents or engaged in petty trade (this focus group was gender balanced).

1. **Recent changes:**
   • More educated people
   • Improved housing
   • Improved health services
   • Poor agricultural productivity

2. **Why have these changes occurred?**
   • The village now has many educated youth
   • Improved housing
   • More people are engaged in agricultural productivity
   • The village now has a dispensary

3. **Future changes:**
   • Lack of institutions
   • More health problems
   • Poor infrastructure
• Lack of economic opportunities
• Poverty
• Emigration to other places with better opportunities

4. Main obstacles facing them:
• Poor infrastructure
• Lack of education
• Poor human health
• Lack of agricultural extension services and inputs
• Lack of markets

5. Realistic and sustainable solutions to these obstacles:
• Improved infrastructure can change the entire people’s livelihoods, i.e. roads and electricity
• Improve education sector in order to educate community
• Improve markets
• Improved investment in local farming systems

Location: Kagongo Village
Zone: Lowland
Date: June 26, 2006
Target: The group was a mix of farmers, business owners, and fishermen—dominated by mature males.

1. Recent changes:
• More desire for education
2. Why have these changes occurred?
   - Good government policy

3. Future changes:
   - Things will change for good because the government is willing to intervene
   - Sustainable development
   - If the central government continues to lack interests in the region

4. Main obstacles facing them:
   - Soil infertility
   - Lack of financial capital and markets
   - Refugees from war-torn countries
   - Poor infrastructures

5. Realistic and sustainable solutions to these obstacles:
   - Credits and loans
   - Improve infrastructures

Location: Mkongoro Village

Zone: Lowland

Date: June 26, 2006

Target: The group included mature, household heads (males and females) pursuing varied economic interests such as farming and small business.

1. Recent changes:
   - Increased number of schools; people see the importance of education
   - Poor health care due to lack of medicine and qualified experts
2. Why have these changes occurred?

- Modern buildings; government has employed more teachers
- Poverty due to lack of education, government support, and markets
- Lack of environmental education; no alternatives for charcoal-making

3. Future changes:

- The lives of people will improve because of the available education, technology, and citizenry participation
- Good governmental policy; current government has good plans for the people.
- Improved infrastructure will boost agricultural markets
- Corruption will never end and instead, multiply

4. Main obstacles facing them:

- Poverty
- Illiteracy
- Lack of outside information or technology

5. Realistic and sustainable solutions to these obstacles:

- Rural education is needed
- Capacity building through credits
- Reduced corruption
- Involve people in each development strategy from planning to implementation
- Improve marketing strategies especially those that bring foreign currency
Location: Mkigo Village

Zone: Upland

Date: September 19, 2006

Target: The participants were successful coffee farmers (males and females that tended towards middle-age.)

1. Recent changes:

   • Land no longer fertile
   • Rainfall has changed seasons, plus lack of rainfall
   • Native tree species now rare
   • Clouds used to be familiar and at that there was plenty of water in the village. This trend has changed. The village is now facing lack of water
   • They have moved from one to three primary schools; there is a desire to get more education
   • There is poor infrastructure
   • Villagers now produce one of the best coffee in the world but still lack adequate agricultural inputs

2. Why have these changes occurred?

   • Environmental degradation due to widespread bushfire is washing top soil
   • Lack of education especially in agricultural systems; poor animal husbandry system; poor education system
   • Poor financial capital
• Lack of markets
• Human population growth
• Government neglect
• Peer influence has helped more people to afford corrugated iron sheet
• Shortage of food

3. Future changes:
• A drug-addicted generation
• Depopulation due to infectious diseases, such as AIDS/HIV
• Hard times to those without education; there will be increased desire to get education

4. Main obstacles facing them:
• Poor human health due to severe lack of health centers
• Shortage of adequate energy sources

5. Realistic and sustainable solutions to these obstacles:
• Emphasize education
• Provide enough drinking water
• Provide agricultural inputs

Location: Matendo Village
Zone: Upland
Date: September 22, 2006
Target: The most remote village of the uplands—the participants were heavily dominated by mature females, between 30-55 years old. They were “internal refugees” who were farmers who had migrated with their spouses from the lowlands near GSNP in pursuit of more land of higher fertility.

1. Recent changes:
   - A new primary school has been constructed in the village
   - Access to a new village market
   - Lack of soil fertility

2. Why have these changes occurred?
   - A new primary school
   - Poor farming systems
   - Poor human health system

3. Future changes:
   - Poor soil productivity
   - Poor human health
   - Lack of access to markets
   - No infrastructure
   - Hunger and poverty

4. Main obstacles facing them:
   - No agricultural extension services and other agricultural support
   - No infrastructure
   - No access to markets
5. Realistic and sustainable solutions to these obstacles:

- Improve infrastructure
- Support of agricultural extension services
- Promote human health services
- Promote animal husbandry
- Improve education

Location: Kizenga Village

Zone: Upland

Date: October 5, 2006

Target: The group was for youths aged 18-25 who were not involved in agriculture. Most of these young people were either still dependent on their farming parents or engaged in petty trade (this focus group was gender balanced).

1. Recent changes:

- While village forests have declined or disappeared, more and more individuals are taking initiatives privately to protect forests
- Local traditions continue to favor boys in education
- Lack of education
- Poverty

2. Why have these changes occurred?

- People are starting to know the meaning of environmental protection for both social and economical gains
• Education of boys only because parents believe that girls are likely only to benefit other families when married and then move to her husband’s family

• Lack of education

• Lack of financial capital in savings and credits

3. Future changes:

• Shortage of reliable rainfall

• Climate change likely to change seasons

• Degradation of indigenous cultures

• Overpopulation

• More people will seek education

• Degradation of traditional norms and traditions

4. Main obstacles facing them:

• Poor rural healthcare; no easy access to hospital

• Declined quality of education

• The village is now endangered by influx of refugees, the UN agencies has put people in forest because of European “pristine” wildlife attitude and this has changed indigenous cultures and environment

• Poor infrastructures

• Lack of markets

• Shortage of reliable power

• Degradation of indigenous cultures

5. Realistic and sustainable solutions to these obstacles:
• Promote human health
• Improve education
• Protect environment
• Protect indigenous cultures
• Improve infrastructures of the region in roads and reliable power

**Location:** Kidahwe Village

**Zone:** Upland

**Date:** August 6, 2007

**Target:** The group included mature, household heads (males and females) pursuing varied economic interests such as farming and small business.

1. **Recent changes:**
   
   • Food shortage
   
   • Poverty
   
   • Poor quality of education
   
   • Lack of reliable human health

2. **Why have these changes occurred?**
   
   • Lack of financial capital in savings and credits
   
   • Lack of economic capital, savings, credits, loans, and agricultural inputs
   
   • While human population has grown but number of schools is not enough
   
   • Poverty
   
   • Poor healthcare
3. **Future changes:**
   - Modernity is happening in housing, roads, schools, etc
   - Human population increase
   - People will be forced to work together to overcome constraints
   - People will choose to become selfish

4. **Main obstacles facing them:**
   - Lack of education
   - Lack of financial capital

5. **Realistic and sustainable solutions to these obstacles:**
   - Education
   - Introduce credits with low interest rates
1. **What are some recent environmental, social, and economic changes that you have seen in Kigoma Rural? [For each change, is that a change for the better or for worse? Why do you feel that way?]**

   - Social changes through increased rural population. Kigoma has the highest birth rates and hence, increased human demands.
   - Economic change through increased prices of gas. Very little has been done by the government to remedy the situation.
   - Environmental changes due to increase in population there is a tremendous change in environmental, e.g., more trees have been cut down for charcoal and firewood, fishing using illegal gears has increased hence destroying multiplication areas of fish. Fish harvest has gone down and prices of fish at retail level have gone up. Serious environmental degradation is coming as a result of deforestation, illegal fishing, etc.

2. **Why, in your opinion, have these changes occurred? [For each change in Question above]**

   - Economics of the environment in the rural area has changed. For example, the cost of transportation due to high prices of fuel has gone up, this has led to high prices of most commodities. For a normal person to survive, they have to
increase their income. Sometimes this involves destruction of environment through selling more charcoal as people can no longer afford kerosene.

- Increased human population and prices. Reasons for this are that improved health services have reduced the child mortality.
- Lack of market opportunities as the government acts only in times of food shortage and less during surplus.
- Lack of seriousness from the government, no new road has been constructed in the entire Kigoma Region since Tanzania got its independent from the British in 1961.
- Lack of education especially in health care services

3. In your opinion, how do you think the quality of life has changed for most of the villagers of Kigoma Rural district over the past 5 years?

   Answer: (b) Improved some

4. What, in your opinion, is the likely future of Kigoma Rural and why?

   This depends on the action or how the government intervenes. Life in Kigoma Rural areas will improve very much in the future. Reasons for this are:

   - Government has decided to improve infrastructure e.g., road network. Most of the major roads in the region will be improved to tarmac level. This will improve business in the region
   - FELISA Co. Ltd and efforts mad government to improve oil palm as cash crop will raise income of the rural majority. Increased income will improve living standards of the rural.
• Great future because of good rainfall and fertile. Kigoma is one of the few places where any crop can thrive due to the physical features of the region.

5. What do you think is the likely future for the district? [Probe for at least two possible views on how they see the future of Kigoma Rural District (one optimistic, one pessimistic):

Optimistic future

• Multi-party systems have aroused political consciousness of the people of Kigoma region.

• Kigoma needs a very little push because of good land, strategic location. For instance, solar fish drying can help a lot.

• Food security due to access to food to all people at all times (i.e., time, accessibility, all people). You can access food by getting your own farm or have income.

Pessimistic future

• The education system; there is a serious lack of adult education for a new generation

• Five groups of farmers. First group is the innovators (5%); risk-takers even without any security. Second group is the early majority (40%) who copy innovators. Third group is the Late Majority who wait until a close friend has done it. Fourth group is the majority who need a law enforced for them to do something. The fifth, and final group, is laggards (5%) who will never change. Most of people in Kigoma are in group three to five because of lack of education.

6. What, in your view, are the major constraints facing rural people in Kigoma Rural District to improve their lives?

• Poor infrastructures especially roads.

• Poor marketing systems of cash crops
• Lack of adult education; what people really need is skills, not education. They don’t get results from research.

• Lack of inventiveness—people are not working hard to invent or improve their way of living e.g., most people are lazy; they do not like work (they want to work very little and talk too much). This ends up into less income.

7. **What development interventions, in your view, are most needed to overcome these constraints and why?**

**Development interventions needed.**

• First, improve infrastructure especially roads or bridges. If the Member of Parliament dies it takes 100 million Tanzanian shillings in three months but not to fix a broken bridge.

• Second, improve marketing and processing facilities e.g., in fishing—most *sadines* are fished during the rainy season, and the drying mechanism is very poor hence more fish get rotten, loss of income to fishermen.

• Third, Provide access to information that is relevant to the daily livelihoods of an average person.

• Government should stop talking too much with very nice write ups but doing very little to farmers. Politicians are now detached from the reality.

• Banks do not give loans to small farmers. For instance farmers in Tanzania cannot get a bank loan as the set up of almost all banks in the country does not permit a small scale farmer to access bank loans. 70% of farmers do not get any bank support.
Interviewee Code: 2

Gender of Interviewee: Male

Age of Interviewee: 57 Years

Depth of Knowledge of Kigoma Rural District: Very Good

Date of Interview: August 29, 2006

Place of Interview: Kigoma Town

1. What are some recent environmental, social, and economic changes that you have seen in Kigoma Rural? [For each change, is that a change for the better or for worse? Why do you feel that way?]

   • Population increase is worsening
   
   • Political instability has attracted many international NGOs in urban areas, not in the rural
   
   • Tourism is growing
   
   • Worsening human health and education system

2. Why, in your opinion, have these changes occurred? [For each change in Question above]

   • Culturally, wives are expected to have more children. The nutrition of people around Lake Tanganyika has improved. Plus, medical facilities are now available.
   
   • The vast country of neighboring Democratic Republic of Congo is becoming hard to govern, mainly because of international politics rooted in the exploitation of its widespread natural resources, especially minerals.
   
   • Tourism is now a growing industry because of daily flights linking Kigoma Region and the outside world. Now chimpanzees in the region receive widespread news on international media outlets. We now have two major airlines
in Tanzania competing. Additionally, tour companies in Mahale now fly people directly to the park. However, tourism in the region has had no effect on the rural economy of Kigoma.

- Increased costs to access health care and education because of privatization of health care and education sectors, but this has not been good for subsistent families in rural areas. Only favorable to employed people in urban areas.

However, more people mean more diseases.

3. In your opinion, how do you think the quality of life has changed for most of the villagers of Kigoma Rural district over the past 5 years?

Answer: (b) Improved some

4. What, in your opinion, is the likely future of Kigoma Rural and why?

He divides the Kigoma Rural district into two major zones: north of Malagarasi and south of Malagarasi River. For the northern portion of the river, the following likely future can be summarized.

- Improved quality of life
- Environmental degradation likely to increase
- New economic initiatives especially in palm oil for diesel or fuel

5. What do you think is the likely future for the district? [Probe for at least two possible views on how they see the future of Kigoma Rural District (one optimistic, one pessimistic):]

Optimistic future

a. Reduced birth rates likely to protect the environment

Pessimistic future

- Increased birth rates will destroy natural resources
• Intensive cultivation of oil palm and coffee will likely destroy environment

6. What, in your view, are the major constraints facing rural people in Kigoma Rural District to improve their lives?

• Lack of starting capital

• Lack of business opportunities and possible markets. For example, cultivation of ginger and fishing industry of Lake Tanganyika lack reliable markets

• Lack of adequate knowledge on how to improve quality of livelihoods

7. What development interventions, in your view, are most needed to overcome these constraints and why?

• Introduction of micro-credits through the introduction of non-predatory banks that help average person rather the current banks that can only take money from them

• Trade organizations must help establish local markets

• Introduce applied curriculum based on rural settings

Interviewee Code: 3

Gender of Interviewee: Male

Age of Interviewee: 48 Years

Depth of Knowledge of Kigoma Rural District: Excellent

Date of Interview: July 15, 2006

Place of Interview: Kigoma Town

1. What are some recent environmental, social, and economic changes that you have seen in Kigoma Rural? [For each change, is that a change for the better or for worse? Why do you feel that way?]
• Economically, the local economy has improved since he arrived in Kigoma from northern Tanzania in 1982. Transportation network has improved somehow. Food production is increasing for both food and cash crops. Kigoma coffee now ranks the best in Tanzania and is starting to fetch the highest price. Kigoma has never received food aid and instead, the region feeds other neighboring regions of Tanzania and countries especially through such crops as maize, beans and bananas. Key indicator is construction of modern homes. Student enrolment in the region is second indicator, plus less disease outbreak.

• Socially, increased number of schools. The number of primary schools has grown from 60 in 1982 to 219 currently available. One village is possible to have more than two primary schools. Secondary schools have increased from 2 in 1982 to 21 now available. Society is now very involved. In terms of human health, at least each village now has dispensary, plus four health centers. People now have access to human health.

2. **Why, in your opinion, have these changes occurred?** [For each change in Question above]

• Economically, people are now having basic education through government actions by seminars. Less bureaucracy from the government side. Agricultural inputs have been subsidized.

• Socially, same as above, through participatory approach

• Environmentally, has changed for worse. A lot of soil, forestry, and environmental degradation. Despite of so many programs. They haven’t been successful to cope with pace of degradation. Examples are now widespread open hills and drying up of
many sources of water. Historically, people of Kigoma have never been empowered and instead, they have always been used as cheap labor elsewhere in Tanzania; people now feel empowered.

3. **In your opinion, do you think the quality of life has changed for most of the villagers of Kigoma Rural district over the past 5 years?**

Answer: (b) Improved some

4. **What, in your opinion, is the likely future of Kigoma Rural and why?**

A lot of opportunities to develop:

- Lots of virgin lands
- Reliable rainfall
- Adequate manpower—so many youths. They need governmental support through mechanization.

5. **What do you think is the likely future for the district? [Probe for at least two possible views on how they see the future of Kigoma Rural District (one optimistic, one pessimistic):**

**Optimistic future**

- Opening up of the region via roads and skyways
- Strategic location of Kigoma for trade. There is a port that can serve DRC, Burundi and Zambia. The region needs electricity—there is a lack of power.

**Pessimistic future**

- Very serious environmental degradation

6. **What, in your view, are the major constraints facing rural people in Kigoma Rural District to improve their lives?**

- Lack of infrastructures—no roads
• Limited number of schools. For example, very few complete secondary schools with
dorms, labs, and good teachers. Most of those 21 secondary schools are very poor
especially for girls.
• Lack of reliable electricity
• Increased number of refugees; too much energy put in solving refugee factor. Peace
is needed. Environmental degradation.

7. What development interventions, in your view, are most needed to overcome
these constraints and why?
• Central government needs to give Kigoma region the first priority especially through
tarmac roads, plus feeder roads maintained even by gravel standard.
• Enough teachers need to be available in both arts and sciences. The trend now is
that there are regions that are meant to provide science students and some reserved
for art students.
• Grid electricity

Interviewee Code: 4
Gender of Interviewee: Male
Age of Interviewee: 50 Years
Depth of Knowledge of Kigoma Rural District: Excellent
Date of Interview: June 16, 2006
Place of Interview: Kiganza Village

1. What are some recent environmental, social, and economic changes that you
have seen in Kigoma Rural? [For each change, is that a change for the better
or for worse? Why do you feel that way?]
• Environmental: high soil degradation is resulting into poor fertility which, in turn, is causing poor crop production. Farming households are becoming increasingly poor economically and in terms of their human health as a result of this environmental degradation.

• Social: Poverty hinders access to basic human needs such as housing, clothes, food, school fees for their children, adequate food, etcetera etcetera.

• Overpopulation

2. Why, in your opinion, have these changes occurred? [For each change in Question above]

• Lack of environmental education to farmers

• Poor marketing system

• Lack of capital and affordable loans to rural communities

• Lack of education in the community

3. In your opinion, do you think the quality of life has changed for most of the villagers of Kigoma Rural district over the past 5 years?

Answer: (d) Declined some

4. What, in your opinion, is the likely future of Kigoma Rural and why?

To sustain the quality of life of the people through:

• Provide agricultural technical skills to farmers

• Protect local environment

• Provide capital and soft loans to small groups of farmers

• Improve infrastructure, including access to water for both drinking and agriculture
5. What do you think is the likely future for the district? [Probe for at least two possible views on how they see the future of Kigoma Rural District (one optimistic, one pessimistic):

Optimistic future

- Lack of financial support from both governmental and non-governmental organizations

Pessimistic future

- Lack of improved organizational abilities especially in groups, cooperatives, family organizations, etc

6. What, in your view, are the major constraints facing rural people in Kigoma Rural District to improve their lives?

- Lack of education
- Lack of capital and soft loans
- Poor infrastructure
- Poor access to markets
- Environmental degradation
- Lack of communication

7. What development interventions, in your view, are most needed to overcome these constraints and why?

- Sustainable agricultural and environmental projects
- Creation of educational institutions to provide both formal and informal education, that employ participatory method

Interviewee Code: 5
Gender of Interviewee: Male

Age of Interviewee: 44 Years

Depth of Knowledge of Kigoma Rural District: ok

Date of Interview: June 30, 2006

Place of Interview: Kigoma

1. What, in your opinion, is the likely future of Kigoma Rural and why?
   - Prices of petroleum are now so high in the last two years; agricultural energy through palm oil provides hope for Kigoma. Palm oil described as the best energy crop possible.

2. What do you think is the likely future for the district? [Probe for at least two possible views on how they see the future of Kigoma Rural District (one optimistic, one pessimistic):

   **Optimistic future**
   
   Biofuel development can substitute traditional fuels/diesel. It is cheaper and cleaner than conventional diesel. Technology brings hope especially through renewable fuels is going to be cheaper

   **Pessimistic future**
   
   Implosion of refugees as refugees leaves for their home countries. The region has seven major refugee camps. The departure of these international NGOs will cause trouble as the region will have no cash circulation.

3. What, in your view, are the major constraints facing rural people in Kigoma Rural District to improve their lives?

   No access to suitable markets

4. What development interventions, in your view, are most needed to overcome these constraints and why?
Promotion of biofuels and ethanol

Interviewee Code: 6

Name of Interviewee: Thaddeus Anthony Ragije

Gender of Interviewee: Male

Age of Interviewee: 60 Years

Current Official Position of Interviewee: Cabinet Assistant Secretary in the State House of Tanzania. For 6 years

Depth of Knowledge of Kigoma Rural District: very good

Date of Interview: October 10, 2006

Place of Interview: Rombo Greeen View Hotel

1. What are some recent environmental, social, and economic changes that you have seen in Kigoma Rural? [For each change, is that a change for the better or for worse? Why do you feel that way?]

   • Deforestation
   
   • Shortage of water and rainfall
   
   • Land scarcity
   
   • Human population increase especially among youths under 30 years
   
   • Increased demands of basic human services e.g., education, health care, roads, communication, etc
   
   • Low agricultural productivity

2. Why, in your opinion, have these changes occurred? [For each change in Question above]

   • Human population growth due to high birth rates, improved health care, increased number of refugees in forests and wetlands, timber, housing, and lack of...
environmental education. Age-structure whereby increased number of children means increased demand of schools and tertiary education for youths.

- Deforestation, poor soil fertility, poor farming systems and lack of adequate rainfall.
- Lack of modern agricultural inputs. Past staple crops such as cassava are now becoming increasingly rare.

3. In your opinion, how do you think the quality of life has changed for most of the villagers of Kigoma Rural district over the past 5 years?

Answer: (d) Declined some

4. What, in your opinion, is the likely future of Kigoma Rural and why?

- Internal migration among able-bodied in search of green pastures
- Kigoma Region likely to continue being a labor reserve region. Even people who are assigned to work in the region tend to see it as a “demotion”. It is likely to become a ghost region.

5. What do you think is the likely future for the district? [Probe for at least two possible views on how they see the future of Kigoma Rural District (one optimistic, one pessimistic)]:

**Optimistic future**

- Immense human capital as the region has many hard-working people in agriculture, trace and formal jobs.
- Suitable geographical location will likely make the region a very suitable economic zone and a linkage for much of East and Central Africa.
- Virgin lands and reliable markets from neighboring countries and regions of western Tanzania

**Pessimistic future**
6. What, in your view, are the major constraints facing rural people in Kigoma Rural District to improve their lives?

- Lack of education in each level
- Poor human health
- Poor infrastructure, i.e., water-ways, roads, railways, and air

7. What development interventions, in your view, are most needed to overcome these constraints and why?

Similar as in the optimistic list

Nothing since the region has almost everything
Interviewee Code: 7

Gender of Interviewee: Male

Age of Interviewee: 49 Years

Depth of Knowledge of Kigoma Rural District: Excellent, 18 years of experience

Date of Interview: June 6, 2006

Place of Interview: The Office of the District Executive Director (DED), Kigoma Rural

1. What are some recent environmental, social, and economic changes that you have seen in Kigoma Rural? [For each change, is that a change for the better or for worse? Why do you feel that way?]

   - Improved livelihoods i.e., housing, extensive irrigation schemes, introduction of new seeds, new investors (i.e., employment), new industries, and water services.
   - Primitive farming systems due to lack of peer innovation
   - Many new schools (both primary and secondary); but lack of skilled teachers
   - Environmental degradation
   - Refugee influx since 1972 (they bring chaos)—in environment, peace, etc
   - Poor health care system
   - Indigenous people now investing in Kigoma
   - Decreased jealousy among people
   - New roads built; television
   - Lack of agricultural markets (e.g., no board for palm oil)
   - Environmental degradation will increase due to population growth in absence of good planning. People of Sukuma tribe from the north are now coming in large numbers.
2. Why, in your opinion, have these changes occurred? [For each change in Question above]

- Lack of peer innovation (needs interaction or networking)
- Lack of skilled manpower
- Improved networking via open infrastructures
- Introduction of cooperatives e.g., savings and credits (SACCOs)
- Availability of water facilitated significantly
- Almost each village has at least one health center or a dispensary
- Reliable access to markets
- People now have adopted “private forests” (i.e., “ukiharibu mazingira yatakuharibu, ila ukiyatunza nayo pia yatakutunza”—destroying local environment is equal to self-destruction, but its conservation means our own prosperity

3. In your opinion, how do you think the quality of life has changed for most of the villagers of Kigoma Rural district over the past 5 years?

Answer: (d) Improved some

4. What, in your opinion, is the likely future of Kigoma Rural and why?

- Very bright future because of markets in neighboring countries and regions of Tanzania, especially once commercial farming starts
- Almost reliable rainfall and conducive climate; enough rivers in the lowlands
- Palm oil is the only oil with the highest vitamins and with high productivity per unit area. Kigoma is the only place in Tanzania that produce palm oil.
Tourism in the Kigoma region because of its two famous national parks of Gombe and Mahale national parks

Potential mineral areas. Thus, the region has a potential for growth in terms of mineral exploration, tourism, and trade

5. **What do you think is the likely future for the district?** [Probe for at least two possible views on how they see the future of Kigoma Rural District (one optimistic, one pessimistic):]

**Optimistic future**

- Commercialization of agriculture

**Pessimistic future**

- Land crisis especially from new pastoralists, new investors mean that these new and outside investors with big money will alienate locals.

6. **What, in your view, are the major constraints facing rural people in Kigoma Rural District to improve their lives?**

- Lack of modern networking
- Reliable markets both internally and externally
- Lack of competitive schools because education is power. Youths get married while too young. Kigoma is extremely behind in education.

7. **What development interventions, in your view, are most needed to overcome these constraints and why?**

- Improve infrastructures and networks
- Improve education at both primary and secondary schools
- Introduce appropriate agricultural machinery and commercialization of farming systems.
Interviewee Code: 8

Gender of Interviewee: Male

Age of Interviewee: 33 Years

Depth of Knowledge of Kigoma Rural District: very good, 20 years

Date of Interview: June 30, 2006

Place of Interview: Bangwe Beach on shoreline on Lake Tanganyika, Kigoma Town

1. What are some recent environmental, social, and economic changes that you have seen in Kigoma Rural? [For each change, is that a change for the better or for worse? Why do you feel that way?]

- Environmental degradation because of bushfires, deforestation, and poor farming systems
- Declining education standard. Lack of teachers and poor performance, low quality of education. Lack of student housings is the reason for frequent pregnancies for young women in schools.
- Decaying health care system due to ill-trained public officials and lack of medicines
- Quantity and quality of water has declined
- Lack of reliable infrastructure; no single paved road in Kigoma Rural
- Poor agriculture system; lack of inputs and technologies. Low government priority given to the district
- Absence of qualified agricultural extension officials—no regular training
• Loss of soil fertility

2. Why, in your opinion, have these changes occurred? [For each change in Question above]
• Lack of education
• Poor agriculture and fishing due to lack of inputs and technologies
• Environmental degradation because of refugees from neighboring countries and surrounding dry regions of Tanzania

3. In your opinion, how do you think the quality of life has changed for most of the villagers of Kigoma Rural district over the past 5 years?
Answer: (d) no change

4. What, in your opinion, is the likely future of Kigoma Rural and why?
• Landless local people because all productive lands are now taken by outsiders
• Lack of access to education because more priority is now given to building schools for elites only, i.e. “international schools.”
• Poverty will multiply as land becomes scarce
• Starvation will increase

5. What do you think is the likely future for the district? [Probe for at least two possible views on how they see the future of Kigoma Rural District (one optimistic, one pessimistic):]

   **Optimistic future**
   Strategic location of Kigoma region provide access to suitable markets

   **Pessimistic future**
   Poor education system

6. What, in your view, are the major constraints facing rural people in Kigoma Rural District to improve their lives?
• Poor health care
• Poor education system
• Water shortage
• Lack of technology

7. What development interventions, in your view, are most needed to overcome these constraints and why?

• Improve education system. The government should provide hardship allowance to workers and increase the number of teachers in remote schools
• Improve irrigation system. The district has many lowlands and permanent rivers
• Improve rural health care
• Good governance or supervision of all development programs

Interviewee Code: 9

Gender of Interviewee: Female

Age of Interviewee: 55 Years

Date of Interview: June 16, 2006

Place of Interview: Kiganza Villa

1. What are some recent environmental, social, and economic changes that you have seen in Kigoma Rural? [For each change, is that a change for the better or for worse? Why do you feel that way?]

• The people are becoming uneducated, very few people have education
• Three-quarters of land is bare, no trees
• Old people are not ready to embrace changes
• Too many youth are very lazy, work seems as punishment to them

• Increasing poverty

2. Why, in your opinion, have these changes occurred? [For each change in Question above]

• Lack of education is causing deforestation since people think that cultivation requires only soil and not anything else

• Rural-urban migration among youth where most of them end up working the white collar jobs

• People think that to be rich you must work in the offices or in the industries

3. In your opinion, dow do you think the quality of life has changed for most of the villagers of Kigoma Rural district over the past 5 years?

Answer: (d) improved some

4. What, in your opinion, is the likely future of Kigoma Rural and why?

• Changes can occur in Kigoma Rural in future, provided people are ready to communicate with different people and advisers and trainers from different parts

• Through education, growing generation will change, and people will become rich

5. What do you think is the likely future for the district? [Probe for at least two possible views on how they see the future of Kigoma Rural District (one optimistic, one pessimistic):]

Optimistic future

Through education people will change, will work hard and will become rich

Pessimistic future

Tribal beliefs will disappear although it will take a very long time to change people, especially in witchcraft beliefs
6. What, in your view, are the major constraints facing rural people in Kigoma Rural District to improve their lives?

- Education
- Traditional beliefs, such as witchcraft beliefs
- Some are afraid of others to do good things, thinking that they will be laughed at.

7. What development interventions, in your view, are most needed to overcome these constraints and why?

- Education on sustainable agriculture and formal education especially from primary to high school level
- Practical education and study tours

Interviewee Code: 10

Gender of Interviewee: Male

Age of Interviewee: 59 Years

Depth of Knowledge of Kigoma Rural District: helped to create villages during early years of Tanzania’s independence especially in Kigoma region

Date of Interview: June 29, 2006

Place of Interview: Kigoma town

1. What are some recent environmental, social, and economic changes that you have seen in Kigoma Rural? [For each change, is that a change for the better or for worse? Why do you feel that way?]

- Environmental degradation
• Rural-urban migration

• Food shortages

2. Why, in your opinion, have these changes occurred? [For each change in Question above]

• Population growth and refugees

• Lack of government action toward rural people

• Rural-urban migration denies rural areas the most talented and capable manpower

3. In your opinion, dow do you think the quality of life has changed for most of the villagers of Kigoma Rural district over the past 5 years?

Answer: (d) declined a lot

4. What, in your opinion, is the likely future of Kigoma Rural and why?

Rural-urban migration of youth

5. What do you think is the likely future for the district? [Probe for at least two possible views on how they see the future of Kigoma Rural District (one optimistic, one pessimistic):

   Optimistic future

   • New investors

   • Government promise of improving infrastructure in the region will help to stop rural-urban migration

   Pessimistic future

   • Lack of indigenous institutions whereby local people have become humble servants of new and most powerful investors
• These outside and usually foreign investors are taking all prime arable lands, which will likely leave local people without any arable lands.

• Kigoma has the highest birthrates in Tanzania

6. **What, in your view, are the major constraints facing rural people in Kigoma Rural District to improve their lives?**

• Lack of education

• “Hand-out” mentality whereby all government officials are not from here—they have been imposed by the government. These “employees” lack interests in the progress of the region

• Local people have already given up

• Elites from Kigoma never return—they invest elsewhere

7. **What development interventions, in your view, are most needed to overcome these constraints and why?**

• Build schools to change people’s mentality through self-love; build schools and employ descent teachers and implement relevant curriculum

• Build capacity of adults through socio-economic projects; current schools only benefit young people.

• Strengthen rural community development initiatives

• NGOs are there only because they can write proposals and have connections that enable them to get funds that benefit themselves and not targeted population

• Improve health and water facilities in rural areas in order to strengthen a human capital. Only healthy people can think and act properly. Employ committed and
capable employees in healthcare system by focusing on prevention. You do not need a person who is fully qualified.

• Food security; even youth need to be involved. They will need assistance from the outside in terms of inputs.

• Focus on local investors; outsiders take a long time to materialize. Locals ensure that everything stay here.

• Mobilize current elites to develop their villages
Interviewee Code: 12

Gender of Interviewee: Female

Age of Interviewee: 42 Years

Depth of Knowledge of Kigoma Rural District: Very good

Date of Interview: October 4, 2006

Place of Interview: Kigoma Town

1. What are some recent environmental, social, and economic changes that you have seen in Kigoma Rural? [For each change, is that a change for the better or for worse? Why do you feel that way?]
   - Environmental degradation
   - Improved cultural capital

2. Why, in your opinion, have these changes occurred? [For each change in Question above]
   - Improved education
   - People now work hard

3. In your opinion, do you think the quality of life has changed for most of the villagers of Kigoma Rural district over the past 5 years?
   Answer: (d) improved some

4. What, in your opinion, is the likely future of Kigoma Rural and why?
   - The region is endowed in natural resources such as Lake Tanganyika, swamps, rivers, enough rain, fertile land, and conducive geographical location for trade with neighboring countries
5. What do you think is the likely future for the district? [Probe for at least two possible views on how they see the future of Kigoma Rural District (one optimistic, one pessimistic):]

   **Optimistic future**

   Peace in the region

   **Pessimistic future**

   Droughts

6. What, in your view, are the major constraints facing rural people in Kigoma Rural District to improve their lives?

   - Poor infrastructure (i.e., roads, electricity, schools, and health care)
   - Lack of community education
   - Illiteracy
   - Lack of outside information or technology

7. What development interventions, in your view, are most needed to overcome these constraints and why?

   - Improved infrastructure
   - Education

**Interviewee Code:** 14

**Gender of Interviewee:** Female

**Age of Interviewee:** 27 Years

**Depth of Knowledge of Kigoma Rural District:** Good

**Date of Interview:** October 4, 2006

**Place of Interview:** Kigoma Hilltop Hotel
1. What are some recent environmental, social, and economic changes that you have seen in Kigoma Rural? [For each change, is that a change for the better or for worse? Why do you feel that way?]

- Both quantity and quality of education
- People now rely on western medicine rather than traditional ones

2. Why, in your opinion, have these changes occurred? [For each change in Question above]

- Role of education is now obvious
- Education on healthcare has increased

3. In your opinion, how do you think the quality of life has changed for most of the villagers of Kigoma Rural district over the past 5 years?

   Answer: (d) improved some

4. What, in your opinion, is the likely future of Kigoma Rural and why?

   Improved education will reduce “primitivity” and will mean more educated people

5. What do you think is the likely future for the district? [Probe for at least two possible views on how they see the future of Kigoma Rural District (one optimistic, one pessimistic):]

   **Optimistic future**

   - Power of education
   - Self-reliance will create more jobs

   **Pessimistic future**

   Rampant poverty will terrorize people

6. What, in your view, are the major constraints facing rural people in Kigoma Rural District to improve their lives?

   - Poor access to healthcare
   - Water shortage
7. What development interventions, in your view, are most needed to overcome these constraints and why?

- Healthcare access
- Provision of safe drinking water
- Education
- Environmental education

Interviewee Code: 15

Gender of Interviewee: Female

Age of Interviewee: 55 Years

Depth of Knowledge of Kigoma Rural District: Very good

Date of Interview: October 11, 2006

Place of Interview: Kigoma Town

1. What are some recent environmental, social, and economic changes that you have seen in Kigoma Rural? [For each change, is that a change for the better or for worse? Why do you feel that way?]

- Food shortage
- Improved regional planning whereby people now live in planned neighborhoods
- People now eager to diversify incomes through trade
- Increased demand for education
- Decreased agricultural products

2. Why, in your opinion, have these changes occurred? [For each change in Question above]

- Soil infertility due to lack of capital
• Change in livelihood strategies

• Role of education in earning livelihoods now seen as a map to success especially through peer influence

• Soil infertility and lack of capital

3. In your opinion, how do you think the quality of life has changed for most of the villagers of Kigoma Rural district over the past 5 years?

Answer: (d) improved a lot

4. What, in your opinion, is the likely future of Kigoma Rural and why?

• More educated people

• Modernization

• People will re-adopt farming as a way of earning livelihoods as results of capacity building and self-help programs

5. What do you think is the likely future for the district? [Probe for at least two possible views on how they see the future of Kigoma Rural District (one optimistic, one pessimistic):

Optimistic future

Government now seems serious about improving conditions of people in rural areas

Pessimistic future

Lack of government action; priorities given to those in core areas and not those in peripheries

6. What, in your view, are the major constraints facing rural people in Kigoma Rural District to improve their lives?

• Food shortage

• Lack of education
• Poor access to means of communication

7. **What development interventions, in your view, are most needed to overcome these constraints and why?**

• Sharing of ideas among stakeholders and team-building

• Public education on their role in development
APPENDIX C.

SURVEY DOCUMENTATION
Hujambo! I would like to speak to the head of the household, or his or her representative, that farms this land. My name is ____________ and I am conducting research with farmers in Kigoma Rural District. I am a student at Utah State University in the United States. The purpose of this work is to learn about the condition of farmer’s lives in our district and propose helpful ideas to address problems. I have a survey with about 42 questions for you. I hope to interview men and women separately and want to walk with you on your farmland and see your situation. I may want to take some photos of you, your household, and farm with your permission. Your answers to my questions are confidential and will not be shared with anyone. I will appreciate your complete and honest answers. Honest answers will be useful. You will never be personally identified nor will I identify where the photos came from. My visit with you should take about three hours. You are free to not participate if that is your wish. Finally, I cannot promise that benefits will directly come to you or your family if you participate in this survey.

1. Name of Male Enumerator/Assistant: ______________________________
2. Name of Female Enumerator/Assistant: ______________________________
3. Interview Date: ______________________________
4. Stratification Codes: ______________________________
5. Name/location of Nearest Village: ______________________________
**GENERAL FARM DESCRIPTION** *(to be completed with male and female respondents together)*

6. Who is the **Head of Household** or *primary decision maker* for this farm? ________________
   ___ (name)

7. Can you tell me about the two main people we can interview today? *(assume one will be a senior male and the other a senior female)*

<table>
<thead>
<tr>
<th>No.</th>
<th>Interviewee’s Name</th>
<th>Relation to HoH</th>
<th>♂ / ♂</th>
<th>Age</th>
<th>Level of Education</th>
<th>1st Language (mother tongue)</th>
<th>2nd Language?</th>
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8. Please tell me about **all other people** who primarily depend on this household for food and shelter:

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<th>No.</th>
<th>Name</th>
<th>Relation to HoH</th>
<th>♂ / ♂</th>
<th>Age</th>
<th>Level of Education</th>
<th>1st Language (mother tongue)</th>
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9. How long has this **shamba** been farmed by:

   a. The household head (primary decision maker): ______________________ (years)

   b. The family of the household head: ______________________ (years)

10. Please tell us about the number and size of **all the shambas** you use and how you use them:

<table>
<thead>
<tr>
<th>Shamba #</th>
<th>Size (hectares, or specify other size units)</th>
<th>Land Tenancy &amp; Ownership*</th>
<th>Number of Years Used</th>
<th>What is this shamba used for…</th>
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<td>A (this shamba)</td>
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<td>I (total plots)</td>
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*Codes: 1 = owns shamba and has an official title deed; 2 = owns shamba but does not have a title deed; 3 = rents the shamba from someone else for payment in cash or sharecropping; 4 = uses the shamba freely with permission only from the owner; 5 = uses the shamba with no permission from an owner; 6 = respondents have no idea about tenancy or ownership. (if the farmer has a title deed, you should ask permission to see it.)

11. What are the **most important crops** you have grown over the past 5 years, on average, FOR ALL YOUR SHAMBAS COMBINED? [List as many as possible from the most important (1) to the least important (10); if only a few can be listed, that is OK].

<table>
<thead>
<tr>
<th>Rank</th>
<th>Name of Crop</th>
<th>Used for Family Food</th>
<th>Used for Cash Income</th>
<th>Used for Food and Cash Income</th>
<th>Used for Livestock Feed</th>
<th>Other Purpose (medicinal, cultural, fuel, soil fertility?)</th>
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Include all crops including grains, beans, root crops, fruits, tree crops, animal feeds, straw, fuel wood. Also beer brewing and other forms of production related to alcohol, traditional medicines, drugs, etc.
12. What are the **most important livestock/livestock products** that you have raised over the past 5 years, on average, ON ALL YOUR SHAMBAS? [List as many as possible from the most important (1) to the least important (10); if only a few can be listed, that is OK].

<table>
<thead>
<tr>
<th>Rank</th>
<th>Species</th>
<th>Number of Head Owned in Total</th>
<th>Product</th>
<th>Used for Family Food</th>
<th>Used for Cash Income</th>
<th>Used for Food and Income</th>
<th>Used for Trade or Barter</th>
<th>Used for Other Purposes (soil fertility, tillage, portage, etc.)</th>
<th>Grazing (G), confinement (C), or both (G/C)</th>
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Possible species include cattle, sheep, goats, chickens, donkeys, honey bees, etc. Possible products include milk, meat, eggs, hides & skins, manure, power for pulling carts or hauling goods to market, or honey. All of these products could be consumed on farm, sold, or traded.
13. What are the most important **natural or wild products** that the family has collected over the past 5 years, on average? These may come from your shambas or from forest, lakes, or other locations. [List as many as possible from the most important (1) to the least important (10); if only a few can be listed, that is OK. Remind the respondents that answers are confidential].

<table>
<thead>
<tr>
<th>Rank</th>
<th>Name of Item</th>
<th>Used for Family Food</th>
<th>Used for Cash Income</th>
<th>Used for Food and Income</th>
<th>Used for Trade or Barter</th>
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Possible items may include bush meat, hides & skins, fish, wild plants, charcoal, minerals/gem stones, medicinal plants, firewood, wild honey, animal products (horns, bones, fur, teeth, etc.) used for cultural or medicinal purposes. Weaving textiles from natural fibers and making pottery from natural clay could also be included.
14. Considering the past 5 years on average, please estimate the annual CASH INCOME (in TSh) for the household FROM ALL SOURCES. INCLUDE IN THIS ESTIMATE THE ANNUAL MARKET-VALUE OF HOME-GROWN FOOD AND OTHER COLLECTED OR HARVESTED ITEMS USED ON THE SHAMBA [note: it may be easiest to estimate a low monthly income and a high monthly income, take the average, and multiply by 12 for an annual total] CIRCLE ONE BEST ANSWER BELOW:

a. 0 to 49,999  b. 50,000 to 99,999  c. 100,000 to 149,999  d. 150,000 to 199,999  e. more than 200,000

15. Considering the past 5 years on average, estimate how much of the total income in Q #14 comes from each of the following categories (use 20 stones or marbles to allocate on a plastic sheet with labeled categories – must add to 100%).

a. Sales of all crops grown on shambas: Number of stones/marbles: _________/20 and Calculated Percent____(%)  
b. Sales of all livestock and their products: Number of stones/marbles: ________/20 and Calculated Percent___%  
c. Sales of any other (wild) products: Number of stones/marbles: __________/20 and Calculated Percent____(%)  
d. Off-farm income from all wages/salaries/pensions/rentals for all family members (total) living at the shambas:  
   Number of stones/marbles: ________________/20 and Calculated Percent _____(%)  
e. Remittance income--wages, salary money sent home from family members who DO NOT LIVE at the shambas:  
   Number of stones/marbles: ____________/20 and Calculated Percent _____(%)  
f. Estimated market value of all home-grown food and household items consumed on-farm (crops, livestock, bush food):  
   Number of stones/marbles: ________________/20 and Calculated Percent _____(%)
[Note: Categories a-f must add to 100%. Adjust if necessary. After this exercise the respondents may also want to re-consider their answer to Question #14. It would not be surprising if item f was the largest component, especially for poorer households. This question only addresses income and change in assets is not assessed] Explain any important details about income categories in Question #15 as needed:

16. Considering the past 5 years on average, please estimate the annual CASH EXPENDITURE PATTERN (in TSh) for ALL HOUSEHOLD PURPOSES. (Use 20 stones or marbles to allocate on a plastic sheet with labeled categories – must add to 100%).

   a. All purchased food items--- Number of stones/marbles________ Calculated percent ____ (%)  
   b. Clothing and miscellaneous household items--- Number of stones/marbles_______ Calculated percent ____ (%)  
   c. Farming / livestock / livestock supplies--- Number of stones/marbles________ Calculated percent ____ (%)  
   d. Child education, school fees, etc--- Number of stones/marbles________ Calculated percent ____ (%)  
   e. Adult education--- Number of stones/marbles________ Calculated percent ____ (%)  
   f. Health care total--- Number of stones/marbles________ Calculated percent ____ (%)  
   g. Gifts or transfers to others--- Number of stones/marbles________ Calculated percent ____ (%)  
   h. Leisure including purchase of beer, etc. --- Number of stones/marbles________ Calculated percent ____ (%)  
   i. Personal savings--- Number of stones/marbles________ Calculated percent ____ (%)
j. Payments on loans--- Number of stones/marbles_________ Calculated percent ____ (%)  
k. Other (specify: ________________) --- Number of stones/marbles_______ Calculated percent ____ (%)  

Total Percent = ______________

GENERAL LIVELIHOOD TREND INFORMATION (Note: This section may be filled in having the senior male and senior female interviewed separately. After posing question #17, give the respondent some time to reflect before answering)

17. Please take some time and think carefully. Overall, what has the quality of life been for you and your family members OVER THE PAST 5 YEARS? Consider health, income, the environment, market prices, and anything else that is important. Then with assistance from the interviewer, CIRCLE ONE BEST ANSWER BELOW:

   (a) Improving Alot  (b) Improving Some  (c) No Change  (d) Declining Some  (e) Declining Alot

18. If improving or declining, WHY has this change occurred? [Rank opinions from More Important (1) to Less Important (5)]. Note: If only a couple reasons are given, that is OK. We may expect a mixture of “bad” factors and “good” factors as well as a mixture of “personal” factors and “system” factors. The interviewer needs to help the respondent self-analyze and describe what the most important factors are before writing down answers.

   (1) 

   (2) 

   (3)
19. How have you or your family members COPED to try to improve your lives given these changes? [Rank coping tactics from More Important (1) to Less Important (5)]. *Note: If only a couple of coping tactics are given, that is OK. Some may say they have no coping tactics. We may expect a mixture of “traditional” tactics and “non-traditional” tactics. The interviewer needs to help the respondent self-analyze and describe what the most important coping tactics have been before writing down answers.*

(1)

(2)

(3)

(4)

(5)

**SPECIFIC LIVELIHOOD TREND INFORMATION**

20. Over the past 5 years, the health of my household members and myself has (circle one):

(5) Improved alot   (4) Improved some   (3) No change   (2) Worsened some   (1) Worsened alot
Briefly explain:

21. Over the past 5 years, the ability of my household members and myself to do manual farm labor has (circle one):
   (5) Improved alot  (4) Improved some  (3) No change  (2) Worsened some  (1) Worsened alot

Briefly explain:

22. Over the past 5 years, the skills and knowledge of my household members and myself have (circle one):
   (5) Improved alot  (4) Improved some  (3) No change  (2) Worsened some  (1) Worsened alot

Briefly explain:

23. Over the past 5 years, the ability of my family to recover from a serious household problem has (circle one):
   (5) Improved alot  (4) Improved some  (3) No change  (2) Worsened some  (1) Worsened alot

Briefly explain:

24. Over the past 5 years, the social and helpful connections between my household and other households have (circle one):
   (5) Improved alot  (4) Improved some  (3) No change  (2) Worsened some  (1) Worsened alot
25. Over the past 5 years, the cash income for my household and myself has (circle one):
   (5) Increased alot  (4) Increased some  (3) No change  (2) Decreased some  (1) Decreased alot
   Briefly explain:

26. Over the past 5 years, the total numbers of livestock (cattle, sheep, goats, donkeys) my household owns has (circle one):
   (5) Increased alot  (4) Increased some  (3) No change  (2) Decreased some  (1) Decreased alot
   Briefly explain:

27. Over the past 5 years, my confidence in the future of my household and myself has (circle one):
   (5) Increased alot  (4) Increased some  (3) No change  (2) Decreased some  (1) Decreased alot
   Briefly explain:

28. Over the past 5 years, my belief that I can solve my problems in life has (circle one):
   (5) Increased alot  (4) Increased some  (3) No change  (2) Decreased some  (1) Decreased alot
29. Organizations include networks and institutions where people collaborate and help each other. Traditional forms may include blood-relatives, larger ethnic (tribal) groups, village groups, harambee, etcetera. How many TRADITIONAL organizations can you and your family members rely upon if you need help? (circle one)

   0  1  2  3  4  5  6  7  8  9  10

30. Organizations include networks and institutions where people collaborate and help each other. Non-traditional forms may include church, schools, farmer’s unions, women’s groups, etcetera. How many NON-TRADITIONAL organizations can you and your family members rely upon if you need help? (circle one)

   0  1  2  3  4  5  6  7  8  9  10

31. What kinds of help can you receive now from TRADITIONAL and NON-TRADITIONAL organizations?

32. Over the past 5 years, the number of TRADITIONAL organizations that my family and I can rely upon has (circle one):

   (5) Increased alot   (4) Increased some   (3) No change   (2) Decreased some   (1) Decreased alot

   Briefly explain:
33. Over the past 5 years across all my shambas, the productivity of the soil for crops has (circle one):

(5) Increased alot (4) Increased some (3) No change (2) Decreased some (1) Decreased alot

Briefly explain:

34. Over the past 5 years across all my shambas, the amount of land we farm has (circle one):

(5) Increased alot (4) Increased some (3) No change (2) Decreased some (1) Decreased alot

Briefly explain:

________________________________________________________________________________________________

35. Over the past 5 years across all my shambas, the amount of feed for my livestock has (circle one):

(5) Improved a lot (4) Improved some (3) No change (2) Worsened some (1) Worsened a lot

Briefly explain:

36. Over the past 5 years, the environment (rainfall, temperature, disease, land use) of this area has (circle one):

(5) Improved a lot (4) Improved some (3) No change (2) Worsened some (1) Worsened a lot

Briefly explain:
37. Over the past 5 years, the availability of agricultural technology (new seeds, veterinary supplies, fertilizers, etcetera.) for you and the family has (circle one):

   (5) Improved a lot   (4) Improved some   (3) No change   (2) Worsened some   (1) Worsened a lot

   Briefly explain:

38. Over the past 5 years, the availability of credit for you and the family has (circle one):

   (5) Improved a lot   (4) Improved some   (3) No change   (2) Worsened some   (1) Worsened a lot

   Briefly explain:

39. Over the past 5 years, your cash savings has (circle one):

   (5) Improved a lot   (4) Improved some   (3) No change   (2) Worsened some   (1) Worsened a lot

   Briefly explain:

40. Over the past 5 years, the access to markets to sell your produce has (circle one):

   (5) Improved a lot   (4) Improved some   (3) No change   (2) Worsened some   (1) Worsened a lot

   Briefly explain:

41. Over the past 5 years, the access to banks to save your money has (circle one):
(5) Improved a lot    (4) Improved some    (3) No change    (2) Worsened some    (1) Worsened a lot

Briefly explain:
42. If you were able to IMPROVE the quality of the lives of you and your family in ONE REALISTIC WAY, what would you do, and what would you need? The interviewer needs to give the respondent time to reflect. Help the respondent self-analyze and describe the pathway clearly before writing down answers. Referring back to answers for questions 18 and 19 should be helpful. Use back of page if necessary.

What:

Why:

How:

THE END---WALK THE SHAMBA AND VERIFY SOME ANSWER
CURRICULUM VITAE

Yared J. Fubusa

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EDUCATION

<table>
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<tr>
<th>Dates</th>
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<th>Location</th>
<th>Degree Awarded</th>
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<tr>
<td>2004/10</td>
<td>Utah State University</td>
<td>Logan, Utah</td>
<td>Ph.D., Human Dimensions of Ecosystem Sci. &amp; Mgt.</td>
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<td>2000/03</td>
<td>University of Utah</td>
<td>Salt Lake City, Utah</td>
<td>Masters Degree, Economics of Protected Areas</td>
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<tr>
<td>1997/2000</td>
<td>Longwood University</td>
<td>Farmville, Virginia</td>
<td>Bachelors Degree, Economics</td>
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<td>1994/96</td>
<td>Milambo</td>
<td>Tabora, Tanzania</td>
<td>High School Diploma</td>
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<td>1990/93</td>
<td>Mwandiga</td>
<td>Kigoma, Tanzania</td>
<td>Secondary school diploma</td>
</tr>
<tr>
<td>1983/89</td>
<td>Kiganza</td>
<td>Kigoma, Tanzania</td>
<td>Primary school certificate</td>
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BACKGROUND

Yared Fubusa was born and raised in a small village on the eastern portion of the Gombe Stream National Park. He became Dr. Jane Goodall's young research assistant at Gombe where he helped observe behaviors of chimpanzees in the wild. He was a founding member of Goodall's international program for young people, *Roots and Shoots*, where he became instrumental in launching outreach programs for the Jane Goodall Institute in Tanzania and around the world. While working at Gombe Stream National Park, Fubusa hosted a group of high school students and their three chaperons from Prince Edward County High School in Virginia, who called themselves the African Primates Environmental Study (APES) group. As their gift to Tanzania, the APES group facilitated Fubusa's admission to Longwood University in their hometown of Farmville, Virginia and the group raised money for his airfare.

Fubusa earned a Bachelor's degree in Economics at Longwood University in 2000, a Master's degree in the Economics of Protected Areas from the University of Utah in 2003. He spent the 2003/04 academic year teaching African studies at the University of Virginia. Fubusa has earned his Ph.D. at Utah State University in the summer of 2010, with his degree in the Human Dimensions of Natural Resources. His dissertation is entitled, “*Conservation from the Bottom-Up: Human, Financial, and Natural Capital as Determinants of Resilient Livelihoods in Kigoma Rural, Tanzania.*”

Fubusa’s research interests cover a wide range of topics from rural economy, sustainable livelihoods, linkages of research knowledge and action, African indigenous institutions, community-based conservation to effects of African wildlife and foreign aid.
on the livelihoods of indigenous people who live around protected areas throughout Africa. Fubusa has been featured as a keynote speaker at various educational institutions and conferences in 45 U.S. states. Fubusa is increasingly acknowledged by local and international media, including BBC, as a distinguished social scientist.

To facilitate a more participatory approach to conservation efforts at Gombe Stream National Park in western Tanzania, Fubusa founded the Gombe School of Environment and Society (GOSESO). The GOSESO project employs a more community-oriented approach to bridge human prosperity with wildlife conservation at Gombe Stream National Park. The vision of GOSESO has been to foster a new generation of Africans—both locally and elsewhere—who are inspired by environmental stewardship, community self-reliance, and economic sustainability. Its mission is to generate widespread support to lay groundwork for improving both human and wildlife prosperity through education for rural Africans that promotes self-reliance, economic and cultural vitality, human health, and peace. The GOSESO framework is addressing pressing issues threatening both people and the environment in the Lake Tanganyika Region while offering lessons with worldwide applicability.

The GOSESO projects seeks to: (1) Create and operate a residential school that uses the environment as a framework for an integrated curriculum, (2) train African youth to pursue the fields of ecological management, wildlife conservation, and community development; (3) provide local communities with access to resources, information, and services that will enhance understanding and foster partnerships among stakeholders; (4) contribute to societal change through educational programs that aim to stop the spread of
human and wildlife disease; (5) empower a diverse group of committed youths to improve cross-cultural understanding, increase prospects for stability and peace, strengthen environmental and community relations, and lead the way to a more sustainable future; and (6) enhance understanding of concepts related to community and wildlife sustainability, while ensuring that local people benefit from the land and local resources through participation in environmental decision-making.

Fubusa was inspired by the fact that education has historically been used to promote and maintain a system that creates marginality, especially in Africa. Most of the African education system continues to have a legacy of colonialism. Indigenous knowledge throughout Africa has been deliberately eliminated and replaced by a Eurocentric educational system designed to modify behaviors of students through a command and control approach. Indigenous education is a necessary foundation for indigenous life and the persistence of traditional culture. For indigenous learning, people become architects of their own future whereby information is invested anew with each passing generation. It was Fubusa’s early life experiences growing up in a small village on the eastern shoreline of Lake Tanganyika just outside Gombe Stream National Park in western Tanzania that fueled his interest in community-based conservation. The following is his account of a shocking human-wildlife conflict that changed his life:

I was no more than five years old when my village hired a group of hunters to kill the ‘enemy’ baboons. As a child I saw countless heads, legs, and hands of baboons on display in the government building in the center of the village. Almost everybody in the village came to see the ‘enemy’ wildlife that had crippled the subsistence economy and hindered crop productivity for centuries. Many of my friends were jubilant to see dead wildlife, but I never felt that way.
What I saw were heads of baboons that bore remarkable similarities to humans. As far as I can remember, watching their dead open eyes was like watching the eyes of my grandmother who had died the year before. Their faces clearly bore an uncanny resemblance to humans. Their dark eyes had the color of my own. Even at that age, I felt that wildlife near our village were in danger and that their end was near.

Fubusa later on came to understand the connection between the plight of wildlife and the economic realities facing his people. As he grew up and took a leadership role within his community, Fubusa saw the need to create an institution that fosters the coexistence of humans and wildlife; one that bridges human prosperity with wildlife conservation. This is now the vision of the Gombe School of Environment and Society (“GOSESO”). For now, Fubusa’s responsibilities afford him little time to enjoy GOSESO’s idyllic campus, which offers lakeside views of lush miombo woodlands and mountains. Along with completing this doctoral research, Fubusa has maintained a busy speaking schedule throughout the United States and abroad trying to forge partnerships. In the fall 2008, Fubusa was elected an Ashoka Fellow by the Ashoka Foundation, an Arlington, Virginia-based organization that describes itself as the world's large community of leading social entrepreneurs. As an Ashoka Fellow, he received a three-year fellowship that supports his work as GOSESO's director and visionary.

**PUBLICATIONS, PAPERS GIVEN**


Fubusa, Y. J. 2009. Field report for third and final year of Phase II (School without Walls) of a project on the creation of Gombe School of Environment and Society (GOSESO). Kigoma, Tanzania.


Fubusa, Y. J. 2008. Field report for second year of Phase II (School without Walls) of a project on the creation of Gombe School of Environment and Society (GOSESO). Kigoma, Tanzania.


Fubusa, Y. J. 2007. Field report for first year of Phase II (School without Walls) of a project on the creation of Gombe School of Environment and Society (GOSESO). Kigoma, Tanzania.


LECTURES

Fubusa, Y. J. 2010. Building Human and Social Capital for Increased Livelihood Resilience in Kigoma, Tanzania. Paper given to Environment and Society Department, College of Natural Resources, Utah State University. Spring lecture series, April 12


Fubusa, Y. J. 2010. The Role of Indigenous Institutions for Protected Areas and Poverty Reduction. The 12th International Congress of Ethnobiology. Tofino, Canada: May 9-14


OTHER IMPORTANT APPEARANCES

• Have been featured in various local and international media on the future of Africa and responsible ecosystem management on the continent.

• BBC Swahili Service Analyst, London-based radio service reaching an audience of more than 40 million people in East, Central, and Southern Africa. Served as a frequent commentator on various environmental, social, cultural, political, or economic issues facing Africans.

• Featured on BBC television program on the “Endangered Apes” of Africa as a “Social Scientist” (July, 2005).

• Featured in various magazines, newspapers, and local television news.

• Appeared as a keynote speaker at various American educational institutions, including major universities and conferences, with talks given in 44 states.

TEACHING EXPERIENCES

• Gombe School of Environment and Society, http://www.goseso.org, in Lake Tanganyika Region, Tanzania. Apart from being the founder and executive director of the school, I also have teaching responsibilities on the mission of the school of bridging human prosperity with wildlife conservation in the Lake Tanganyika Region.

• University of Virginia (Fall 2003 to Spring 2004). African Studies through Cultural Anthropology, two classes, Charlottesville, Virginia (USA)

• University of Utah (Fall 2000 to Spring 2002). Teaching Assistant, Department of Parks, Recreation, & Tourism. Courses taught: Sustainable Tourism and Natural Resource Management. Responsibilities included preparing and teaching discussion sections, periodic in-class lectures, grading papers, providing assignments and exams, and holding office hours, and one-on-one sessions with students.

• Prince Edward County High School, Virginia (1998 to 1999). Taught mathematics to students with special needs to help them improve skills to appropriate grade level during both work and after-school hours.

• The Jane Goodall Institutes’ Roots and Shoots Program “Think Tank” (1997). Served as one of 12 members in the Central Committee for the Roots & Shoots Program worldwide as African representative.
• Field Assistant to Dr. Jane Goodall, Gombe Stream Research Center, Tanzania (1994 to 1996). Studied the behavior of the wild chimpanzees. Translated research notes taken by local field assistants from Kiswahili or tribal language, Kiha, into English.

FUNDRAISING

• Have raised nearly USD $500,000 in cash and additional USD$400,000 as in-kind. Have done this in his role as the founder, visionary, and Executive Director of the Gombe School of Environment and Society, http://www.goseso.org, in western Tanzania. Has also done this while simultaneously in his capacity as a fulltime doctoral student at Utah State University.

• His pursuit of the doctoral degree is in harmony with the GOSESO leadership role. He has forged a strong link between the two endeavors by having the doctoral research help meet the information-gathering needs and management of GOSESO in both Tanzania and USA.

OTHER ACTIVITIES, AFFILIATION, PROFESSIONAL MEMBERSHIPS

• International Congress of EthnoBiology (2010 to present)
• International Funders for Indigenous Peoples (2010 to present)
• The Bioneers (2006 to present)
• Human Dimensions of Natural Resources in the Western U.S. Conference (2005)
• Roots & Shoots Program (Founding Member, 1991 to present)
• National Outdoor Leadership School (2000 to 2003)
• Youth Environmental for Sanity (1999 to present) July 1999 World Representative nominated by their global network to be one of the 30 leading young activists worldwide
• Jane Goodall’s International Ambassador and Disney V.I.P., Disney Institute at Orlando, Florida. (April 2000)
• Longwood University Honor Society (1997 to 2000)
• Regional Coordinator, Roots & Shoots Program, Tanzania (1994 to 1996). Worked with 52 school clubs in western and central Tanzania where we planted trees in open areas and at schools, organized school and village celebrations with environmental conservation and community themes, worked with Jane Goodall in nationwide Wildlife Awareness Week in western Tanzania and the capital of Dar-Es-Salaam, and worked with several international film companies featuring behaviors of wildlife at Gombe National Park.
SCHOLARSHIPS, AWARDS, ASSISTANTSHIPS

- Cell Signaling Technology (2008)
- Ashoka Foundation (2008 to present)
- Mathews Community Foundation (2007 to 2008)
- The New England Biolabs Foundation (2006 to present)
- The New England Biolabs, Inc. (2008 to present)
- The International Community Foundation (2006 to present)
- The International Foundation of New Jersey (2008)
- The Walton Family Foundation (2005 to present)
- Utah State University Fellowship (2004 to 2005)
- University of Utah Teaching Assistantship (2000 to 2002)
- Longwood University Alumni Scholarship. Funded (Spring 1997 to May 2000)
- Funded by over 200 various individuals through both in-kind and financial support
- Kigoma regional government
REFERENCES

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