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# Transforming lands and livelihoods in the Awach River Basin of Lake Victoria, western Kenya

Mary Kerubo Nyasimi  
*Iowa State University*

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**Transforming lands and livelihoods in the Awach River Basin of  
Lake Victoria, western Kenya**

by

**Mary Kerubo Nyasimi**

A dissertation submitted to the graduate faculty  
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Major: Sustainable Agriculture

Program of Study Committee

Lorna Michael Butler, Co-Major Professor

Charles Lee Burras, Co-Major Professor

Hsain Ilahiane

Richard Schultz

Jan Flora

Iowa State University

Ames, Iowa

2007

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## **DEDICATION**

This dissertation is dedicated to my parents, William Nyasimi Bousi and Agnes Nyamusi Nyasimi, for the love and encouragement they have given me through the years.

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During the three summers that I interacted with the people of Ainamoi and Kanyibana village, I marveled at their abilities to construct their livelihoods. In Ainamoi, it was with pride and power. In Kanyibana, it was with shame and humility. But one thing has been constant - their smiles and a hope for a better tomorrow. I learnt a lot from the interactions I had with groups in open spaces, with families in their houses as we had a meal, and with the younger women, I shared a thousand laughs. But the important information came from the intimate individual conversations, and usually the unexpected. Through their personal narratives, they welcomed me into their world and allowed me to journey with them. Their stories unraveled in my field notebooks. Sometimes, I had to restrain myself from writing all they told me, because each piece of their lives was connected to the other.

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## ABSTRACT

The significance of understanding the relationships between land degradation and livelihoods in developing countries has become a worldwide concern because of its importance to human food security, environmental quality and biodiversity. In sub-Saharan Africa, estimates indicate that 73% of the land is degraded as a result of erosion, soil compaction, nutrient depletion and deforestation. This degradation had caused a decline in quality of life or livelihoods. To understand the dynamic interaction between land degradation and livelihoods, a cross-cultural study was conducted among the Luo and Kipsigis people of western Kenya. The study adapted DFID's sustainable rural livelihood framework and investigated the following questions. 1) What livelihood capitals are rural people drawing upon in their everyday lives? 2) What livelihood strategies are rural people pursuing with regard to quality of their capitals? 3) What feedback relationships exist between capitals and livelihood strategies with special focus upon the role of land and culture? and 4) What is the appropriate research framework and methodology for studying land degradation and livelihoods?

Results suggest that a dynamic relationship exists between land and livelihoods that is rapidly transforming the lives of people of Awach River catchment, western Kenya albeit in different directions. Among the Luo people negative natural and cultural capital synergies exist, which in turn, are triggering downward spiral of other capitals. The negative interaction is rendering them unable to not only withstand internal and external shocks, but rebuild their capitals. As the land continues to degrade, the people seem to lack the needed will power, self confidence and determination to break away from deeply embedded cultural practices and reorganize their livelihood assets into more productive systems. Instead, they are escaping from their village problems, and in turn, their land and livelihoods are collapsing. The end result is escalating land degradation and increasing unsustainable livelihoods. On the other hand, the Kipsigis are experiencing positive capital synergies that enable them to adapt and utilize a range of capital management strategies. They are able to take advantage of internally changing capitals and external opportunities to build a somewhat healthy and resilient agrarian community that is linked to asset intensification and diversification. In conclusion, the study showed that the ability to make a meaningful livelihood in rural Africa is dependent not only on the quality and quantity of capitals that homestead members possess, but the capability to use and transform the capitals as well.

## CHAPTER 1

### GENERAL INTRODUCTION

*Standing precarious on an igneous cliff rock on the Awach catchment and casting one's eye across the vast land below, the beauty and serenity of the view is breathtaking. The blue waters of Lake Victoria shimmering in the far distance is captivating. However, on the landscape of Awach River basin, time and space do not stand still. Season after season, year after year, the erosive power of water continues to eat the landscape, consuming the soil, plants, animals and the people. On this landscape, massive gullies are constantly dissecting the land, deepening and diffusing their tendrils with each rainy season. The gullies, locally known as roaring monsters, have taken power from the people and are now shaping their lives, threatening their livelihoods, and making them destitute in their own cultural homeland...and therein lies the Mystery of the Land.*

The significance of understanding the relationships between land degradation and livelihoods in developing countries has become a worldwide concern because of its importance to world food security, biodiversity, and environmental quality. In these countries, land degradation is strongly linked to increased poverty, famine, malnutrition, starvation, disease epidemics, economic and social instability and migrations (Johnson and Lewis, 1995; Eswaran and Reich, 1998; Lal and Stewart, 1994). Degradation of land has direct and indirect adverse livelihood impacts, since the majority of rural people derive their livelihoods from natural resources. As the people struggle to secure acceptable lifestyles, they are, therefore, faced with the twin challenges of addressing the problems of land degradation, and simultaneously, in achieving sustainable livelihoods at the community level (Eswaran and Reich, 1998; Scherr, 2000; Baland and Platteau, 1996).

Few studies have documented direct linkages between land degradation and livelihoods in developing countries for two reasons. First, the concept of livelihoods is a relatively new idea, and secondly, since sustainable livelihoods is a recent concept; it is indirectly implied through the interconnectedness of land degradation and poverty. Reports suggest that poverty and land degradation are intertwined in a vicious cycle. Elements of poverty, that is, low income, poor health, powerlessness and illiteracy, are shown to lead to degradation (Southgate, 1990; Cleaver and Schreider, 1994). Degraded lands further exacerbate poverty, affecting people's abilities to make a living. This concept of "making a living" was adopted by development scholars such as Ian Scoones, Robert Chambers, and

Gordon Conway and translated into an analytical tool centered around the concept of livelihood. These authors and others have argued that poor people confronted with degraded lands, rationalize and construct intricate coping strategies. To the authors, livelihood was implicit within the context of poverty, and defined as:

Livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living: a livelihood is sustainable which can cope with and recover from stress and shocks and maintain or enhance its capabilities and assets..... both now and in the future or ... while not undermining the natural base (Chambers and Conway, 1992; Scoones, 1998; Carney, 1998).

Elements of poverty included within a livelihood are: inability of people to adequately manage land, illiteracy, powerlessness (*capability and assets*), activities that influence degradation (*activities*), vulnerability (*in ability to cope from stress and shocks, future generations, local and global concern*). The concept of livelihood was thus brought to the forefront among academic, governmental and development agencies because it has a direct relationship with land degradation.

Failure of development approaches to eradicate poverty in developing countries has led to adoption of the livelihood concept. Livelihood research is emerging as a promising strategy for understanding the multidimensional realities of rural people, and hence, in addressing poverty. Its strength lies in its consideration of local people as central to any development process. Indeed, the concept of livelihoods is about people making a living, responding to opportunities and coping with uncertainties (de Haan and Zoomers, 2005; Scoones, 1998). The nature of livelihood research permits it to be carried out at micro-level to facilitate understanding of relationships among the various dimensions of people's lives (Murray, 2001). It addresses the multidimensional aspect of poverty and draws upon the capabilities and strengths of local people, rather than using a needs approach to address persistent poverty (Murray, 2000).

Drawing upon the livelihood concept, this study aims to understand the relationships between land degradation and livelihoods in western Kenya. The concept of livelihood offers a vital approach that can be used to analyze and understand the diverse modes of livelihoods that prevail both within and between households in the face of adverse social, cultural and economic circumstances. For example, some rural people in developing countries faced with declining negative returns to farming engage in a multiplex of activities

to sustain their households (Chambers, 1997; Chambers and Conway, 1992; de Haan and Zommers, 2005). Other households are faced with heightened poverty and vulnerability as their farming system and socio-cultural structures breakdown (Drinkwater, 2003). However, the nature, form and impact of multiple strategies, poverty and vulnerability are contextual varying from one household to another. Thus, to understand the dynamic processes occurring among rural people, a holistic model that is actor-oriented and context specific is necessary.

### **Purpose of the Study**

The purpose of this study was to explore the complexities and relationships that exist between degraded lands and human livelihoods in rural western Kenya. The key concern was:

- How do rural people respond to changes in the quality of their natural capital?
- What factors explain changes in livelihood capitals, and how do families respond to changes in capitals?

Answering the above concerns could offer insights into both direct and indirect relationships that exist between land degradation and rural livelihoods. The study was conducted to provide a holistic understanding of the dynamic processes of land degradation and livelihoods in western Kenya.

### **Research Questions**

This study took place in two distinct yet contiguous villages with attention to the household level. It evolved over time as new information was gathered. However, the following three main questions guided the study:

1. What livelihood capitals are these ethnically different, but contiguous rural villages drawing upon in their everyday lives?
  - a. What capitals are available in each village?
  - b. What is the quality and quantity of the capitals?
  - c. What is the nature of the dynamic interactions among capitals?
2. What livelihood strategies are these ethnically different, but contiguous rural villages pursuing with regard to the quality of their capitals?
  - a. What strategies are used to make a living?
  - b. What critical capitals are drawn upon to make a living?

- c. What changes are occurring among the various strategies?
3. What feedback relationships exist between capitals and livelihood strategies with focus upon the role of land and water quality?
4. What is the appropriate research framework and methodology for studying land degradation and livelihoods?

### **Format of the Dissertation**

This dissertation consists of six chapters. Chapter 1, the introduction, outlines the importance of global concepts of poverty, land degradation and livelihoods. In this chapter, the purpose and research questions that guided the study are included. Chapter two presents a comprehensive analysis of the sustainable livelihood framework and proposes an integrative framework to address land degradation and livelihoods. Chapters three through five are stand alone manuscripts inclusive of methodologies, study area, and findings. Each chapter is written and presented in the format of a specific journal to which the article will be submitted.

Chapter three, titled *Unlocking the Ecology of Capitals in two Geographically-linked yet Culturally-Distinct Communities in western Kenya* addresses research questions 1 and 4. In this chapter, the dynamic interconnectedness of capitals is explored. Chapter four, titled *Changing Capitals and Shifting Livelihoods: Dynamics of the Agrarian Landscape of Lake Victoria Basin, Western Kenya* addressed research question 3. It investigates the hermeneutics of cultural practices that are embedded and valued by rural people and their impacts on land management. Chapter five, titled *Livelihoods as Capital: Differing Survival Strategies among the Luo and Kipsigis People on Kenyan shores of Lake Victoria* addresses research question 2. This chapter evaluates the livelihood strategies in terms of shifts in the agrarian and non-agrarian activities continuum and investigates ways that a vibrant rural economy can encourage its people to diversify strategies. Chapter 6 is an integrative conclusion of findings from chapters 3, 4 and 5 and responds to research question 4 as well.

### **Methodologies**

The above framework provides a holistic and integrated view of processes by which people do or do not degrade land. Investigating each core component and factors within them, requires differentiated methods. Therefore, a hybrid research method has the



advantage of providing a rich database. The selection of methods for this study drew upon scientific and local knowledge, and included:

- Biophysical and social-cultural observations and documentation
- Qualitative and quantitative techniques
- Participatory and non-participatory processes

A combination of the above methods in the study ensured an iterative and participatory process. Furthermore, a hybrid of methods guaranteed that different groups of people (wealthy and poor, women and men, young and elderly and socially included and excluded) occupying and operating at different spaces and scales were included. Multiple methods also assisted the researcher and local people in cross-checking and verifying the assembled information. This helped to limit bias and misrepresentation of meanings.

### **Definition of Important Terms**

**Affines** – This refers to kin relationship through marriage

**Land degradation** – The United Nations Environmental Programme (UNEP) defines land degradation as a human and climatically induced process that leads to reduction or loss of the biological and economic productivity and complexity of terrestrial ecosystems, including soils, vegetation, other biota, and the ecological, biogeochemical and hydrological processes that operate therein.

**Livelihood** – Livelihoods are made up of the capabilities, assets (stores, resources, claims and access) and activities required for a means of living. A livelihood is sustainable if it can cope with, and recover from, stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation, and contribute net benefits to other local and global level livelihoods in the short and long term.

**Livelihood capitals** – These are tangible and intangible resources and other assets that people can draw upon to make a living. Capitals include natural, financial, human, social, cultural, political, informational and physical resources.

**Livelihood diversification** - This is the process of constructing a diverse portfolio of activities and support capabilities in the struggle for survival and in order to improve the standards of living.

**Livelihood Intensification** – This refers to increased averaged inputs of labor or capital on a small holding either cultivated land alone or on cultivated and grazing land for the purpose of increasing the value of outputs per hectare.

**Livelihood vulnerability** – This refers to inability to cope and/or withstand shocks (one-time events such as flood, death and drought) and stresses (continuous events such as chronic illness, declining yields and declining labor).

**Patrilineal descent** – This refers to process of identifying descent through the male lines.

**Patrilocal residence** - This refers to a process of a newly wedded couple establishing a new home within the groom's father's compound.

**Polygamy marriage** - This refers to a process of a man marrying more than one wife.

**Polygyny marriage** – This refers to marriage between two women.

**Poverty** – This refers to lack of assets, necessities and low income. It is associated with different forms of isolation, vulnerability and powerlessness.

**Neolocality residence** - This refers to a process of a newly wedded couple establishing a new home away from the groom's or the bride's relatives.

**Uxorilocality residence** - This refers to a process of a newly wedded couple establishing a new home in the bride's father's compound.

**Virilocal residence** - This refers to a process of a newly wedded couple establishing a home near the groom's father's compound.

## CHAPTER 2

### LITERATURE REVIEW

#### Overview of land degradation

Land degradation is recognized as a multi-dimensional and multifaceted problem cutting across social, natural, cultural and political dimensions. The United Nations Environmental Programme (UNEP) defines land degradation as:

A human and climatically induced process that leads to reduction or loss of the biological and economic productivity and complexity of terrestrial ecosystems, including soils, vegetation, other biota, and the ecological, biogeochemical and hydrological processes that operate therein (UNEP, 1992).

The extensive literature surrounding the cause, extent and impact of land degradation is laced with conflicts. This is due partly to the definition that recognizes climatic (natural processes) and human induced processes as the main causes. Reducing causes of degradation to two distinct factors, without showing connectivity between them exacerbates the complexity of establishing a cause of land degradation. This is because elements of climate change, and its variability, may themselves be human-induced. Furthermore, anthropogenic factors and natural factors operate in the same space and time. This dynamic interaction of climatic and anthropogenic factors has led to confusion about the factors underlying land degradation, particularly in developing countries.

#### Causes of land degradation

##### a. Land degradation as a natural process

As a natural process, land degradation has been occurring over millennia through tectonic processes and climatic changes (Van der Leeuw et al., 2000). Climatic fluctuations during the Quaternary period led to expansion and contraction of glaciers in high latitude regions (Rasmussen et al., 1997; Hurrell, 1995). During this period, there was considerable climatic variability that produced decadal or seasonal cyclicity in key climate elements such as temperatures and precipitation in the tropics and sub-tropical regions (Ghil, 2002; Weldeab et al., 2005). This climatic change might be responsible for some of the harshest deserts today, e.g., Atacama Desert in northern Chile, and massive vegetation loss in Iceland during the Holocene period (Clarke, 2002; Hellden and Olafsdottir, 1999). In recent

geological times, decadal and seasonal climate fluctuations have led to warmer and drier, and wetter and more humid conditions (Hulme et al., 1995; Hastenrath, 1995). For example, during unusually heavy rain, windstorms and wild fires, vegetative cover might be lost, thus exposing soil to agents of erosion. Despite these natural disturbances, the land had the ability to regenerate what it had lost, in what is termed as resilience – the capacity or ability of a system to absorb perturbations, or the magnitude of disturbances that can be absorbed before a system changes its structure (Holling, 1973; Lal, 1997).

### **b. Land degradation as a human induced process**

As a human induced process, researchers have produced a framework focusing on the population-environment-poverty vicious cycle (Cavendish, 2000; Leach and Mearns, 1991; Cleaver and Schreider, 1994). Within the population-poverty-environment nexus, causes of land degradation are factors that determine the rate of degradation. These are *direct biophysical* (land use and management including continuous cultivation, deforestation, tillage methods and overgrazing), and *underlying socioeconomic* (land tenure, marketing, vulnerability, poverty, illiteracy, institutional support, income and human health) and *political* (incentives, instability and conflicts) factors. Demand for more food as population increases leads to encroachment on new lands such as forests (Southgate, 1990). After a while, there are no more new lands to invade and people are thus forced to concentrate large numbers of people on smaller and smaller fields, as is observed in east and southern Africa, India, Pakistan, Brazil, Mexico and China (Southgate et al., 1991). Small sized fields create severe economic pressures as people attempt to produce food and income. As a result, human and financial capital is shifted into non-agrarian activities and land suffers. In addition, tenure regimes, particularly in Africa and Asia, pose a huge threat to land quality. In this region, women who provide most of the labor for farming do not have property rights, and neither do they have rights to the products of their labor (Agarwal, 1986 and 1994; Berry, 1999). This precipitates a situation whereby the labor provider lacks incentive to care for the land.

### **Manifestation and Extent of Degradation**

Manifestation of land degradation processes includes physical (erosion, destruction of soil structure, reduction in infiltration rates, runoff, sedimentation and desertification), chemical (acidification, pollution, leaching, salinization, decrease in cation exchange

capacity and fertility) and biological processes (decline in biodiversity, reduction in vegetative cover and biomass carbon) (Cleaver and Schreider, 1994; Sanchez et al., 1997; Barbier, 2000; Eswaran et al., 2001). Social manifestations include abandonment of lands, increased human diseases, seasonal and permanent migration, and changes in consumption patterns (Blaike and Brookfield, 1987; Southgate, 1990).

In sub-Saharan Africa, nutrient loss is estimated between 60-100 kg/ha/year, creating a nutrient imbalance that is estimated to be between -14 to -136 kg/ha/year (Sanchez et al., 1997). As the area under plant cover declines, serious problems of sedimentation in lakes and reservoirs emerge. Offsite erosion impacts include destruction of aquatic systems through eutrophication, making it easier for invasive species to colonize aquatic habitats e.g., hyacinth (Labrada, 1995). Economically, impacts of degradation include increased cost of water resource management, loss of revenue, loss of agrarian and natural resource-based employment and shifting livelihood options (Bojo, 1996); Lal, 1987).

### **Framework for Studying Land Degradation and Livelihoods**

Land degradation is a multi-dimensional process that transcends both social and natural systems. Existing literature on causes, extent and impacts of land degradation are inadequate to offer useful strategies for tackling the problem. Therefore, how may we best study and comprehend the complexities that surround land degradation? Landscapes are understood to be intersections of the realms of natural environment, interacting processes, social relations and of cultural meanings (Sinclair and Walker, 1998; Odum, 1988; Chambers, 1983 and 1997). Nature in its own right, and humans, influence and alter landscapes (Sayer and Campbell, 2004). Indeed, rural landscapes, particularly in developing countries are shaped and influenced by meanings and identities attributed to it, structural and historical processes of agrarian and industrial change, and economic and political forces (Berkes and Folke, 1991). It is not surprising that current academic discourse advocates for a holistic interdisciplinary approach (Rapport et al., 1998). However, before this can be achieved, scientists must first reorient themselves to working within an interdisciplinary research paradigm.

Political ecology, entering the academic discourse in the 1980s, is the most current theory that situates landscapes with human and natural processes that are acquiescent to analysis through interdisciplinary methods (Greenberg and Park, 1994; Bryant, 1992). Previous studies of degradation posited the population-poverty-environment nexus (Cleaver

and Schreider, 1994; Scherr, 2000). However, further social studies revealed that this latter nexus could not satisfactorily account for degradation (Fairhead and Leach, 1996; Robbins, 1998). Instead, internal and external socio-political inequalities are pushing people to manage resources in unsustainable ways (Eldadawi and Sambanis, 2000; Diamond, 2005; Gezon, 1997; Hecht and Cockburn, 1990).

Political ecology arose from political economy theory that stressed the importance of integrating social relations into production of goods and services and with access and control over resources (Morris, 1995; Stahl, 1993; Pakenham, 1991; Mbaku, 1991; Blaike and Brookfield, 1987). Political economy emerged from two previously distinct fields of inquiry, cultural ecology and ecological functionalism. Cultural ecology was concerned with examining the ways culture adapts to the natural environment and the necessary strategies for survival in that particular environment (Steward, 1955). It recognizes that environment presents opportunities as well as adaptive problems. Economic and social organization emerges in attempts to exploit a given environment (using tools and knowledge) for subsistence production. Clearly this is a one-way thought process; one factor appears to be the cause of another. In addition, the theory does not offer an explanation of why the focus is on subsistence at the expense of other factors such as reproduction and politics. Furthermore, cultural ecologists' focus on adaptive mechanisms to deal with environment remains nebulous. For example, are adaptive mechanisms due to natural selection or rational decision making processes? Ecological functionalism treats humans (cultures) as one of a number of interacting species (Moran, 1990; Marshall, 2002). It recognizes closed relationships between population and natural elements. In particular, explicit attention is given to measurement of ecological variables such as land area, population density, and energy and nutrient flows (Moran, 1990; Marshall, 2002). The limitation of ecological functionalism lies in its treatment of systems as closed, hence failing to recognize that internal and external social, cultural and economic systems are impacting natural systems.

The merging of these two fields enabled scholars to think differently about the relationship between society and nature, and challenged the ways that they might attempt to solve degradation problems. This led to acceptance of political economy theory which emphasized that communities are not isolated, and power relations permeate all human interactions (Wolf, 1992). As more research revealed the political side of natural resources conflicts and scarcity, there was recognition that outcomes of human action on landscapes results from the interplay of forces over time that interact in environments that are, to begin

with, ecologically complex (Fairhead and Leach, 1996; Robbins, 1998). These brought into play, the two concepts of 'ecology of politics' and 'politics of ecology' (Wolf, 1992; Robbins, 1998; Forsyth, 2003; Gadgil, 1987). The former acknowledges that natural resources play a central role in shaping the political and social institutions within a society, and existing ecological conditions impose challenges and opportunities to meeting basic needs. The latter recognizes that in situations of scarcity, decisions are made on who has access, use and control of resources. Such factors as power, hierarchy, privileges and status all come into play shaping access, use and control of resources. Thus political ecology is a theory that emphasizes locality-based studies of people, including cultural, social and political factors influencing use of environmental resources (Goldman and Schurman, 2000). The strength of political ecology lies in its pragmatic assumption about the integration of biophysical processes, social and political relations, power of humans, and outcomes of their actions on the land (Schroeder, 1993; Peterson, 2000; Bryant, 1991). It also offers a platform for linking local-national-global complex political influences (Adger et al., 2001).

A pragmatic and analytical framework is therefore needed that draws upon the principles of political ecology. This can aid us in understanding the processes of land degradation and the dynamic ways in which people make a living. Livelihoods framework represents a step in the right direction, since it emphasizes how people live and interact with available resources.

### **Sustainable Livelihood Framework**

The sustainable livelihood framework is a pragmatic model that can be used to study processes of land degradation (natural and human induced), and to analyze relationships between relevant micro and macro factors. The importance of the sustainable livelihood framework (SLF) lies in its ability to integrate historical, biophysical, political and social processes that connect people with their environment. The SLF offers researchers a way of understanding - through chains of explanations and feedback mechanisms - how environmental actions of local people are shaped by economic and ecological forces, political marginalization, and pressures of production on resources. It can also aid researchers to comprehend existing flawed environmental data and policies.

The nascence of SLF can be traced back to the 1987 Brundtland Report (Brundtland, 1987). In this report, the commission recognized that despite numerous development strategies to alleviate poverty, the numbers of poor people in developing countries was

increasing. The report argued that pursuit of sustainable development requires citizen participation in political decision making, profitable economic systems, functioning social systems to address conflicts, and production and technological systems that respect and continuously search for solutions that are sensitive to future needs and conditions. All these factors pointed towards self-reliance and sustainability. A livelihood approach was thus proposed as a way of understanding the complexity surrounding poverty. In 1992, Chambers and Conway offered a working definition of livelihood (Chambers and Conway, 1992). They criticized previous development frameworks citing that they were reductionist, hence failing to capture the complex and diverse realities of rural landscapes. In the new framework, the concepts of capability, equity and sustainability were emphasized (Chambers and Conway, 1992).

In 1997, the United Kingdom Department for International Development (DFID) published a White Paper that made a commitment to eliminating poverty in poor countries. DFID advocated restructuring of the macro policy environment in such a way that it could support sustainable livelihoods. In 1998, DFID adopted the analytical SLF (Figure 1) that emerged from a brainstorming session involving the scholars of Institute of Development Studies, University of Sussex, UK. DFID uses SLF as a tool to eliminate poverty in two ways.

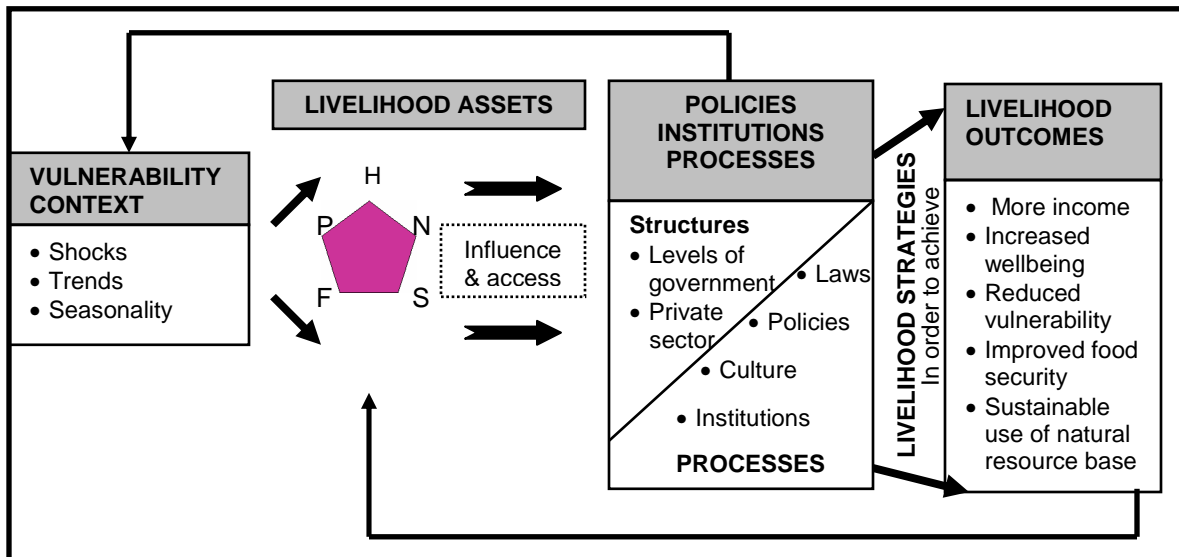
- Mainstreaming a set of core principles which determine that poverty-focused development activities should be people-centered, responsive and participatory, multi-level, conducted in partnership, sustainable and dynamic (Ashley and Carney, 1999; Carney, 1998).
- Applying a holistic approach to ensure that relevance is maintained with respect to improving poor people's livelihoods.

Livelihood analysis can be done using the SLF. It is a conceptual framework for analyzing poverty and its causes, people's access to resources, diverse livelihood strategies and influence of various factors at the micro and macro levels. The framework permits a deeper understanding of people's lives and the vulnerabilities they face. It recognizes that the lives of people are complex with multiple influences, actors, strategies and outcomes (Murray, 2001). It focuses on the strengths of local people and the value of building on their capabilities, not their needs and problems (Scoones, 1998; Chambers and Conway, 1992). The nature of SLF makes it possible for local people to participate in identifying and setting



priorities for development. This makes the framework actor oriented, people centered and context specific (Scoones, 1998; Chambers and Conway, 1992). It offers a dynamic approach that is interactive in understanding relationships and changing combinations of livelihoods. Since it encompasses the different dimensions of sustainability, that is, economic, social and environmental, it permits use of multiple methods (qualitative and quantitative; scientific and local knowledge) to analyze livelihoods. It encourages researchers and development agents to think holistically about capitals and their interactions, complementarities and sequencing (Adato and Meinzen-Dick, 2002).

**Figure 1.** The Sustainable Livelihood Framework (DFID, 2001).



### Limitations of the Sustainable Livelihood Framework

Though the SLF is seen as an improvement to conventional methods of poverty assessment, it does have some pitfalls. First, it overlooks important capitals that are central to the lives of rural people. These include cultural, political, informational and historical capitals. Cultural capital defined by Throsby (1995) as “a set of attitudes, practices and beliefs that are fundamental to the functioning of different societies”, is a critical capital that aides rural people in organizing their behavior and activities in relation to their other capitals, particularly natural capital. Incorporating cultural capital can offer insights into such questions as: *What cultural values govern choice of a livelihood strategy? What are the embedded norms that encourage or hinder involvement in activities?*

Political capital involves the notions of power and power relationships and negotiations, voice, decision making capabilities and ability to influence policy making. Extensive literature documents the extent and nature of power relations at micro and macro scales, and how this relationship affects livelihoods (Francis, 2000). Incorporation of political capital into the framework can enable researchers to assess: *who own what capitals, who decides, how are decisions made, levels of powerlessness, and who has the ability to influence policies that affect peoples' lives*. Inserting political capital can also aide researchers to understand how the poor can lobby for legislative support, thereby encouraging new investment opportunities within their communities.

One of the principles of sustainable livelihoods is to improve people's access to information (DFID, 2001). This refers to informational capital which, when availed to local people, can play a critical role in improving agricultural productivity. For rural people dependent on agrarian activities, Information is critical to improve land management, markets and prices, credit availability and other mitigating factors. In particular, information capital can assist researchers to answer question such as: *What type of information do rural people receive? Is the information packaged in a user friendly approach? Who has or has no access to new information? What organizations are available that can provide useful information to improve people's livelihoods?*

Historical capital is another important asset that local people draw upon. Passed through generations in the form of stories, dances, rituals or oral narratives, understanding important historical events can contribute to our understanding of ways in which the people have altered, changed, or shifted their livelihoods strategies. In addition, historical factors can help to understand how people have dealt with vulnerability factors such as famine and drought. The current way in which the framework is implemented suggests a one-time assessment, yet the livelihoods of people are dynamic, undergoing different processes at different times of the year, decade, and over generations.

Second, the framework does not offer strategies to encourage local participation in the process. Use of SLF enables one to draw upon a set of methodologies such as gender analysis, institutional appraisal and stakeholder analysis that can capture group diversity (Ashley and Carney, 1999; Murray, 2001). However, it does not equip researchers with tools that they can draw upon to incorporate local people into the process. In the end, it still might remain a top-down approach that targets only a select group of local people such as the powerful and wealthy.

Third, the framework fails to pay attention to issues of social differentiation and how these govern the lives of people. Among a group of people, there may be different social and wealth hierarchies. This differentiation can be observed even at individual level, whereby some members of the household are disadvantaged compared to others. In such circumstance, the framework may be used to only identify poor people at the household level. Intra-household differentiations (husband versus wife; boys versus girls) can potentially be ignored and could play a critical role in setting livelihood priorities.

### **Usefulness of the SLF to this study**

To understand circumstances of land degradation and design strategies to alleviate it among the rural poor living in developing countries, a detailed analysis of changing livelihoods is necessary. Land degradation and livelihoods are in a dynamic state and application of SLF can aid us to illuminate the historical and structural elements of degradation at micro and macro levels. Murray (2001), acknowledges that application of SLF transcends the conventional boundaries between different sectors, i.e., natural/social and scientific/local knowledge. The framework permits merging of different approaches to understand land degradation and how this is shaping the livelihoods of rural people.

Since land degradation is a dynamic multifaceted phenomenon, application of SLF permits a multi-method research team representing different disciplines to be involved. This study was conducted under guidance of both social and natural scientists (program of study advisers) from academic disciplines of soil science, natural resource ecology and management, sociology and anthropology. The five member team of advisers had strong analytic and facilitation skills that proved useful to me when I was conducting focus group discussions, collecting data and in analysis. Application of the SLF overcame disciplinary boundaries and helped build a holistic analysis of land degradation and its impact on livelihoods.

The SLF permitted us to actively involve local people in the study process, particularly during focus group discussions, water and soil quality assessment (Figures 1 and 2). A lot of information was gathered during the various exercises, not only on causes and impacts of land degradation, but on strategies to solving the problem.

Figure 2. Women measuring the quality of water on Awach River in Kanyibana village using the 'Basic Water Monitoring Kit'.



Figure 3. Group of men drawing the village map.



## **Applying the Sustainable Livelihood Framework to assess Land Degradation**

The framework for assessing land degradation in the study is an adaptation of the DFID framework (Appendix I). The main reason this study adapted the DFID framework is because it provides an analytical structure to facilitate a broad and systematic understanding of various factors that might lead to degradation. It shows how these factors relate to each other. It also enables assessment of poverty and other complexities surrounding livelihoods such as access to assets, power relationships, vulnerability, policies and institutions.

### **The core components of the framework**

The above framework identifies four core components - capitals, transforming processes and structures, livelihood strategies and vulnerabilities – that are the key to understanding processes involved in land degradation. The framework allows an integrative analysis in understanding and uncovering, direct and underlying processes of land degradation. Central to the framework are capitals whose interactions might influence degradation. The capitals are also affected by transforming processes and structures, and various vulnerabilities. Each of the framework components are discussed below.

#### **a. Capitals**

Pursuit of a livelihood strategy is by and large, dependent on intangible and tangible capitals to which people have access (Ellis, 2000; Berry, 1999). The way the capitals are used, at different spaces and times, is driven not only by individuals' rational choices, but rational actions as well (McCown, 2005). Eight capitals are identified by several authors (Scoones, 1998; Ellis, 2000; Flora et al., 2004; Odera, 2005)(Figure 4). Understanding how these eight capitals interact inevitably helps us understand how internal and external structures and processes influence local people in the use of their land (Scoones, 1998; Bebbington, 1999; Ellis, 2000; Flora et al., 2004; Chambers and Conway, 1992).

Figure 4. Framework for studying land degradation and livelihoods.

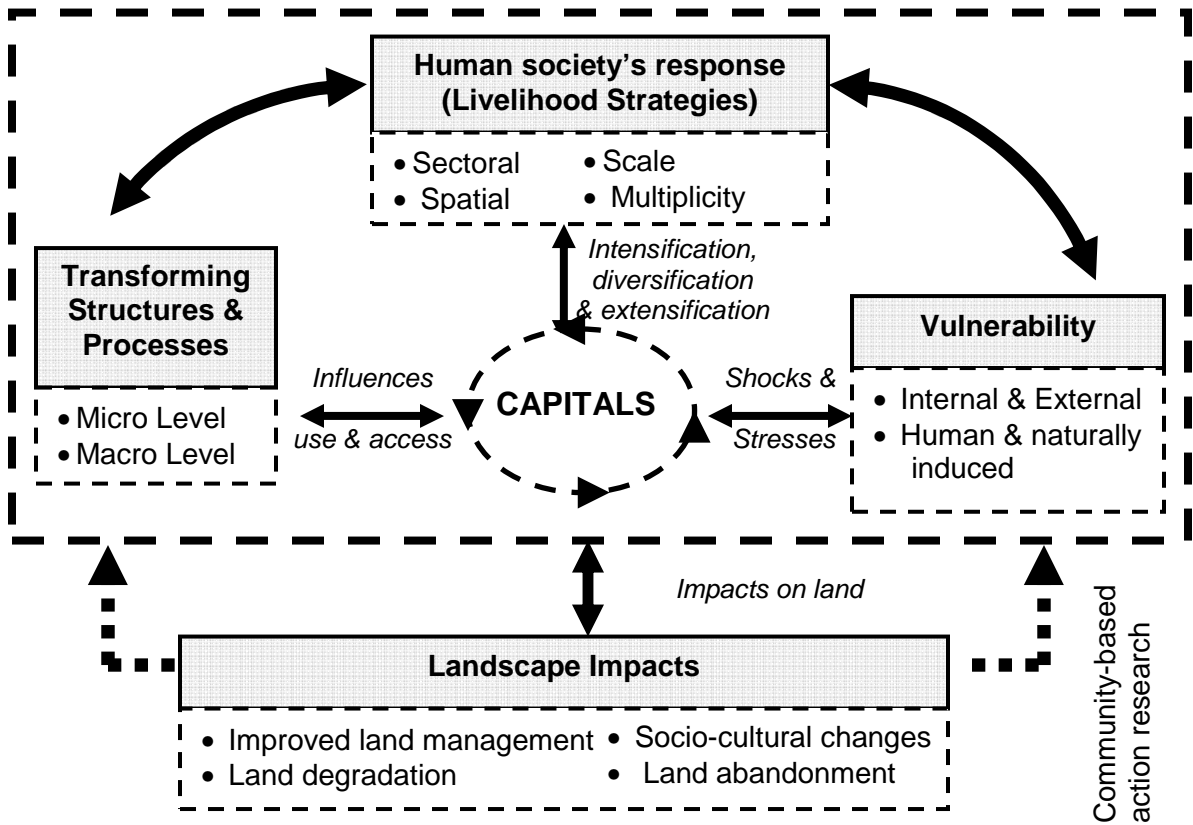
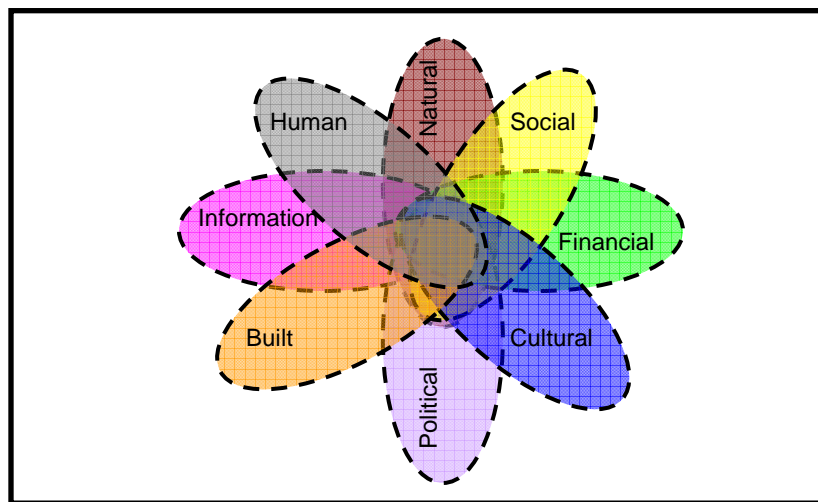


Figure 5. The eight capitals that people can draw upon to make a livelihood (Adapted from Flora et al., 2004).



- 1) Natural capital refers to tangible and intangible assets that include natural resources (land, water, fauna and flora), climate (rainfall, temperature, wind), natural processes (hydrological and biogeochemical) and aesthetic value.
- 2) Social capital refers to the connections between and among people at different levels, and includes networks, trust, reciprocity and institutions. There are horizontal (bonding) and vertical (bridging) connections (Flora et al., 2004).
- 3) Cultural capital reflects a set of attitudes, practices and beliefs that are fundamental to the functioning of different societies and passed from generation to generation, e.g., language, symbols, behavior, values, norms, rituals and beliefs.
- 4) Political capital includes power, organization, decision making, and access to resources.
- 5) Informational capital refers to different kinds and sources of data, for example, printed, technological, ancestral legends and symbols among others. These data have to be relevant and purposely useful to people to enable them to make decisions.
- 6) Financial capital is the cash, savings and credit that can be invested in other capitals.
- 7) Built capital includes infrastructure such as roads, bridges, health centers and schools.
- 8) Human capital refers to skills, knowledge, capabilities, and quality of health that people possess and which enables them to pursue a livelihood.

Figure 4 above shows the ways in which capitals interact between and among each other (Pretty, 1995). The dynamic interactions of these capitals at any scale (micro or macro) may drive the process of degradation. For example, a study conducted in western Kenya, showed that there is a negative tension between natural and cultural capitals (Nyasimi, 2006). In the study community, married adults within a homestead must perform sexual rituals before any farming activity takes place. If either spouse is absent from the home, the land is neither farmed nor conserved. The situation is exacerbated by the HIV/AIDS pandemic that is killing married adults (human capital) and creating child-headed homesteads, who cannot adequately manage the land.

Rural people combine capitals in complex multiple ways. The following questions, adapted from Scoones (1998), guided this study:

1. What are the meanings of capitals? Through a hermeneutic study, we documented the meanings of capitals, ways of operationalizing them, and the way each relates to land use.

2. What are the most important capitals on which people depend? What processes are involved in capital substitution?
3. Who has access to what capitals? What are the governing processes? How do cultural conditions, power, inheritance, distribution of capital control, out-migration for income earning opportunities, and other factors impact access to the capitals? How does this affect people's abilities to manage the land and hence pursue livelihoods?
4. What capitals are sacrificed or traded-off and what are the implications on land?
5. What are the historical trends of access and availability of capitals, and for whom? Different people (in terms of gender, age, marital status, class, etc) have access to different capitals at different periods of their lives and in different seasons. Understanding of these trends can help understand capital accumulation and/or, depletion, and the impacts.

#### **b. Transforming structures and processes**

Once there is an understanding of the meaning of different capitals, including sequencing, substituting, clustering, trade-offs and trends, then structures and processes influencing their use and accessibility are examined. Here, we need to understand capital use and accessibility at two levels, micro and macro. Micro level structures are usually at household and village levels, and processes denote power, class and gender (Scoones, 1998; Ellis, 2000; Bebbington, 1999). At the macro level, structures include government and private sector, and processes are policies, laws and stability. Exploration of transforming structures and processes allows identification of socio-cultural rules and norms, restrictions and barriers to access and use of capitals (Scoones, 2001; Ellis, 2000; Bebbington, 1999).

#### **c. Livelihood strategies**

The interactions between capitals and structures and processes greatly influence the choices of livelihood strategies. Livelihood strategies refer to the portfolio of activities that members of a household do to make a living (Chambers and Conway, 1992). Different strategies are either pursued to accumulate capitals (e.g., increased savings to buy more land) so that family members are buffered against shocks and stresses and/or risk pooled to ameliorate vulnerability factors (Ellis, 2000; Francis, 2000). Risk pooling usually implies coping and adaptive strategies.



### ***i) Livelihood diversification***

Livelihood diversification involves broadening the types of activities that generate food and income. In rural areas, many families are involved in non-farming economies such as wage labor, self employment in small enterprises such as crafts, sand harvesting, pottery and bicycle transportation (Ellis, 2000; Francis, 2000; Bebbington, 1999). Others are involved in seasonal or permanent migration into urban areas (Ellis, 2000; Bebbington, 1999; Breman and Mundle, 1996; Bryceson, 1996). The migrants send remittances back to rural areas, thus remittances become another livelihood strategy (Francis, 2000; Ellis, 2000; Bebbington, 1999).

In the developing world non-farming activities are gaining in importance as a livelihood source. The process of “deagrarianization”, in which rural people are becoming less dependent on agricultural activities, is rapidly changing the landscape of rural Africa and Asia (Bryceson, 1996; Reardon and Vosti, 1995; Adger et al., 2002; Mandel, 2004). In Africa, estimates indicate that 43 percent of livelihood strategies are non-farming and projections show that this will increase in the future (Bryceson, 1996; Reardon and Vosti, 1995). A pertinent question arises: *what are the implications of livelihood diversification shifts on land?* A study by Alwang (1999) report that as people diversify into non-farming activities, they tend to neglect their own land. There is less labor to tend the land and other income generating activities around the home. In addition, there might be a loss of traditional farming knowledge that used to be passed down through generations because the older people are involved in non-farming activities.

There is social support diversification whereby people draw upon and build new social networks to support their activities (Francis, 2000). In other cases, they are looking for new market linkages, and building safety nets to act as cushions during periods of vulnerability. To deal with vulnerabilities such as land degradation, families draw upon their livelihood capitals and develop a range of options. This includes accumulation of resources to act as reserves and buffers, spreading of activities over space and/or time, mixing of activities, risk pooling options to ameliorate shocks and stresses (Scoones, 1998).

### ***ii. Intensification of livelihood strategies***

Intensification of agrarian activities is driven by capital and labor availability factors (Bebbington, 1999; Bryceson, 1996). It involves continuous intercropping of annual and/or perennial crops (Netting, 1993; Scoones, 1998; Chambers and Conway, 1992).

Intensification of livestock production involves increasing the carrying capacity of land to maximize returns per unit land. The above processes of diversification and intensification may be leading to social and cultural changes. This study will attempt to provide insights in this regard.

#### **d. Vulnerability**

The degree to which a family is able to cushion against risks, cope or adapt after a disturbance, is central to understanding land degradation. Vulnerability includes the stresses and shocks that people face as they transform capitals into meaningful livelihoods (Chambers and Conway, 1992; Ellis, 2000). With respect to land degradation, stresses and shocks can be studied from two perspectives, internal/ external and nature/human induced. Nature induced shocks include floods, drought and fire that are sudden and unpredictable. Stress may be caused by rainfall variability, or intense heat. Human induced stresses include powerlessness, social exclusion, labor shortages and illiteracy, and shocks may include gender and age, particularly where younger people cannot participate in decision making and/or have access to resources. External shocks include natural and human induced, such as civil unrest and war and climatic change. Internal stresses include natural and human induced, e.g., unemployment and death. This is not intended to be a conclusive list of all vulnerability factors and sometimes attempts to compartmentalize shocks and stresses into human/natural and internal/external can create confusion. Various strategies for dealing with vulnerability include depleting existing capitals, diversifying capitals and activities, protecting what is already present, migration to work in different spaces and activities, accumulating and storing cash, savings, land, and food, changes in consumption patterns, and intensifying activities (Scoones, 1998; Ellis, 2000; Sen, 1981).

#### **General Socio-cultural and Biophysical Characteristics of Study Villages**

Awach River basin occupies an area of 1045 km<sup>2</sup> of which 58% is heavily degraded through runoff (gully and sheet erosion) (Shepherd and Walsh, 2002). The basin is home to about 245,950 people whose main activities include agriculture, fisheries, extraction and processing of natural resources, and small-scale commodity exchange (Mugo, 2000). The Kipsigis people reside in the highlands of the basin where they engage in agricultural activities growing both perennial and annual crops (Table 1). The lowlands are occupied by the Luo people.

The Kipsigis and Luo are linguistically classified as nilotes. However, based on diverse cultural patterns, varying ecological circumstances and interactions with hamitic speakers, the Kipsigis are subdivided into nilo-hamites (Evans-Pritchard, 1950). The Luo, referred to as people of lakes and rivers, migrated from southern Sudan arriving in present day Lake Victoria sometime between 1490 and 1517 (Herring, 1979; Ogot, 1967). According to the authors, climatic influences (drought) and ethnic wars with neighbors prompted the migration. The Luo are socially organized into clans, sub-clans and at the micro-level, into families (Ogot, 1967). Land ownership is customarily gained and accessed by being a male member of this social system and it is held in custody for past and future generations (Shipton, 1992). All married men who establish their homestead inherit land from their fathers, and when they die and become ancestors, they still maintain ownership of land. Married women maintain ancillary rights to use the land through their husbands (Shipton, 1992). Upon death of the husband, women were customarily inherited, and hence, land ownership passed to the inheritor (Okeyo, 1980). The inheritor subdivided the land for the sons of their departed father. Bride wealth in the form of cattle belonged to the head of the homestead.

The most important person within the homestead is a dominant male known as *Wuon dala*. The *Wuon dala* owns the land and cattle and makes decisions for the rest of the family. He is the first person to perform any rituals. Historically, he was also responsible for fishing or herding cattle until his sons were of age and took over his activities. Second in line is the wife or first wife if the man was polygamous. All visitors coming to the *Wuon dala* homestead first to report to the house of the first wife (Glickman, 1974). Historically, women and unmarried girls were responsible for farming sorghum, millet and vegetables, storing the produce, and rearing children (Okeyo, 1979). A decade after Kenya gained independence and husbands migrated to urban areas, women became more engaged in multiple roles including farming and petty trading of agricultural produce and fish selling (Okeyo, 1979). Relationships between *Wuon dala* and his affines had the potential of both cooperation and conflict. The most significant affines to the *Wuon dala* were his father and the unmarried sister of his wife. The father of his wife was important because of bride wealth which was paid over a long period of time. The unmarried sister of his wife was important because she could potentially become his wife in the future.

The Kipsigis, who inhabit the fertile highlands of the Awach River catchment, are a patrilineal society belonging to the Nilo-hamitic speaking group (Sutton, 1977). They arrived

in the Awach River catchment around the 14<sup>th</sup> Century (Waller, 1985). Kipsigis were traditionally organized into villages known as *Kokwet* and governed through a centralized council of elders (Peristiany, 1939; von Bülow, 1992). The smallest unit was, and still is, the homestead consisting of parents and children. The Kipsigis are also socially organized into clans and sub-clans that assert the rules of exogamy and property inheritance (Snell, 1954; Orchardson, 1961). Men acquired land through paternal inheritance. Traditionally, women's rights to use land were through their ties to husbands. Upon death of a husband, the women gained land ownership rights, held it in custody, and transferred it to the sons (Shipton and Mitzi, 1992). This system represented a situation of 'house property' where land was transferred from father to son through the wife/mother (Oboler, 1985). Cattle and land are both highly valued by the Kipsigis. When a son was ready to establish his home, the father gave him a bull and cow. Cattle brought into the homestead through bride wealth belonged to the mother of the daughter (Oboler, 2005). The mother could use these cattle for her son to acquire a wife, or to pay as bride wealth for a wife (polygny marriage). This occurred when a wife could not bear children, or if she had only daughters, then she could marry a young girl to sire sons for her. Children born from such marriages took the identity of the man and inherited land from him (Oboler, 1980; von Bulow, 1992). Relationship with affines was cordial since the women maintained close contact with maternal relatives.

Table 1. General characteristics of study villages in the Awach river catchment.

Characteristics	Villages	
	Kanyibana (Lowlands)	Ainamoi (Highlands)
<b>Social organization</b>		
Ethnic group	Luo	Kipsigis
Linguistic classification	Nilotic	Nilo-hamite
Marriage system and post marriage residence	Polygamous and levirate Virilocal residence	Polygamous and polygynous, virilocal residence and sometimes neolocality and uxorilocality residence
Descent identity	Patrilineal	Patrilineal
Composition of homestead	More than 3 generations (grandparents, parents and children)	2 generation of parents and children
Married women's rights to land ownership	None	After death of husband
Wife inheritance	Yes	No
Significant homestead members	Male head of homestead ( <i>Wuon dala</i> ), wife/wives and sons	Head of homestead, wife/wives, sons and daughters
Significant affines	Father and sister of wife	Father and mother of wife
Inheritance patterns	Male lines	Male and female lines
<b>Bio-physical characteristics</b>		
Spatial location	Floodplains of Awach basin	Highlands of Awach basin
Average altitude (meters above sea level)	1200 m	2000 m
Topography	Flat alluvial plains	Gentle northward slope
Annual average rainfall	1200 mm	1800 mm
Annual mean temperature	32°C	22°C
Parent material	Sedimentary rocks	Volcanic
Soils	Vertisols that impede drainage and highly degraded	Nitisols that are fairly well drained and deep to very deep
<b>Economic subsistence strategies</b>		
Customary strategies	Fisherpeople and pastoralists	Pastoralists
Current primary strategy	Wage labor in rural and urban areas	Small-scale intensive farming practices that include food and cash crops
Current secondary strategies	Sand harvesting (for house construction), farming and pottery	Off-farm employment, e.g., teaching, clerks.
Crops grown	Maize and beans, sorghum, cassava and local vegetables	Annual crops: maize and beans, sweet potato, bananas, pumpkin, finger millet, irish potato and vegetables. Perennial crops: coffee, tea and sugarcane
Livestock reared	Zebu cattle and goats	Donkeys, grade dairy cattle, zebu bulls, sheep, goats and chicken

**CHAPTER 3**  
**UNLOCKING THE ECOLOGY OF CAPITALS IN TWO**  
**GEOGRAPHICALLY LINKED YET CULTURALLY DISTINCT COMMUNITIES IN**  
**WESTERN KENYA**

*Paper to be submitted to the Journal of the Agriculture, Food and Human Values Society*

Mary Nyasimi, Lorna Butler, Lee Burras, Jan Flora, Hsain Ilahiane and Richard Schultz

**Abstract**

The livelihoods of rural sub-Saharan African people are heavily influenced by the quality and quantity of capitals, policies and internal and external vulnerability factors. In this region, the majority of the people depend on agriculture to sustain their communities, and therefore, a vibrant farming sector is essential to reduce food insecurities, minimize underemployment, attract internal and external investment, and slow rural emigration. Increased agricultural productivity also implies increased income from sale of food surplus and freeing of labor for non-farming enterprises. Using the sustainable livelihood framework, we examined the ecology of capitals and their multiplier effects in two ethnic groups. Results suggest that the ecology of capitals is dynamic. The various ways in which families are able to draw upon each capital are transforming communities in different directions. Among the Luo, negative interactions between natural and socio-cultural capitals is contributing to decline in quality of other capitals, spiraling the village into poverty. The Kipsigis people appear to be experiencing a positive interaction whereby villagers are building on one capital and harnessing the benefits to invest in another. They are able to transform the capitals to sustain their livelihood strategies and build their community. In conclusion, understanding the ecology of capitals provided a lens through which to assess and understand how capitals are shaping the lives of rural people in western Kenya.

**Introduction**

Since about 80% of rural Africans directly depend on agriculture to sustain their communities, a vibrant farming sector is essential to reduce food insecurities, minimize underemployment, attract internal and external investment and slow rural emigration. Increased agricultural productivity also implies increased income from sale of food surplus

and making labor available (or freeing labor for) for non-farming enterprises. Conversely, moribund agricultural productivity results in decreased nutrition and health, and prevents investment in non-farming enterprises and services. Both scenarios might experience multiplier effects – either positive or negative - from government policies affecting land tenure, infrastructure, market access, credit availability, input supply and extension/knowledge transfer (Place, 1996; Cleaver and Schreiber, 1994).

The conditions of western Kenya epitomize much of rural sub-Saharan Africa where negative local and national policy conditions have made rural livelihoods extremely vulnerable. Since independence, the region has been noted for its poor government infrastructure and services provision, minimal access to markets, restrictive cultural behavior, and poor health care. Unreliable rainfall, deteriorating land productivity, processes of degradation, and diminishing human productivity due to HIV/AIDs, malaria and other diseases have exacerbated the situation. Understanding and managing these issues – as well as their complex interactions – is challenging for local people, governments and development agencies. Not surprisingly, at the rural farm level one of two actions tends to occur. The first is a sense of human powerlessness and temptations of emigration. The second is intensification and diversification of livelihood strategies (Ellis, 1998, 2000a, 2000b; Scoones, 1998; Chambers, 1995; Bryceson, 2002). Using multiple strategies of intensification and diversification, a number of western Kenya communities have transformed their economies in to consistent profitability, although in some cases, the economic gain is unsustainable (Hoddinott and Haddad, 1995). Other communities are caught in an endless cycle of impoverishment. The crucial factors influencing the stability of rural livelihoods revolve around the dynamic interaction of resources (or capitals), human behavior, cultural patterns and knowledge.

To enable a deeper exploration of the changes in capitals quality and quantity, we adapted the sustainable livelihood framework (SLF) and focused mainly on the capitals component (Chambers and Conway, 1992; Ashley and Carney, 1999). The SLF provides a holistic approach that scientists, development practitioners and policy makers can apply to better understand how the poorest of the poor adapt and construct a livelihood. It was developed to facilitate more holistic thinking about poverty issues in Africa, and to encourage analysis of relationships among various factors that affect rural people's lives. It is a versatile approach that captures and connects dimensions of poverty at different levels: local, regional and national. The approach includes five main components, namely:

livelihood assets/capitals, mediating processes instigated by policies and institutions, livelihood strategies, outcomes and vulnerability context.

The capital component of the SLF targets key tangible and intangible assets that people draw upon to make a living. The framework identifies five central capitals that include natural, social, physical, financial and human assets (Figure 1). For this study, we included the cultural and political capitals from the community capital framework (CCF) developed by Flora et al., (2004). By focusing on seven key capitals and their interactions, that is, ecology of capitals, we can understand how internal and external structures and processes influence local people in the use of their land and in choice of livelihood strategies. The concept of ecology of capital directs attention to the relationships among capitals and how these interactions might shape the sustainability of individual households and the community as a whole. These include relationships among capitals and people in specific contexts and in differing time scales. One should not assume that the capitals are the ultimate indicator of a successful and vibrant farming environment, or of a collapsing one. Indeed, exploring the concept of capitals provokes a number of risks and challenges. First, capital is a relatively new concept that emerged in early 1990s. Its interpretation, definition and conceptualization might be subject to replication and/or overlap (Schuller, 2001). Secondly, the use of capitals is quite adaptable and applicable at different levels - household, community, regional and national levels. The term can potentially be susceptible to academic misuse. Lastly, it also might be vulnerable to excessively complicated applications through scholars' attempts to unravel complex interactions. Nonetheless, ecology of capitals offers an opportunity to dissect the interactions of capitals, and to understand the impacts of capitals on livelihood activities. This provides more insight for finding locally acceptable solutions to problems.

This paper explores the dynamic interconnectedness of capitals in two ethnic groups of western Kenya. In particular, the paper attempts to a) show how through analyzing capital interactions, it is possible to analyze causes and consequences of decline in capital quality and quantity on rural people, b) demonstrate that ecology of capitals is dynamic and has multiplier effects, c) illustrate the potential that exists for tension among capitals and, d) suggest potential research and development initiatives that might be appropriate in the study area. It is important to note that prominence is placed on interactions between natural and cultural capitals, and the accompanying tensions or uneasiness within homesteads.



### **Research Design and Methodology**

The study relied primarily on qualitative and to a lesser extent quantitative methods. The triangulation of methods ensured an iterative and participatory process and strengthened validity and reliability. We used focus group discussions (FGDs) and in-depth interviews with five and eight key informants in Kanyibana and Ainamoi villages, respectively. In general, these included the chief, village headman and leaders of social groups. In addition, eight case studies were developed, however only minor reference to this is made in this paper. The key informants, the main source of data for this paper, were selected because they were well informed about the community, had deep knowledge of local situations, and the research team was able to develop a comfortable rapport with them. The study unit was two villages composed of 138 and 78 homesteads. Participants in focus groups were selected to capture the diverse range of people with different wealth resources, genders, ages and education levels (Chambers, 1995). A total of six focus group discussions were held in each village. In-depth interviews were conducted with key informants who possessed wide and varied knowledge about their villages. Among these were village elders and teachers. The local languages were used during discussions.

### **Cultural Ecology of Study Population**

This study was conducted across the Awach River watershed in western Kenya (Figure 2). Altitude ranges from 1200 m in the lowlands to 2000 m in the highlands. Climatic conditions are influenced by the regional physiography and Lake Victoria. Average temperatures are 21°C and 30°C in the lowlands and highlands, respectively (Corbett et al., 1999). Soil types are nitisols and vertisols, found in the highland and lowlands, respectively.

The Awach watershed occupies an area of 1045 km<sup>2</sup>, supporting a population size of 245,950 people whose main occupations include agriculture, fisheries, extraction and processing of natural resources, and small-scale commodity exchange. The watershed is inhabited by two ethnic groups, the Luo and Kipsigis, residing in Kanyibana (lowlands) and Ainamoi (highlands) villages, respectively. They practice patrilineal and virilocal systems of descent and settlement. Composition of the homestead differs between the two groups. Within the Luo homestead, members might include father, wife/wives, married sons and their families, unmarried sons and daughters. The Kipsigis homestead members include father, wife/wives and unmarried children. Even though the two ethnic groups are close neighbors sharing a boundary, they may as well be thousands of kilometers apart in terms

of their cultures, histories, climates and the physiographical characteristics of their communities (refer to Table 1 in chapter 1).

### **Local people's interpretation of capitals**

To acquaint the focus group participants with the word 'capital', the word 'resources' was used, including examples such as land, livestock, social groups, cash money, trees and people. At the beginning, the participants listed only tangible resources that could be quantified, exchanged and/or traded for cash money. To generate insights about intangible resources, we had to give examples using local stories to illustrate trust and reciprocity (see Flora et al., 2004; Coleman, 1988; Putnam, 1993; Cocklin and Alston, 2003). Operationalizing intangible capitals was a challenge because indicators as we – the researchers – understand them cannot be found in the local languages. So storytelling took place in the local language. Table 2 shows the different indicators of capitals in the two ethnic groups as defined by the FGD participants.

In both villages, natural capital is considered to be land with interconnected components. Other authors have posited similar view of natural capital, referred to as ecosystems that support both the biotic and abiotic and the processes therein (Flora et al., 2004; Ellis, 2000a; Berkes and Folke 1998). Of particular interest in this study, is the mention of ancestors as natural capital and the important role they play in the functioning and sustenance of other natural capitals. According to a 78 year old Luo participant:

*Piny* (land) includes all things that support our being and animals. It is the soil, water, air, animals, plants, people and our ancestors. We cannot separate these things...because they depend on each other. Hence we include our ancestors under land because we commune with them. Ancestors travel through the soil, water and air to make it productive and healthy for the living.

According to Schuller (2001), operationalization of capitals can lead to problems of overlap and duplication. The participants experienced this challenge particularly when they attempted to separate indicators of social and cultural capitals. In the end, the participants grouped social and cultural capitals together because, to them, they are one and the same capital. For instance, relatives and friends and the networks they form are usually considered to be social capital (Flora et al., 2004). However, to the participants, relatives and friends are part of their cultural heritage. Thus they should not be treated as discrete

entities that exist separately from cultural capital. Using the example of funeral participation and attendance, the participants noted that clan members are expected to attend funerals, participate in activities prior to and after the burial, and offer emotional and financial support to the bereaved family. According to the Luo FGD participants, it is not required that someone develop close bonding ties with immediate relatives and/or bridging ties with affines. Relatives and their respective linkages in this case are considered as cultural capital drawn upon when in need.

There was a marked difference in the range of physical capitals in the two villages (see Table 1). The Kipsigis people listed more physical capitals, for example protected springs, boreholes, health center and a playing ground. The capitals identified were those that the people had built through collective action. Differences were also noted in the financial capital. The Luo considered people to be a financial resource, while to the Kipsigis, crops, particularly perennials such as tea and coffee, were the most important resource. Among the Luo, wage labor is the most important livelihood strategy, and hence the number of healthy people that a family has is an important financial resource. Human capital comprised the knowledge and physical outlook (nutrition and health) of people. The participants distinguished traditional and formal skills and knowledge as important resources for enhancing their livelihoods. Having traditional skills and knowledge enables them to survive in their current environment. Formal education is an added advantage that helps them cope with the changing environment.

### **Ecology of Capitals**

Having defined and operationalized the capitals, the participants analyzed the ecology of capitals and the key processes that might explain the patterns of capital change. This stage of the discussion was crucial because literature has documented the reasons behind the processes of diversification, intensification and extensification of livelihood strategies that might include push and pull factors (Bebbington, 1999; Barret et al., 2001) and means of survival and to accumulate capitals (Barret et al., 2001; Chambers, 1995). Latent among the above factors are the dynamic interactions of capitals that might influence the choice of a livelihood strategy. Based on the interactions of capitals, rural African farming communities might a) organize or reorganize capitals that they possess just to survive and remain within the same regimen, b) accumulate more capitals and, hence, shift to a more productive livelihood characterized by investment, or c) deplete the capitals and

shift into a destructive regimen characterized by increased poverty levels and degraded rural landscapes.

### **Declining Capitals – the Luo**

Among the Luo people, social-cultural capital is strongly held and permeates through generations (Table 1). Rules, norms and prescribed practices guide behavior patterns and interpersonal relationships. Some of these have persisted over time, while others are rapidly changing. For instance, rituals related to subsistence production are still strongly valued and have endured to present day.

Two socio-cultural practices that have persisted over time and are currently contributing to decline in natural capital are seasonal land allocation and sexual rituals performed before farming activities. Property ownership and decision making processes within a Luo homestead are carried out by *Wuon dala*, the oldest dominant male. At the beginning of each rainy season, *Wuon dala* allocates his wife (or wives) and married son/s a piece of soil to cultivate. This piece of soil is not permanently allocated and may change as often as each rainy season. A key male informant verified that the *Wuon dala* has a lot of power when it comes to soil ownership. He said:

I am 46 years old and still living within my father's homestead. I have two wives and eight children and yet I do not own any pieces of *Loo* (soil), cattle, goat or tree. It is a shame that I do not own anything. My father gives me a piece of *Loo* to cultivate every season. Even though the *loo* is cultivated by my mothers and brothers, we don't feel responsible to manage it. I might add some cow manure but that is hardly enough for the crop. Instead, the soil is always hungry, begging for more manure. If I owned the soil, I might invest more into it.

According to the FGD participants, this seasonal pattern of land allocation does not encourage investment in soil conservation practices such as nutrient addition, green manuring, terracing and/or crop rotation. Soil users are not motivated to improve the soil because tenure is not guaranteed. In this case, wife and son try to maximize production with minimal investment. Where maximization is the goal, this has led to negative nutrient balances, decreased organic matter and soil fauna, increased gully and sheet erosion (Sanchez et al., 1997; Smaling, 1993; Lal and Stewart, 1994). In addition to seasonal land allocation practices, sexual rituals are performed to bless the soil and crops. Any married woman cannot till the soil or perform any farming activity unless her husband has had conjugal relations with her the previous night. A male key informant remarked that:

All Luo ceremonies involve sexual blessing and cleansing. We have conjugal relations before all farming activities, establishment of homestead, weddings and funerals. We have sex when someone dies. Most of our activities are spiritually tied to conjugal relations.

Sexual rituals govern the way of life of the Luo people in this study. They adhere to these norms as long as the men and women reside in the same homestead. However, most of the men have migrated into cities in search of formal employment, thus stagnating farming and subsequently, investment in land management. The Luo people are spiritually tied to the land they inherit from their patrilineal ancestors, who despite being dead, are considered living. The quality and quantity of natural capital has been on a steep decline for the past 27 years (Figure 3 and 4), and more so in the decade. A 50 year old woman narrated:

Our land has become poor. The waters of Awach River are brown and loaded with sediment. Some plants have disappeared and replaced by thorny ones that even the goats cannot eat. The soil is dead and does not have life. The animals that live in the soils have migrated to our neighbor's fields. It is very sad that even the animals living in the soil do not want to live in this village. Our ancestors are unhappy and children are disappearing from home. They will never return because there is no land to return to. The few who are left behind are dying from a combination of *Chira* (HIV/AIDs), malaria and diarrhea. I can foresee no one living in this village 20 years from today.

Another male participant added:

As we have destroyed our land, it has in turn become angry with us. The land is regurgitating the bones of our ancestor buried a long time ago. Our village headman woke up one day and found bones in his homestead. The soil has been swept away into Nam (Lake Victoria) and our dead are coming back to the surface. We do not have Loo (soil) anymore. All that is left are pebbles, stones and smooth surfaces that glitter like a silver shilling coin in the blazing January sun.

Kanyibana people are attributing the decline of natural capital to deforestation in the highlands, draining of swamps for crop production, continuous cropping with little or no external manure addition and restrictive cultural practices. Most people stressed the centrality of cultural practices as one of the major causes of land degradation. As natural capital continues to decline, it is in turn affecting the socio-cultural capital. Trust and reciprocity among village members has deteriorated as people are forced to minimize

contact with each other. This seems to be leading to low bonding ties, and hence very weak social cohesion. A female case study respondent remarked that people have failed to maintain harmony between soil, water, plants and ancestors. In addition to deteriorating soil and water quality, the health and perceived nutritional status of Kanyibana people is declining as well. The soil can barely support millet and sorghum, which are drought tolerant crops (Figure 5). Other crops that can provide sources of proteins and vitamins such as common bean, vegetables and sweet potato do not perform well. A female case study respondent remarked:

The little food that I grow is not enough for my children. We are lucky to have a meal each day. And most of these meals comprise of maize flour that we make *ugali* or porridge for the children. It is rare to eat meat in my home and I can see the skin of my children is not healthy at all. The skin has *mashilling* (skin diseases) and it looks white. I have to look for work everyday among the Kipsigis to supplement what I harvest. Sometimes I sell pots and use the money to buy food. I do not have time to interact with other people. In any case, I do not want people to visit me because I do not have food to share with them. I cannot trust the boys who live in the next homestead because I know they will come and steal my goats. The only people I trust are those women who can tell me where to get work.

The tension between socio-cultural practices and soil use and management is forcing most of the homestead members to migrate seasonally to urban centers or daily to nearby rural areas. Children as young as 12 years are involved in the daily migration pattern and this is raising insecurities, particularly for unaccompanied younger women. An old woman lamented that:

My village is losing very young children into the cities and to the Kipsigis and the Kisii people. When these children travel to these places, I am sure that their safety is not guaranteed. A young man of 10 years can easily be drowned when they harvest sand from Nyando River. A young girl can be raped along the way. But I cannot tell them to stay at home because there is nothing here. There is no soil to till and no relatives to visit. The gully has stripped us bare and all that it has left us with is embarrassment and shame.

Degraded soils have destroyed physical capital such as roads, water system and houses. In some areas, deep gullies have cut through the non-tarmacked road hindering vehicle movement. There are no bridges to connect the severed roads so transportation is impossible. In addition, the vertisol soils are plastic and sticky making the roads impassable

during the rainy season. The underground water supply system constructed in late 1980s is exposed and connections broken. Homesteads located downstream from the breakage are no longer supplied with domestic water. Kanyibana village is located downstream from the water pipe breakage. Currently people draw water from the Awach and Sare Rivers, both of which are heavily loaded with sediment. Houses constructed of clay-manure mixtures are destroyed during the heavy rainstorms. A male participant remarked:

When it rains up in the hills, we become afraid because storm water gushes through our village. It floods our village and destroys houses, drowning people, crops and livestock. When the gully cuts across the landscape, it cracks the foundation of the house and it collapses. We have to rebuild our houses and lives.

A social hall, constructed by the Aga Khan Foundation as a pre and post-natal clinic, is no longer used for the purpose it was initially intended. It now houses research personnel from various institutions, including our team. A participant remarked:

The hall is used by outsiders who conduct research. In particular, people from medical research that come and take our blood drops. In 1980s, the hall was used to treat pregnant women and children and show movies. Clinical officers and nurses from the provincial hospital in Kisumu town could come twice a week to people. Now it is a deserted hall, occasionally used by people like you (researchers).

For communication with relatives who live in urban centers, some people have mobile (cell) phones. In a village of 138 homesteads only six people own mobile phones. An aspiring man who wants to be elected councilor in the 2007 general elections bought a mobile phone. To promote his popularity, he allows his fellow villagers to call their relatives. He said:

I let people use my mobile phone to call their relatives all over Kenya. I do not incur any expense except when recharging the phone battery. When someone comes to use the phone, I flash the person they want to talk to and the person calls back. They talk as long as they want. I am promoting myself for the next elections and now people know me very well.

Since the village does not have electric power to recharge mobile phones, a young man who recently left Kisumu town and returned home has installed a solar panel. Using the solar battery, the young man is able to recharge mobile phones at 20 Kenya Shilling per full charge.

When I returned home, about five people had mobile phones. They would walk to Katito town about 5 km to recharge their phones. Now, they can do it in my house. In addition, we have a lot of funerals and people who travel from urban centers want to stay in touch with their contacts. Funerals here can sometime last for two weeks. For those people, I charge 50 Kenya shillings per recharge because they have money. I actually make a lot of money from recharging phones.

Children have access to a dilapidated government primary school. The school buildings are deteriorating due lack of maintenance. Financial capital is mainly livestock, remittances, earnings from wage labor, and sale of sand (for construction) and crafts such as baskets, ropes and pots. A few people are involved in petty trading such as selling vegetables, maize, fish and beans. One family owns a retail shop and a maize mill store. According to a female respondent:

There is no cash money in this village. The soil is too poor to have any value. The money we make from working on other people's farms is immediately used to buy food. I use money from selling pots to buy school uniforms for my children and medicine. There is nothing left to save. Even if I wanted to save, where is the bank to do that? I will have to walk to Katito town to save just 30 shillings (40 US cents). The only thing we can proudly say is of value is the cows and goats that we have. Unfortunately all those belong to the head of the homestead who decides on what to do with them. I can say that my money is my friend who helps me wherever I am in trouble. My friend has become my money and we help each other.

A friend is considered financial capital. In normal circumstances, a friend would be classified as social capital, but to this woman, a friend transcends both the social and financial capitals. This reinforces the argument by Ellis (2000a) that capitals can contain common elements (indicators) depending on how one operationalizes them. In Kanyibana village, homesteads were increasingly supported by remittances earned by family members residing in urban centers. However, this trend is declining as most of the people who lived in cities have died due to AIDS pandemic. In addition, the cities dwellers are not making enough money to enable them survive and remit as well.

Since 1970, the Luo people have been politically marginalized following their loss of favor with the government in power. The amount of development funds allocated to them has continued to dwindle each year. Even though they elect political representatives every



five years, the elected representatives lack political clout to re-direct development funds to their constituents. The political leaders are unable to stand up for them. No developmental funds have been allocated to the study village and the physical capital that was put in place prior to 1970 consists of a primary school and a non-tarmacked road. The people of Kanyibana village lack the basic ingredients of a vibrant farming community -- safety, peace, food, shelter, will, political power, formal education and cash income. There is evidence of low bridging ties (Flora et al. 2004) with external organizations. There is a breakdown of social cohesion as decline in one capital is spiraling into decline of other capitals. In particular, the unproductive tension that exists between socio-cultural practices and soil management is leading to the decline of other capitals. Failure of the government to provide development funds further compounds the downward spiral of capitals. And neither government extension nor private NGOs seem willing to assist the community.

There is evidence that the Luo people are holding on to their socio-cultural capital as the other capitals decline. This capital is failing to react to warning signs of natural capital change. Within the homestead, members continue to adhere to cultural norms and rules, while on the other hand, relations with friends and neighbors continue to weaken.

### **Thriving Capitals – the Kipsigis**

Unlike their Luo neighbors, the Kipsigis are rapidly changing their socio-cultural practices in response to internal and external factors. Traditionally, men had ownership rights to land (Table 1). Married women owned property through a system of house property, whereby they exercised economic autonomy over household goods (Gluckman, 1950; Von Bulow, 1992). Sons inherit land and cattle from their fathers upon marriage. In recent years, the system of land ownership, control and inheritance has started to change. Just like their Luo neighbors, wage employment has been enticing men to migrate from rural to urban areas (Francis, 2000). Originally, the men who migrated into urban centers did not relinquish land management decisions to women. Some of the natural capital, particularly soil, started to deteriorate in quality since women were obligated to wait for their husbands' consent before taking up any management decision. As the soil degraded, men quickly realized that they must hand over decision making power to their wives. A male case study informant, who spent most of the time working in the city, remarked:

I am away from my land eleven months in a year. I come home for one weekend in a month and longer time in December. I realized my wife was waiting for me to tell her what to do. I

had to let her make decisions on the land, which includes what crops to grow, and what strategies to employ to improve the land. The land still belongs to me, but my wife makes all the decisions now. I am no longer under pressure to come home every month.

We were able to ascertain the validity of the statement from the FGDs that we held. Male participants agreed that they now involve women in land management issues. Women can make decisions in the absences of their husbands. One woman said:

Our culture did not allow us to make decisions on land. My husband allows me to manage the soil, plants and livestock. It is easier for me to decide what to grow without having to wait for my husband to return from Kericho town. I know what crop to grow on certain plots of the land. I visit the market once a week and I get to know what crops people are demanding and plan for next season. For instance, the boarding secondary school nearby requires fruits and I am now growing pineapples and paw paws (papayas). I feel happy that I can make these decisions before consulting my husband.

Other socio-cultural practices are changing among the Kipsigis. For instance, divorced women, or women separated from their husbands, are inheriting lands from their fathers. In these instances, women are gaining power and autonomy and are able to cultivate and build their own capitals. In addition, both men and women have organized themselves into several groups for financial and social support. A number of “merry-go-round” credit groups exist, whereby women contribute money weekly, fortnightly or monthly. The collected cash is given to one member and the cycle continues. Both men and women are involved in farming and church groups. For farming, the groups pool their labor resources and market produce, particularly sweet potatoes. A female FGDs participant said:

My group realized that we were being given different prices for a bag of sweet potato. The buyer was negotiating with each farmer a different price and we decided to collectively demand for one price. It was easier because the buyer had no choice but to accept the price that we all agreed on. The same goes for coffee because the buyer comes to our farm. For tea, the prices are standardized based on quality of tea leaves collected.

Collective action is also observed on commonly owned and utilized resources such as water, forest products, nursery and primary school and health center. The socio-cultural capital's flexibility and adaptive capacity reinforces the quality of natural capital. The soils, classified as nitisols, contain sufficient organic matter and nutrients from compost and

inorganic fertilizers. The rich red soil is productive even though the FGD acknowledged that it is slowly declining. In this village, there is a healthy and dynamic interaction between socio-cultural and natural capitals that is enhancing the quality of life, and this is recognized by residents. According to a female case study participant:

Since I am now able to manage crops and livestock without seeking consent from my husband, I can grow both tea and sweet potato for the market. I am also able to grow maize, beans and vegetables for my family. The money I make from selling crops, I buy clothes for my children, pay school fees and save some. I also use the money to buy DAP fertilizer and manure from my neighbors. I am able to invest back on the soil. I have joined a woman's group where we have a merry-go-round and contribute a hundred shillings every week. All group members help each other during land preparation and harvesting.

The quality of soil, coupled with adequate rainfall and cool temperatures, are enabling a diverse portfolio of agricultural activities. Local residents are able to grow a variety of subsistence and cash crops such as maize, beans, bananas, vegetables, tea, coffee, pineapples and sweet potatoes (Figure 6). These crops are grown using intensive integrated practices that maximize available space. Tea and coffee, both perennial crops, have a guaranteed market in nearby factories. The money earned from crop sales is re-invested in the soil as fertilizers, a health center and in children's school fees. A variety of livestock is reared for home consumption, sale and security. Cattle (local Zebu and imported grade breeds e.g., Ayrshire and Jersey) are raised for ploughing activities and milk, which is made into a delicacy called *chego*.

We love milk so much. We use milk to make *chego*, which is fermented milk mixed with ash from a variety of roots and leaves. *Chego* is a healthy combination of milk and herbs and our children rarely fall sick. We also value the bull because we can sell it when we are in need of cash. So, it is a security. In recent years, women have started to own dairy cows that they are given by their father. Men cannot touch this cow at all.

The number and value of donkeys has increased within the past five years. Donkeys are used to transport produce to markets. A young man who grows tomatoes with his wife remarked:

I used to grow tomatoes and wait for people to come and purchase on the farm. I always felt that I was not getting a good price. My wife and I decided to each carry a crate of tomatoes to the market but this was really heavy. We saved some money and bought a donkey. Now

this donkey can carry 4-6 crates of tomatoes and we are getting good price. As more people in this village are growing sweet potato, onions and tomatoes to sell in the market, importance of the donkey is increasing. When I do not need the donkey, I lease it to my neighbors and make some money as well.

His wife added:

The donkey also helps me in carrying drinking water from the valley spring all the way to the hill. Previously I could try and carry a 20 liter container and I could have to take 3-5 trips each day. Now, with the donkey, I only go one trip since the donkey carries four containers on one trip. It has made my life quite easy. I also use the donkey for carrying firewood.

Most people in the village get their water from roof top collection, boreholes, protected springs and rock aquifers. Water for domestic use is from a protected spring and a permanent rock aquifer. The aquifer is surrounded by a natural forest that is protected by rules set by the villagers. Water from the boreholes is used for livestock and laundry activities. Financial capital is held in both liquid and asset form. Important financial capital includes soil, compost, cattle, remittances and cash crops.

There is collective management of communal physical capital such as non-tarmacked roads, schools and the health center. The schools and health center are managed by four surrounding villages. Staff at the health center includes a full-time registered nurse and a part-time clinical officer. Educational infrastructure includes a nursery, primary and secondary school. Parents contribute school development funds to buy books, pens, desks and to maintain the structures. In the study village, the village elder remarked:

We have built a semi-permanent nursery school that houses about 15 young children. We all donated money to construct the building and provided the labor as well. The parents of the children pay the teacher, but it is not much money. She is more or less volunteering to educate these young kids.

Road maintenance is the responsibility of each homestead. In homesteads that have elderly residents, people with misdemeanor offenses are fined by the chief to clear the roads for them. The main road connecting Ainamoi village and the nearest urban center is an all weather non-tarmacked road that is maintained by the government. This road facilitates easy movement of people and produce to and from major urban centers such as

Kisumu and Kericho towns. Communication services are mainly through mobile phones. In this village, more people own phones compared to Kanyibana village.

### **Multiplier Effects of Capitals**

Using a participatory ladder-scale exercise, FGD participants in both villages were able to assess the quality and quantity of their capitals over a given time period – 27 years. During the exercise, we used visual charts and graphs that enabled participants with limited formal literacy to understand the process and hence, actively participate. The visual assessment also allowed the participants to get an overall picture of each capital in relation to other capitals over the 27 years.

In Kanyibana village, we initially started with a scale of zero to ten to assess changes in capital quality, zero being lowest and ten highest. The FGD participants started with socio-cultural capital. After much discussion, they agreed that it had declined from a value of 10 to 4 within the last 27 years (Figure 7). However, when it came to assessing natural capital, the participants re-adjusted the scale to extend below zero into negative numbers. According to a female participant:

Our land had deteriorated beyond the zero mark. The soil and water are dead. If the soil was asleep, we can give it a value of zero because then we can re-awaken it with manure, compost and tend care. But our soil (topsoil) that used to be rich in organic matter has been swept towards Lake Victoria and what is left behind is dead. It will require a miracle to bring the soil back to life, or better still, millions of money to recover the soil from the bottom of Lake Victoria. All the other resources (capitals) that we listed are all in the red (negative). We can only boast of our heritage and practices that we strongly value.

Figure 7 shows that the scale of capital assessment increased, ranging from 10, the highest value, to a negative of 10, the lowest value. Apart from the socio-cultural and information capitals, all the capitals are in the negative range. When soils and other natural capitals degrade, the traditional cycles of reciprocity, trust and relationships building breaks down as well. This limits people from interacting collectively and sharing knowledge on ways to manage the land. Decline of natural capital and rigid socio-cultural practices are also triggering decline of other capitals. In particular, human and financial capitals are negatively affected by the loss of crops, livestock and people. According to the village elder:

The soil cannot support maize and beans, our staple crop. We are lucky if we can get 20 Kg of maize from the farm. The deep gullies on the landscape are killing people and livestock.

The fragile soils near the gully are so unstable that when cattle graze on it, the soil crumples and cattle fall in where they die or break their legs. People also fall into the gully and die or break some part of their body. The medical bills are so huge that relatives do not bother taking the injured to the hospital. Most of our young people are running away from the village and return with AIDs. They usually die within a year of returning home.

As human capital declines, coupled with the rigidity of socio-cultural capital, there is a lack of natural capital investment. This fosters a negative multiplier effect, leaving people powerless to counteract this negative interaction. Food production from the degraded land can sustain families for three months of the year. For the remainder of the year, people must seek wage employment among other neighboring ethnic groups.

The story was different in Ainamoi village. According to FGD participants in Ainamoi, the overall quality and quantity of their capitals is good (Figure 8). Using a scale of 1 to 10, the participants assessed the quality and quantity of their capitals during the last 27 years.

Overall, ranking of capital in Ainamoi village had a positive integer. Some have declined (natural, socio-cultural, physical and informational), and others have increased (human and financial) over the 27 year period (Figure 8). According to the FGDs, they have witnessed a positive multiplier interaction with one form of capital on another. By changing their socio-cultural capital, they have improved their natural and human capital. Investment in natural and human capital has led to increased financial capital as a variety of crops (cash and subsistence, annuals and perennials, with integration of trees) are grown. In this case, the means of increasing financial capital is not threatening other capitals. A key informant noted:

Somehow, our village comes together when we have a common interest. We have protected our drinking water and constructed boreholes for animals. We encourage each other to grow tea and sweet potato that we can sell. If someone cannot do, especially old people, we step in and help them. Everyone is food secure in this village. The difference is the extra cash that comes from relatives working in urban centers who remit money back home.

A further positive capital multiplier effect is observed with physical capital. With surplus money from farm and non-farming activities, Kipsigis people have been able to invest in schools and a health center with that a full-time clinical officer and a nurse. The roads maintained by the village elder, with assistance from young men, are used by middlemen from urban centers who buy coffee, tea, maize and assorted fruits. In some

cases, donkeys are used to transport products to nearby markets. The money earned is invested back into the natural and human capital.

The cultural practices of the Luo are deeply embedded in their day to day activities and their beliefs about the connection between ancestors and their behavior makes them unable to respond to change. The perceived consequences of not adhering to deeply engrained practices destroy their ability to change (Table 1). On the other hand, the Kipsigis recognize importance of ancestors for example at burial, but they appear to be able to move beyond cultural confines and respond to change. Even though they have retained some of the rituals, they don't seem to prevent them from adapting to changing agricultural needs.

### **Conclusions and Recommendations**

Focus on the capital components of the SLF provides a lens through which to explore the ecology of capitals in western Kenya. Through focus group discussions and in-depth discussions with key informants, we have explored the dynamic interactions of capitals and the way capitals impact choice of livelihood strategies. The study compared and contrasted the interactions among capitals in two different but neighboring ethnic groups, and was found to be moving in different directions. Among the Luo, negative interactions between natural and social-cultural capitals seem to be further spiraling into the decline of other capitals. On the other hand, the Kipsigis appear to be experiencing a positive interaction whereby villagers are building on one capital and harnessing the benefits to invest in other capitals.

This study has drawn on the SLF because of its holistic capacity for examining all of the capital assets available to the poor. These assets help to secure a livelihood. The concept of ecology of capitals served as a lens through which capitals can be assessed in order to propose potentially beneficial interventions to rebuild declining and/or bolster existing capitals. By concentrating on capitals, it is possible to understand the impediments to positive capital building among rural people. Our experience suggests that there may be several ways to strengthen the applicability of the SLF so that practitioners are in a better position to contribute to improving and sustaining local livelihoods. Our research suggests that the SLF has more to offer if it is integrated into a more holistic framework that will not only assess capitals, but help point to ways to develop appropriate strategies for poor and vulnerable people. For example, our deliberations and findings have led us to conclude

that these can be achieved by expanding the SLF to incorporate an integrated watershed approach to livelihood improvement by:

- Assessing the status and complexity of capitals within different ethnic or cultural groups, analyzing how interactions of capitals, in the face of transforming process and structures, may lead to choices of livelihood strategies;
- Facilitating action research whereby local people assume active roles in the process.
- Using mental maps and images to construct and build shared understandings;
- Developing an integrated grassroots co-management strategy;
- Setting clear realistic goals and performance indicators;
- Recognizing the value of adaptability and long-term action learning;
- Breaking down barriers between science and local people and committing to an equitable relationship among local people, government and researchers;
- Implementing an integrated, multidisciplinary approach whereby research teams focus on both qualitative and quantitative methodologies (adapted from Sayer and Campbell, 2004)

Second, we also learned that more emphasis may be needed on both cultural and political capitals. At the same time there is a need to look for balance in all of the capitals at all times. In the two ethnic groups investigated, the cultural and political capitals appear to be most prominent because they comprise strong hidden values that guide everyday life, and according to Emery and Flora (2006), influence human creativity and innovations. For example, we found that there were certain subtleties in the cultural data that lead to unexpected conclusions such as the important connection between Luo ancestors and soil degradation. This was substantiated by the remarks of an old man:

The gully is vomiting the bones of our ancestors to the surface and they are being swept into the *nam* Kavirondo (Lake Victoria). Our ancestors are supposed to intercede for us with the soil, water and air and if there are not here, the soil and water will continue to be poor. Our ancestors are angry with us. The gully has destroyed their resting places. We need to bring the bones of our ancestors back and then, they will start helping us. We need our ancestors to rebuild the land.

This unexpected relationship suggests the value of interventions that give precedence to the influence that ancestors, and ancestor-related rituals, may have in



helping to restore degraded watershed areas. Insights into political capital will also help to better understand who might benefit from our findings and recommendations. Political capital provided insights into power relationships both at homestead and village levels, and beyond, but we do not know how to best strengthen the seemingly weak political capital among the Luo. In the Luo community we found that women hold a subordinate cultural position and are frequently unable to move beyond invisible fences. This seems to impede women from actively pursuing particular livelihood strategies. Perhaps we have not yet uncovered their sources of influence and power.

Third, we assumed that bonding relationships would be a natural mechanism for facilitating community action. With more cultural insight, there may be reason to believe that it would be more constructive to bridge the capital relationships found in similar cultural communities such as other Luo communities. While we do not know the answer to this question without further investigation, this could prove a better intervention path than only looking within the Luo community of the investigation, or encouraging the Luo community to bridge to the Kipsigis where there is little common cultural capital.

Fourth, perhaps the most important, by concentrating on ecology of capitals, the SLF principles guided the process of identifying and assessing capitals and their impacts on livelihood strategies. In particular, we are reminded that our methods must recognize and foster local interpretations of the capitals and their meanings. Meanings vary across communities and cultural groups, and these must be different than those identified in research literature. Further, our research and learning process must help people to identify ways to “spiral up” their stocks of capitals, and hence build sustainable livelihoods. Emery and Flora (2006) and Guitierrez-Montez (2005) suggest that investing in one capital can create a positive synergy that can initiate increase of other capitals. By encouraging visits to other Luo communities that have initiated positive cultural and land use change, the Luo of Kanyibana village can interact, share and learn from this communities. In order to achieve this, we need to take the study findings back to the communities where we originally got them, so that everyone is able to understand and reflect on their meanings and implications. This is the action research that we are moving towards.

## References

- Barrett, C.B., T. Reardon, and P. Webb, P (2001). "Nonfarm income diversification and household strategies in rural Africa: concepts, dynamics and policy implications." *Food Policy* 26(4): 315-331.
- Bebbington, A. (1999). "Capitals and capabilities. A framework for analyzing peasant viability, rural livelihoods and poverty". *World Development* 27(12): 2021-2044
- Berkes, F., and C. Folke (1998). "Linking social and ecological systems for resilience and sustainability." in Pages 1-25 in F. Berkes, C. Folke and J. Colding (eds), *Linking social and ecological systems: management practices and social mechanisms for building resilience* (pp. 1—25). Cambridge, UK: Cambridge University Press.
- Bryceson, D.F. (2002) "Multiplex livelihoods in rural Africa: recasting the terms and conditions of gainful employment." *Journal of Modern African Studies* 40(1): 1-28.
- Cocklin C., and M. Alston, editors. 2003. Community sustainability in rural Australia: a question of capital? Centre for Rural Social Research, Charles Sturt University, Academy of the Social Sciences in Australia, Canberra, Australia.
- Chambers, R. (1995) "Poverty and livelihoods: whose reality counts?" *Environment and Urbanization* 7(1): 173-204.
- Cleaver, K.M. and G.A. Schreiber (1994) *Reversing the spiral: the population, agriculture and environment nexus in sub-Saharan Africa*. Washington, DC. World Bank. 293 pp.
- Coleman, J. (1988) "Social capital in the creation of human capital". *American Journal of Sociology* 94: 95-119.
- Corbett J.D., S.N. Collis, B.R. Bush, E.I. Muchugu, R.Q., Jeske, R.A. Burton, R.E. Martinez, J.W. White and D.P. Hodson, (1999): Almanac Characterization Tool. Blackland Research Centre, Texas, USA.
- Ellis, F. (2000a). *Rural livelihoods and diversity in developing countries*. Oxford University Press. 273 pp.

- Ellis, F. (2000b). "The determinants of rural livelihood diversification in developing countries". *Journal of Agricultural Economics* 51 (2): 289-302.
- Ellis, F. (1998). Household strategies and rural livelihoods diversification. *Journal of Development Studies* 35(1): 1-38.
- Emery, M. and C. Flora (2006) "Spiraling-up: mapping community transformation with community capital framework". *Journal of Community Development Society* 37(1): 19-35.
- Flora, F., Emery, M., Fey, S. and C. Bregendahl. (2004). Community Capitals: A Tool for Evaluating Strategic Interventions and Projects. North Central Regional Center for Rural Development, Iowa State University, Ames, IA. Retrieved from <http://www.ncrcrd.iastate.edu/projects/commcap/7-capitalshandout.pdf> on 3 March 2007.
- Francis, E. (2000). *Making a living: changing livelihoods in rural Africa*. Routledge. 212 pp.
- Gluckman, M. (1950). Kinship and marriage among the Lozi of Northern Rhodesia and the Zulu of Natal. in A.R. Radcliff Brown and D. Forte (eds). *African systems of kinship and marriage*. London: Oxford University Press for the International African Institute.
- Gutierrez-Montez, I. (2005). *Healthy communities equals healthy ecosystems? Evolution (and breakdown) of a participatory ecological research project towards a community natural resource management process, San Miguel Chimalapa (Mexico)*. PhD Dissertation, Iowa State University, Ames, IA.
- Hoddinott, J. and L. Haddad (1995). "Does female income share influence household expenditure patterns? Evidence from Cote d'Ivoire" *Oxford Bulletin of Economics and Statistics* 57(1) 77-96.
- Lal, R. and B. Stewart (1994) "Land Degradation. Advances in Soil Science". Vol 11, New York: Springer: Raton: CRC.
- Place, F. (1996). *Towards improved policy making for natural resource and ecosystem management in sub-Saharan Africa*. Nairobi, Kenya. ICRAF.

Putnam, R.D. (1993) "The prosperous community: social capital and public life". *The American Prospect* 13:35-42.

Sanchez, P.A., Shepherd, K.D., Soule, M.J., Place, F.M., Mukwenye, A.U., Buresh, R.J., Kwesiga, F.R., Izac, A., Ndiritu, C.G., and Woome, P.L. (1997): Soil fertility replenishment in Africa: An investment in natural resource capital. In: Buresh, R.J., P.A. Sanchez, and F. Calhoun (eds) *Replenishing soil fertility in Africa*. SSSA. Special publication. No.51, Madison, Wisconsin, pp. 1-46.

Sayer, J. and B. Campbell (2004). *The science of sustainable development: local livelihoods and the global environment*. Cambridge University Press, UK. 288 pp.

Schuller, T. (2001) "The Complementary roles of human and social capital". *Canadian Journal of Policy Research* 142: 89-106.

Scoones, I. (1998). *Sustainable rural livelihoods: a framework for analysis*. IDS working paper No. 72. IDS, UK. Retrieved from [http://www.ids.ac.uk/ids/bookshop/classics/working\\_paper72.pdf](http://www.ids.ac.uk/ids/bookshop/classics/working_paper72.pdf) on 12 November 2006

Smaling, E. (1993). Soil Nutrient Depletion in Sub-Saharan Africa. *In* The role of Plant Nutrients for Sustainable Food Crop Production in Sub-Saharan Africa. Van Reuler, Henri and William Prims, ed. Leidschendam, the Netherlands: VKP.

Von Bulow, D. (1992) "Bigger than men? Gender relations and their meaning in Kipsigis society, Kenya". *Africa* 62(4): 523-545.

Table 1. Customary agricultural rituals and practices among the study population.

Rituals and practices	Luo	Kipsigis
Blessing of agricultural abundance	Following crop harvest, small portions of it was thrown into lake or river for ancestors e.g., millet.	The first milk after a cow has calved was poured onto the ground at dawn for the ancestors.
Blessing the land or cattle to ensure fertility	Sexual rituals performed before major agricultural activities e.g., land preparation, sowing, weeding and harvesting.	A medicine man walked around the cattle <i>boma</i> (kraal) blessing the cattle for productivity and protection against any malady. The medicine man sprinkled the boundary of <i>boma</i> with rumen contents mixed with herbs.
Land use (before establishing homestead)	Seasonal land allocation to wives and married sons, with seasonal variations. In some cases, favored wife or son could be allocated better quality of land	Sons have use of mother's land till marriage when they inherit land from father.
Land inheritance	Sons inherit land after establishing own homestead.	The first born son permanently inherited the poorest quality and farthest field. The second son gets slightly better quality and closer field and so on for other sons
Livestock inheritance and bride wealth	Patrilineal inheritance of cattle	Sons inherit a one cow from father upon marriage. Daughters get one cow from parents at time of marriage

Table 2. Local people's interpretation of capitals.

Capitals	Indicators	
	Luo – Kanyibana villages	Kipsigis – Ainamoi village
Natural	Land (soil, plants, ancestors, animals, people*, air and water)	Land (water, soil, plants, animals, air and living people)
Physical	Homes, non-tarmacked roads, schools, churches, shops and vehicles	Health centers, Roads, shopping center, protected springs, boreholes, playing ground, vehicles, schools and chief center
Socio-Cultural	Rules, norms and practices that guide their everyday life	Rules, norms, practices, relations, trust and reciprocity that guide everyday life; collective action, friends and relatives
Human	Traditional skills and knowledge, formal education, health and capabilities	Traditional skills and knowledge, formal education, health, nutrition and capabilities
Financial	People*, cash money, livestock, remittances, trees and friends	Crops (for home use and market), trees, livestock, business, remittances, wage employment, cash money and constituency funds
Political	Marginalized and have no contact and voice with elected leaders	Elected leaders, voice to influence allocation of resources, linkages to government departments.

\* People are considered under financial capital because the number of economically active people influences the amount of cash that they can generate.

Figure 1. The Sustainable Livelihood Framework (DFID, 2001).

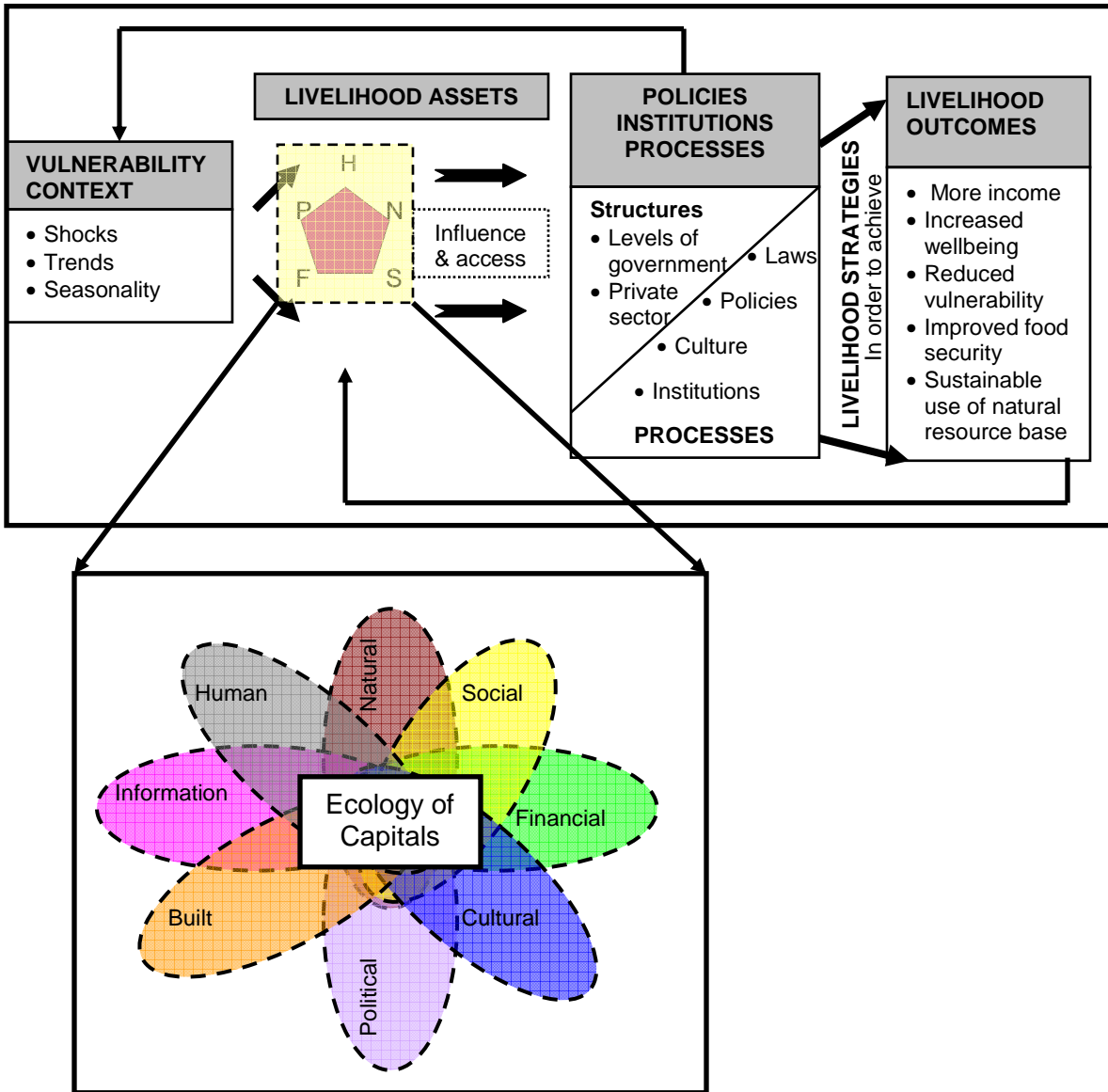


Figure 2. Location of study villages in Awach River catchment.

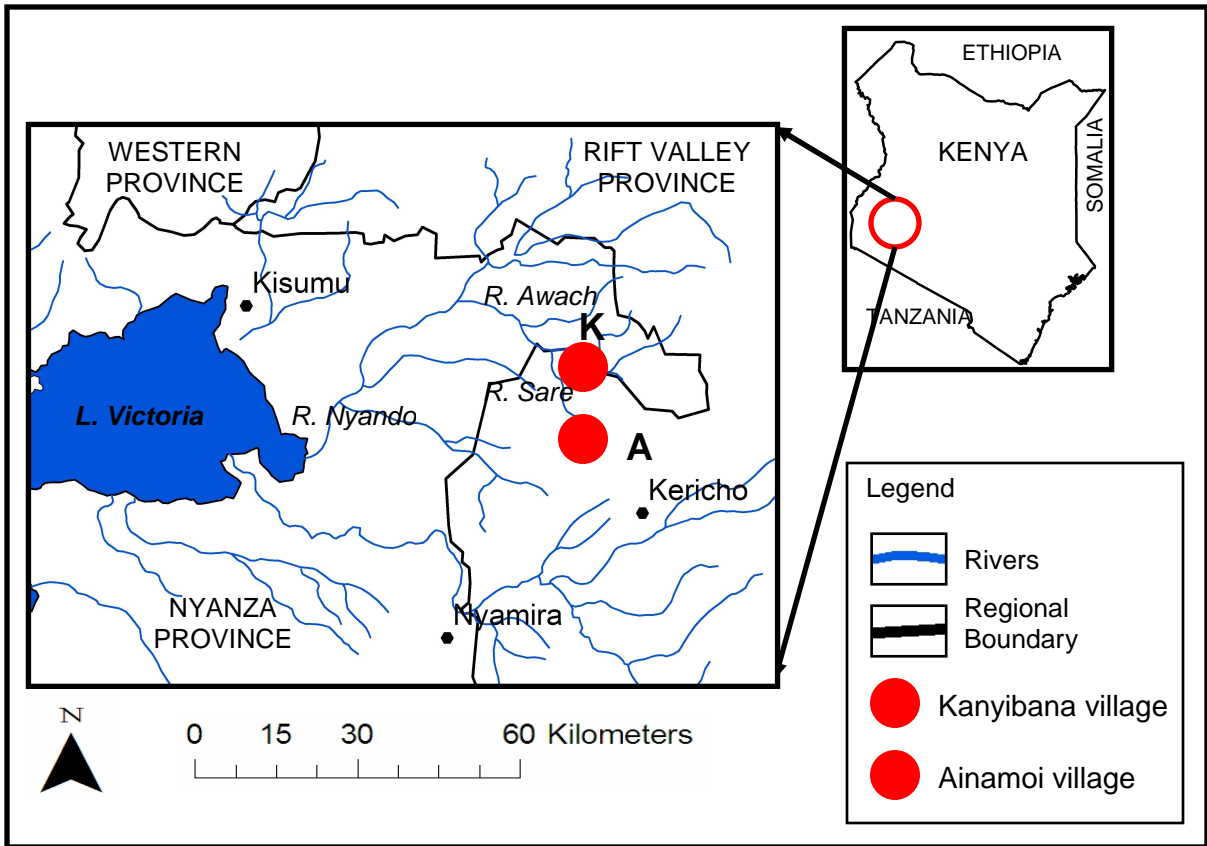




Figure 3. Pillar showing original alfisol soil profile (pillar height is 1.8 meters)

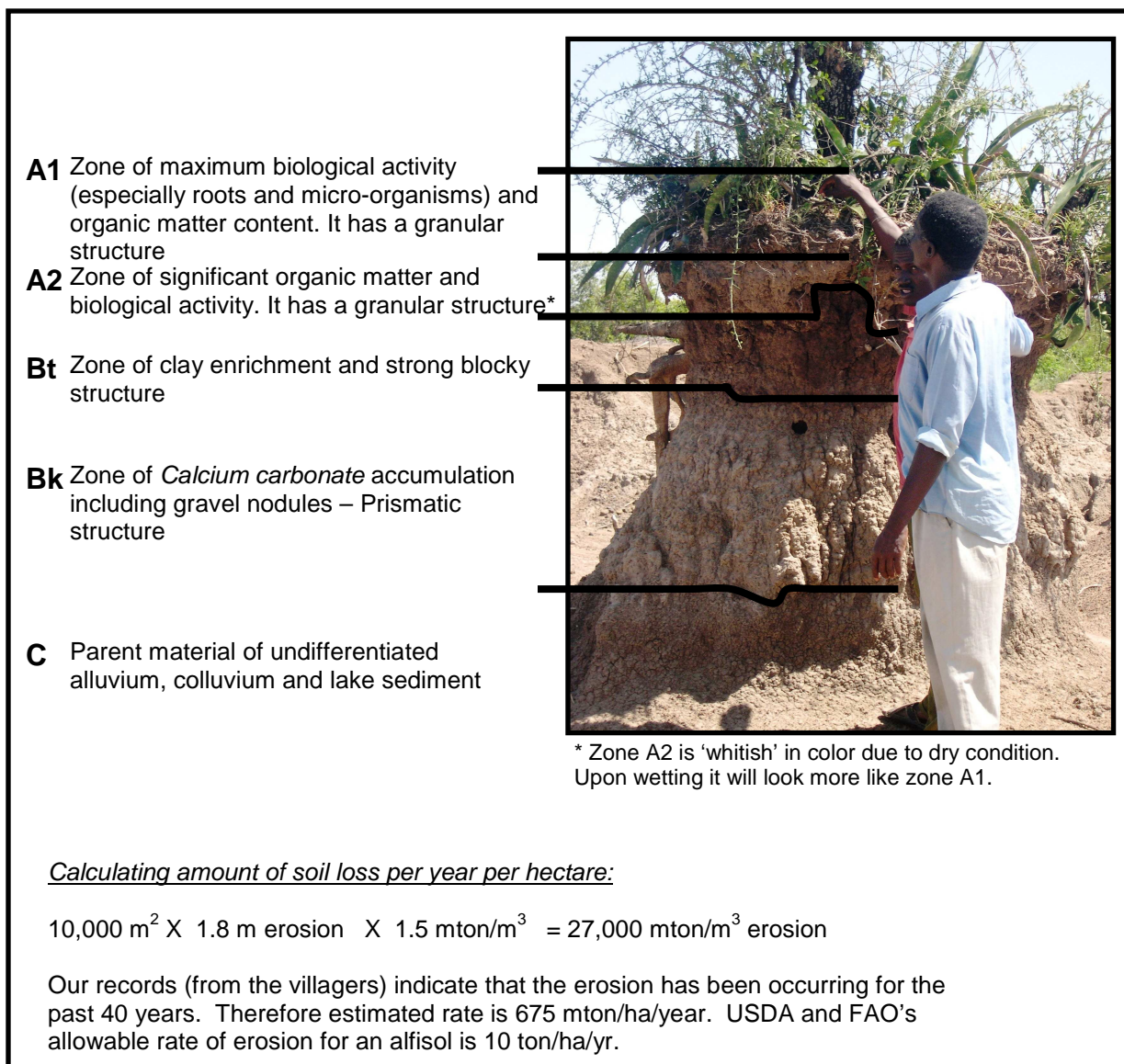


Figure 4. Typical current soilscape in Kanyibana village.



Figure 5. Field of sorghum under water stress in Kanyibana village.



Figure 6. Farmers admiring a healthy crop of finger millet in Ainamoi village.



Figure 7. Community estimates of capital quality and quantity over a 27 year period – Kanyibana village (10 is highest and -10 is lowest value).

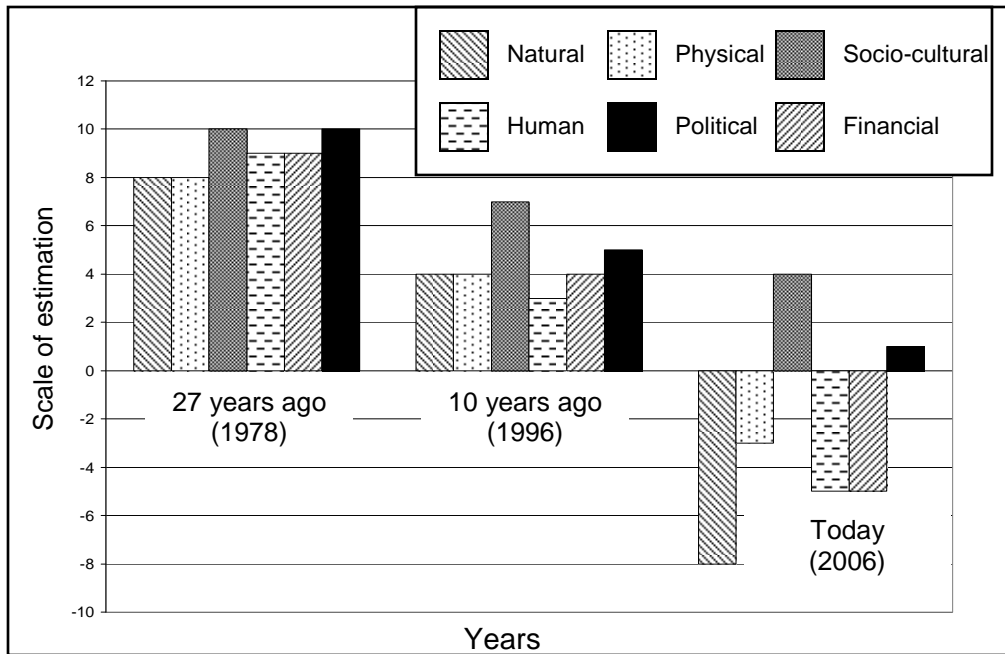
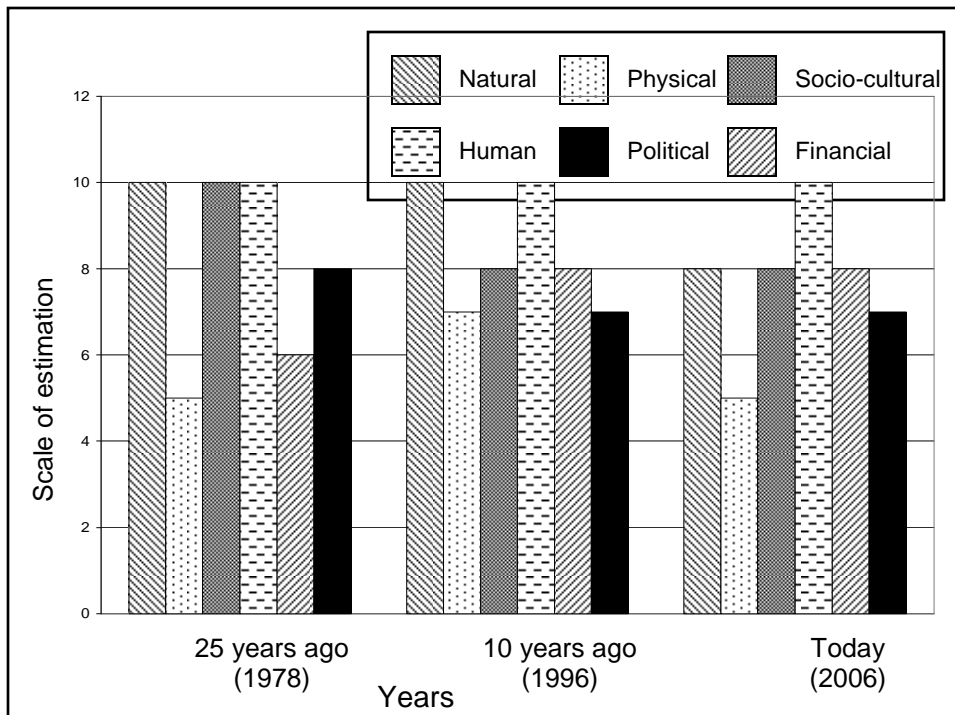


Figure 8. Community estimates of capital quality and quantity over a 27 year period – Ainamoi village (10 is highest and 0 is lowest value).



**CHAPTER 4**  
**CHANGING CAPITALS AND SHIFTING LIVELIHOODS: DYNAMICS OF THE**  
**AGRARIAN LANDSCAPE OF LAKE VICTORIA BASIN, WESTERN KENYA**

Paper to be submitted to the Journal of Ecological Anthropology

Mary Nyasimi, Lorna Butler, Lee Burras, Hsain Ilahiane, Richard Schultz and Jan Flora

**Abstract**

The relationship between humans and nature is creating global challenges. No area is so precariously at risk as rural Africa. In this region, people are food insecure due to land degradation, which in turn is threatening their very cultural, economic, social and political survival. Applying the sustainable livelihoods framework, this study was conducted in two culturally distinct communities to 1) understand the meaning, relationship and impact of cultural practices on land management, and to 2) examine the critical role of cultural capital in influencing livelihood choices of rural people.

Results suggests that among the Luo community, embedded and strongly held cultural practices such as conjugal relationships, family hierarchies and order of farming activities are leading to land degradation. Cultural practices and beliefs are strongly adhered to and are resulting in unabated environmental degradation. This collision between deeply embedded rituals and land degradation is having dire consequences whereby villagers seem to be divorcing themselves from farming and engaging more in non-farming activities. On the other hand, the Kipsigis community is rapidly changing its cultural practices in response to declining land quality, market forces and investment opportunities. Women are inheriting property, particularly land, as the men relinquish ownership and decision making power to them. This is encouraging investment in land management. Though lives of rural people are complicated beyond the scope of this study, applying the sustainable livelihoods framework permitted us to gain new insights to the realities. We recognized that rural people shape their lives and environments according to the meanings and values placed on their livelihood capitals. For instance, by focusing on cultural capital we unveiled latent dynamic relationships that could not have been captured if culture was not considered within the framework. These include gender, age and power relationships, whose embedded nature within a group of people is not easily discerned unless their culture is clearly understood.

*The Luo people liked to welcome visitors. Friends and relatives made no appointments. When they felt like seeing one of their friends, they just dropped by. Visitors were entertained with drinks and nice foods. Strangers, including their neighbors - Kipsigis and Gusii people - were given an equally warm welcome.....Ochieng, 1979.*

*Today all that has changed....we shut our doors because we are ashamed of receiving visitors. People hide from each other and all we have is desolation and sadness and grief... Elderly woman, Kanyibana village, 2005.*

## **Introduction**

Land degradation in sub-Saharan Africa has generated enormous discourse in political and academic arenas. At these levels, it is a highly contentious issue due to its dynamic nature and variability in terms of magnitude and manifestation across landscapes. There is an extensive but conflicting literature on the causes and impacts of land degradation. A plethora of literature leans toward population, the nature of environment, poverty or an interaction of these factors that point to a vicious cycle (Cleaver and Schreider, 1994; Koning and Smaling, 2004; Barbier, 1997; Forsyth et al., 1998; Scherr, 2000). Response from the scientific community in dealing with land degradation has been to conduct empirical research on various land use technologies and action research involving the participation of local people. For rural African people, land degradation is often fraught with conflict and a history of deep seated beliefs and traditions.

In recent years, development focus has shifted to the sustainable livelihood framework (SLF), which recognizes that people, even the poor, have resources and capabilities to make a living (Chambers and Conway, 1992; Scoones, 1998). Use of SLF is gaining importance as a means to better understand the complexity issues of rural Africa, involve local people as partners in development, and integrate different disciplines in developing appropriate land use technologies and livelihoods (Ellis, 2000a and 2000b; Carney, 1999; Carney et al., 1999). The framework uses a systematic step-wise analysis of five main livelihood capitals, institutions that influence access to the capitals, composition of livelihood strategies and their outcomes, and vulnerabilities that might affect not only capitals, but choice of a livelihood strategy (Ellis, 1998 and 1999, Scoones, 1998; Carney, 1999, Farrington et al., 1999). Before the emergence of SLF as a promising rural development paradigm for Africa, other approaches existed. Haug (1999) systematically traces different development approaches, from conventional sector-oriented strategies to those that are integrated and multi-sectoral, top-down to bottom up, external driven to

participatory action research. The SLF is regarded as a new and better approach of understanding and analyzing local conditions (Haug, 1999; Scoones, 1998; Carney, 1999). The SLF seeks not only to identify capitals, livelihoods strategies, policies and social institutions, but recognizes the constraints and opportunities that local people face. Central to the framework are the five capitals: natural, social, human, physical and financial (Scoones, 1998).

Several authors have critiqued the SRL framework (Carney, 1999; Carney et al., 1999; Murray, 2001; Cahn, 2002). Based on our investigation, we see two primary limitations of the framework. First, it is the situating of culture as an influential agent. This does not provide sufficient room for the observation of culture as one of the critical capitals that individuals actively incorporate into a livelihood decision. Throsby (1999) defines cultural capital as a set of attitudes, practices and beliefs that are fundamental to the functioning of different societies. Thus, by placing cultural capital in a central position within the SLF, we will attempt to show its critical role in influencing livelihood choices of the people of western Kenya. Second, the way the framework is conceptualized does not consider the embedded local meanings and customary values that people attach to capitals and choice of a livelihood strategy. This paper, therefore, aims to widen the number of capitals in the framework, and incorporate and understand the hermeneutics of cultural practices that are embedded and valued by rural people. The focus of this paper is on the livelihood capitals (Figure 1). In developing its case, the paper builds on a study that was conducted to understand the meaning, relationship and impact of cultural practices on land management.

### **The Study Area**

The spatial dimension of this study was across the Awach River catchment that transcends into Nyanza and Rift Valley Provinces of Kenya (Figure 2). Rainfall is adequate in quantity and reliability (Jama et al., 1997). Its distribution is bimodal permitting two crop growing season in March - July and in September - December. For this study, qualitative methods were used to collect and analyze data. These are focus group discussions, key informants and ethnography with purposively selected case studies. Case studies were selected from a rigorous participatory process known as “pathways into and out of poverty” in which homesteads were disaggregated into four categories as follows: a) those who maintained their wealth in the last 25 year period, b) those who have been poor in the last

25 years, c) those who have escaped poverty in the last 25 years and, d) those who have fallen into poverty.

### **The Luo People of Kanyibana Village**

Kanyibana village is located on the northeast corner of Nyakach Location in western Kenya. Kanyibana simply means “*the home of the Nyibana*”, and lies between two rivers, Awach and Sare. There are 138 homesteads, each with an average of 15 members. The Luo are linguistically classified as Nilotic (Dietler and Herbich, 1993). Among the Luo people, descent is traced through the patrilineal lineage whereby cultural identity and property inheritance passes through male lines. The patrilineal kinship system is complex and serves as the strongest regulator of behavior and patterns of subsistence production. This includes rights, duties, obligations, marital customs and regulations, and status of individuals within the homestead and the village. The Luo are a polygamous group that also practice the levirate system, which is the practice of marrying a widow to the brother of her deceased husband (Ochieng, 1976). The smallest unit is a homestead which is headed by a dominant male, known as **Wuon dala**, who is both the owner and allocator of property and decision maker. A case study stated that:

**Wuon dala** owns all the land inherited from his father. He owns all the livestock including the ones brought by his wife/wives, sons and those paid as daughters' bride wealth. All trees planted around the homestead and on the farm are owned by the **Wuon dala**. Women are not allowed to plant trees. This is because trees are used to establish boundary and hence a woman can claim ownership of a piece of **Loo** (soil) if she plants a tree. Sons own property after establishing their own homesteads. If **Wuon dala** dies, ownership of land, trees and livestock is passed to **Jatero**, the male inheritor.

After the homestead, the next unit is the clan that exerts extensive influence on its members. Decisions such as burial of an adult Luo man or woman, and in some cases wife inheritance, rest entirely with the clan.



### **Homestead composition and decision-making process**

Establishment of a homestead is an important rite of passage in the socialization process of a Luo man. A man cannot make homestead and clan decisions, or be enlisted for clan leadership, unless he has his own homestead, known as **dala**. Once a man becomes a **Wuon dala**, he blesses his land by having conjugal relations with his wife, or first wife if polygamous, on the day the house is constructed. The first wife's house is erected directly facing the main entrance gate, a symbol of seniority. All visitors are first welcomed into this house before meeting whomever they have come to see. If a man is polygamous, the second wife's house is constructed to the right of the first wife's. The third wife's house is constructed to the left of first wife's house. The positioning of each house is governed by cultural practices that are highly controlled by taboos and symbolizing hierarchical order of subsistence production.

All the land and livestock belongs to the **Wuon dala**. Every season, **Wuon dala** allocates each wife a piece of land to cultivate. This piece of land is not permanently allocated and may change as often as each rainy season. In situations where there is only one wife, she cultivates all the land until the sons marry and request land from their father. One of the oldest female participants stated that:

We (women) are enclosed and confined within the homestead. We only own the small garden behind our houses. Actually we do not own it. It is the piece of property that we maintain throughout our life. We are fenced in within the cultural practices. We wait for our men to give us **Loo** (soil) every season. We cannot do anything unless our men perform their duty first. It is very disheartening because many women are really industrious. Some women start trading in crafts and selling **omena** (fish) when they see that the critical time for planting crops is disappearing and the man has not performed his duty. Other women borrow cow dung from their birth village and fertilize the fields. Unfortunately we have to seek for permission from our husbands to do anything.

Sons born into the home usually build houses (**simba**) when they reach puberty. The first, third, fifth and seventh sons build their **simba** to the right of the first wife's house. The second, fourth, sixth and eighth sons build on the left side. In many cases, sons marry and have children while living within their father's homestead. If a son gets married, he and his wife are considered members of his mother's house. They produce and consume food within their mother's house. Only when the son's second child attains one year does the father allocate his son a piece of land to cultivate and grow crops. As long as the son has

not moved out of his father's homestead and established his own homestead, the land he is given to cultivate is not permanent.

Sons get a permanent piece of land from their father once they establish their own homestead. Moving out of the father's homestead is usually done in the order of birth, that is, the first son has to move out first, followed by the second son, and so forth. This order cannot be broken. If the first-born son dies before establishing his own homestead, the person who inherits the widow takes the responsibility of establishing the homestead. Therefore, if the first-born son does not move out of his father's homestead, the rest are condemned to living in their father's homestead. In such a case, they cannot make their own decisions on land, or get elected as leaders within their village. As a result, the homestead would be composed of different generations of people dependent on the **Wuon dala** for decision making. A male participant said that:

Our homestead has many people living in it. In the morning when we are all getting ready to start the day, one might assume that we are gathering for a ceremony. My grandfather had three wives. Unfortunately the first wife died in 1998. The other two wives are alive. My first grandmother had two sons and three daughters. My second grandmother had four sons and two daughters. My third grandmother had five sons and three daughters. All the daughters are married. The first son of my first grandmother died before moving out of the homestead. The person who inherited his wife died before he could establish a homestead for her. The next **Jatero** (inheritor) also never established a homestead for her. We are all now living in my grandfather's homestead. Look at the many houses constructed in this homestead. The arrangement of the houses will clearly tell you what generation lives there. In our homestead we have four generations now. This includes my grandfather, father, myself and my children.

The HIV/AIDS pandemic that has swept across sub-Saharan Africa has led to a lot of changes in Luo homestead composition. The impacts of HIV/AIDS on families, particularly in Africa, are heavily documented. Some of the impacts include death of parents and income earners, loss of assets, decline in agricultural productivity as labor is reallocated to taking care of the sick, loss of indigenous knowledge, and an increase in orphans. The HIV/AIDS pandemic in Kanyibana village has also led to changes in homestead composition. According to the focus group participants, HIV/AIDS has killed middle-aged people and only left the old and the young. But, the young do not escape the disease. The rapid spread of HIV/AIDS has been, and still is, fueled by wife inheritance and other cultural practices. When

the head of the homestead dies, the wife/wives are inherited by the head's brother. This brother takes on the role of homestead head.

In certain circumstances, a widow can be inherited by someone outside the homestead. This **jatero** is usually a cousin or any relative living nearby. If the **jatero** is from outside the homestead, he becomes the head of two homesteads—his own and the inherited homestead. We were intrigued by the strongly held practice of wife inheritance. This prompted us to have lengthy discussions with male participants on the issue. The oldest male participant strongly stated that a Luo woman must have a **Wuon dala** to stand up for her and her children. He stated emphatically that:

A Luo woman once married can never be without a husband.

Since the Luo people are patriarchal and patrilocal, property is inherited through male descent lines. Married women do not own land or property. They have user rights. Unmarried women, with or without children living in their father's house, do not own property or have user rights. All women, after attaining marriage age, which is usually about 15 years, are expected to be married. A female participant clarified the interdependency between women's married status and property rights as follows:

It is very important for a mature woman to get married. A woman does not have the right to use property unless she is married. If she dies before marriage, she must be buried outside the homestead. If she is buried within the homestead compound, she will appear to us, begging us to rest her spirit outside the compound. If a woman was married and she later returned to her father's homestead and then dies there, the husband is informed. The husband is obligated to come and collect his dead wife and bury her in his homestead. If the husband refuses, the clan leaders then consult the husband's clan leaders. If no agreement is reached, the woman is buried outside her father's compound as if she was never married.

### **Sexual rituals**

Sexual rituals are performed before all subsistence production activities and ceremonies as a way of blessing or cleansing the homestead and the land. In addition, sexual rituals also serve as a way to ensure other wives their sexual rights. According to the Luo, in a polygamous setting, a man might sexually favor one wife - usually the youngest - and neglect the older ones. According to an old woman:

When a man married several wives he tended to forget the older women. The man said that the older women could not keep him warm and he spends most of the nights with the

youngest wife. To ensure that all the wives received sexual attention at night from their husbands, our ancestors established a ritual that the man must spend the night with his first wife, the second wife on the following night and so on. To reinforce the ritual, our ancestors said that the rituals must be performed before or after major activities have been carried out. For example, at the beginning of the rainy season, my husband spends the night in my house and the following day I have to start preparing the land. This is a signal to my co-wife that she should expect our husband in her house that night. The same is done when we have weddings or funerals in our village.

Any married woman cannot till the soil or perform any farming activity, such as cultivating, sowing, weeding and harvesting, unless her husband has had conjugal relations with her the previous night. This was verified by a male key informant:

All Luo ceremonies involve sexual blessing and cleansing. We have conjugal relations before major activities such as land preparation, sowing seed, weeding and harvesting of crops, establishment of homestead, weddings and funerals. We have sex when someone dies or when there is a wedding. Most of our activities are spiritually tied to conjugal relations.

Sexual rituals are performed in a hierarchical manner. If the man is polygamous, he first performs the ritual with the first wife, then the second, and so on. If there are married sons living within his homestead, then the first son performs the ritual after the father, followed by second, third, and so on. In Kanyibana village, there are women whose husbands have died and they have refused to be inherited due to the pandemic HIV/AIDS disease. These women do not own any land and any livelihood activity that they undertake must occur outside their village. They cannot farm their dead husbands' lands because no rituals are performed.

My husband is sick because of HIV/AIDS. I have heard my brothers-in-law talking amongst themselves on who will inherit me. It is a shame that the brothers are already talking about inheritance even before their brother has died. I do not want to get inherited because I will pass the disease on. However, if I am not inherited I cannot plant any crops. Other women in our village will keep away from me because I will have broken the tradition. After I am dead, my daughters and sons cannot get married because there will be no man to negotiate their marriage.

Failure to be inherited implies that women cannot cultivate their fields, nor perform other homestead and village duties. Even though the women do not get chased away from

their houses, they become outcasts. Most of the widows have become permanent features along the roads leading to the local markets, nearby towns and/or the villages in the highlands. They trek to these places in search of jobs. The land left behind is not managed and is soon lost to degradation.

### **Impact of cultural practices on natural capital**

Land is inherited through patrilineal descent lines. Only married women and married sons still living in their father's homestead have user rights. Unmarried daughters and sons customarily belong to their mother's house, and hence, provide labor to the mother's fields. Despite being considered fishermen, Luo people have, through the years, incorporated small-scale farming into their lives. The environment of Kanyibana village can only support drought resistant crops such as sorghum, millet and cassava. Since Kanyibana village is located on the floodplains of Lake Victoria, and on the edge of the steep Nandi escarpment, it is susceptible to flooding during the long rainy season (May - June). The drought and flooding phenomena makes it extremely difficult for Kanyibana people to select appropriate crops that can withstand both extreme dry weather and waterlogged soil conditions. Local Zebu cattle are also reared in this fragile environment. The fragility of environment is brought by two extreme weather conditions, drought (January to March) and flooding (April to July). During both periods, there is insufficient forage that affects milk production and livestock growth rates. Grasses that grow do not supply sufficient nutrients.

Using the focus group participants, lengthy discussions took place about the changing environmental conditions and processes. We relied heavily on local people's historical knowledge about changes as far back in time as they could remember. The oldest male participant could recall events from the 1930s. Where there was an apparent knowledge gap, key informants were interviewed. Most of these were elderly individuals who were not able to attend focus group discussions. Nonetheless, the participants had a profound and detailed knowledge of changes in the soil and water conditions and vegetation. The participants were also able to discern the relationship between soil conditions and disappearance or emergence of specific plants. According to the participants, there were three main reasons for the degraded landscape: their cultural practices (discussed in the previous section), land use changes, and the anger of their ancestors. Other secondary causes of land degradation noted included the breakdown of soil conservation structures that were built under forced labor by the British colonial

administration, draining of swamps for sugarcane, rice and cotton production, and cutting of trees on the Nandi escarpment. An interview with an elderly woman revealed an emic view of the degradation processes:

Our **dala** [homestead] has totally disintegrated. The reason is **ongoro** [gully]. **Ongoro** has and is still eating our land. We watch **ongoro** eat into our soil and there is nothing we can do. **Ongoro** is caused by too much water running down from the hills. This water does not find any barrier when it reaches our village and sweeps the soil away. After a rainstorm, you think someone was sweeping the soil to make it shine. We never had a problem with water running across our soil. In the 1960's and 1970's, Awach and Sare Rivers would fill with water during the rainy season and spill onto the swamps that ran along the rivers. If the swamps could not take more water, then some of it could come into our homes. The swamps stored the excess water. Now the swamps are gone and people started farming very close to the river. There is nothing to hold the excess water. In addition, we discovered, and by we, I mean the Luo living here on the Kano plains, we discovered that there are trees up there owned by the Kipsigis and we could buy, make charcoal and sell in Ahero and Sondu market, sometimes, as far as Kisumu town. We cut the trees on Kipsigis land and there was nothing to hold the rain. So when it rains up there, we know our village is going to be flooded.

Another elderly woman added:

Our ancestors are not happy with us. Their bones have been brought to the surface by the **ongoro**. As the bones are swept away by the raging waters, they will continue to punish us. We will never have a place to grow crops and rear children. Look at this land, what do you see? Desolation and sadness and grief. The ancestors are scattering **Nyibana** people far and wide. They only return for funerals to bury the dead.

Narratives from other village elders and case studies conveyed similar accounts of degradation and the perceived underlying causes. There was also no disagreement among focus group participants on the indicators of degradation and descriptions of landscape changes. The participants identified four indicators or impacts of degradation. These are:

- a) Soil indicators - gullies, flooding, soil running away, rocky and stony surfaces, barren soil, water running across the surface, hot soil, hungry soil and cracked soil, no soil animals, standing pillars of soil, ponding, pebbles from other places being carried and deposited by water on the land, hanging rocks, light soil, dust storms, deposited stones and soil on fences, and eating of river banks (Figure 3).

- b) Water indicators - vanished springs, brown muddy waters, dead insects floating on water surfaces, increased number of diarrhea cases, and sediments at the bottom of stored water (Figure 4).
- c) Plants indicators - decreased crop yields, stunted crop and tree growth, yellowing of maize and bean leaves, presence of weeds, disappearance of some tree and shrub species and crops.
- d) Social indicators - increased cases of hungry people, empty homesteads, increased migration into other villages, homesteads separated, reduced social time, increased human (and livestock) injury, children quitting school at age 12 years to search for jobs, people closing doors when eating a meal, people being accused of trespassing, and giving of children to be reared by other people.

The most visible and threatening indicator that is threatening the lives of Kanyibana people is the gully (Figure 5). A male participant said;

When I was young the gully was 5 km away. It is here now and it's destroying homes, cattle and our lives. Can we control the gully? No!! To control the gully, we need power and freedom from some of our cultural rituals. We do not have power. The gully has power right now. The gully with its strength is constantly changing, slowly creeping into our land. It's a silent killer, eating land slowly by slowly just like HIV/AIDs. We call it, the roaring monster because when there is a rain storm you hear the water rushing through it. The only advantage the gully has over HIV/AIDs is that we see it coming.

### **The Kipsigis People of Ainamoi Village**

The Kipsigis living in Ainamoi village are a subset of the larger Nandi ethnic group. The name 'Ainamoi' means, river of calf. It was named so because of the river that provided clean water for calves during drought. The river used to originate in a swamp located on the eastern boundary of present Ainamoi village. The river no longer exists and the swamp is dry except during the rainy season. The north side boundary of the village drops sharply off the Nandi escarpment, providing a spectacular landscape panorama of the Luo villages below. The village is composed of 76 homesteads with an average of 6 members per homestead.

Like the neighboring Luo, the Kipsigis also trace their descent through the patrilineal lineage whereby cultural identity and property inheritance passes along the male lines. The Kipsigis are also a polygamous group and practice polygyny as well. The smallest unit is the

homestead which is headed by a **Boiyot**. Homestead composition includes father, mother(s) and children. Polygyny was permitted in circumstances where a woman would not bear children. Children born in this arrangement belonged to the childless woman, and sons inherited her piece of land upon her death (Mwanzi, 1976). In a polygamous situation, every wife was permanently allocated a piece of land to cultivate. Each wife managed the land based on male decision making. When the **Boiyot** died, the widow(s) inherited rights of occupancy and usage of land, which passed to her sons upon her death (Mwanzi, 1976). In a monogamous family, if the woman did not bear sons and all daughters were married, the land was given to her husband's brother's son(s).

### **Changing cultural practices in response to changing environment**

Prior to the year 2000, Kipsigis married men had ultimate rights over land and livestock while married women owned property through a system of house property, where women exercised economic autonomy over household goods (Von Bulow, 1992). The women only had rights to cultivate the land but not to allocate (Von Bulow, 1992). At the turn of the 21<sup>st</sup> century, the system of land ownership, control and inheritance started changing. Customarily, land ownership, control and management were the prerogative of the **Boiyot**. Men residing at home made decisions on management of land, while women provided the labor. Since independence in 1963, the pull of formal wage employment has enticed men to migrate from rural to urban areas (Beskok, 1981; Oucho, 1980; Rempel, 1981). In the 1980s and onwards, decreasing land sizes and associated declines in productivity have pushed men into migration (Barret et al., 2001a and 2001b; Barret and Reardon, 2000; Ellis, 2000a and 2000b; Francis, 2000; Reardon, 1997 and 1999; Bebbington, 1999). Migrating men did not usually relinquish land management decisions to women. Change was evident by 1995. A case study respondent who spent most of the time working in the city in 1995 decided to hand over management rights to his wife. He said:

I am away from my land eleven months in a year. I come home for one weekend in a month and longer time in December. I realized my wife was waiting for me to tell her what to do. I had to let her make decisions on the land, which includes what crops to grow and what strategies to employ to improve the land. The land still belongs to me, but my wife makes all the decisions now. I am no longer under pressure to come home every month.



Discussion with other male key informants ascertained that this was true. According to these men, they all lived in the cities, and during a funeral they shared their predicament of maintaining land management issues while living in the city. The case study respondent, who was present, informed them of his decision to relinquish management decisions to his wife. Most of the men realized the convenience of leaving the land under the care of their spouses. In 2004-2005, at the time of this study, women whose husbands resided away from home were making land management decisions. One woman said:

It is easier for me to decide what to grow without having to wait for my husband to return from Kericho town. I know what crop to grow on certain plots of the land. I visit the market once a week and I get to know what crops people are demanding and plan for next season. For instance, the boarding secondary school nearby requires fruits and I am now growing pineapples and paw paws. I feel happy that I can make these decisions before consulting my husband.

Literature from Africa is replete with land tenure regimes that favor men and relegate women to merely having user rights. A woman gained land use rights through her husband, which she relinquished if divorced. However, divorce cases were very rare mainly because women did not retain a place in their maternal home (Von Bulow, 1992; Oboler, 1985; Saltman, 1969; Soi, 1984). Kenya, like other countries in Sub-Saharan Africa has steadily witnessed increased divorce or separation of women from their husbands, both in rural and urban since early 1980s. Landless women are appearing in rural areas as the marriage institution has collapsed (Hakansson, 1988; Davison, 1988; Geisler, 1992). During this study, we interacted with two divorced and five separated women. These seven women owned land and cattle through their fathers, and they were quite comfortable with their status. What explains this new land ownership pattern? One father who had subdivided his land for his divorced daughter said:

My daughter was married to a man who beat her quite often. Two years after my daughter was married, she started running away from her marital home on a monthly basis. At the beginning, my affines came and we settled the problem. This went on for two years and one day my daughter came home badly beaten. I decided that she would get killed one day. I told her that I will return the bride wealth and she could live with me. I encouraged her to remarry but the scars of her previous marriage were too deep. I decided to give her land where she can live. She now owns one and half acres of land and she can grow whatever she wants. In future, she has authority on who she will give the land to.

This seems to be a new phenomenon among the Kipsigis people that started in 2000. The position and role of women is rapidly changing not only in their married homes, but in their maternal villages as well. The women are readily welcomed back to their fathers' lands if their marriage has collapsed. The land the women inherit from their fathers is managed quite differently from land where women have only user rights. These women do not have men directing them about what to grow and how to manage the piece of land. One woman who inherited three acres said:

I now own a piece of land. I have a daughter who will inherit it from me. My brothers cannot take the land from me because the chief was present when the land was given to me. I have acquired the government title deed on the land as well. All the crops that I grow are mine and I decide what to do with the excess produce. I have friends who have to give the money to their husbands after selling the crops. Since this land is my source of food and cash, I have to tend to it carefully. I have planted napier grass on contours to stop the soil running away during intense afternoon storms.

### **Impact of cultural changes on land management**

The Kipsigis land tenure regimes are responding to change in the marriage institution as well as to changing economic and environmental conditions. As men relinquish their land decision making power to their wives and women (divorced, separated or unmarried), and women are inheriting land from their fathers, there are profound impacts on land management. According to a female participant:

Our land is improving now that women can manage and protect it. We (women) protect the land like our own children. We nourish it by giving it manure and hope that it will still be in good condition for our children. Previously, it was not easy for a woman to go to the market and buy DAP fertilizer or buy cow dung manure from the neighbors. Now, I can do it without bothering to ask **Boiyot**.

As more women are becoming involved in land management, there is a marked increase in crop diversity. This diversity includes legumes and non-legumes, annuals and perennials, and short and long duration crops, subsistence and cash crops (Figure 6). In addition, there is increased integration of fruit and timber trees on the landscape. A male farmer noted:

My farm looks like a forest. My wife and I are growing all kinds of crops and have planted a variety of trees. We grow legumes such as beans and peas that are intercropped with maize.

Within the same plot, there are scattered banana stems and on the boundary we have planted *Grevillea robusta* and passion fruits. On other pieces of land, we have sweet potato, pineapples, finger millet, local vegetables, tomatoes and onions. At any time of the year, there is a crop in the field or we are preparing the field for another crop. We also grow tea and coffee and sell to the factory for cash.

### **Awareness of soil degradation**

Through the focus group discussions accompanied by exploratory transect walks, the local people revealed that they are experiencing land degradation in spite of improved soil management practices like stone terracing, planting napier grass to control erosion, and mulching. Though degradation is small in scale compared to Kanyibana village, the participants and case studies easily discerned several indicators of degradation such as the sweeping of topsoil, particularly during heavy rainstorms, and piling it on the living fence boundaries.

Unlike the Luo people, the major causes of degradation in this village are related to land use practices and management. These findings are in agreement with what most authors cite as causes of land degradation in developing countries (Sanchez et al., 1997; Barbier, 2000; Smaling et al., 1993; Conelly and Chaiken. 2000). Most of the participants noted that intensive use of land without “giving the soil a rest or feeding it with enough food”, is leading to “less and less produce for people every season and every year”. Maize crop yields in this village are relatively high compared to Kanyibana or other parts of Kenya. In this village, the people harvest average yields of about 6 t/ha of maize compared to Kanyibana village where even 0.2 t/ha is unattainable. Other causes of land degradation identified were ploughing up and down the slope, overgrazing small pieces of land, deforestation in response to greater demand for tree products for the home, and Luo population increases.

Indicators of land degradation include:

- a. Plant indicators - yellowing and thinning of maize, appearance of bad weeds like striga, plant root exposure,
- b. Soil indicators - light weight soil, rocky surfaces, decrease in earthworms and other soil animals, decrease in A-horizon, rills after rainstorms, build-up of eroded soil on tree bases and fences.

In contrast to the Luo village downstream, social and water indicators were not cited as indicators of land degradation. Most families can afford to eat three full meals a day, work on the farm, and have time for leisure and social meetings with friends. In addition, the Ainamoi people draw their domestic water from a protected spring and a natural aquifer. According to the participants, the water is clean and free of water borne diseases.

### **Conclusion**

This paper adapted the SLF and integrated culture as one of the core and central capitals that influences the way people construct their livelihoods. We have analyzed the way cultural capital interacts with natural capital (land), and the meanings and value embedded within it. We have shown how the Luo people are rigidly holding on to their cultural capital. On the other hand, the Kipsigis people are experiencing a dynamic relationship among their cultural capitals, land and livelihood strategies. In addition, by focusing on cultural capital we have unveiled other latent dynamic relationships that could not have been captured if culture was not considered. These include gender, age and power relationships, whose embedded nature within a group of people is not easily discerned unless their cultural patterns are clearly understood.

Though the realities of rural people are complex, stretching beyond the scope of this study, using the livelihood capital component of the SLF allowed us to incorporate and understand new insights of realities. It enabled us to recognize that rural people shape their lives and environments according to the meanings and values that they place on their capitals. Finally, we have come to recognize an important strength of the SLF. This is the easy adaptability of the framework to encompass unanticipated components and to include the micro and macro level interactions. In addition, its practicability helped the local people and us to understand their livelihood context.

## References

- Barbier, E.B. 2000. The economic linkages between rural poverty and land degradation: some evidence from Africa. *Agriculture, Ecosystems and Environment* 82: 355-370.
- Barbier, E. 1997. The economic determinants of land degradation in developing countries. *Philosophical Transactions: Biological Sciences*. 352: 891-899.
- Barret, C. and T. Reardon. 2000. Asset, activity and income diversification among African agriculturalists: some practical issues. Mimeo.
- Barret, C., T. Reardon and P. Webb. 2001a. Nonfarm income diversification and household livelihood strategies in rural Africa: concepts, dynamics and policy implications. *Food Policy* 16: 315-331.
- Barret, C., M. Bezuneh and A. Abdillahi, 2001b. Income diversification, poverty traps and policy shocks in Cote d'Voire and Kenya. *Food Policy* 26: 367-384.
- Bebbington, A. 1999. Capitals and capabilities: a framework for analyzing peasant viability, rural livelihoods and poverty. *World Development* 27(12): 2021-2144.
- Beskok, O. 1981. Migration data from the 1979 Kenya Population census. Population Studies and research Institute. University of Nairobi (Mimeographed).
- Cahn, M. 2002. Sustainable livelihood approach: Concept and Practice. Retrieved from [http://www.devnet.org.nz/conf2002/papers/Cahn\\_Miranda.pdf](http://www.devnet.org.nz/conf2002/papers/Cahn_Miranda.pdf) on January 4, 2007.
- Carney, D. 1999. Approaches to Sustainable Livelihoods for the Rural Poor. ODI Poverty Briefing No. 2.
- Carney, D., Drinkwater, M., Rusinow, T., Neefjes, K., Wanmali, S. and Singh, N. 1999. Livelihood approaches compared: a brief comparison of the livelihoods approaches of the UK Department for International Development (DFID), CARE, Oxfam and the UNDP. Retrieved from <http://www.livelihoods.org/info/docs/lacv3.pdf> on February 5, 2007.
- Chambers, R. and G. Conway. 1992. Sustainable livelihoods: practical concepts for the 21<sup>st</sup> Century. IDS Discussion Paper 296. IDS, UK.

- Cleaver, K.M. and G.A. Schreider, 1994. Reversing the spiral: the population, agriculture and environment nexus in sub-Saharan Africa. The World Bank, Washington, DC.
- Conelly, W.T. and M.S. Chaiken. 2000. Intensive farming, agro-diversity and food security under conditions of extreme population pressure in western Kenya. *Human Ecology* 2(1): 19-51.
- Davison, J. 1988. *Agriculture, women and land: the African experiences*. Westview Press.
- Dietler, M. and Herbich, I. 1993. Living on Luo time: reckoning sequence, duration, history and biography in a rural African society. *World Archaeology* 25(2):248-259.
- Ellis, F. 1998. Survey Article: household strategies and rural livelihoods diversification. *Journal of Development Studies*, 35(1): 1-38.
- Ellis, F. 1999. Rural livelihood diversity in developing countries: evidences and policy implications. ODI. Natural Resources Perspectives 40. London. ODI.
- Ellis, F. 2000a. The determinants of rural livelihood diversification in developing countries. *Journal of Agricultural Economics* 51(2): 289-302.
- Ellis, F. 2000b. *Rural livelihoods and diversity in developing countries*. Oxford University Press.
- Farrington, J., Carney, D. Ashley, C. and Turton, C. 1999. Sustainable livelihoods in practices: early application of concepts in rural areas. ODI Natural Resources Perspectives 42. London.
- Forsyth, T. M., Leach and I. Scoones. 1998. Poverty and environment: priorities for research and policy. Paper prepared for the United Nations Development Programme and European Commission, IDS. UK.
- Francis, E. 2000. *Making a living: changing livelihoods in rural Africa*. Routledge.
- Geisler, G. 1992. Moving with tradition: the politics of marriage amongst the Toka of Zambia. *Canadian Journal of African Studies* 26(3): 437-461.

- Hakasson, T. 1988. Landless Gusii women: a result of customary land law and modern marriage patterns. Working papers, African Studies program. University of Uppsala.
- Jama, B., R. A. Swinkels, and R. J. Buresh. 1997. Agronomic and economic evaluation of organic and inorganic sources of phosphorus in western Kenya. *Agronomy Journal* 89: 597–604.
- Haug, R. 1999. From integrated rural development to sustainable livelihoods: what is the role of food and agriculture. *Forum for Development Studies* 2: 181-201.
- Koning, N. and E. Smaling. 2004. Environmental crisis or 'lie of the land'? The debate on soil degradation in Africa. *Land Use Policy* 22: 3-11.
- Murray, C. 2001. Livelihoods research: some conceptual and methodological issues. Development Studies Association Annual Conference IDPM, University of Manchester, 10-12 September 2001.
- Mwanzi, H.A. 1976. *A history of Kipsigis*. Kenya Literature Bureau. Nairobi, Kenya.
- Oboler, R.S. 1985. *“Women, power and economic change: the Nandi of Kenya”*. Standford University Press. California.
- Ochieng, W.R. 1979. *Kenya's People: People round the lake*. Evans Brothers Limited.
- Oucho, J.O. 1980. Urban migration field: a study of the spatial migration system of Kisumu Town, Kenya. *The Kenyan Geographer* 3(1): 7-22.
- Reardon, T. 1997. Using evidence of household income diversification to inform study of the rural non-farm labor market in Africa. *World Development* 25(5): 735-747.
- Reardon, T. 1999. Rural non-farm income in developing countries. Mimeo, FAO.
- Rempel, H. 1981. Rural-urban labor migration and urban unemployment in Kenya. RR-81-24. Laxenburg, Austria. International Institute for Applied Systems Analysis.
- Saltman, M. 1969. *The status of Kipsigis customary law*. Nairobi. University of East Africa.

Sanchez, P., Shepherd, K., Soule, M., Place, F. Buresh, R., Izac, M., Mkwunye, U., Kwesiga, F., Ndiritu, C. and Woomer, P. 1997. Soil fertility replenishment in Africa: an investment in natural capital resource. In Buresh et al (eds). Replenishing soil fertility in Africa. SSSA Special Publication No. 51. Madison, Wisconsin, USA.

Scherr, S. J. 2000. A downward spiral? Research evidence on the relationship between poverty and natural resource degradation. *Food Policy* 25: 479-498.

Scoones, I. 1998. Sustainable rural livelihoods: a framework for analysis. IDS working paper No. 72. IDS, UK.

Smaling, E., J. Stoorvogel and P. Windmeijer. 1993. Calculating soil nutrient balances in Africa at different scales. II. District Scale. *Fertilizer Research* 35(3): 237-250.

Soi, E.K. 1984. Kipsigis words of wisdom. Sotik, Kenya. Rift valley Review Association.

Throsby, D. 1999, 'Cultural capital', *Journal of Cultural Economics*, 23, 3–12.

Von Bulow, D. 1992. Bigger than men? Gender relations and their meaning in Kipsigis society, Kenya. *Africa* 62(4): 523-545.



Table 1. Characteristics of the study villages in the Awach River catchment.

Characteristics	Villages	
	Kanyibana	Ainamoi
Ethnic group	Luo	Kipsigis
Linguistic classification	Nilotic	Nilo-Hamites
Number of homesteads	138	76
Location	Flood plains of Lake Victoria basin	Highlands of Nandi escarpment
Topography	Flat plains	Gentle sloping land
Average altitude	1200 m	2000 m
Annual average rainfall	1200 mm	1800 mm
Drinking water (quality and source)	Bad from sediment loaded rivers	Good from springs and aquifers
Roads	Bad and inaccessible during wet season	Good murram road
Livestock	Zebu cattle and goats grazed along river banks	Improved grade cattle and sheep tethered on compounds
Health facilities	None	Health center managed by local people and a pharmacy
Customary livelihood strategy	Fisherpeople	Pastoralists
Current dominant livelihood strategies	Wage labor, sand harvesting and minimal farming	Small-scale intensive farming of cash and food crops

Figure 1. The Sustainable Livelihood Framework with emphasizes on cultural capital (Adapted from DFID, 2001).

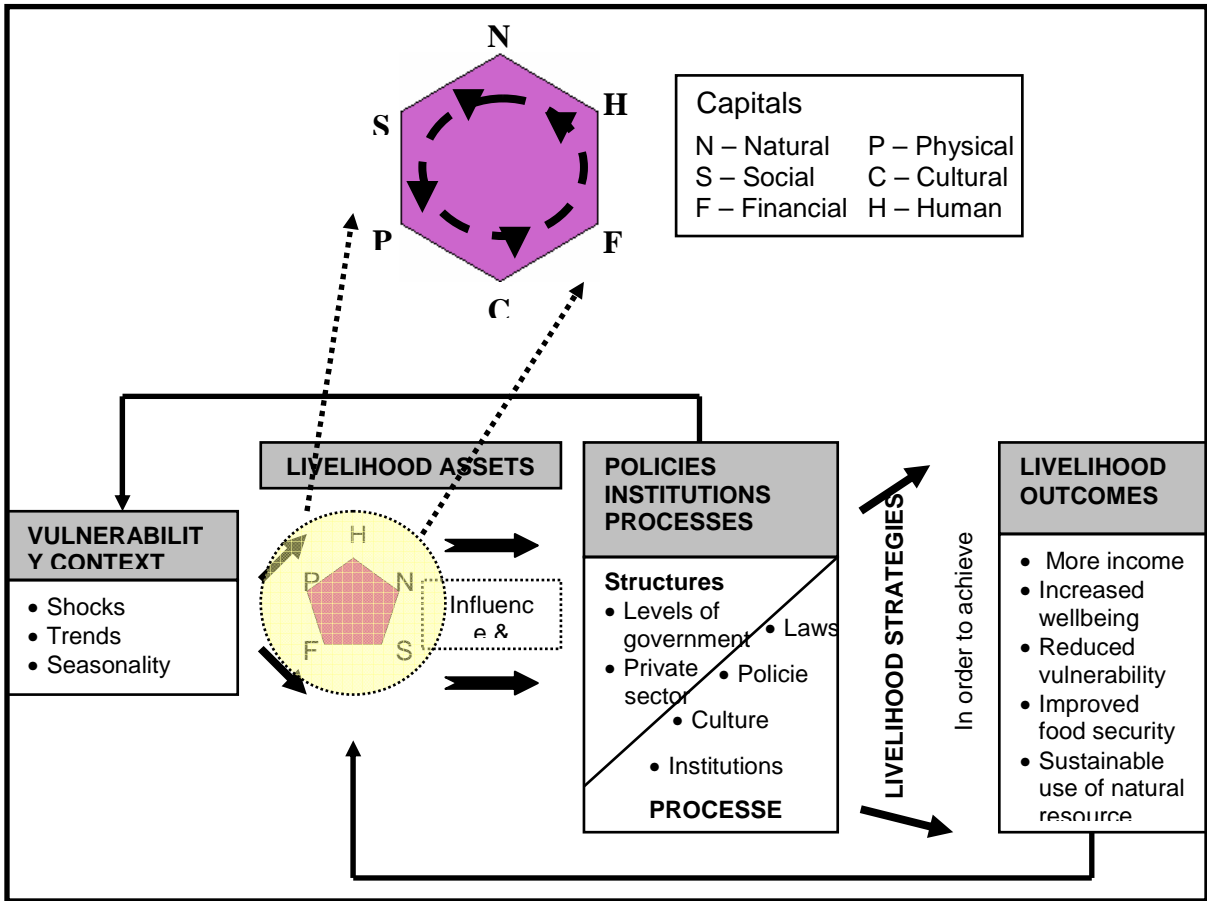


Figure 2: Location of study villages in Awach River catchment.

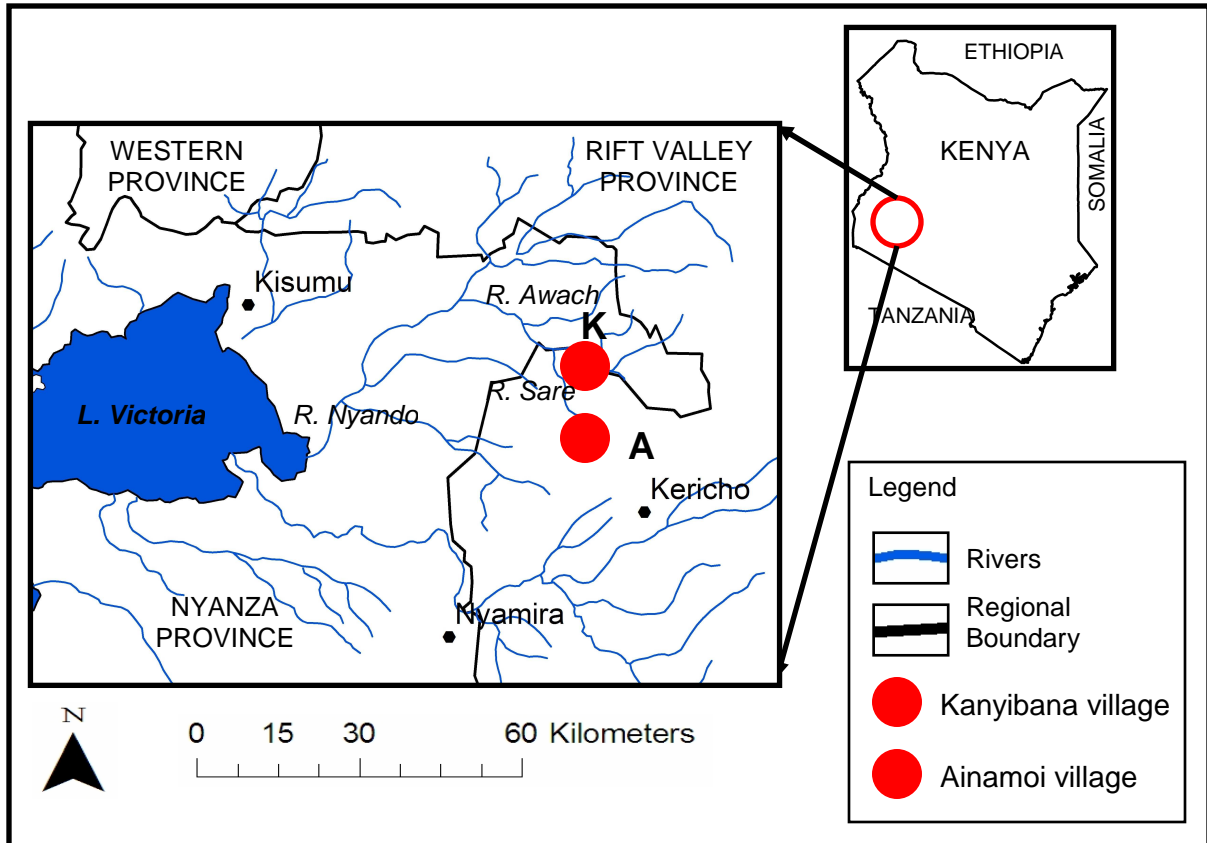


Figure 3. Eroding landscape in Kanyibana village. Note the meandering gully that is developing in the center of the picture and gravel sized nodules of *Calcium carbonate* left behind after a rainstorm.

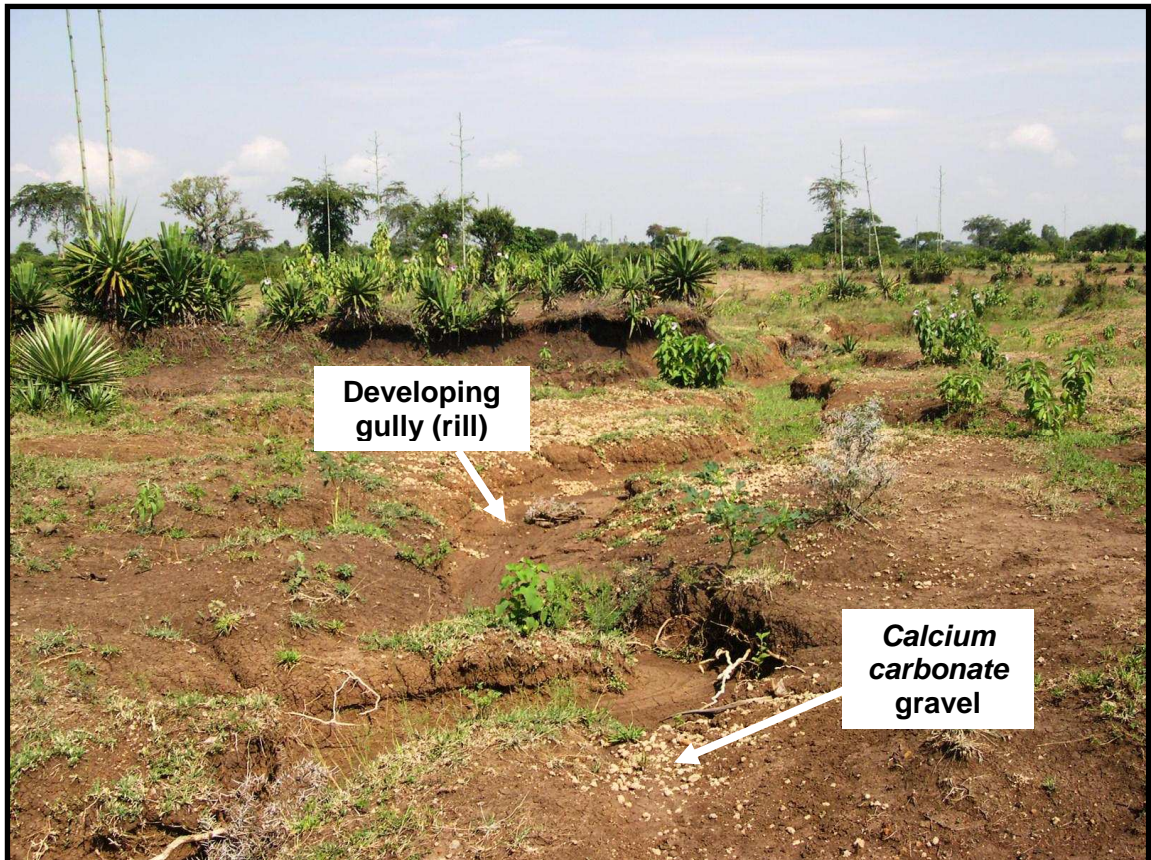


Figure 4. Sediment loaded Awach River. Note the erosion of rivers banks.



Figure 5. Gullies forming across the Awach River Basin.



Figure 6. The landscape of Ainamoi village.



**CHAPTER 5**  
**LIVELIHOODS AS CAPITAL: DIFFERENTIATING SURVIVAL STRATEGIES**  
**AMONG THE LUO AND KIPSIGIS PEOPLE IN WESTERN KENYA**

Paper to be submitted to the Journal of Ecological Anthropology  
Mary Nyasimi, Lee Burras, Lorna Butler, Richard Schultz, Jan Flora and Hsain Ilahiane

**Abstract**

Rural communities of sub-Saharan Africa are under increasing adaptive pressure resulting from decline in the quality of land resources. To increase food and generate income, and safeguard against risks and shocks, families are engaging in multiple livelihood strategies. This study was conducted to 1) evaluate livelihood strategies, 2) examine the dynamic diversification process in the agrarian and non-agrarian continuum and, 3) investigate how a vibrant rural economy can encourage new investments. Applying the sustainable livelihood framework, results from our investigation in western Kenya suggest that as land is subjected to degradation, there is a shift in the type of capitals that families can draw upon. Among the Luo, collision between deeply embedded cultural beliefs and land, is bringing about a shift from farming to non-farming activities. Rural people migrate daily into nearby productive rural areas in search of casual wage jobs. They are heavily reliant on human capital which has become a central livelihood strategy.

An asset diversification and intensification process among the Kipsigis is closely intertwined with rapid social-cultural change and strong bonding and bridging ties. At the community level, we observed spatial and temporal diversification of farming activities, and new market opportunities. These are enticing people to invest and, hence, build a healthy rural environment. Findings suggest that the ability to make a meaningful livelihood is dependent not only on the quality and quantity of capitals that an individual household possesses, but the capability of its members to use and transform the capitals as well. Among the Luo that we studied, dependence on human capital may be making them less resilient, and more vulnerable to existing and emerging risks and shocks. The overriding scenario is escalating land degradation, increased poverty levels, and a failed social support system. The Kipsigis are involved in a capital-led intensification and diversification system that entails substantial use of all capitals to enhance both tangible and intangible resources.

*A degrading and dying landscape does not know wealth...it does not respect boundaries...Village elder, Kanyibana village*

## **Introduction**

Rural people of sub-Saharan Africa are now engaged in a multiplex of livelihood strategies in order to safeguard against risks and shocks, and increase food and household income (Ellis, 2000; Francis, 2000; Rigg, 2006; Bryceson, 2002; Scoones, 1998). This trend of livelihood pluriactivity is not new in Africa, because for decades people have been involved in multiple activities (Ellis, 2000). However, the current ways by which people are engaging in strategies differs from traditional African subsistence production systems that were resilient and designed to respond, adapt and cope with environmental changes. During periods of perturbation, indigenous communities drew upon a wide range of indigenous coping mechanisms that included shifting cultivation, production of a diverse range of crops that could be grown in different spaces and/or different times, mixed crop and livestock systems, traditional agroforestry systems and strategic trading relationships (Geheb and Binns, 1997; Abate et al., 2000; Rambo, 1984; Swinkels et al., 1997; David, 1997). Sometimes, war with other communities was waged as a means to improve the community's wealth and security (Ochieng, 1979). Strategies for livelihood survival in the face of environmental uncertainty or threats from enemies demanded creativity as well as willingness to forge relationships with other communities (Robert, 1983; Schultz, 1964; Caldwell et al., 1992).

Today, subsistence production in western Kenya is largely associated with customary systems that are characterized by smallholdings of about two hectares per household of six members (Mango, 2002; David and Swinkels, 1993). Diverse subsistence production is practiced under high population densities and highly variable agro-ecology and soil conditions (Conelly and Chaiken, 2000). Drawing on data from intensive case studies conducted in western Kenya, this paper proposes three unique trends in rural livelihoods that appear to be impacting the African subsistence production systems which we studied. First, we will analyze livelihoods strategies in two communities located about eight kilometers apart; second, we will examine the dynamic diversification processes in terms of shifts in the agrarian and non-agrarian strategies continuum, and third, we will investigate how a vibrant rural economy can diversify strategies that manage risks, and not only keep its people from migrating into urban centers, but attract other people into the community.



The study communities are located on the Awach River catchment in western Kenya. It is home to the Luo and Kipsigis people, who are close neighbors, but have distinct cultures and physical environments. The Luo and Kipsigis we studied live in Kanyibana and Ainamoi villages, respectively. Kanyibana is located on the lowlands, while Ainamoi is in the highlands. Both communities are patrilineal and virilocal. However, the Luo practice levirate marriage, while Kipsigis practices polygny.

### **Rural Livelihood Framework**

In western Kenya, agriculture and fishing activities are common livelihood strategies. However, increasing human pressure on land resources, coupled with the introduction of cropping systems that require intensive tillage, has resulted in severe land degradation. Socio-cultural practices associated with tenure regimes and cultural rituals are also contributing to the degradative processes (Nyasimi, 2005; Migot-Adholla et al., 1990). Some of the degradation processes include erosion, declining soil organic matter, soil nutrient depletion, compaction and acidification (Sanchez, 2002). Degradation of farm lands has led to an increased number of households that are food insecure and malnourished, with high rates of child mortality (Shipton, 1990; Sanchez, 2002).

To enable a deeper exploration of the changes in rural livelihoods as a result of land degradation, we applied the sustainable livelihood framework (Chambers and Conway, 1992; Ashley and Carney, 1999). The development of livelihood frameworks emerged with the need to holistically understand poverty in Africa, and to develop strategic approaches for targeting the most vulnerable groups of people (Ashley and Carney, 1999; Chambers, 1997). The UK's Department for International Development (DFID) has been in the forefront of developing and applying the livelihood framework in its African development work.

The framework is a tool that aids scientists, development agents and policy makers to better understand how the poorest of the poor adapt and construct a livelihood. It was developed to facilitate more holistic thinking about poverty issues in Africa, and to enable analysis of relationships among various factors that affect rural people's lives. Participatory application of the framework allows for prioritization of action as well as targeting of the poorest and most vulnerable people. It is a versatile approach that captures and connects dimensions of poverty at different levels: local, regional and national. The approach includes five main components, namely livelihood assets/capitals, mediating processes caused by policies and institutions, livelihood strategies, outcomes and vulnerability context

(Figure 1). The framework acknowledges people first, including the most vulnerable, as rational actors in their choice of livelihood strategies. Their livelihood strategies are most influenced by available assets, capabilities and vulnerability factors.

The livelihood strategies component recognizes that rural people may pursue multiple activities based on sector, space, scale, gender and generational status (Start and Johnson, 2004; Chambers, 1995). Ellis (2000) has documented the livelihood diversification process, defined as ‘the process by which rural households construct an increasingly diverse portfolio of activities and assets in order to survive and improve their standard of living’. These activities are performed in succession or simultaneously, in similar or different spaces and/or by different gender and ages (Adato and Meinzen-Dick, 2007; Start and Johnson, 2004; Chambers, 1995). Land, as a natural capital, is one of the most critical resources for the majority of rural Africans. This is due to limited industrialization of rural areas and, therefore, the main activities are dependent on natural resources. This includes crop farming, fishing, livestock rearing and harvesting of forest products. The livelihood framework was used in this study to analyze local people’s responses to their changing land resources.

### **Methodology – Differentiation and Selection of Case Studies**

This paper documents the livelihood strategies of farm families in two culturally distinct ethnic groups, whose ecological boundary coincides (Figure 2). The ethnic groups studied were the Luo and Kipsigis who reside in Kanyibana and Ainamoi villages, respectively. The case studies were derived through a participatory process.

To capture the complexities and scope of rural livelihoods, a combination of methods that include longitudinal studies are advocated (Murray, 2001; Ellis, 2000; Chambers, 1995; Adato and Meinzen-Dick, 2007). We combined several qualitative methods, particularly at the sampling and data collection stages. This mixed-method approach facilitated not only triangulation (to maximize validity and reliability), but also clarified and elaborated more general information. This was done by cross-checking data through interviews with different people within a homestead and involving a multidisciplinary research team. This study was conducted in the months between May and August over a three year period (2004, 2005 and 2006), providing three different time periods for a cross-sectional analysis. The months also coincided with the long rainy season in East Africa when farm families are involved in agrarian activities.

Selection of case studies involved a rigorous historical pathway-prosperity participatory process, referred to as Stages-of-Progress approach (Krishna, 2006). This approach involves a facilitated group discussion exercise. We used this method because our intention was to select case studies that were not only distinct from each other, but with characteristics that overlapped at one time. Stages-of-Progress approach is used to solicit local meanings of poverty and track poverty changes within a human group (Krishna, 2006). Based on local perceptions of poverty levels, the approach can be used to divide a group of people into four categories within a period of time, usually several years. These are (adapted from Krishna, 2006):

- a) People who were poor then and are poor now ---Always poor
- b) People who were poor then and are not poor now ---Escaped poverty
- c) People who were not poor then but are poor now ---Fallen into poverty
- d) People who were not poor then and are not poor now ---Never poor

Using a mixed gender and age group, we selected three time periods, 25 years ago, 10 years ago and now (2004) to track poverty changes in the two communities. During each village meeting, each lasting approximately six hours, the participants identified and developed a list of poverty and prosperity characteristics. Some of the common poverty-prosperity characteristics in the two villages were: quality of land, human capabilities, type and number of livestock, type of business, availability of remittances, crops grown, formal education for children, type of clothing, number of meals eaten, off-farm work, presence of a head of homestead, polygamy, social networks, sources of income and different strategies for recovering from risks and shocks. The participants agreed that the indicators captured the important similarities and differences among people within their respective villages. With a previously prepared list of homestead names, the participants allocated each homestead a number that corresponded to its characteristics (Figure 3). Each homestead was given a rank for 25 years ago, 10 years ago and now (2004). The homestead trends were noted and placed in a particular category, that is, always poor, escaped poverty, fallen into poverty or never poor.

At the end of the exercise, we tracked and classified all homesteads that had been established since the year 1978. If a son established the homestead after 1979 or 1994, it was given the same rank as the father's for the respective year. Results of this exercise suggested that more homesteads had fallen into poverty in Kanyibana than in Ainamoi

village within the last 25 years (table 1). A note of caution is appropriate when interpreting the results of table 1 since each village had its own indicators of wealth and poverty. In fact, characteristics of poor homesteads in Ainamoi village could feasibly be considered wealthy by the residents of Kanyibana. Nonetheless, there is a significant variation in percentages of homesteads considered poor in Kanyibana compared to Ainamoi.

Overall, the percentage of homesteads perceived as poor in Kanyibana increased dramatically over 25 years. There was a 23 and 21 percent increase in poor homesteads between the years of 1978 and 1994, and 1995 to 2004, respectively. According to a male participant:

The wealth of our village has been dropping over the years. In 1970s we had a lot of cattle and goats grazing all over the plains. We had sugarcane and cotton factories that have now closed. Our sons are poorer than us. Many children were educated in 1970s and 1980s and were employed by the government. However, the money they made was converted into food very fast instead of investing in cattle and purchase of property. If the soil was giving us enough food, then the salary that they made could be saved.

In Ainamoi village, there was a 0.3% percent decrease in number of homesteads considered poor between the years of 1978 and 1994. Almost the same percentage fell into poverty (0.4%) between 1994 and 2004.

The results suggest that a substantial percentage of homesteads fell into poverty in Kanyibana village, while in Ainamoi, the percentages remained fairly constant (Table 2). A myriad of factors appear to underlie this dramatic change, such as degradation and unproductiveness of land; poor human health due to HIV/AIDs, cholera and malaria; rigid cultural rituals and norms; high social expenses associated with funerals; loss of livestock; flooding and extended drought periods. Conversely, Ainamoi village had a fairly constant situation due to better agricultural techniques and new opportunities such as direct marketing of high value crops. The community also exhibited flexible cultural practices that responded to changing social, environmental and economic conditions. For example, men who resided in urban centers are relinquishing decision making power to their wives who reside in the village. This allows women to make farming decisions and other investment opportunities.

Based on the categories generated above, four case studies were randomly selected from each category in each village. For this study, we documented four cases, two from each village, that is, a) always poor and b) never poor. The two categories were selected

because their characteristics did not overlap. We engaged the cross-sectional study so that we could intimately observe and document the livelihood strategies. To capture the various activities, we applied multiple qualitative data collection tools, including life histories, livelihood mapping, and participant observation.

### **Differentiation of Livelihood Capitals and Subsistence Production**

The villages of Kanyibana and Ainamoi are located within the Awach River catchment, receiving about 800 mm and 1800 mm of annual rainfall, respectively (Barring, 1988). Elevation ranges from about 1100 to 2100 meters above sea level differentiating two agro-ecological zones. Kanyibana village is located in the first zone that encompasses the lake floodplains, while Ainamoi village is in the second highland zone. Located at the foot of the 500 m high Kericho escarpment, Kanyibana village is susceptible to flooding. The soils are classified as vertisols and have poor physical characteristics such as poor drainage, cracking and churning. According to the residents, the soils are deficient in plant nutrients, particularly nitrogen and phosphorus. This is visible in the yellowing and purpling of maize and bean leaves. Acacia trees that are adapted to soil and weather conditions dominate the flat landscape. In most areas, the soil is bare or covered by glittering pebbles and rocks that have been left behind after floods stripped away finer soil particles. According to one case study:

It can rain up there in the hills and the water comes gushing through our village. At the beginning, all the water sinks into the soil, gullies and other ground openings. If the rain continues for a week, the soil cannot take any more and starts flooding the land. When the rains subside, we notice more gullies and more openings on the land.

Kanyibana village has a dirt road that links it to nearby town centers and in some places, gullies have undercut the road. The common transportation is by bicycle. During the rainy season, it becomes physically difficult to travel to, from, and within the village because of the sticky nature of the soils. Vehicles avoid the villages during rainy season. There is no health center within the village and the closest is a private clinic located four kilometers away. One primary school located at the edge of Kanyibana village serves children from eight nearby villages. The main means of communication is verbal. A few homesteads own battery operated radios. Two people own cell phones that they allow fellow villagers to use at a cost. The main crops grown include sorghum, maize, common beans,

cassava, and assorted local vegetables. Production of cotton and sugarcane, introduced by the British colonial government in early 1960s, ceased as prices fell. Livestock include Zebu cattle and goats that are grazed on roadsides and on crop residues after harvest. The Sare and Awach Rivers serve as water sources for domestic use, laundry and livestock. There is considerable evidence of overgrazing and trampling of the soil by livestock, especially along river banks.

Ainamoi village, situated in the highlands, receives adequate and reliable rainfall and has fairly fertile nitisols soils. The high altitudes permit a relatively cool climate that encourages growing of tea, pineapples, cabbage and rearing of mixed breed dairy cattle. Timber and fruit trees are grown on farm boundaries and on woodlots. An all-weather road links Ainamoi with nearby urban centers. There are two primary schools, a high school and a kindergarten. A health center, managed by a group of six villages, is open daily. A privately owned dispensary also operates everyday. The high school and health center have electricity supplied by the Kenyan government. Most of the residents own livestock, particularly dairy cows, because milk is a dietary staple. Others own donkeys to transport food to market, water for household use, and firewood for cooking. A protected spring and natural rock aquifer is the source of domestic water. The aquifer is located in a communally protected natural forest at the edge of the escarpment. There are several boreholes that supply water for livestock. The shopping center houses several retail shops, a bar, butchery, maize mill and a recreation room facility for men that has a pool table and a dart board. There is a volleyball field for young men who play in the late afternoons.

### **Livelihood Strategies of Four Case Studies**

#### **Case study 1: Always poor in Kanyibana village – human capital vulnerability**

The first case study is from Kanyibana village. It is categorized as ‘always poor’ and called Onyango<sup>1</sup> homestead. There are 16 people in the homestead and only 10 are economically active, ranging in age between 9 to 55 years. The homestead is under the umbrella of the father’s cousin who inherited the mother. The inheritor, known as *Jatero*, performs all social functions and rituals that the late Onyango would have carried out. The late Onyango had three sons, all married. However, the first son died seven years ago and the third son called Oluoch inherited the widow. The second son, called Otieno, resides at home with his first wife, Akoth. Otieno’s second wife (Akinyi) ran away after a year and half

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<sup>1</sup> Names have been changed to protect identities.

of marriage and left two children. Otieno still considers her his wife because he has paid partial bride wealth. According to him, she ran away because of lack of food and security. He remarked:

I married Akinyi when I used to work as a security guard in Kisumu town. When the company closed and I returned home, she could not survive here. We tried to grow maize and beans, but the soil does not have life. We started working for the Kipsigis people upstream but Akinyi could not withstand the long hours of manual work. She was raised in Migori where the land is fertile and they have plenty of food. So, she ran away and left me with two kids. Many young women, who get married into this village, run away after awhile. If nothing is done to restore our soil, no girl will be willing to live in Kanyibana.

Otieno lost his security job in Kisumu, and without any formal training or marketable skills, he could not secure another job that would enable him to remit money to his family. Instead, he got employment as a truck goods loader, a job he could not manage because he is not physically strong. He decided to relocate back to Kanyibana. However, the land had become severely degraded. Otieno and his family became involved in a daily rural migration pattern, whereby they awake early each day, except Sunday, and trek to farms belonging to the neighboring Kipsigis and Kisii ethnic group members. There, they provide their labor for various agricultural activities such as tea and coffee picking, tilling the land, sowing and weeding, and herding cattle. According to Akoth:

Working on farms of Kipsigis is our main source of food and cash. We have come to depend on the Kipsigis to employ us. My mother-in-law and I craft baskets and ropes on Sunday to sell in the market. To supplement food, my husband owns a bicycle that he uses to transport people and goods to Katito town. He gets very little money. In addition, we all (men and women) harvest sand that we sell to builders.

Rural-to-rural migration patterns have been documented in sub-Saharan Africa countries. Migration involves relocating of people from one rural area to another, or migrating to work in factories established in rural areas (Ellis, 2000; Francis, 2000). Most of the Kanyibana village residents are involved in daily rural-to-rural migration. This seems to be an adaptation to land degradation, inability to compete for attractive jobs in urban centers, and restrictive cultural rituals. Onyango's family does not own any livestock. They previously owned two Zebu cattle that were sold to pay for their late brothers' medical expenses. The third son, Oluoch resides in Webuye town working as a casual laborer in a

paper milling company. His two wives (one inherited from his late brother) live in Kanyibana. Oluoch comes home in December and remits money once every two months. Remittances have been documented as a coping strategy for many people in the developing world (Francis, 2000; Ellis, 2000). In western Kenya, remittances from urban centers to rural relatives serve as a critical coping strategy, contributing about 30 percent of household off-farm income (Francis, 2000; Ellis, 2000).

Two children of the late brother are working away from the homestead. The son, Peter, who left home at the age of twelve, is a fisherman on Lake Victoria. He jointly owns a fishing canoe with two other young men. Peter, now sixteen, lives in a communally rented house with friends. He fishes at night, and every morning sells the fish to women fishmongers. He sends his mother some money and saves a little. He remarked:

Fishing is a tough job especially when strong winds blow at night. Since we do not have a fishing license we have to hide from the lake patrol police who demand for bribes. I make good money from selling the fish. I have two women who buy from me everyday

Peter's choice to pursue fishing as a livelihood strategy is driven by two factors. The first is that fish are a free commodity and no one can force you out of the lake. Even though all fishermen require fishing licenses, Peter's still thinks that fish are free. Second, there are ready buyers every morning and, hence, he does not have to worry about markets. The other child, a girl named Atieno aged thirteen years, works as domestic help for a Kipsigis family. Since she lives, eats and sleeps with her employer, she is paid 900 Kenya Shillings (USD 12.80) monthly. The employer keeps 200 shillings for her and she uses it to buy clothes and feminine accessories. The rest is given to her mother.

Akoth also receives food and clothes from her mother who lives in Ugenya about 125 km away. Her mother sends her 45 kg of maize twice a year. Sometimes, she also sends cassava and millet. This situation has created tension between Akoth and her husband because he is embarrassed that his mother-in-law is helping him. According to him:

I am no longer a man in my affines' eyes. I cannot provide for their daughter and I am sure that they are secretly encouraging her to leave me. I have been humiliated by my affines. I wish I could tell her to stop accepting food from her mother, but I am embarrassed to discuss the issue with my wife.

This case study illustrates the different spheres of individual economic activity bound within a large homestead. There is marked differentiation in activities between the parents



and the children. The children would prefer not stay in the village. Rather, they want to pursue activities away from the village. In addition, there is gender differentiation in ways of dealing with shocks and stress. Married women are drawing upon their maternal networks and relationships to generate some of the family's food. The men have no option except to capitalize on their physical strength and capabilities and engage in activities such as sand harvesting.

### **Case study 2: Never poor in Kanyibana village – rural-urban connections**

The homestead of Ochieng is a nuclear family composed of parents and four children. Ochieng is a full time lawyer and part-time business man who own a private primary school in Kisumu city, located 30 km away from Kanyibana village. The two secure sources of income adequately maintain Ochieng and his family among the wealthy class families in Kisumu town. His wife stays at home performing household chores and raising children. Ochieng's family (wife and children) spend three months in a year at their colossal houses in Kanyibana and according to his wife:

When you cast an eye across Kanyibana village, the type of the house constructed is what differentiates the landscape. Everyone, including the poor, rich, young, old, the dead and the living, woman and man is affected by the erosion and has been touched by the gullies.

Ochieng does not farm and the one hectare of land he owns has been destroyed by runoff water and series of small rills that run across the landscape (Figure 4). He remarked:

I only keep the land because it is my ancestral home. My father, grandparents and other ancestors are buried there...I, my brother and our family members will be buried there too and hence, I have to keep the land. Apart from being a resting place for my bones, my land has lost its productivity. I realized long ago that I can never farm on our land because our mother had refused to be inherited. So, I joined a missionary team who put me through school and college....now I am a lawyer. I own a law firm with two other partners and the money I make is sufficient for my family's food, medical bills, education and leisure.

Ochieng's father was a polygamous man with three wives and several children. Ochieng's mother was the last wife and she refused to be inherited by a cousin after her husband died. Her refusal to be inherited implied that she could not farm since rituals could not be performed. She was ostracized by her two co-wives and the rest of the community. She left Kanyibana and went back to her maternal home with her two sons, Ochieng and

Okoth. There, Ochieng and Okoth were educated by missionaries, became Christians, and never returned to Kanyibana till their mother died. He said:

Before my mother was buried, I agreed to a cleansing ritual to be performed on her that could free us from her chains. My brother and I could now farm, but the land was beyond recovery. All the topsoil had been swept away. Cleansing my mother allowed my brother and I to construct our own homesteads and I built beautiful houses for my retirement. I still love the land because it holds my ancestors. I know my sons will never live there.

This case study presents a unique situation whereby the family is still considered part of the village and yet, they do not farm nor live there. However, the family participates in important cultural events such as funerals and weddings of relatives. Non-farming activities performed far away from the village offer this family a secure livelihood strategy. There still remains a strong cultural attachment to the land and the ancestors, and Ochieng retains his ties with his fellow Kanyibana people. Despite the steady secure source of income (lawyer and business), Ochieng still feels it is important to maintain cultural ties. He had the option of settling in any part of Kenya, far from Kanyibana village, but he chose not to. According to Nyasimi (2006), Kanyibana people display strong kinship ties with the living, the dead, and the land, and are pulled back to the degraded and fragile landscape.

### **Case study 3: Always poor in Ainamoi village – asset intensification**

Korir's homestead was classified under the 'always poor' category in Ainamoi village. He has been a village headman for the past nine years. The homestead has six members and Korir supports his late brother's family. The Kipsigis do not practice levirate, but the men are obligated to support extended family members. Korir owns 2 ha of land where he grows a variety of subsistence crops such as maize, beans, sweet potato, sorghum, bananas and assorted local vegetables. He sells some green maize and sweet potato to middle men who buy produce in their village. He said:

Every year, I grow enough food for my family. I sell excess produce and pay for school fees and medical bills. I rely on the farm for my survival and the soil has stayed fertile for a long time. I add manure and compost every season and this ensures that I get good yields.

Korir also owns three improved dairy cattle, a zebu bull, four sheep, a donkey and several chickens. Some of his land is used for pastures. He leases the bull at Kenya Shillings 100 (USD 1.4) for three hours to other farmers who require it for ploughing the

land. The donkey is also used to carry goods for people at a price that varies with the distance. The wife said:

The donkey is becoming as important as cattle to us...even to other people. I use it to carry domestic water and firewood. I use it to carry goods to the market. My friends and neighbor borrow it. My husband charges people who need their goods taken to the market. The donkey is acquiring the same value as a cow.

The value of a donkey has been increasing in Ainamoi village as more people are producing market-oriented food crops. Two vehicles that collect farm produce come, predictably, to the village three times a week. Most farmers rely on donkeys to transport their produce to nearby markets. Korir's family relies solely on farming activities for their livelihood. Since the village receives enough rainfall and the soils are fairly well drained and fertile, they have maintained an intensive system of production. Traditionally, the bimodal rainfall pattern permitted two crop growing seasons, March to July and September to December. However, the demand for more domestic and market food has led to an intensive three-crop system, annually (Figure 5). The intensive system involves sowing an intercrop of maize and bean seed in March. Beans are harvested in early June and during the same time, sweet potato vines are sown. Korir sells some of the maize as green maize and harvests it in early July, thus creating space for the sweet potato. The green maize is in high demand by urban dwellers where it is eaten as roasted or boiled maize on the cob. In early August, dry maize is harvested and the sweet potatoes are left to grow. At the start of the short rainy season, Korir sows a small grain crop, such as finger millet and millet, between the sweet potato ridges. Sweet potatoes are harvested in mid-October, leaving the small grains till the end of the year. To maintain productivity of such an intensive system, Korir's family practice crop rotation, adding manure and compost; every other year, they purchase diammonium phosphate (DAP) fertilizer and apply it to the maize and bean intercrop. In addition, crop stovers are left in the field to provide additional organic material. According to Korir:

This type of system is practiced by most farmers in this village. Since I am the village headmen, I visit most homes and observe what they are doing. I can say that about 75% of homesteads produce crops three times a year. It is a tough system because we have to be careful that crops do not compete for nutrients and light. We plan carefully and provide the soil with enough nutrients to satisfy two crops.

Korir receives agricultural information from extension officers in the Ministry of Agriculture, and from a non-governmental organization called Adventist Development and Relief Agency (ADRA). Korir and his wife participate in agricultural field days and tours, and occasionally get extensionists to visit their farm. Korir's family also depends on neighbors and friends for help during critical labor periods such as crop weeding and harvesting. The church and women's group of which the family is a member, provides spiritual and social support. Korir's livelihood strategy is an intensive agrarian system whereby he has achieved temporal and spatial diversification of farming activities.

#### **Case study 4: Never poor in Ainamoi village - asset diversification**

The last case study is a family classified as 'never poor' in Ainamoi village. The farm is managed by the wife (Chebet) who is also a primary school teacher. The homestead comprises 13 members, three of whom are children of their dead relatives and two are permanent employees who live with her. Chebet's husband owns a construction company and is based in Kericho town (55 km away). Due to his absence from the farm, her husband relinquished the power to make farming decision to her. Chebet teaches at a nearby government primary school and oversees farm activities on weekends. She has employed two people (both Luo speaking), a woman who does house chores, and a young man who manages the five dairy cows and supervises daily laborers, each of whom are paid to do activities such as tilling, sowing, weeding, and picking tea leaves or coffee berries.

Chebet grows a variety of subsistence and cash crops. For house consumption, she grows maize, beans, finger millet, cassava, vegetables and fruits. For the market, she grows high value perennial crops such as tea, coffee and pineapples. Chebet also has planted trees for timber, firewood and fruits. Timber and firewood trees such as *Grevillea robusta*, *Markhamia lutea* and *Eucalyptus grandis* are planted on three niches, farm boundary, woodlots and scattered on cropland. Fruits include *Mangifera indica*, *Persea americana*, *Morus alba*, *Musa paradisiaca*, *Carica papaya* and *Passiflora edulis var edulis*. She remarked:

My farm is a forest...a diversity of crops and trees. It is a heaven for soil animals. If I decided to retire from teaching, I can comfortably feed my family, clothe and educate them.

Chebet sells tea and coffee to nearby factories and she receives a reliable monthly cash income. According to her:

Any farmer growing tea or coffee is assured to a market and a steady source of cash. From the half acre of tea, picked twice a month, I regularly earn about Kenya Shillings 16000 (USD 229). At the end of the financial year, I also get 'tea bonus' that varies. Coffee prices vary a lot, but the price I get is still good. Any farmer who has tea growing in this village is a rich farmer.

Chebet does not practice an intensive production system described above on Korir's farm. Instead she maximizes use of all available niches on the farm (Figure 6). On the fields where she grows annual crops, she harvests three produce a year. According to her: I have other sources of income and hence, I do not demand a lot from the soil. I sometimes leave the land fallow for a year if I observe that the crop is not performing well. During the fallow period, I apply manure and let the field rest.

Other sources of income include proceeds earned from selling milk and a monthly salary as a teacher. The salary is used to purchase farm implements, DAP fertilizer, manure from other farms and to pay for farm laborers. The cash that her husband earns is primarily used for educating the children. At the time of the study, she had three children studying in university and four in boarding high schools. The children assist with farm activities during school holidays in April, August and December. Chebet's livelihood strategies encompass both farming and non-farming. She relies on a strong network of women, church groups, and relatives to support her. In particular, her friends play a key role in helping her market her produce. In addition, she receives extension visits on a weekly basis, and attends different training sessions organized by non-governmental organizations.

## **Discussions**

The aim of this paper was threefold. First, we aimed to analyze livelihood strategies in two communities; secondly, to examine the dynamic diversification process in terms of shifts in the agrarian and non-agrarian strategies continuum; and lastly, to investigate how a vibrant rural economy can encourage its residents to diversify strategies that include managing risks, that not only prevent people from migrating to urban centers, but attract new residents into the community.

Results from the case studies suggest that whilst diversification is practiced in both ethnic groups, it is taking different directions and is dependent on different capitals (Table 3). For the Luo people, there is a total shift in strategies from farming into non-farming

activities. At the same time, diversification is occurring in non-farming activities and away from the village space. The diversification is occurring across multiple geographical localities such as rural, peri-urban and urban areas. Slater (2002) reported similar trends in Qwaqwa, South Africa, whereby household members were spatially spread in different geographical areas to capture varied livelihood opportunities that required different capitals. The difference with Kanyibana village is that the people in Qwaqwa, were combining both on-farm and off-farm activities. In Kanyibana, they are diversifying their off-farm activities through intensive use of human capital.

Among the Kipsigis there is temporal and spatial agrarian diversification within the farm. The people are involved in intensive mixed systems of small-scale agrarian production that include field crops and vegetables, fruits and timber trees and livestock. The adequate rainfall, cool temperatures and fertile soils, coupled with good land management practices, enable people to cultivate their land throughout the year. Aided by strong vertical and horizontal social connections, extension visits, and connectedness to new opportunities and investments, such as factories, the people are maintaining a highly diverse system that ensures good yields, minimizes risks and shocks and, safeguards the quality of the land resource base at a reasonable level.

This study further suggests that ability to make a meaningful livelihood is dependent not only on the quality and quantity of capitals that a person possesses, but the capability to use and transform the capitals as well. Human capital is the critical capital on which the Luo people depend for a living. Everyone, including the young and elderly, is involved in at least one income-earning activity. In most cases, individuals are involved in a multiplex of non-farming activities at different times and in varying spaces. There appears to be no gender and age disparity regarding choice of a livelihood strategy. According to an elderly woman:

In this village, everyone is involved in all kinds of activities. I am quite old but I am harvesting sand to sell. This is a job that requires strong young male backs. But I do not have a choice. I also make ropes and baskets to sell at the market. My sons and their wives have died of *chira* (AIDs) and I have to provide for my grandchildren. They too are somewhere making some money and I will see them in the evening. I do not know where they are, but I pray that they are safe.

The diversification in Kanyibana village is driven mainly by what Barrett et al., (2001) refer to as push factors. Push factors are internal factors that do not encourage strong incentives to pursue local activities (Barret et al., (2001). In Kanyibana village this includes

degraded and unproductive lands and restrictive cultural practices that are strongly embedded and highly valued. To escape the above factors, people pursue daily migration in search of wage labor in the nearby villages – especially among the Kipsigis. Most everyone wakes up very early in the morning and goes in search of work. Earnings from this work are not rewarding, hence forcing the people to diversify into other non-farming activities such as basket and rope making, sand harvesting, fishing and bicycle transportation. This is supported by mounting research evidence from Africa which avers that non-farm strategies account for about 40 to 45 percent of household incomes, leading to a process called de-agrarianization (Reardon, 1997; Niehof, 2004; Bryceson, 2002; Bryceson and Jamal, 1997). Unfortunately, the diversification process in Kanyibana village encourages the emergence of new risks and vulnerabilities such as rape, domestic violence, unplanned pregnancy, exposure to the HIV/AIDs virus and death at early age.

The Kipsigis are involved in a capital-led intensification and diversification that entails substantial use of all capitals to enhance both tangible and intangible resources. The diversification and intensification is driven by pull factors that encourage complementarities among activities (Barret et al., 2001). Successful integration of a variety of perennial and annual crops, livestock and trees on their farms, helps to spread their risks and build up financial capital. In turn, this helps to keep children in school and adults at home. They draw upon their socio-cultural, natural, human and informational capital to build healthy livelihoods. Availability and accessibility of capitals also enables allocation in such a way as to maximize returns. This provides the leeway to choose among extensive, intensive or diverse activities.

Slater (2002) and Barret et al., (2001) avers that engagement in multiple livelihoods is dependent on active social networks, financial savings, skills and education. We observed a similar scenario in Ainamoi, but not in Kanyibana where there is evidence of few networks, limited financial savings, and low skills and knowledge, and involvement in multiple activities. According to a case study 4 in Ainamoi village:

I am involved in social groups that have similar interests with me. I belong to Tea Growers Association, Young Fruit Producers and Kaplaritet Women Group because each group has specific interests and activities. I also rely on other women and friends to provide labor during heavy farm activities. Hence, I grow a variety of crops and trees for home consumption and market, teach at a primary school, knit sweaters and table clothing. I also rear chicken for eggs and keep dairy cattle. I have forged business networks with schools

and hotels that need farm produce. The money I earn from teaching and selling produce and trees, I re-invest back into the farm and save some for future use.

The above statement suggests that the homestead relies on social networks that meet specific needs such as the marketing of farm products and providing group labor. Thus, residents are able to draw on their networks, take advantage of savings, and engage in multiple activities to improve their productivity. In Kanyibana village, engagement in multiple activities consumes so much time and energy that there is neither time nor motivation to create social networks. The type of non-farming activities in which they are involved pays very low wages and is immediately converted into food. Case study 4 in Kanyibana remarked:

I do not have friends, local groups or relatives to depend on. I am involved in sand harvesting, bicycle transportation, growing maize, beans and cassava and rearing chicken for sale. My wife makes ropes and baskets, sells firewood and charcoal and works for other people. We wake up early each morning and return late in the night. We do not have time to contact other people. In any case, everyone in this village is so busy running here and there, to make some money and buy food.

### **Conclusion**

This study has highlighted the multiplicity of livelihood strategies in two different but neighboring ethnic groups in western Kenya. The case studies have allowed us to glimpse the changing and shifting strategies within a very small geographical distance. The Luo people of Kanyibana village do not have access to productive land that could allow them to maximize their labor efforts, like their close neighbors, the Kipsigis in Ainamoi village. Thus, it should not be surprising that the Luo people are looking beyond their village boundary, into other rural areas, to make a living. However, their survival is based upon rural wage work availability, a potentially unsustainable resource. Their capitals, particularly human capitals have become their livelihood strategies. The diversification processes among the Kipsigis are closely intertwined with rapid socio-cultural changes, effective land management practices, and strong ties within and beyond the local boundaries. New market opportunities are creating a healthy environment for Kipsigis to invest, particularly in the tea and coffee factories and milk processing plants established within the last ten years. Establishment of these factories has increased the market integration of many households in Ainamoi village.



Rural communities of sub-Saharan Africa are under increasing adaptive pressure resulting from the decline in the quality of their land resources. As more land is subjected to agents of degradation, there is a shift in the type of asset on which families can draw. In some case, the capital has been transformed in to a livelihood strategy. Unless critical measures are put in place to restore land, the livelihoods of rural people of sub-Saharan Africa will continue to hang in a precarious balance.

## References

- Abate, T., van Huis, A. and Ampofo, J. 2000. Pest management strategies in traditional agriculture: An African Perspective. *Annual Review of Entomology* 45:631–659.
- Adato, M. and Meinzen-Dick, R. 2007. *Agricultural Research, Livelihoods, and Poverty Studies of Economic and Social Impacts in Six Countries*. The John Hopkins University Press.
- Ashley, C. and Carney, D. 1999. Sustainable livelihoods: Lessons from early experience. London, DFID.
- Barret, C.B., Reardon, T., and Webb, P. 2001. Nonfarm income diversification and the household livelihood strategies in rural Africa: Concept, dynamics and policy implications. *Food Policy* 26(4): 315-331.
- Barring, L. 1988. Regionalization of Daily Rainfall in Kenya by Means of Common Factor Analysis. *Journal of Climatology* 8(4): 371-389.
- Bryceson, D.F. 2002. Multiplex livelihoods in rural Africa: recasting the terms and conditions of gainful employment. *Journal of Modern African Studies* 49(1): 1-28.
- Bryceson, D.F. and Jamal, V. 1997. *Farewell to farms: deagrarianization and employments in Africa*. Aldershot, UK. Ashgate.
- Caldwell, J.C. P. Caldwell and Orubuloye I. 1992. The Family and Sexual Networking in sub-Saharan Africa: Historical Regional Differences and Present-Day Implications. *Population Studies* 46(3): 385 – 41.

Chambers, R. 1995. Poverty and livelihoods: whose reality counts? *Environment and Urbanization* 7(1): 173-204.

Chambers, R. 1997. *Whose reality counts? Putting the last first*. London: ITDG.

Chambers, R. and G. Conway (1992). *Sustainable Livelihoods: practical concepts for the 21<sup>st</sup> century*. IDS Discussion paper 296. IDS, UK. Retrieved from [http://www.livelihoods.org/static/rchambers\\_NN13.html](http://www.livelihoods.org/static/rchambers_NN13.html) 12 November 2006

Conelly, W.T. and Chaiken, M.S. 2000. Intensive farming, agro-diversity, and food security under conditions of extreme population pressure in western Kenya. *Human Ecology* 28(1):19-51.

David, S. 1997. Household economy and traditional agroforestry systems in western Kenya. *Agriculture and Human Values* 14(2): 169-179.

David, S. & Swinkels, R. 1993. Socio-economic characteristics of households involved in agroforestry technology testing in western Kenya. Nairobi: ICRAF, AFRENA Report. No. 78.

DFID (Department for International Development). 2001. Sustainable Livelihoods Guidance Sheets. Retrieved from [www.livelihoods.org/info/info\\_guidanceSheets.html#6](http://www.livelihoods.org/info/info_guidanceSheets.html#6).

Ellis, F. 2000. *Rural livelihoods and diversity in developing countries*. Oxford University Press.

Francis, E. 2000. *Making a living: changing livelihoods in rural Africa*. Routledge

Geheb, K. and Binns, T. 1997. 'Fishing farmers' or 'farming fishermen'? The quest for household income and nutritional security on the Kenyan shores of Lake Victoria.

Krishna, A. 2006. Pathways Out of and Into Poverty in 36 Villages. *World Development* 34(2): 271–288.

Mango, N.A.R. 2002. Husbanding the land: agrarian development and social change in Luoland, Kenya. PhD Thesis. Wageningen University, The Netherlands. 322 pp.

Migot-Adhola, S.E., P.B. Hazell and Place, F. 1990. Land rights and agricultural productivity in Ghana, Kenya and Rwanda: a synthesis of findings. Washington, D.C, World Bank.

Murray, C. 2001. Livelihoods research: some conceptual and methodological issues. Development Studies Association Annual Conference IDPM, University of Manchester, 10-12 September 2001.

Niehof, A. 2004. The significance of diversification for rural livelihood systems. *Food Policy* 29: 321-338.

Nyasimi, M. 2006. Changing capital, shifting livelihoods. The Case study of Luo community living on Awach Catchment of Lake Victoria Basin, Western Kenya. MSc. Thesis. Iowa State University, Ames, IA.

Ochieng, W.R. 1979. *The people round the lake*. Evans Brother Limited.

Rambo, A.T. 1984. Why shifting cultivators keep shifting: understanding farmer decision-making in traditional agroforestry systems. In *Community forestry: some aspects*. UNDP/East-West Center/FAO. Bangkok.

Reardon, T. 1997. Using evidence of household income diversification to inform study of the rural non-farm labor market in Africa. *World Development* 25(5): 735-747.

Rigg, J. 2006. Land, farming, livelihoods, and poverty: rethinking the links in the rural South. *World Development* 34(1): 180-202.

Robert, R.H. 1983. *Essays on the Political Economy in of Rural Africa*. Cambridge: Cambridge University Press.

Sanchez, P.A. 2002. Soil Fertility and Hunger in Africa. *Science* 295 (5562): 2019 – 2020.

Schultz, T. W. 1964. *Transforming Traditional Agriculture*. New Haven: Yale University Press.

Scoones, I. 1998. Sustainable rural livelihoods: a framework for analysis. IDS Working Paper No. 72.

Shipton, P. 1990. African Famines and Food Security: Anthropological Perspectives. *Annual Review of Anthropology* 19:353-394.

Slater, R. 2002. Differentiation and diversification: changing livelihoods in Qwaqwa, South Africa, 1970-2000. *Journal of Southern African Studies* 28(3): 599-614.

Start, D. and Johnson, C. 2004. Livelihood options? The political economy of access, opportunity and diversification. Overseas Development Institute Working Paper No. 233.

Swinkels, R.A., Franzel, S., Shepherd, K.D., Ohlson, E. and Ndufa, J.K. 1997. The economics of short rotation improved fallows: evidence from areas of high population density in western Kenya. *Agroforestry Systems* 55:99–121.

Table 1. Distribution of homesteads in Kanyibana and Ainamoi villages based on participatory wealth assessment for three time periods.

Category	Kanyibana village (n=138)			Ainamoi Village (n=78)		
	Percentage distribution and total number of homesteads					
	25 years ago	10 years ago	Now (2004)	25 years ago	10 years ago	Now (2004)
Poor	45.7 (63)	62.3 (86)	77.5 (107)	59.0 (46)	55.1 (43)	60.3 (47)
Not Poor	54.3 (75)	37.7 (52)	22.5 (31)	41.0 (32)	44.9 (35)	39.7 (31)

Number of homesteads in parenthesis

Table 2. Poverty-Prosperity trends in Kanyibana and Ainamoi villages based on participatory wealth assessment for the last 25 years.

Category	Poverty – prosperity trends for 25 year period	
	Kanyibana village (n=138)	Ainamoi village (n=78)
	Percentage distribution and total number of homesteads	
Always Poor	18.8 (26)	55.1 (43)
Fallen into Poverty	58.7 (81)	5.10 (4)
Escaped Poverty	1.40 (2)	3.80 (3)
Never Poor	21.0 (29)	35.9 (28)

Number of homesteads in parenthesis

Table 3. Summarized comparison of livelihood strategies in the four case studies.

Case study	Description of strategy	Driving forces	Principal homestead members involved	Sector/Space	Dominant and supportive capital components	Type of diversification
<b>Kanyibana village</b>						
Always poor	Human capital vulnerability	Degraded lands, cultural traditions and beliefs	Grandparent parents and children	Rural non-agrarian wage support	Human capital (labor based) supported by social and financial	Push - Sectoral shift from agrarian to non-agrarian
Never poor	Rural-urban connections	Degraded lands, cultural traditions and beliefs, education, urban social networks	Parents	Urban non-agrarian wage support	Human capital (knowledge based) supported by physical, political, social information and financial	Pull - Multiplicity of urban opportunities while retaining rural cultural ties
<b>Ainamoi village</b>						
Always poor	Asset intensification	Good land quality, strong social support system (labor and friendship), extension support	Parents and children	Rural crop and livestock integration	Natural capital (production based) supported by human, social, financial, political, physical, cultural	Pull- Multiplicity of rural agrarian production opportunities
Never poor	Asset diversification	Good land quality, new markets/ business opportunities, strong social support (friendship and respect), cultural changes (spousal empowerment and support), extension/non-governmental organization information	Parents	Rural agroforestry (crops, trees and livestock) & urban wage support	Natural and human capitals (production based & market oriented) supported by social, cultural, information, political, physical, and financial	Pull- Multiplicity of agrarian activities integrated with urban opportunities

Figure 1. The Sustainable Livelihood Framework with emphasis on livelihood strategies.

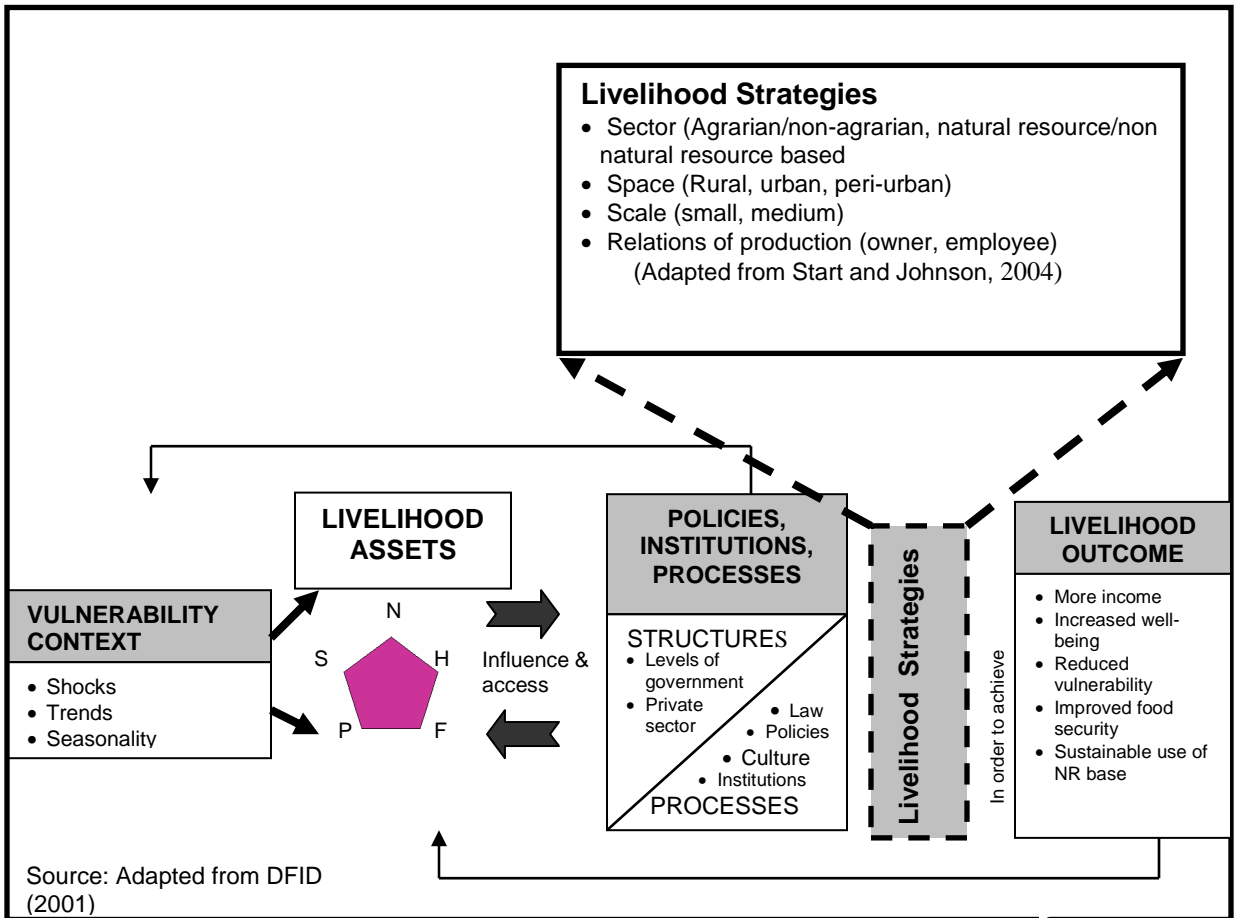


Figure 2: Location of study villages showing location of different ethnic groups.

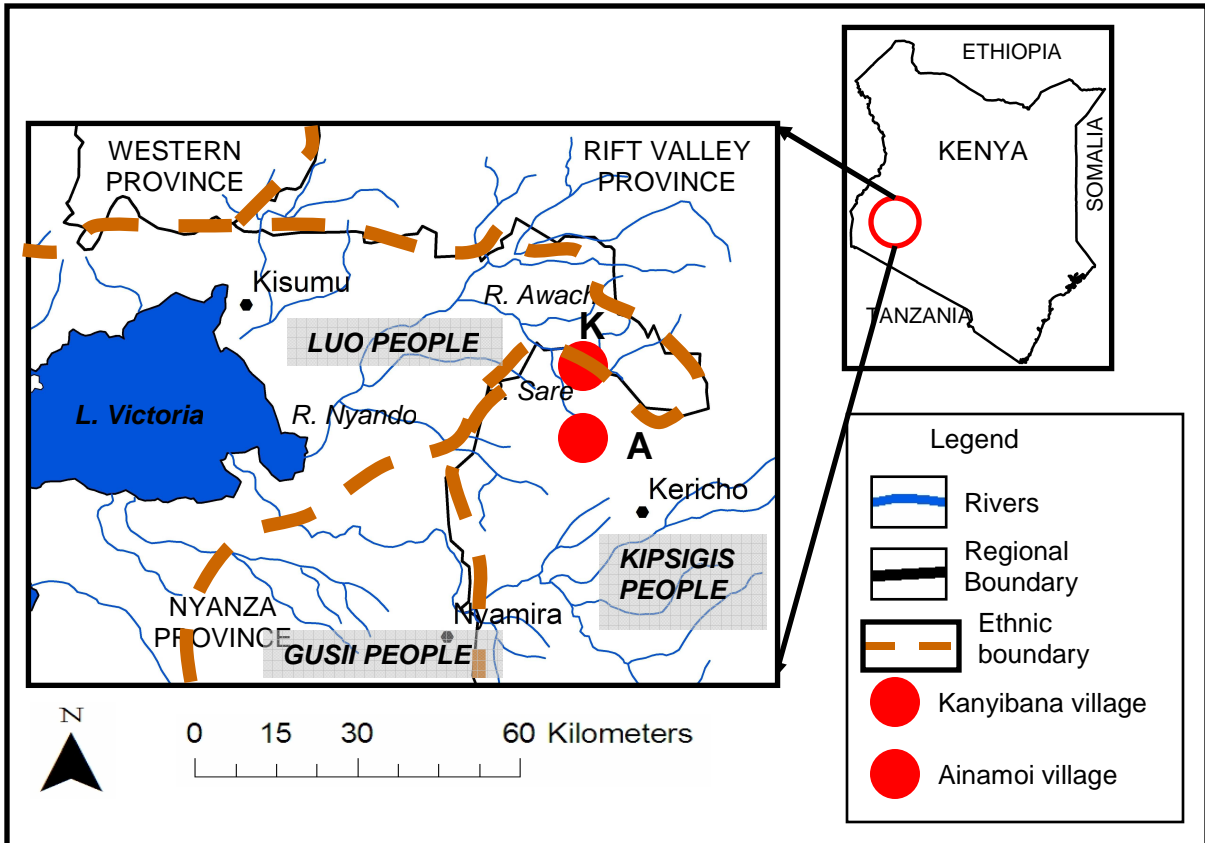




Figure 3. Poverty and prosperity indicators. The first chart shows the hand-written data and the second chart is a typed version of the data.

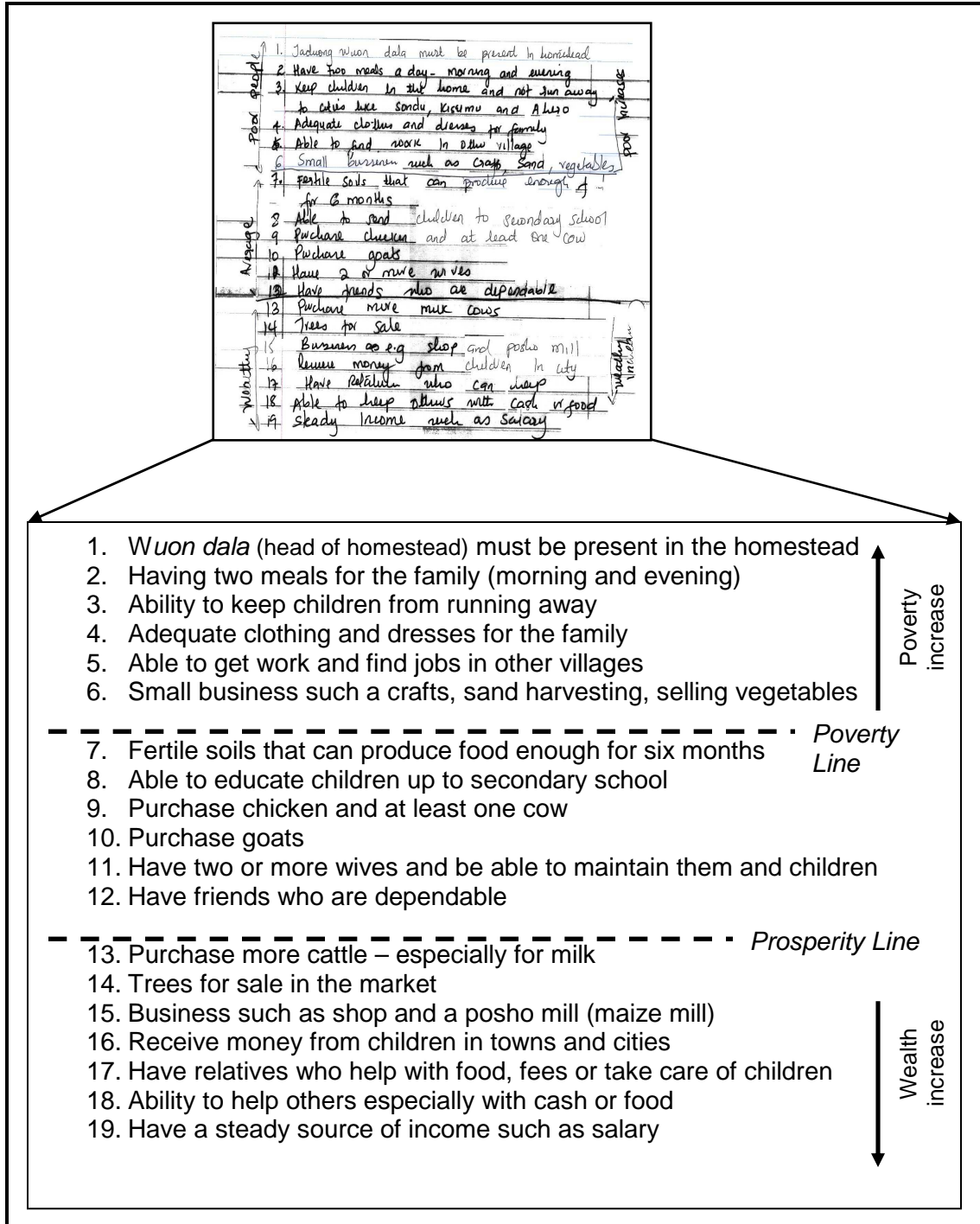


Figure 4. Degraded land in Kanyibana village (case study 2).



Figure 5. Intensive cropping system that yields three crops per year (case study 3).

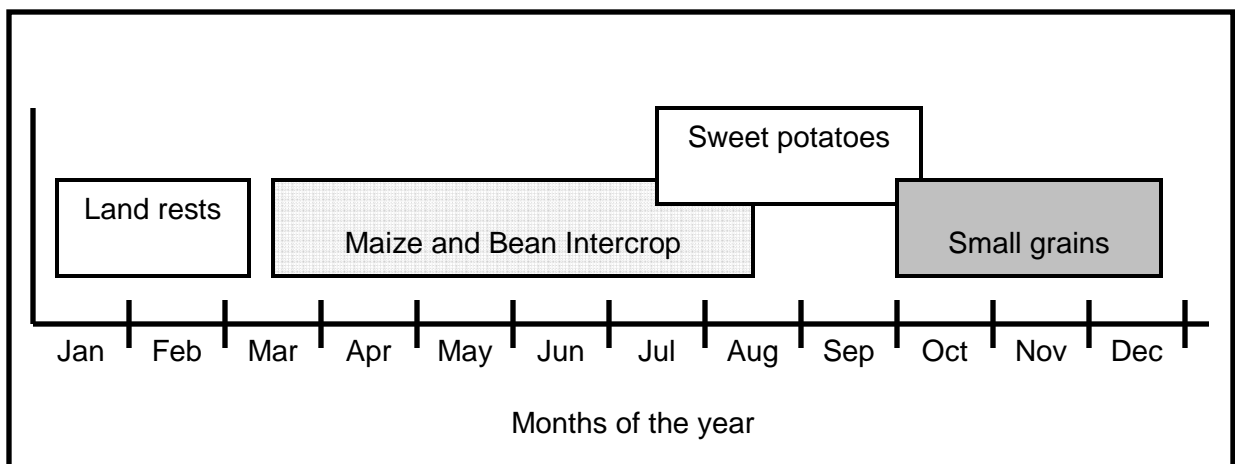


Figure 6. Intensive farming practices that maximizes space and time. The image shows different growth stages of maize that are staggered and harvested at different times of the years. A = Land prepared for sowing, B = Maize at 3 months, C = Green maize and D = Dried maize ready for harvesting.

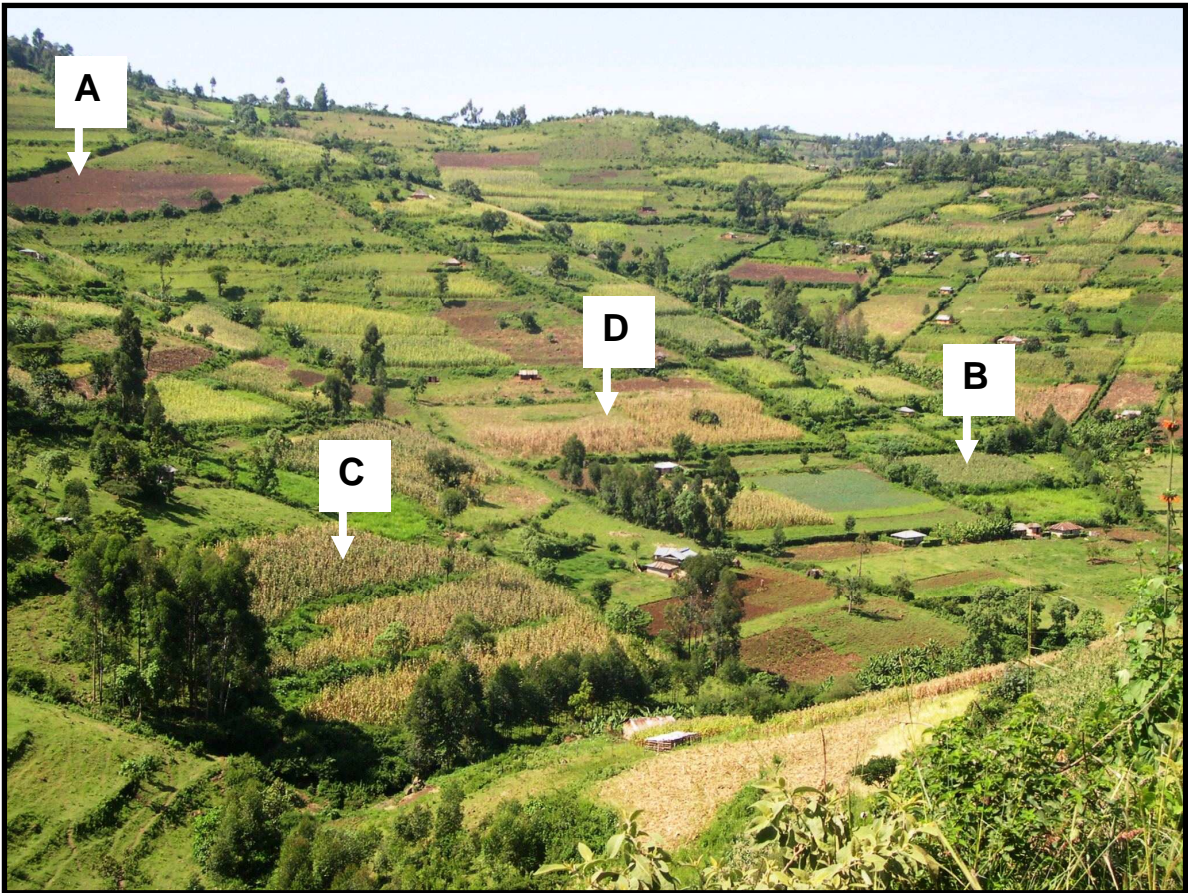
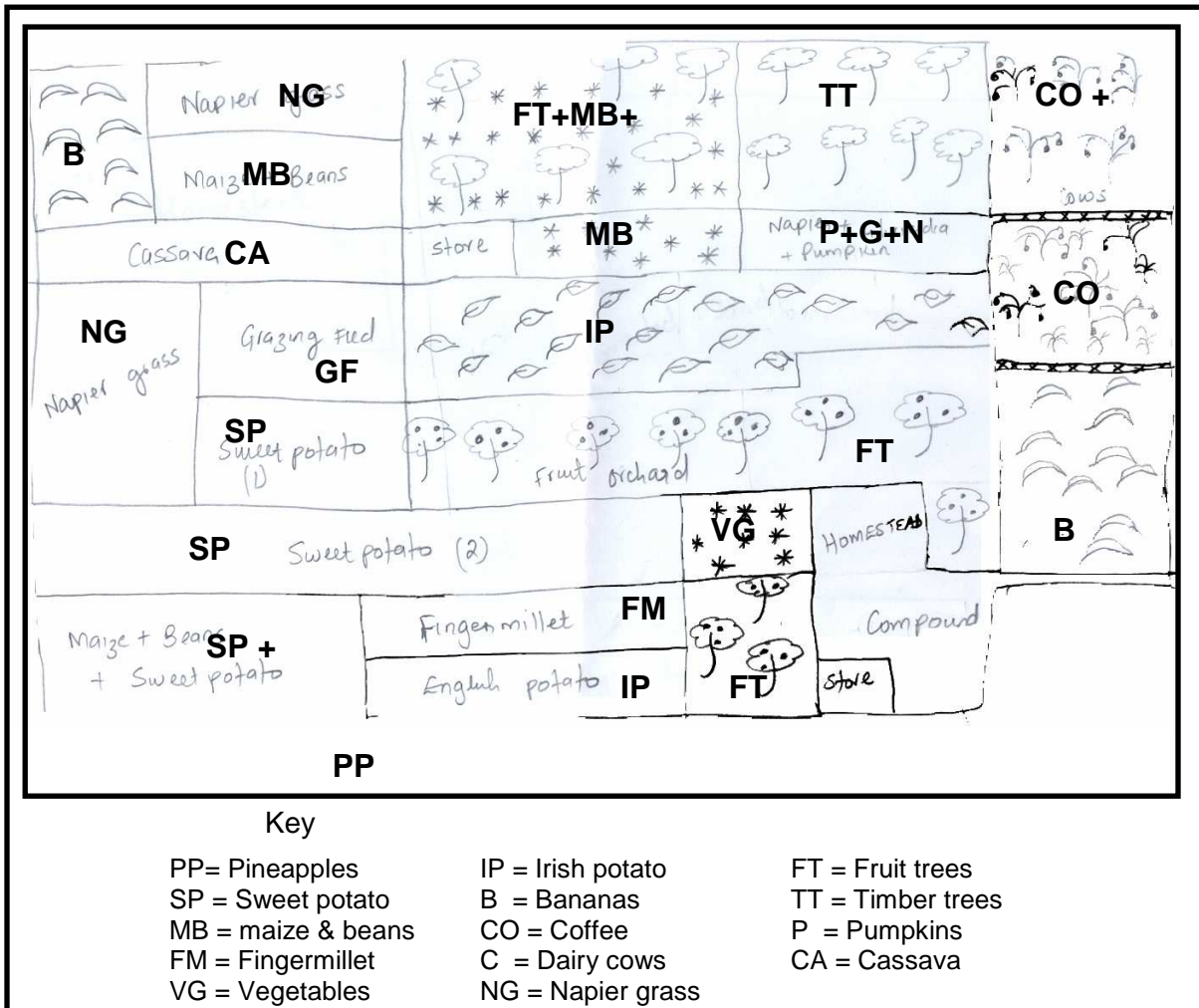


Figure 7. Diversification of farm enterprises (case study 4).



## CHAPTER 6

### CONCLUSIONS AND RECOMMENDATIONS

#### Transforming Lands and Livelihoods

Global concerns about land degradation and poverty are stimulating new thinking about ways to address the complexities surrounding the livelihoods of rural people in sub-Saharan Africa. This study, conducted among the Luo and Kipsigis people living on the Awach River catchment of Lake Victoria, has illuminated the daily hidden realities and struggles of people in two particular rural communities. The findings support Robert Chambers' claims that rural dwellers consciously construct their livelihoods based on the context in which they live. The research questions that this study set out to investigate suggest that the land and livelihoods of the Awach River catchment are rapidly being transformed with an intricate connection between the two. The research questions were:

1. What livelihood capitals are rural people in two distinct yet contiguous villages drawing upon in their everyday lives?
  - d. What capitals are available in each village?
  - e. What is the quality of the capitals?
  - f. What is the quantity of the capitals?
  - g. What is the nature of the dynamic interactions among capitals?
2. What livelihood strategies are rural people pursuing with regard to quality of their capitals?
  - a. What are the various strategies for making a living?
  - b. What critical capitals are drawn upon to make a living?
  - c. What changes are occurring among the various livelihood strategies?
3. What feedback relationships exist between capitals and livelihood strategies with special focus upon the role of land and culture?
4. What is the appropriate research framework and methodology for studying land degradation and livelihoods?

This study has contributed to understanding the dynamic interactions between land degradation and livelihoods. It re-formulated an existing theoretical framework for exploring these relationships, beginning with DFID's sustainable livelihood framework (Carney, 1999). Application of the framework to the Awach River catchment exposed and recognized the

hidden realities of rural peoples' lives. The study findings contained in chapter 3 clearly suggest that ecology of capitals is transforming people's lands and livelihoods. In the context of this study a capital is defined as the tangible and intangible resources and other assets that people can draw upon to make a living. Capitals include natural, financial, human, social, cultural, political, informational and physical resources. Among the Luo people of Kanyibana village, negative capital synergies exist, particularly between natural and cultural capitals. The personal narratives of Kanyibana people highlight a situation where interactions among capitals are leading to a breakdown in societal resilience. Holling (1973) defined resilience as the capacity of an ecosystem (abiotic and biotic) to tolerate disturbance without collapsing into a qualitatively different state that is controlled by a different set of processes. The current state of ecology of capitals in Kanyibana village cannot withstand shocks and appears unable to rebuild itself. The Kipsigis living in Ainamoi village are experiencing positive capital synergies for improved livelihoods. The ecology of capitals is creating mutually supportive relationships that enable the Kipsigis to adapt and utilize a range of capital management strategies. These positive synergies among the capitals can potentially be strengthened and shared with other communities, particularly the Luo in Kanyibana village, to minimize the conflicts that exist between cultural and natural capitals.

Chapter 4 documented the strong interconnectedness among livelihood components, particularly across the livelihood capitals. Among the Kipsigis where land degradation is minimal and external economic opportunities exist, households have propagated a positive change in cultural practices. Individuals' self-awareness and willingness to respond to changing environmental and economic conditions suggests that the livelihoods of the Kipsigis people are somewhat resilient and sustainable. On the other hand, the cultural beliefs and values of the Luo are proving to be a hindrance in terms of unwillingness to respond to shifting environmental conditions. As the land continues to degrade, the people lack the needed will power, self confidence and determination to break away from cultural ties and reorganize their livelihood assets into productive systems. Instead, the Luo are escaping from their village problems, and in turn, their land and livelihoods are collapsing.

Chapter 5 addressed rural people's changing livelihood strategies when confronted with declining land productivity. This study argues that the ability to make a meaningful livelihood is dependent not only on the quality and quantity of capitals that an individual possesses, but the capability to use and transform the capitals as well. This is clearly

observed among the Kipsigis where positive capital synergies are enhancing asset intensification and diversification. The Kipsigis are able to take advantage of internal changing capitals and external opportunities to build a healthy rural community. In contrast, the Luo lack the capacity to transform their capitals, and hence, they are gradually becoming a non-agrarian community, living in a rural area surrounded by other agrarian communities. The overall scenario is escalating land degradation, poverty and unsustainable livelihoods.

The study adapted the SLF as its analytical framework. SLF is an integrated and holistic model that aided this study to not only assess capitals, but to identify factors that appear to lead to poverty and vulnerability, and the main impediments to capitals building. SLF is a useful tool for conducting cross-cultural comparisons of the complexities of capitals, and for understanding how these complexities open up alternative livelihood strategy choices. The most distinctive quality of the SLF is viewing rural people as critical partners in analyzing their own environments, and in strengthening their capacities to influence change. This study applied several methodologies, of which participatory research (where local people participated in data collection and partial analysis) proved useful in integrating people into the research process. This process enabled local people to analyze the ecology of their own capitals, livelihood strategies and vulnerabilities within their respective villages.

There are a few shortcomings of the SLF as a development approach. First, it is not salient on the social differentiation that may exist among rural people. Social differences include, but are not limited to, gender, age, education, marital status and ethnicity. These differences might become critical during implementation of development strategies. Second, the framework does not offer strategies to encourage local people's participation in the process. For researchers who are not familiar with past rural development programs, they might find it extremely difficult to encourage local people's participation. Lastly, the framework does not propose ways to develop solutions or specific interventions for problems identified during the process of analysis. With that, I recommend modifications that can be made to the SLF to improve its applicability as a development paradigm.

## Recommendations

The SLF does not offer solutions to the problems that local people face. Neither does it offer strategies that can be applied to improve livelihoods. For instance, the Luo people, despite recognizing that cultural practices may be contributing to land degradation, are not willing to break away from their practices and beliefs. And yet, they would like to restore and improve the quality of their land. In the context of this study, an action research approach is recommended whereby the principles of SLF could be applied in concert with an integrated watershed learning and research process. On the Awach River catchment, an integrated action research strategy could be conducted at multiple scales (plot, farm, village and catchment). Assuming there was adequate time and resources, this could be accomplished through several facilitated steps as suggested below. The first three steps were covered during this study.

- a) Select a research team that includes a multi-disciplinary group whose agreed-upon goal is to implement an integrative approach that responds to the needs of the people, technical knowledge, and the assets available. An integrative approach will ensure that both quantitative and qualitative information are gathered and analyzed by both the local people and the technical and/or scientific team, and that consideration is given to multiple disciplines and points of intersection.
- b) In each community, analyze the complexity and interactions of capitals, transforming processes and structures, livelihood strategies and vulnerabilities.
- c) Use mental maps and visualization images to help the communities plan and build a shared understanding of their own situation and technical possibilities.
- d) Apply an action research approach whereby local people become players in the investigation, learning and action processes.
- e) Develop an integrated grassroots co-management strategy. For example, on Awach River catchment, we can facilitate the involvement of both communities and external organizations in a process to draft a catchment strategy for design and implementation.
- f) With the participants, set clear and realistic goals and performance indicators, recognizing that adaptability and action learning is essential. The facilitated process must enable all parties to commit to the process and its outcomes, for as long as it takes.
- g) Allow time and conversation to break down barriers, and build trust, between science (researchers, technicians) and local people. There must be a fundamental commitment



to an equitable, learning relationship between and among local people, government, researchers and technicians (adapted from Sayer and Campbell, 2004).

To engage and increase local people's participation, ownership and ensure long-term restoration success, several strategies can be applied:

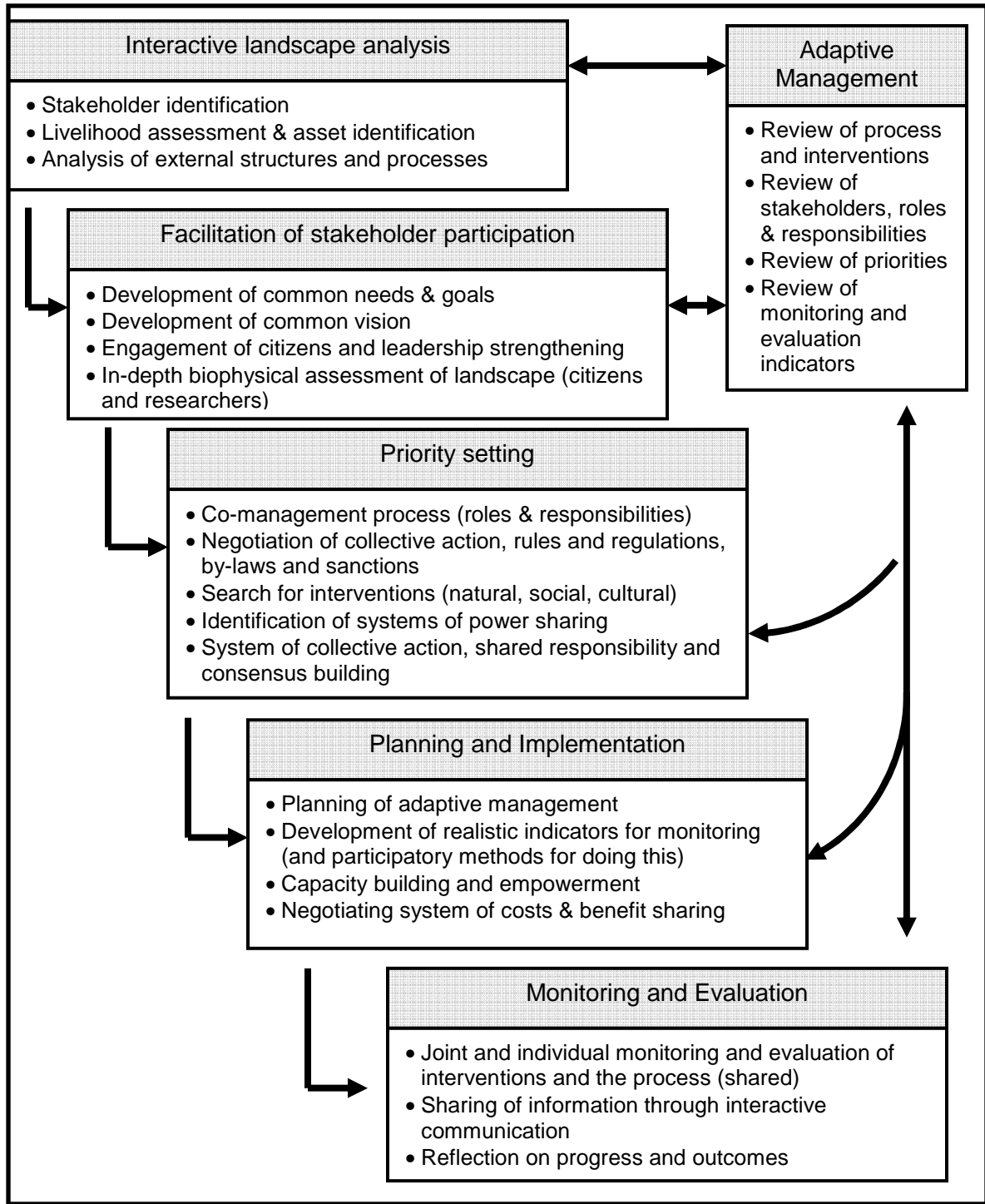
1. Co-management. This is an approach to ensure shared representation, power and responsibility among local people and partnering external organizations (Plumer, 2006; Klooster, 2000).
2. Creation of civic structures. These are dynamic social infrastructures created by local people enabling them to engage each other in public dialogue around a common problem (Morton, 2006). Use of existing and new civic structures in Awach catchment can facilitate interactions between and among different ethnic groups, and external organizations, to exert social pressure and increase the potential of shifting internal beliefs, attitudes and values. When existing structures are respected, local people will instigate rigorous measures that often put community interests over personal and ethnic egoistic tendencies.
3. Citizen participation. This implies involvement of local people in understanding and analyzing their landscapes, particularly the upstream and downstream connections. This can be accomplished by involving local people in discussion of cultural and scientific information, and helping them apply the information to the land degradation issues. This will guarantee that Awach catchment people have the freedom and power in decision making processes.
4. Develop realistic indicators and track them. The stakeholders must be involved in selecting realistic indicators. The selection and categorization of indicators should always take into account the dynamic nature of the landscape (Sayer and Campbell, 2004). Stakeholders should also realize that over time the desired outcomes might change, and thus require changes of indicator as well.
5. Mutual trust and respect. In any joint venture, trust and respect among stakeholders is crucial to success. In Awach catchment, the ethnic differences might cause distrust and disrespect. In addition, the most vulnerable group of people in either group is usually disregarded and their ideas ignored. By building trust and respect for each other, everyone will be encouraged to participate in the restoration process, and internal beliefs and values may gradually shift- particularly if there is evidence of short-term benefits.

Where trust and respect exist, plans, decisions and implementation of action plans will be more readily accomplished.

6. Adaptive learning and management. This should be based on shared social learning and action research to enable local people to monitor, analyze and interpret the response of their landscape to interventions (Curtis et al., 1999). Adaptive management must occur at all stages of the process, from problem identification through to implementation of interventions (Hillman et al., 2005; Castro and Nielsen, 2001; Plumer and FitzGibbon, 2004). Monitoring and evaluation of the process and outcomes should also be a participatory learning and reflection process.
7. Make restoration attractive. To encourage farmer involvement and active resident participation, restoration and change must be viewed as attractive to both upland and lowland communities. This includes planning for both short-term and long-term benefits.

In conclusion, as land degradation continues to occur, the livelihoods of rural people of western Kenya living within close geographical proximity are rapidly transforming, sometimes in different directions. Modifications of the sustainable livelihood framework proved to be a very useful tool for exploring local-level complexities and livelihood dynamics. While it does not have all the answers, it offers the needed flexibility and holistic perspective, to be adapted to the circumstances. The findings of this study, conducted at homestead and village level, provide evidence that rural people might be the primary agents of rural landscape change. However, governmental, local and international agency support, or a lack of it, has also left an imprint on the Awach landscape.

Figure 1. Proposed framework for restoration of the Awach River catchment (modified from Hagmann, 1999).



### General References

- Adato, M. and R. Meinzen-Dick. 2002. Assessing the impact of agricultural research on poverty using the sustainable livelihood framework. IFPRI Discussion Paper 128. Washington, DC.
- Adger, N., Kelly, M., Winkels, A., Huy, L. Q. and C. Locke. 2002. Migration, remittances, livelihood trajectories and social resilience. *Journal of Human and Environment* 31(4): 358-366.
- Adger, Tor A. Benjaminsen, Brown, K. and H. Svarstad. 2001. Advancing a Political Ecology of Global Environmental Discourses. *Development and Change* 32: 681-694.
- Agarwal, B. 1986. Women, poverty and agricultural growth in India. *Journal of Peasant Studies* 13(4): 165-220.
- Agarwal, B. 1994. A fields of one's own: Gender and land rights in South Asia. Cambridge University Press.
- Alwang, J. 1999. Labour Shortages on Small Landholdings in Malawi: Implications for Policy Reforms. *World Development* 27 (8): 1461–75.
- Ashley, C. and D. Carney. 1999. Sustainable Livelihood: lessons from early experience. Retrieved from <http://www.livelihoods.org>. December 4, 2006.
- Baland, J. and P. Platteau. 1996. Halting degradation of natural resources. Clarendon Press, Oxford.
- Barbier, E. 2000. The Economic Linkages between Rural Poverty and Land degradation: Some evidence from Africa. *Agriculture, Ecosystems and Environment* 82: 355-370.
- Bebbington, A. 1999. Capitals and capabilities: a framework for analyzing peasant viability, rural livelihoods and poverty. *World Development* 27(12): 2021-2044.
- Berkes, F. and C. Folke. 1991. A system perspective on the interrelationships between natural, human-made and cultural capitals. *Ecological Economics* 5(1): 1-8.

- Berry, S. 1999. Social institutions and access to resource. *Africa* 59(1): 41-55.
- Blaikie, P. and Brookfield, H. 1987. *Land degradation and society*. Routledge, London.
- Bojo, J. 1996. The costs of land degradation in Sub-Saharan Africa. *Ecological Economics* 16: 161-173.
- Brundlandt, GH. 1987. *Our common future*. Oxford. Oxford University Press.
- Bryant, R. 1991. Putting Politics First: The Political Ecology of Sustainable Development *Global Ecology and Biogeography Letters* 1(6): 164-166.
- Bryant, R. 1992. Political ecology: an emerging research agenda in the third world studies. *Political Geography* 11:12-36.
- Bryceson, D. 1996. De-agrarianisation and rural employment in sub-Saharan Africa: a sectoral perspective. *World Development* 24(1): 97-111.
- Carney, D. 1998. *Sustainable rural livelihoods: what contributions can we make?* DFID. London.
- Castro, P and Nielsen, E. 2001. Indigenous people and co-management: Implications for conflict management. *Environment Science Policy* 4: 29-239.
- Cavendish, W. 2000. *Empirical Regularities in the Poverty-Environment Relationship of African Rural Households*. CSAE Working Paper Series 99-21.
- Chambers, R. 1983. *Rural development: putting the last first*. Hatlow: Longman.
- Chambers, R. 1997. *Whose reality counts: putting the last first*. London. IT.
- Chambers, R. and G. Conway. 1992. *Sustainable Livelihoods: practical concepts for the 21<sup>st</sup> century*. IDS Discussion paper 296. IDS, UK

Clarke, J. 2002. Antiquity of aridity in the Chilean Atacama Desert. *Geomorphology* 73:101–114.

Cleaver, KM. and GA, Schreider. 1994. Reversing the spiral: the population, agriculture and environment nexus in sub-Saharan Africa. The World Bank, Washington, DC

Curtis, A., Britton, A. and J. Sobels. 1999. Landcare networks in Australia: state sponsored participation through local organizations. *Journal of Environment Planning and Management* 42:5-21.

De Haan, L. and A. Zoomers. 2005. Exploring the frontiers of livelihood research. *Development and Change* 36(1): 27-47.

Department for International Development (DFID). 2001. Sustainable Livelihoods Guidance Sheets. Retrieved from [www.livelihoods.org/info/info\\_guidanceSheets.html#6](http://www.livelihoods.org/info/info_guidanceSheets.html#6).

Diamond, J. 2005. Collapse: how societies choose to fail or succeed. The Penguin Press, NY.

Drinkwater, M. 2003. HIV/AIDS and agrarian change in southern Africa. Paper Presented at the United National Regional Inter-Agency Coordination and Support Office Technical Consultation on Vulnerability in the light of an HIV/AIDS pandemic. 9-11 September. Johannesburg, South Africa.

Eldadawi, I. and N. Sambanis. 2000. Why are there so many civil wars in Africa? Understanding and preventing violent conflicts. Retrieved from <http://www.worldbank.org/research/conflict/papers/eca2000c.pdf>. Accessed Oct 14, 2006.

Ellis, F. 2000. Rural livelihoods and diversity in developing countries. Oxford University Press.

Eswaran, H. and PF, Reich. 1998. Desertification: a global assessment and risks to sustainability. Proceedings of the 16<sup>th</sup> International Congress of Soil Science, France.

Eswaran, H., Lal, R. and P. Reich. 2001. Land degradation: an overview. In: Bridges, E.M., I.D. Hannam, L.R. Oldeman, F.W.T. Pening de Vries, S.J. Scherr, and S. Sompatpanit (eds.). *Responses to Land Degradation. Proc. 2nd. International Conference on Land Degradation and Desertification*, Khon Kaen, Thailand. Oxford Press, New Delhi, India.

Evans-Pritchard, E. 1950. Nilotic Studies. *The Journal of the Royal Anthropological Institute of Great Britain and Ireland* 80(1/2): 1-6.

Fairhead, J. and M, Leach. 1996. *Misreading the African landscape*. Cambridge University Press.

Flora C.B., Flora, JL and S. Fey. 2004. *Rural communities: legacy and change*. 2<sup>nd</sup> Edition. Boulder, Colorado. Westview Press.

Forsyth, T. 2003. *Critical political ecology: the politics of environmental science*. London: Routledge.

Francis, E. 2000. *Making a living: changing livelihoods in rural Africa*. London, Routledge.

Gadgil, M. 1987. Diversity: cultural and ecological. *Trends in Ecological Evolution* 2:369-373.

Gezon, LL. 1997. Political ecology and conflict in Ankara, Madagascar. *Ethnology* 36(2):85-100

Ghil, M. 2002. Natural Climate Variability. In *The Earth system: physical and chemical dimensions of global environmental change*, MacCracken and Perry (eds). John Wiley & Sons.

Glickman, M. 1974. Patriliney among the Gusii and the Luo of Kenya. *American Anthropologist* 76(2): 312-318.

Goldman, M. and RA, Schurman. 2000. Closing the "great divide": new social theory on society and nature. *Annual Review Sociology* 26:563-584.

Greenberg, JB and TK, Park. 1994. Political ecology. *Journal of Political Ecology* 1:1-12

Hastenrath, S. 1995. Recent advances in tropical climate prediction. *Journal of Climate* 8(6): 1519-1532.

Hecht, SB. and A, Cockburn. 1990. *The fate of the forest; developers, destroyers, and defenders of the Amazon*. New York. Harper Perennial.

Hellden, U and R, Olafsdottir. 1999. Land degradation in NE Iceland – an assessment of extent, causes and consequences. Electronic reports, Dept. of Physical Geo. Lund Univ. Sweden.

Herring, R. 1979. The influence of climate on the migrations of the central and southern Luo. East African Publishing House, Nairobi, Kenya.

Hillman, T., Crase, L., Furze, B., Ananda, J. and Maybery, D. 2005. Multidisciplinary approaches to natural resources management. *Hydrobiologia* 552:99-108.

Holling CS. 1973. Resilience and stability of ecological systems. *Annual Review of Ecological Systems* 4: 1– 23.

Hulme, M., D. Conway, P.M. Kelly, S. Subak, and T.E. Downing. 1995. The Impacts of Climate Change on Africa. Stockholm Environment Institute, Stockholm, Sweden.

Hurrell, JW. 1995: Decadal trends in the North Atlantic Oscillation: Regional temperatures and precipitation. *Science* 269 676-679.

Johnson, DL and LA, Lewis. 1995. *Land degradation: Creation and destruction*. Oxford: Blackwell.

Klooster, D. 2000. Institutional choice, community and struggle: a case of forest co-management in Mexico. *World Development* 28(1):1-20.

Labrada, R. 1995. Status of Water Hyacinth in Developing Countries. FAO-UN, Rome, Italy.



Lal, R. 1997. Degradation and Resilience of soils. *Philo. Trans. Of the Royal Society* 352: 997-1010.

Lal, R. 1987. Effects of soil erosion on crop productivity. *CRC Crit. Rev. Plant. Sci.* 5(4): 303-365.

Lal, R. and B, Stewart. 1994. Land degradation: *Advances in soil sciences*. Vol. 11. New York: Springer.

Leach, M. and R. Mearns. 1991. Poverty and Environment in Developing Countries: An overview study. Report to ESRC. Swindon: ESRC.

Mandel, J. 2004. Mobility matters: women's livelihood strategies in Port Novo, Benin. *Gender, Place and Culture* 11(20): 257-288.

Marshall, A. 2002. The unity of nature: Wholeness and Disintegration in Ecology and Science *University of Nizhni Novgorod, Russia*.

Mbaku, J. 1991. Property Rights and Rent Seeking in South Africa. *Cato Journal* 11:135-50.

McCown, R. 2005. New thinking about farmer decision makers. In Hatfield, J. (ed). *The farmer's decision: balancing economic successful agriculture production with environmental quality*. Soil & Water Conservation Society, Ankeny, IA.

Moran, EF. 1990. *The Ecosystem Approach in Anthropology*. Ann Arbor: University of Michigan Press.

Morris, J. 1995. *The Political Economy of Land Degradation Pressure Groups, Foreign Aid and the Myth of Man-Made Deserts*. Institute of Economic Studies No. 5. London.

Morton, W.L. 2006. The role of civic structures in achieving performance based watershed management. *Society & Natural Resources*. In submission.

Mugo FW. 2000. Natural Resource Use, Constraints and Possible interventions: The case for Katuk-Odeyo Focal Area. Start-up Phase Report No.2. ICRAF, Ministry of Agriculture and Rural Development. Nairobi, Kenya.

Murray, C. 2001. Livelihoods research: some conceptual and methodological issues. Background Paper 5. Chronic Poverty Research Centre. Retrieved from <http://www.chronicpoverty.org/pdfs/05Murray.pdf> on January 5, 2007.

Netting, R. 1993. Smallholders, Householders: farm families and the ecology of intensive sustainable agriculture. Palo Alto, Ca. Stanford University Press.

Nyasimi, M. 2006. Changing capital, shifting livelihoods. The Case study of Luo community living on Awach Catchment of Lake Victoria Basin, Western Kenya. MSc. Thesis. Iowa State University, Ames, IA.

Oboler, RS. 1985. *Women, Power and Economic Change: The Nandi of Kenya*. Stanford, CA: Stanford University Press.

Oboler, R. S. 1980. Is the female husband a man? Woman-woman marriage among the Nandi of Kenya. *Ethnology* 19: 69–88.

Oboler, R. S. 2005. Whose cows are they, anyway?: Ideology and behavior in Nandi cattle “ownership” and control. *Human Ecology* 24(2): 255-272

Odera, K. 2005. Extending the sustainable livelihoods framework. Dept. of Rural and Urban Planning. University of Zimbabwe. Harare, Zimbabwe.

Odum, EP. 1988. *Ecology: the link between the natural and social sciences*. Holt-Saunders. NY.

Ogot, B.A. 1967. *History of the Southern Luo. Volume 1. Migration and Settlement*. Nairobi, Kenya: East African Publishing House.

Okeyo, AP. 1979. Women in the Household Economy: Managing Multiple Roles. *Studies in Family Planning* 10(11/12): 337-343.

Okeyo, A. P. 1980. Daughters of the lakes and rivers: Colonization and the land rights of Luo women. In Etienne, M., and Leacock, E. (eds.), *Women and Colonization: Anthropological Perspectives*. Praeger, New York.

Orchardson, I.Q. 1961. *The Kipsigis*. Nairobi, Kenya: East African Literature Bureau.

Pakenham, T. 1991: *The Scramble for Africa*, London: Wiedenfeld and Nicolson.

Peristiany, J.G. 1939. The Social Institutions of the Kipsigis. London: Routledge and Kegan Paul.

Peterson, G. 2000. Political ecology and ecological resilience: An integration of human and ecological dynamics. *Ecological Economics* 35: 323–336

Plumer, R. 2006. Sharing the management of a river corridor: a case study of the comanagement process. *Society and Natural Resources*. 19:709-721.

Plumer, R and FitzGibbon, J. 2004. Co-management of natural resources: a proposed framework. *Environmental Management* 33(6): 876-885.

Pretty, JN. 1995. *Regenerating agriculture: policies and practices for sustainability and self-reliance*. London. Earthscan.

Rapport, DJ. Costanza, R. and AJ, McMichael. 1998. Assessing ecosystem health. *Trends in Ecology and Evolution* 13(10): 397- 402.

Rasmussen T.L., van Weering T.C.E. and L, Labeyrie. 1997: Climatic instability, ice sheets and ocean dynamics at high northern latitudes during the last glacial period (58-10 KA BP). *Quaternary Science Reviews* 16, 73-80.

Reardon, T. and SA, Vosti. 1995. Links between rural poverty and the environment in developing countries: assets categories and investment poverty. *World Development* 23(9):1495-1506.

Robbins, P. 1998. Paper forest: imagining and deploying exogenous ecologies in arid India. *GeoForum* 29: 69-86.

Sanchez, P., Shepherd, K., Soule, M., Place, F., Buresh, R., Izac, A-M., Mokwunye, A., Kwesiga, F., Ndiritu, C. and P, Woomeer. 1997. Soil fertility replenishment in Africa: An investment in natural resource capital. In. Buresh et al. (eds). *Replenishing soil fertility in Africa*. SSSA Special Publication No. 51. Madison, Wisconsin, USA.

Sayer, J. and B, Campbell. 2004. *The science of sustainable development: local livelihoods and the global environment*. Cambridge. Cambridge University Press.

Scherr, S. 2000. A downward spiral? Research evidence on the relationship between poverty and natural resource degradation. *Food Policy* 25: 479-498.

Schroeder, RA. 1993. Shady Practice: Gender and the Political Ecology of Resource Stabilization in Gambian Garden/Orchards. *Economic Geography* 69(4): 349-365.

Scoones, I. 1998. Sustainable rural livelihoods: a framework for analysis. IDS working paper No. 72. IDS, UK

Scoones, I. 2001. Dynamics and diversity: soil fertility and farming livelihoods in Africa. Earthscan Publications, London. 244 pp.

Sen. AK. 1981. Poverty and famines: an essay on entitlements and deprivation. Oxford" Clarendon Press.

Shepherd KD and Walsh MG. 2002. Development of reflectance spectral libraries for characterization of soil Properties. *Soil Science Society of America Journal* 66(3) 988–998.

Shipton, P. 1992. Debts and Trespasses: Land, Mortgages, and the Ancestors in Western Kenya. *Journal of the International African Institute* 62(3): 357-388.

Shipton, P. and M. Goheen. 1992. Understanding African Land-Holding: Power, Wealth and Meaning. *Africa*. 62(3):307-325.

Sinclair, FL. and DH, Walker. 1998. Acquiring qualitative knowledge about complex agroecosystems: representation as natural language. *Agricultural Systems* 56: 341-363.

Southgate, D. 1990. The causes of land degradation along 'spontaneously' expanding agricultural frontiers in the third world. *Land Economics* 66 (1): 93-101.

Southgate, D. Sanders, J. and S, Ehui. 1991. Resource degradation in Africa and Latin America: population pressure, policies and property arrangement. In D. Chapman (ed) *Arresting renewable resource degradation in the third world*. World Bank Environment working paper No. 44 Washington DC.

Snell, GS. 1954. *Nandi Customary Law*. London: Macmillan.

Stahl, M. 1993: Land Degradation in East Africa. *Ambio* 22: 505-8.

Start D. and C, Johnson. 2004. Livelihood options? The political economy of access, opportunity and diversification. ODI working paper No. 233. UK

Steward, J. 1955. *The theory of cultural change*. Urbana: University of Illinois.

Sutton, JEG. 1977. 'The Kalenjin: country and people', in B. A. Ogot (ed.), *Kenya before 1990*, pp. 21-52. Nairobi: East African Publishing House.

Throsby, D. 1999. Cultural capital. *Journal of Cultural Economics*, 23, 3–12.

UNEP. 1992. *World Atlas of Desertification*. London: Edward Arnold.

Van der Leeuw, S. and Archimedes Research team. 2000. Land degradation as a socio-natural process. In *The way the wind blows: Climate, history and human action*. McIntosh et al (ed). Columbia University Press.

von Bülow, D. 1992. Bigger than Men? Gender Relations and Their Changing Meaning in Kipsigis Society, Kenya. *Journal of the International African Institute* 62(4): 523-546.

Waller, R. 1985. Ecology, Migration, and Expansion in East Africa. *African Affairs* 84(336): 347-370.

Weldeab, R. Schneider, M. Kolling, and G. Wefer. 2005. Holocene African droughts relate to eastern equatorial Atlantic cooling. *Geology* 33, 981-984.

Wolf, E. 1992. Ownership and political ecology. *Anthropological Quarterly* 45: 201-205.