ABSTRACT

VAN DER WIELE, CYNTHIA FAY. Understanding the Adoption of Sustainable Natural Resource Management Practices and the Role of Ecological Design within the Milieu of Chronic Conflict and Political Instability: A Case Study of Smallholder Households in Nimba County, Liberia. (Under the direction of Shishir Råjan Råval.)

This dissertation is about rural, subsistence-level smallholder households’ adoption of sustainable natural resource management (NRM) practices within the milieu of enduring disorder and persistent poverty. Theoretically, a sustainable livelihoods framework served to illuminate the interrelationships between households and biophysical and social landscapes, and the corresponding constraints and opportunities to adoption of NRM practices. The research provides insight into whether and how external assistance can be used more effectively to enable smallholder households to secure their basic needs, promote self-reliance, and adopt sustainable NRM practices as a means of breaking the unending cycle of natural resource degradation and persistent poverty.

This research was accomplished with a case study of 55 individuals from four villages in upper Nimba County, Liberia, who attended an 18-week Integrated Pest Management-Farmer Field School (IPM-FFS). The training included seven low-external input and sustainable agriculture (LEISA) practices and two productive conservation practices. A grounded theory approach with complementary research techniques to incorporate qualitative and quantitative data collection was employed. Respondents completed in-depth, semi-structured interviews. Photo-documented field observations and interviews with key informants were used to verify and supplement data provided by IPM-FFS participants.

The grounded theories regarding adoption under uncertainty are: 1) potential NRM practices must be compatible with predominant livelihood strategies and address sources of vulnerability; 2) anything that increases a household’s exposure to risk—or their perceptions of exposure to risk—will seem less attractive, even if it could potentially provide dependable and lucrative sources of income; and 3) NRM practices will not succeed without a commitment to low input requirements—especially
financial requirements—for households to be able to adopt. Appropriate ecological design interventions include: context-specific agro-ecosystem diversity, farmscaping, and the use of home gardens for small-scale experimentation of new NRM practices. The results are applicable to similar socio-political contexts and contribute to the fields of Natural Resource Management and Ecological Design.

Chronic conflict and political instability present a challenge to development initiatives. Providing ‘developmental relief’ to households and communities is akin to ecosystem recovery following a perturbation. The flux between periods of peak crisis and stability present numerous opportunities for ‘developmental relief’ interventions beginning with training opportunities in refugee camps.
UNDERSTANDING THE ADOPTION OF SUSTAINABLE NATURAL RESOURCE
MANAGEMENT PRACTICES AND THE ROLE OF ECOLOGICAL DESIGN
WITHIN THE MILIEU OF CHRONIC CONFLICT AND POLITICAL INSTABILITY:
A CASE STUDY OF SMALLHOLDER HOUSEHOLDS IN NIMBA COUNTY, LIBERIA

by

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North Carolina State University
in partial fulfillment
of the requirements for the Degree of
Doctor of Philosophy

DESIGN

Raleigh

2004

APPROVED BY:

Chair of Advisory Committee  Co-chair of Advisory Committee
Dedicated to

the glory of God

and

the people of Liberia
Cynthia Van Der Wiele was born in Ridgewood, New Jersey. She received her primary and secondary education in Midland Park, New Jersey. Upon matriculation from high school, Cynthia attended North Carolina State University College of Engineering, earning the Bachelor of Science degree in Engineering Operations in December 1984. Her senior project involved studying the feasibility of using powder metallurgy to produce brass wind instrument parts. She practiced engineering with the North Carolina Department of Transportation and several consulting engineering firms. Wanting to expand her horizons, she became a student judge with the American Orchid Society, Inc. in 1987 and became the youngest accredited AOS judge in October 1994.

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Since January 2000, she has been working full-time for the North Carolina Division of Water Quality 401/Wetlands Unit. In August 2000, she enrolled in the newly formed doctoral program at North Carolina State University College of Design, majoring in Community and Environmental Design. She initially went to Liberia in July-August 2001 as a member of a humanitarian mission work team, making a return in February-March 2002 as team leader to perform follow-up on projects. She also served as a Research Assistant during the 2001-2002 and 2002-2003 academic years at North Carolina State University College of Design. She was awarded a scholarship by the North Carolina State University Africana Studies to pursue her research in Liberia. In May 2003, she was inducted into the Gamma Theta Chapter of Tau Sigma Delta honor society.

The author has been married to Chet Buell since June 1996.
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The immense challenge of accomplishing this research could not have been achieved without the timely support and financial assistance of institutions and the advice, encouragement, prayers, words of good cheer and steadfast confidence of family, friends, colleagues, and countless other individuals.

Faculty, staff, and friends at the North Carolina State University Colleges of Design, Humanities and Social Sciences, and Natural Resources helped me in a variety of ways for which I shall always be thankful. The members of my dissertation committee provided thoughtful guidance and mentoring at every stage of the process, from scholarship guidance to writing the finished product. Dr. Shishir Rājan Rāval and Professor Robin C. Moore provided the consistent and unwavering support I needed to dare to change research topics and conduct research in Liberia. Dr. Toddi A. Steelman and Dr. Sarah T. Warren provided advice during the development of the proposal and the rigorous scrutiny and high expectations needed to produce a quality dissertation. They cajoled me into finding my own voice and trusting my judgment. Thank you for your invaluable expertise and your time.

I am extremely thankful for the financial support provided by North Carolina State University, which enabled me to pursue this doctoral program. Research in Liberia would not have been possible without the interventions of Dr. Craig C. Brookins and the North Carolina State University Africana Studies Program for providing scholarship funds to assist me in performing the fieldwork, and to the members of Edenton Street United Methodist Church Committee on Missions for providing health insurance coverage and spiritual support through their many prayers.

This dissertation evolved out of earlier humanitarian missions to Liberia. It was during my second mission trip that I learned of the Liberian IPM-FFS program and decided to abandon my original research proposal. I am enormously indebted to Rev. Anne Girton Kumeh, who made this dream a reality—telling me to ‘go for it’. Without Anne, none of this would have been possible. She
provided moral support, communications, and much-needed housing in Liberia. I am blessed to have encountered the wisdom and guidance of Mr. Mozart Adevu, West African Regional Coordinator for UMCOR-SARDI. Without him, the IPM-FFS in Liberia would not exist. Mozart has been extremely gracious in his willingness to answer an endless assault of e-mails and share his vast experiences in West African rural development. Mr. Billoh Sei Bonkuo was integral to the research process for facilitating access to the villages, translating Mano, believing in my research, accompanying me to the villages and field sites, and faithfully performing whatever task I needed accomplished. I am grateful to Mr. Lewis Momoh for the use of his mountain bike for daily treks to the villages. I am eternally thankful to Mr. Anthony Sekie, my “younger brother”, for my providing my daily bread, friendship, words of encouragement, singing, and thoughtful conversation. The IPM-FFS leaders—Sis. Baindu Dolo, Pastor Joe Garteh, Pastor Sylvester Kpai, and Bro. William Zawolo—were wonderful, spending countless hours arranging interviews, facilitating visits to farms, creating a friendly atmosphere, and sharing their own personal experiences.

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The scores cyclist friends I’ve made through the North Raleigh Road Dogs and randonneuring provided numerous hours of relaxation, fun, and also reminded me that there’s more to life than work.

Finally, I am indebted to my entire family for their innumerable prayers, blessings, care, and life-lessons, which they have so lovingly bestowed on me. They have shaped me into the person I am today. My dear cousins, Dr. Gretchen Johns and Dr. Bethany Geldmaker, held me to high standards of academic achievement; a desire to accomplish as much as they have; and to remind me that there’s nothing wrong with blooming late. My mother, June Reitsma, showed me the world outside Midland Park, New Jersey at a very early age and supported me all throughout this entire challenge. My husband and best friend, Chet Buell, has seen, shared, and experienced it all—the thrills, the dangers, the tropical diseases, the dark moments, and the joys—always lending his utmost support and unconventional sense of humor. I cannot imagine accomplishing this feat without him.

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<table>
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<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>CARI</td>
<td>Central Agricultural Research Institute</td>
</tr>
<tr>
<td>CBO</td>
<td>Community-based organization</td>
</tr>
<tr>
<td>CC &amp; PI</td>
<td>Chronic conflict and political instability</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agriculture Organization of the United Nations</td>
</tr>
<tr>
<td>FDA</td>
<td>Forest Development Authority</td>
</tr>
<tr>
<td>FHH</td>
<td>Female-headed households. <em>De jure</em> (single, widowed, divorced or separated women) and <em>de facto</em> categories (wives of male migrants)</td>
</tr>
<tr>
<td>FYM</td>
<td>Farmyard manure</td>
</tr>
<tr>
<td>GTZ</td>
<td>German Technical Cooperation (<em>Deutsche Gesellschaft für Technische Zusammenarbeit</em>)</td>
</tr>
<tr>
<td>GUMAP</td>
<td>Ganta United Methodist Agriculture Program</td>
</tr>
<tr>
<td>IDP</td>
<td>Internally displaced person</td>
</tr>
<tr>
<td>IGT</td>
<td>Inter-generationally transmitted poverty</td>
</tr>
<tr>
<td>IPM-FFS</td>
<td>Integrated Pest Management-Farmer Field School</td>
</tr>
<tr>
<td>LAC-UMC</td>
<td>Liberian Annual Conference of the United Methodist Church</td>
</tr>
<tr>
<td>LAMCO</td>
<td>Liberian-American-Swedish Minerals Company</td>
</tr>
<tr>
<td>LD</td>
<td>Liberian dollars</td>
</tr>
<tr>
<td>LEISA</td>
<td>Low-external-input sustainable agriculture</td>
</tr>
<tr>
<td>LOIC</td>
<td>Liberian Opportunities Industrialization Center</td>
</tr>
<tr>
<td>LPMC</td>
<td>Liberian Produce Marketing Corporation</td>
</tr>
<tr>
<td>LURD</td>
<td>Liberians United for Reconciliation and Democracy rebel group</td>
</tr>
<tr>
<td>MOA</td>
<td>Ministry of Agriculture</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-governmental organization</td>
</tr>
<tr>
<td>NPFL</td>
<td>National Patriotic Front of Liberia rebel group</td>
</tr>
<tr>
<td>Acronym</td>
<td>Full Form</td>
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<td>---------</td>
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<tr>
<td>NRM</td>
<td>Natural resource management</td>
</tr>
<tr>
<td>SARDI</td>
<td>Sustainable Agriculture and Rural Development Initiative</td>
</tr>
<tr>
<td>SL</td>
<td>Sustainable livelihoods</td>
</tr>
<tr>
<td>SSA</td>
<td>Sub-Saharan Africa</td>
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<tr>
<td>UMCOR</td>
<td>United Methodist Committee on Relief</td>
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<td>WFP</td>
<td>World Food Programme</td>
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CHAPTER 1

INTRODUCTION

Introduction

This dissertation is about the adoption of sustainable natural resource management (NRM) practices,\(^1\) in particular about rural, subsistence-level\(^2\) smallholder\(^3\) households’ decision-making within the milieu of enduring disorder and persistent poverty\(^4\). The overarching goal is to better understand the role of design—broadly considered as a decision-making and problem solving activity or intervention that affects quality of landscape and quality of life (Raval 2004), in such a context. Using a sustainable livelihoods framework (DFID 1999), my objective is to understand and explain smallholder household decision making processes, and their interrelationships with biophysical and social landscapes. Understanding household decision making processes within a setting characterized by chronic conflict and political instability will inform appropriate interventions. I focus on individuals who were trained in a particular suite of sustainable natural resource management practices in Liberia, West Africa (Figure 1.1).

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\(^1\) Sustainable natural resource management is defined as a system of technologies and/or planning that aims to integrate ecological with socio-economic and political principles in the management of land for agricultural and other purposes to achieve intra- and intergenerational equity” (Hurni 2000). Sustainable NRM depends on social and political forces (Harwood 1996) as well as three development components: technology, policy, and land use planning (Bouma 1997). Sustainable NRM practices can be continued in perpetuity absent exogenous disruption (Barrett et al. 2000). This implies two requirements: 1) an ability to address near-term human needs; and 2) an ability to account for long-term social, economic and ecological limits (Brown 1981; Brown 1987; WCED 1987).

\(^2\) Smallholder refers to a subsistence-level (low resources) farmer cultivating approximately 1-2 hectares (Goldman 1995).

\(^3\) Subsistence-level means that the goal of the household is self-sufficiency of staple food production and displays a close interrelationship between production and family survival (Reardon and Vosti 1997).

\(^4\) The terminology ‘chronic conflict and political instability’ has surfaced as a replacement for ‘complex political emergencies’. The substitution of the term ‘emergencies’ with ‘chronic conflict’ is indicative of the persistent nature of these situations. Acute emergencies may surface now and then, but chronic conflict and political instability can exist without an ‘emergency’ of the kind that attracts immediate humanitarian attention (Schafer 2002).
The use of a livelihoods framework serves to illuminate the linkages and the corresponding constraints and opportunities to adoption of practices, thereby facilitating and guiding future ecological design interventions and research in locales experiencing enduring disorder, uncertainty, and persistent poverty.

The specific analysis of decision-making is derived from research conducted in upper Nimba County, Liberia near the commercial center of Ganta. In response to the enduring disorder and persistent poverty that describes Liberia, the United Methodist Church’s Committee on Relief (UMCOR) implemented an Integrated Pest Management-Farmer Field School (IPM-FFS) funded through their Sustainable Agriculture and Rural Development Initiative (SARDI). Farmer teachers from Ghana worked in four villages to introduce sustainable natural resource management practices. Individuals who participated in this training comprise the embedded case studies on which data collection was completed by mid-March 2003.
This first chapter introduces the discourse of adoption of natural resource management (NRM) practices within the context of persistent poverty and enduring disorder and the mission of (human and ecosystem) ecological design research and practice. Three fundamental themes of my dissertation are: 1) the interaction between natural resources and rural livelihoods; 2) the influence of chronic conflict and political instability on rural livelihoods; and 3) the role and mission of community and ecological design with regard to this setting. These thematic areas, as well as lessons learned from the literature, informed the choice of conceptual and methodological frameworks and guided the development of the research questions. This chapter concludes with an outline of the dissertation structure.

The interaction between natural resources and rural livelihoods

The first thematic area concerns the interaction between natural resources and rural livelihoods. The relationship between natural resources and the livelihoods of rural people who depend on them, particularly those who live at subsistence level, is complex. The quality of life of rural, subsistence-level smallholder households, in large part, is determined by the quality of the natural resource base (i.e., the content and condition of the local biophysical landscape) on which they are dependent, as well indigenous management practices. The processes and impacts of management changes in agroecosystems and the surrounding landscapes, along with the relationship to population growth, demographics, and cultural characteristics, are fundamentally influenced by biophysical conditions. Basic aspects include soil characteristics (which affect crop frequency and input use), rainfall and proximity to surface and ground water (affecting crop choice, spatial distribution, and seasonality), and topography (affecting soil degradation and spatial distribution of production systems). Essential aspects of the landscape also include access to, dependency on, and availability of all of its’ resources to the people who rely on them (Steiner 2000). The synergy
between natural and human ecosystem processes forms the fundamental issues with which ecological
designers are concerned.

Conversely, when socio-political, demographic and other pressures shorten the cycles
between land use and regeneration, traditional land management systems become unsustainable and
result in degradation of resources. Degradation or declining amounts of natural resources frequently
produces a series of human and ecological problems such as adverse impacts on economic and social
development, loss of soil fertility and erosion, alterations in local weather patterns, and loss of
biodiversity. The latter, especially, is shown to be related to subsistence needs of rural residents
(Raval 1997). Although subsistence-level households rely on the land and depend on the products
and services of natural resources, they will do whatever is necessary to guarantee survival when
confronted with conditions of persistent poverty. This has resulted in the view of a ‘downward spiral’
of environmental degradation and poverty (Reardon and Vosti 1997; Barbier 2000; Scherr 2000;
Grimble et al. 2002).

The implementation of sustainable NRM practices has been demonstrated to reduce
degradation of the surrounding landscapes and improve the quality of life of rural households (Jagger
and Pender 2002). However, the use of improved technologies in general, and sustainable NRM
practices in particular, is a major investment decision by smallholders. Smallholder households must
make difficult decisions about how best to allocate scarce resources. Several decision-making areas
have been identified in the literature: 1) the kinds of resources and their availability, access, and
proximity; 2) identification of additional resources (financial or labor); 3) response to market
changes; and 4) response to technical change (Stevenson 1981; Reardon and Vosti 1997; Barrett et al.
2000). Subsistence-level households tend to maximize available resources and minimize risk in
production and marketing activities to meet multiple household objectives (Scott 1976; Stevenson
1981; Scherr and Hazell 1994). These objectives include secure provision of food and essential
subsistence goods, cash for purchase of outside goods, savings or accumulation of resources to meet
future planned needs or emergencies, and social security (Scoones 1998). Households select
“livelihood strategies” to pursue these objectives by use of the resources to which they have access, while reducing critical risk factors. Moreover, these livelihood strategies can have either positive or negative consequences on natural resources and livelihood outcomes. In Liberia, the principal livelihood strategies are: agricultural extensification\(^5\); extremely limited livelihood diversification, and migration (to surrounding countries, to safe locations within Liberia, and from urban centers to rural villages).

Furthermore, recent micro-scale studies of livelihood strategies of rural smallholders have challenged the notion of an inevitable ‘downward spiral of environmental degradation and poverty’ (Scherr 2000; Grimble \textit{et al.} 2002). While the cruel cycle of environmental degradation and enduring poverty has been documented in some settings, other research results were indeterminate on the effects of population growth on land and forest quality (Templeton and Scherr 1999; Grimble \textit{et al.} 2002). Rural households have priorities for natural resource use and management practices (Chambers 1983; Lykke 2000). “Poor” people are not necessarily “too poor” to invest in the environment. As a result, although technically impoverished,\(^6\) households may have extremely limited assets, researchers believe that (in some contexts) these households may still have sufficient assets, at the household and/or the community level, to adopt NRM practices that would help them adapt to or reverse degradation and reduce risks, even as pressures increase (Frankenberger 1996; Reardon and Vosti 1997; Pretty 1999; Scherr 2000). These assets are defined as:

- Natural resources (i.e., soil, water, vegetation, and biodiversity of flora and fauna), both on-farm and off-farm;
- Human capital (education, knowledge, skills, health, and labor availability);

\(^5\) Agroecosystems that rely on natural processes for rebuilding soils require long fallow periods and thus produce low yields per unit area (Aber and Melillo 1991). Liberian households utilize extensive amounts of land through slash-and-burn (shifting) agriculture rather than intensively cultivate smaller amounts of land per household.

\(^6\) One measure of income-based poverty is those living on less than US$2 per day, a level which includes nearly 3 billion people (Grimble \textit{et al.} 2002). In Liberia, more than 80 percent of its population lives below the this definition of poverty (less than US$1 per day) according to (LMH 2003).
Financial capital (cash and liquid assets; formal and informal credit);

Physical capital (land, tools, and infrastructure)

Social capital (bonds of trust, relations of reciprocity, shared social norms, social networks and membership in organizations).

The notion of a ‘downward spiral’ (also referred to in the literature as the poverty-environment link), therefore, may be a consequence of how the literature typically considers the concept of poverty—as a household’s level of income or wealth. In many locales, however, households rely on subsistence crops and products and non-timber products collected from their surroundings. Broader definitions include quality of life indicators such as the UN Development Programme’s Human Development Index and the Human Poverty Index. While these indices may be appropriate for assessing human misery at a national scale, they are not the most relevant tools for considering the effect of poverty at the household level (Reardon and Vosti 1997; Alkire 2002), or how it impacts people’s ability to adopt NRM practices. Human development and human poverty indices can potentially miss a great number of subsistence-level households that are not “absolutely poor” by the usual wealth or consumption-oriented definition, but are too poor to make key conservation and/or sustainable management investments necessary to prevent their current land use practices from damaging the resource base or leading them to push onto increasingly fragile lands (Reardon and Vosti 1997). Alternatively, conservation-investment poverty, as defined by Reardon and Vosti (1997, p. 52), is the “cutoff point defined as the ability to make minimum investments in

7 Quality of life indicators typically include: human (prevalence of disease, life expectancy, housing quality, education and diet); support (employment, infrastructure, and community capital); and environment (biodiversity, quality of natural resource base, etc.). Together, these three primary indicators work synergistically to determine quality of life (Stevenson 1981; Dumanski 1997; Haberl and Schandl 1999; Bossel 2001).

8 The Human Development Index (HDI), developed in 1990, measures achievements in terms of life expectancy, educational attainment (literacy) and adjusted real income. In 2003, Liberia’s Ministry of Health (LMH 2003) claimed it ranked 174 out of 175 countries; in actuality, Liberia was so low, it was not ranked at all (UNDP 2003). The World Food Programme classifies Liberia as a least developed country (LDC) and a low-income, food-deficit country (WFP 2004).

9 The Human Poverty Index (HPI) for rich countries ranks them according to their national levels of poverty, illiteracy, unemployment and life-expectancy.
resource improvements to maintain or enhance the quantity and quality of the resource base—to forestall or reverse resource degradation.” Unlike wealth or human development-based poverty measures, the ability to make conservation investments (e.g., adopt a given NRM practice) is context-specific—a function of a household’s particular situation. The lack of research in Liberia means that it is unknown whether or not households have the ability to make conservation investments.

The result of more recent research evidence and recognition of the multi-dimensionality of poverty has been a paradigm shift in the design of interventions. The objective of simultaneously promoting smallholders’ quality of life and positive aspects of their livelihood strategies, while also increasing the sustainability of local, traditional management systems to mitigate negative effects on locally and globally important ecological goods and services—the *sustainable livelihoods approach*—has been widely promoted in the literature among the disciplines of agroecology, agroforestry, international development, sociology, human ecology, ecological design, and a host of other disciplines. This new approach has been dubbed the ‘doubly-Green Revolution’ (Conway 1997).

Sustainable livelihoods are defined as the capabilities, assets (both material and social resources) and activities required for a means of living (Ashley and Carney 1999; DFID 1999). A livelihood is sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining the resource base (DFID 1999; Scherr 2000). This definition is similar to the concepts of resistance and resiliency in the study of human and natural ecosystems. The sustainable livelihoods approach is also at the essence of community and ecological design. A revised view of design is emerging—pragmatic, yet still optimistic and even visionary, socially conscious, while engaged in physical reordering and the protection of natural

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10 Much of the dynamic nature of ecosystems and their response to disturbance deals with how quickly and how strongly they respond to changing inputs, or changes in state. Systems that show relatively little response to disturbance are said to be “resistant”. A severe disturbance is required to change the state of the system. However, resistant systems, once severely disturbed, take a relatively long time to return to their initial state. Resilient systems (the opposite of resistant systems) can be altered relatively easily but will return to their initial state more rapidly. Thus, resiliency is the ability to recover normal function (Aber and Melillo 1991).
systems (Steiner 2002). Thus, William Lucy calls for a broader view of design and planning, based on the principle “that the field and the profession should nurture healthy people in healthy places” (Lucy 1994).

The influence of chronic conflict and political instability on rural livelihoods

While the sustainable livelihoods approach has been applied in many locales around the world, there is a dearth of information on its application in supporting livelihoods in the milieu of chronic conflict and political instability. The professions of community and ecological design can and should delve into such contexts. Thus, the second thematic area, and the crux of my dissertation, is on understanding the context of chronic conflict and political instability, and how it influences rural livelihoods and household decision-making. More to the point, there is a lack of prior research concerning this form of uncertainty and how it affects rural households’ decision-making and ability to adopt sustainable NRM practices. Long-term conflict has been acknowledged to lead to chronic poverty. Where there is little security and the future is uncertain, poverty can increase the likelihood of behavior that is environmentally and socially unsustainable (Goodhand 2003). Whether subsistence-level people act in a sustainable manner or contribute to environmental deterioration must to an extent depend on the culture in which they live and their confidence in reaping the rewards of their investments (Anderson 1996; Grimble et al. 2002). The greater the uncertainty, the less the likelihood that people will invest in their natural environment or attempt to manage resources sustainably. Previous research from conflict situations suggests that the fastest rate of natural resource degradation occurs where there is no assurance of tomorrow.

Livelihood strategies are shaped by perceptions of risk and vulnerability or the capacity of households to manage shock. Conflict is merely one of a number of external shocks that increases vulnerability (Grimble et al. 2002; Goodhand 2003). At this time, it is unknown whether sustainable livelihoods and outcomes, in the strict sense of the ‘sustainability’, is an achievable goal in any time
frame in situations of chronic conflict and political instability. However, interventions can be designed that improve smallholder households’ ability to avoid or minimize some forms of shocks, and rebound more quickly from unavoidable shocks. This can best be accomplished through a holistic examination guided by a conceptual framework.

The sustainable livelihoods conceptual framework

In view of the lack of previous research in chronic conflict settings, it is helpful to clarify and understand the issues influencing rural households and their livelihood strategies through a framework. The sustainable livelihoods (SL) framework as developed by Department for International Development of the United Kingdom offers a conceptual framework for assessing the effectiveness of existing efforts by understanding choices, analyzing relationships between relevant factors at micro, intermediate, and macro levels, and prioritizing interventions. SL introduces many factors and relationships that are often missing from conventional reductionist approaches. Thus, in many ways, it is similar to performing “gap analysis” in landscape ecology or understanding dynamics, composition, and complexity in plant community or social ecology.

The SL framework has been used predominantly among researchers and practitioners trying to understand the multiple and interacting causes of poverty, and evaluating and designing appropriate interventions to eliminate those causes, rather than for the purpose of attaining sustainable natural resource management *per se* (Fitzgerald 2004). However, as discussed above, there can be a cruel cycle of poverty and natural resource depletion, and I believe it is possible to lessen the effects of both, simultaneously through the development of appropriate interventions. The framework

11 UNDP’s approach to sustainable livelihoods makes technology and investment one of the “drivers” (along with policy and governance) that affect local adaptive strategies, assets, knowledge, and technology, which in turn have sustainable livelihoods as an outcome (UNDP 1999). While this approach gives more explicit attention to technology, DFID’s version, upon which my approach is based, has the advantage of being more explicit about the links between vulnerability, assets, and livelihood strategies.
depicted in Figure 1.2 is adapted from the Department for International Development of the United Kingdom (DFID 1999) and is rooted in the development literature of Robert Chambers (Chambers 1983). That is, the SL framework is a way of putting people at the center of development, thereby increasing the effectiveness of development programs (DFID 1999). This philosophical approach is also the heart of community design.

Figure 1.2 Sustainable livelihoods framework (DFID 1999)

The sustainable livelihoods framework identifies the key elements, factors, and relationships that affect the lives of subsistence-level households, and the various feedback loops among them. The basic premise is that the quality and sustainability of livelihoods depend on the strategies households develop to manage their ‘capital assets’, which are by and large under their control, within an environmental and institutional context, over which they have varying levels of control. The SL framework summarizes the main components of, and influences on people’s livelihoods. It does not provide an exhaustive list of the issues to be considered.
My rationale for using the SL approach is that it provides an analytical basis on which to
evaluate existing programs and interventions by identifying the most pressing constraints faced by,
and promising opportunities open to smallholder households with regard to adoption of sustainable
NRM practices. This analysis provides a deeper understanding of the factors and the relationships
and feedback loops among them, which then informs project design, implementation and impact.

Key aspects of this framework, as applied in my dissertation, include:

- Examining vulnerability\textsuperscript{12} with respect to chronic conflict and how this shapes livelihood
  strategies and choices of particular NRM practices;
- Understanding the dimensions of poverty and how they affect adoption of NRM practices;
- Assessing physical, natural, financial, human, and social capital assets (and the constraints on
  access to assets) and how the Liberians in my study combine these in their livelihood
  strategies; and
- Documenting the range of livelihood activities and strategies that Liberian respondents
  pursue, recognizing that different activities are pursued simultaneously, including on- and
  off-farm work.

A ‘livelihood’ comprises the capabilities, assets, and activities for a means of living. An
explanation of each component in the sustainable livelihoods framework depicted in Figure 1.2 is
necessary. Transforming structures and processes refer to the key organizations (i.e., governments,
institutions, etc.) that people interact with (or have an influence on their lives). These can be global,
regional, national, and local. Processes refer to how these organizations accomplish their

\textsuperscript{12} While poverty and poverty alleviation have received considerable attention in development literature and
practice, the concept of vulnerability and reduction of vulnerability form a major focus within the humanitarian
sector. From a livelihoods perspective, ‘vulnerability’ is defined as the lack of ability to cope with stress or
shocks (Schafer 2002). In the studies of ecosystems, this would be similar to a lack of resiliency to
perturbations. In the milieu of chronic conflict and political instability, the vulnerability of a household is
closely related to powerlessness (Le Billon 2000) and to the particular livelihood or coping (risk management)
strategies that they pursue.
objectives—through their policies, regulations, environment, and culture. Both structures and processes have a profound influence on people’s lives.

The vulnerability context describes things that are outside of people’s control. This includes shocks, trends, and seasonal shifts. In this dissertation, the overarching shock occurs from chronic conflict and political instability. Other sources of vulnerability arise from biophysical shocks such as changes in human health, changes in the quality and/or quantity of natural resources, agricultural production, and natural disasters; trends in population, resources, and the national economy; and sudden socio-economic changes resulting from seasonality in prices, food availability and employment opportunities. The use of the term “vulnerability context” draws attention to the fact that this complex of influences makes subsistence-level households less able to cope with stresses, whether predictable or not (DFID 1999). The frequency and severity of these sources of vulnerabilities has a direct impact on a household’s assets, their coping strategies, and their livelihood outcomes. It is not always objective “risk” that matters, but people’s subjective assessments of things that make them vulnerable as well. These matter because both perceptions and actual vulnerability can influence people’s decisions and consequently their livelihood strategies. This is an especially important influence on willingness or interest to adopt NRM practices.

The robustness of a household’s assets, as defined and described by Reardon and Vosti (1997) in the above section, has a direct bearing on a household’s conservation investment potential (i.e., a household’s ability to adopt particular NRM practices). The SL approach is based on a belief that households require a range of assets to achieve positive livelihood outcomes; no single category of assets on its own is sufficient to accomplish the many and varied livelihood outcomes that people seek (DFID 1999). The SL framework is useful in assessing household assets (i.e., presence as well as absence), and considering the potential for substitutability of assets (e.g., strengthening human and social assets may compensate for a lack of physical and financial assets).

Households and individuals may pursue multiple livelihood strategies, sequentially or simultaneously, based on their assets, vulnerability context, and transforming structures and
processes. The pursuit of multiple activities can have important implications for cash and labor availability at different times of the year, and for the relevance of specific development interventions for poverty reduction. Livelihood activities may be composed of, for example, year-round or seasonal formal-sector employment, informal trading or sale of labor, home gardens and food processing, livestock production, cultivation or use of natural or common property resources, labor exchange among family or neighbors, contracted “home work,” borrowing, scavenging, stealing, and begging. Activities may be on- or off-farm, include local or international migration, involve elderly household members or children, be legal or illegal. Small livelihood strategies should not be overlooked, because they can be very important, especially for the poor, who often pursue many livelihood strategies either to make up enough income or to provide a measure of security.

Livelihood strategies, therefore, can be either sustainable or unsustainable.

A *livelihood outcome* is the result of the interaction between people’s (and households’) livelihood strategies and the other elements that influence them. It includes all of the goals that people are trying to achieve through their livelihood pursuits. However, those outcomes are not necessarily the end point, as they feed back into the future asset base. A positive livelihood outcome is the realization of an individual’s (or household’s) priorities. This may include reduced vulnerability to a variety of shocks (i.e., increased food security), increased well-being, and all the other goals a household (or individual) wishes to achieve through use of their assets.

Development programs and other interventions should also aim to develop people’s capacity for resiliency to external shocks, foster sustainable use of the natural resource base, and other positive quality of life outcomes to achieve long-term sustainability. In my dissertation, livelihood outcomes are preferences voiced by my interview respondents. Natural resource and biophysical landscape outcomes may be either improved or diminished, depending on the frequency of cycles between conflicts, severity, the type and quality of household assets, and the livelihood strategies pursued by rural smallholder households.
It is this final box—containing both human and natural environment outcomes—that form the essence of community and ecological design, and what many call ‘sustainability’. The relationships between people and ‘place’—the biophysical landscape—lie at the heart of physical design, and that is why design must have a meaningful role in developing interventions that support people’s livelihoods. For interventions to be effective in achieving positive outcomes on households and their surrounding landscapes, it is imperative to understand these interactions holistically.

In that way, the SL framework is similar to the modes of ecosystematic order, which is enormously complex in its infinite detail, but relatively simple in concept. In essence, ecosystems are defined by three modes of order: structural order, functional order, and locational order (Lyle 1985). In considering the structure of an ecosystem, all life forms and their interactions with non-life (e.g., a household and its interactions) are included. In natural ecosystems, structure is usually consistent in that each species inhabits a niche and maintains ongoing interactions with other species. Functional order consists of the flow of energy and materials that distribute the necessities of life to all of the species within an ecosystematic structure. These flows constitute the dynamics of the ecosystem and often explain the flux and change that it undergoes. In the SL framework, these flows are the assets available to households. Finally, locational order in ecosystems refers to the specific local conditions of topography, soil, and climate. An ecosystem is unique to its location. Thus, regenerative ways of accomplishing sustainable livelihoods are dependent on local processes and resources.

The SL framework also has parallels to the cyclical, yet iterative process of design—identification of issues; establishment of goals; inventory and analysis of the biophysical and sociocultural environments at the local [household] level; determination of options; development of a plan; continued public participation and education; detailed design intervention; implementation; and administration (Steiner 2000). More importantly, the SL framework dovetails with the goals of community and ecological design. The approach is people-centered, in that the making of policy is based on understanding the realities of struggle of people and their households themselves, on the principle of their participation in determining priorities for practical intervention, and on their need to
influence the institutional structures and processes that govern their lives. Secondly, it is ‘holistic’ in that it is ‘non-sectoral’. The DFID (1999) SL framework introduces many factors and relationships that are often missing from conventional reductionist approaches. It recognizes multiple influences, multiple actors, multiple strategies and multiple outcomes. Thirdly, it is ‘dynamic’ in that it attempts to understand change, complex cause-and-effect relationships and ‘iterative chains of events’. Fourthly, it starts with analysis of strengths rather than of needs, and seeks to build on households’ (or a community’s) inherent potential. Fifthly, it attempts to ‘bridge the gap’ between macro- and micro-levels.

Finally, it is committed explicitly to several different dimensions of sustainability: environmental, economic, social, and institutional. Thus, the adoption of NRM practices may not play a central role when the full picture of the sustainable livelihoods framework is taken into account (i.e., there are many other critical issues such as nutrition, sanitation, access to health care, achieving prolonged stability, etc.). Nonetheless, understanding the full spectrum of issues can help households, communities, and agencies work together to prioritize and develop interventions that better fit in with the complex livelihood strategies, especially of rural smallholder households, within the milieu of chronic conflict and political instability. This can provide important insights about the reality that rural Liberian households face.

**Lessons from the literature**

The search for practices that actively regenerate human and ecosystem health has been a subject of increasing focus as natural resource issues have come to the forefront in international development and community design research. The rationale for the focus on land use strategies and natural resource practices is that land is generally the most important natural resource available to subsistence-level households. The last two decades, in particular, have witnessed an explosion in the number of published research studies examining and understanding the opportunities and constraints
to the adoption of a variety of NRM practices (e.g., soil conservation, agroforestry, LEISA\textsuperscript{13}, productive conservation\textsuperscript{14}, etc.).

Previous research studies have developed integrated economic and sociological models together with institutional and bio-physical aspects to explain differences in adoption behavior or adoption potential (i.e. conservation investment potential) among individual households. These studies include: soil conservation practices (Ervin and Ervin 1982; Hansen \textit{et al.} 1987; Gould 1989; Featherstone and Goodwin 1993; Drost 1996; Baidu-Forson 1999; Bennett \textit{et al.} 1999; Clay 2000; Guerin 2000), LEISA practices (De Souza Filho \textit{et al.} 1999), and agroforestry practices (Cashman 1990; Caveness and Kurtz 1991; Godoy 1992; Boahene \textit{et al.} 1999; Franzel 1999; Adesina \textit{et al.} 2000; Franzel \textit{et al.} 2001; Franzel and Scherr 2002). The rationale for the holistic model was that economic adoption models, based on utility or profit maximization, fail to encompass attitudinal and social variables, which are also important in explaining the household adoption decision-making process (Mbaga-Semgalawe and Folmer 2000). Utility or profit maximization theory does not take into account social processes and structures that co-determine households’ resource allocation preferences and behavior (Jones 2002). Similarly, the innovation-adoption-diffusion models used in sociological studies downplay economic variables. Thus, the holistic models, as expected, incorporate on-farm factors (socioeconomic and biophysical conditions); off-farm factors (markets, institutions, policies support services); and cultural/individual attributes. Among the most widely used and adapted of the holistic models is Scherr and Hazell’s theoretical framework (Scherr and Hazell 1994). Scherr and Hazell (1994) proposed that six criteria are necessary for a household to invest in NRM practices:

1. Knowledge of investment needs or options to reverse resource degradation;

2. Economic importance of resource—the notion that agricultural activities plays an

\textsuperscript{13} Low-external input sustainable agriculture (Reijntjes \textit{et al.} 1992; De Souza Filho \textit{et al.} 1999).

\textsuperscript{14} Conservation production is a socially and ecologically progressive approach to achieving protection of timber and non-timber forest resources and products and developing sustainable sources of income for rural, subsistence-level people (Hall 1997; Brown 1999).
economically important role in household livelihood or a degraded resource serves an
economically important role in farm production system;

3. Willingness to invest long-term—the long-term planning horizons and/or relative security of future investment return;

4. Capacity to mobilize resources—sufficient household assets for investment in a given NRM practice;

5. Economic incentives (net returns of the investment, which depend on yields and input requirements per investment unit);

6. Institutional support.

Aspects of this theoretical framework may apply to Liberian households.

Much insight has been gained into people’s decision-making behavior regarding the adoption of NRM practices from this prior research, and several conclusions can be drawn to guide my dissertation research design. First, in empirically testing for the determinants of adoption, past studies have typically been quantitative. While there could be substantial discussion and argument about the selection of the appropriate quantitative model, the basic limitation in comparing empirical research results are that results vary from setting to setting and cannot be generalized and applied to other settings. The majority of adoption studies admit to weak statistical significance due to too many confounding variables. This inhibits the development of strong conclusions (Scherr 1995; Franzel 1999; Mbaga-Semgalawe and Folmer 2000; Jagger and Pender 2002). There simply are no definitive sets of factors to predict household adoption patterns. A lack of recent research in Liberia to form some basic hypotheses (Stevenson 1981), or consistent patterns from developing countries, the African Continent, or even West Africa, meant that my dissertation would become an exploration and explanation of adoption within this context.

Secondly, many of the studies were excessively deterministic or lacked explanatory value as they failed to identify the specific links and mechanisms between social variables and adoption of practices. Since the lists of “factors” in explaining adoption or lack of adoption varied considerably,
it became evident that a better strategy would be to identify processes or linkages that contribute to, or inhibit adoption.

Third, and most critically, there is a lack of research in situations of chronic conflict and political instability. The milieu of extreme uncertainty can completely override typical adoption patterns and make previous studies irrelevant. When coupled with relentless poverty, survival needs override rational exploitation of natural resources and constrain conservation investments\(^\text{15}\). People are forced to flee to wherever they think they will be safe. Widespread displacement of a locality occurs. The result is a vicious cycle of environmental and human crises that leads to the extensive and intensive “mining” of natural resources and persistent dependency on external assistance. Thus, despite the abundance of previous studies on adoption, there is an enormous chasm between conclusions of these studies and the lived experience of Liberian smallholder households. New analysis is required to identify appropriate interventions that can support livelihoods at the household [and community] level within the milieu of chronic conflict and political instability.

Finally, the lack of comparable studies highlights the exploratory nature of my dissertation. Therefore, the use of the sustainable livelihoods framework (DFID 1999) is useful in guiding my dissertation as it draws on a number of theoretical and conceptual approaches to development thinking. In this sense, it is more a holistic and synthetic framework than an entirely new set of concepts. The SL framework provides a method in my dissertation research for considering the multiple and interactive influences on livelihoods in relation to adoption or non-adoption of NRM practices, without overlooking important explanatory factors. Furthermore, the SL framework as originated by DFID (1999) is gaining popularity as an approach for addressing poverty among a wide range of international development organizations including Department for International Development of the United Kingdom, United Nations Development Programme, and a variety of non-

\(^{15}\) In reality, extreme uncertainty from chronic conflict and political instability coupled with poor communication ability causes irrationality in all forms of decision-making. People run, but they do not know what they are running from or what destination they are heading. This was observed during my data collection in late February 2003.
governmental organizations such as CARE and Oxfam (Schafer 2002; Fitzgerald 2004). The DFID (1999) SL framework was primarily developed to help understand and analyze the livelihoods of the poor. It is also a framework for assessing existing interventions (Adato and Meinzen-Dick 2002).

**Methodological framework**

The conclusions drawn from a review of the literature also guided the decision of an appropriate methodological approach. Grounded theory, as interpreted by Glaser (Glaser and Strauss 1967), is used as the methodological framework through which the social reality of the IPM-FFS participants was constructed. Grounded theory is a well-developed, inductive research strategy, especially suited to the systematic study of problems in the social context that are new or that have not been researched, or where published findings are limited (Strauss and Corbin 1998). Since they are drawn from the data rather than based on testing hypotheses, grounded theories are more likely to offer insight, enhance understanding and provide a meaningful guide to action. For that reason, the study was theoretically driven by a qualitative approach based on grounded theory methods. The study was approached as an inquiry process of understanding a social or human problem by building a complex, holistic picture, reporting detailed views of the respondents, and conducting the dissertation research in a natural setting (Creswell 1994).

Intrinsic to the practice of grounded theory is the researcher-as-human-instrument with immersion in the participant’s world. I entered into active dialogue with participants. Analysis of human action was located or situated within a social context.

The grounded theory method links the multiplicity of interpretation and perspective of informants with that of the researcher (Strauss and Corbin 1998). This mode makes use of particular assumptions about the world, the people in it, and the proposed research. These assumptions included the following: that meaning was expressed verbally, in action, and practice; that to understand human behavior, one needed to look at everyday practices; that participants were meaning-giving beings; that
meanings were contextually based; that meaning and significance of human action was fluid and changing; that interpretation was necessary to understand action; and finally, that facts relayed by the participants were authentic and value-laden. In the case of this study, the focus was on understanding and explaining adoption/non-adoption patterns of natural resource management practices. By applying valid methods and with the help of existing and new literature, research questions can be answered and new understanding can be gained as well as applied to other situations of chronic conflict and political instability.

The role and mission of community and ecological design

How does design fit into the context of promoting sustainable livelihoods and sustainable resource management in general, and in situations of chronic conflict and political instability, as is the case in my dissertation? The final theme in this introductory chapter addresses the role and mission of community and ecological design. While many disciplines have risen to the challenge of developing and providing interventions in a variety of settings, I believe the field of design, and specifically community and ecological design, has a responsibility to come to the forefront in developing sustainable solutions. This role, in the context of my dissertation, is illustrated in Figure 1.3.

Zube (1980) defines design as a specific, subjective activity that results in physical changes to the environment. Design includes activities that resolve physical environmental needs and problems and provide for conscious change in the environment. The agent of change may be management practices (Zube 1980). The management of agroecosystems cannot be separated from discussions of the conservation of wild ecosystems (Aber and Melillo 1991). Design has been characterized as a rational decision making process for guiding changes in the physical world to achieve identifiable goals (Zeisel 1984). These identifiable goals can and should include promoting
sustainable livelihoods, enhancing people’s quality of life, and developing sustainable management practices that can balance human needs with conservation of natural ecosystems.

Figure 1.3 Role of community and ecological design research in supporting livelihoods.
Van der Ryn and Cowan (1996, p. 8) describe design as a “hinge that inevitably connects culture and nature through exchanges of materials, flows of energy, and choices of land use.” By this definition, landscape architects are designers, but so are farmers (van der Ryn and Cowan 1996). Domesticated landscapes (e.g., agroecosystems and surrounding landscapes) are shaped by human purpose. The physical forms we see are a direct manifestation of what is most valued in our culture. Thus, van der Ryn and Cowan assert that environmental crises are design crises—a consequence of how landscapes are used. If design decisions are severed from their ecological consequences, we will design accordingly. Conversely, if we build a rich enough set of ecological concerns into the epistemology of design, we may create a coherent response to the environmental crisis. By changing the assumptions underlying agriculture, different results are produced. Van der Ryn and Cowan (1996, p. 11) argue that “if we view the growing of food as a design problem embedded in a wider cultural and ecological context, it begins to echo other design problems.” Many of the same considerations that inform ecologically sound agriculture also inform the design of other systems.

Community design is based on the principle that the environment works better if the people affected by its changes are actively involved in its creation and management instead of being treated as passive consumers. Community design is a theme that cuts across the traditional boundaries of architecture, landscape architecture and planning. The basic premise of community design is that conventional approaches to the creation and management of the environment by experts have not been successful in achieving their ideals and visions. Pioneering developments have demonstrated that it is possible to give people a sense of pride and reinforce their identity with their local community and to develop neighborhoods, towns, as well as other applications, that enrich people’s lives by being responsive to their needs and aspirations (Sanoff 2000). Being responsive to people’s needs and aspirations is important in any setting, but takes on a greater sense of urgency in the milieu of chronic conflict and political instability. When households and communities have lost virtually every asset, community design is essential for rebuilding capacity and providing psychological support through the participatory process.
Ecological design builds on community design by combining the natural environment with the human environment. Motloch (2001, p. 305) challenges the designers to shift to an ecology of design which he describes as:

an appreciative system sensitive to environmental and human needs, cultural diversity, and the broad range of perceived people-environment relations. It promotes ecological responsibility, social equity, long-term economic viability, and design that connects people to place (placemaking) and to other people (community-building). An ecology of design promotes management, planning, and design that regenerate the systems upon which we ultimately rely (regenerative planning and design).

Van der Ryn and Cowan (1996, p. 18) define ecological design as “any form of design that minimizes environmentally destructive impacts by integrating itself with living processes… it is simply the effective adaptation to and integration with nature’s processes.” Ecological design offers three critical strategies for addressing the degradation and decline of natural resources: conservation, regeneration, and stewardship. Finally, ecological design occurs in the context of specific places. It responds to the particularities of place—the biophysical conditions and people lending it coherence—and develops solutions that are consistent with the ecological and cultural context.

Thus, the role ecological designers serve is as facilitator and catalyst in the cultural processes underlying sustainability. The mission of ecological design researchers and practitioners is to sustain local ecologies and culture by designing locally relevant solutions in diverse contexts; to develop expertise in integrating local and external knowledge, and in integrating design with local ecological and cultural dynamics; to pursue innovation-intervention processes to generate solutions responsive to the range of perceptions, as well as to build an understanding of the need for ecological and cultural regeneration. Ecological design interventions in response to sustainability crises view nature and culture as potentially symbiotic. Ecological design moves beyond merely “triage” toward a search for practices that actively regenerate human and ecosystem health (van der Ryn and Cowan 1996). Developing interventions that promote positive outcomes for human and ecosystem health is one facet of ecological design. For example, a sustainable approach to agroecosystems examines
sustainability at the household level—addressing family nutrition needs, soil nutrients, pest
management, etc. Off-site, landscape-level management practices develop solutions for prevention of
soil erosion and nutrient loss; habitat and water quality protection and so forth. Community design
brings people together to discuss their problems, develop priorities in implementing solutions, and
perhaps, as a long-term goal, initiate land use planning at the community level.

My dissertation seeks to promote this vision by using the SL framework as a participatory
means of assessing Liberian households’ strengths, coping mechanisms, livelihood strategies, and
stated outcome preferences. This information will be used to develop ways of nurturing and
combining what assets households do have in innovative ways to ensure survival foremost, and
sustainability\textsuperscript{16} in the long term. Although design research and adoption of NRM practices may not
play a central role when the full picture of the sustainable livelihoods framework is taken into account
(i.e., there are many other critical issues such as nutrition, sanitation, access to healthcare, achieving
prolonged stability, etc.). Nonetheless, understanding the full spectrum of issues and people’s
priorities can help develop interventions that reduce vulnerability and better fit in with the complex
livelihood strategies, especially of rural Liberian smallholder households, within the milieu of chronic
conflict and political instability.

**Research questions**

Thus arises the overarching question of whether and how external assistance, within the field
of community and ecological design specifically, can be used more effectively to enable smallholder
households to secure their basic needs, promote self-reliance, and adopt sustainable resource
management practices as a means of breaking the unending cycle of environmental degradation and

\textsuperscript{16} Sustainability has many dimensions—environmental, economic, social, and institutional—all of which are
important to the sustainable livelihoods approach (Brown 1981; Chambers and Conway 1992; Cernea 1994;
Lyle 1994; Hurni 1997; Scoones 1998; Ashley and Carney 1999; Salafsky and Wollenberg 2000; Bossel 2001;
Lindenberg 2002).
persistent poverty. This is the dilemma that describes many locales globally, but particularly in Liberia, West Africa—which has the added dimension of chronic conflict and political instability. Achieving these goals in the long term involves coming to an understanding of people’s current livelihood strategies and what shapes those strategies as well as understanding how these strategies contribute to achievement of the livelihood outcomes that people are seeking.

The following address site-specific questions that were answered from the data collected in the field:

1. How do rural households manage under conditions of uncertainty? How are decisions made under these circumstances?
2. What NRM practices have been adopted or not adopted and why? How do nature and culture inform these decisions?

From the analysis and interpretation of the data related to the above questions, the following interrelated questions relate to what lessons can be drawn:

3. What strategies can agencies and organizations take to ensure that practices appropriate to high states of uncertainty are adopted?
4. How can ‘developmental relief’ programs be designed to be economically profitable, ecologically responsible, ‘short-tem’—responsive to the dynamic nature of chronic conflict and political instability—and yet also help people in these circumstances move toward (through improved or different livelihood strategies) achieving their desired livelihood outcomes?

These questions will be addressed in the concluding chapter.
Limitations and delimitations of the research

Certain limitations have emerged in applying the DFID (1999) sustainable livelihoods framework to my research. One goal of my dissertation is to test the framework in the context of chronic conflict and political instability and adapt it to increase its usefulness. During the course of data collection, I identified factors that are not explicitly captured in the framework and yet are important to explaining people's decisions and consequent livelihood outcomes. One aspect is the notion of "culture," e.g., beliefs, traditions, status, and identity. Culture may not have direct economic value but it is centrally important in people's lives, choices, and wellbeing. Culture can have economic value as well, such as where assets are transformed into tourism or handicraft production, but this aspect is not explored in my research, nor is it applicable to Liberia at this point in time. Power relationships, politics, and historical experience are other concepts that do not easily fit into the framework but which shape people's livelihood options and strategies, including their choice of NRM practices. These limitations can be addressed by using the framework in conjunction with concepts drawn from other conceptual frameworks or fields of study.

It is also important to note the delimitations of my dissertation in using the sustainable livelihoods framework. First, the framework may identify issues that are salient in explaining livelihood impacts, but are either 1) too far outside of the domain of my research to be a focus of the dissertation, e.g., issues of health and nutrition and public health issues in the context of a participation or adoption; or 2) while relevant to my dissertation, are impossible to include, e.g., psychological impacts of chronic conflict. In these cases, the framework can help make explicit what is not included, but still be important and relevant to understanding chains of causality or important constraints on the ability of an intervention to affect livelihoods.

Secondly, my dissertation examines an intervention at the household level. The role of policies, institutions, and processes will not be examined in detail at the macro level except to touch on particular facets that affect smallholder households at village levels. The case study for this
dissertation was limited to the subset of participants in the Integrated Pest Management-Farmer Field School. This subset was based on availability—whether the participants were still residing in the area and if they had the physical health to engage in interviews and field visits to their farms.

Finally, because my data collection took place approximately one year after the intervention program, it is too soon to measure direct results of the impacts on poverty elimination, quality of life changes, or changes in natural resources and landscapes.

Outline of the dissertation

The remainder of this dissertation explains the rationale, significance, methods, results, and conclusions. Chapter 2, The Milieu of Chronic Conflict and Political Instability, elaborates in more detail the issues introduced in this chapter. It portrays the context of chronic conflict and political instability in general, and the particular context of Liberia. Chronic conflict is the predominant source of vulnerability in Liberia. Chapter 2 also describes the evolution in humanitarian responses to such crises by organizations. This evolution highlights the significance and rationale for my areas of inquiry. Chapter 3 introduces the Integrated Pest Management-Farmer Field School (IPM-FFS) in Liberia, as an agency intervention. The IPM-FFS was intended to provide developmental relief by promoting household quality of life and reducing environmental degradation in situations of protracted conflict and political instability. Chapter 4 describes the research design and data collection and analysis methods. Chapter 5 presents the research setting in terms of natural resources and cultural practices—agroecosystems and social norms—in the Ganta area of Nimba County, Liberia. This provides information at the community level in terms of assets and livelihood strategies. Chapter 6 provides the results of my dissertation at the household level. The final chapter, Chapter 7 discusses the lessons learned from this research—the final two research questions—and ideas for future research are suggested.
CHAPTER 2
THE MILIEU OF CHRONIC CONFLICT AND POLITICAL INSTABILITY

Introduction

The purpose of my research is to understand and explain adoption of sustainable natural resource management practices within the milieu of chronic conflict and political instability. Sustainable management of natural resources and the need to pass to future generations a resource base as ample and productive as that we ourselves inherited has been a cornerstone of the development agenda for nearly two decades (WCED 1987). In response, numerous innovations and rural development projects intended to reduce natural resource degradation and improve subsistence-level peoples’ quality of life in less-developed countries have been tried with varying degrees of success/failure. The African Continent, in particular, has failed to benefit from intervention schemes (Barrett et al. 2000).

The promotion of sustainable rural livelihoods, within the context of chronic conflict and political instability, however, adds a further layer of complexity to an already difficult mission. It challenges existing aid structures and institutions in a number of significant ways. The unceasing nature of contemporary conflict means that conventional responses are inadequate, giving rise to several dilemmas. First, relief instruments were originally designed to save lives in the face of only temporary threats to livelihoods, and to assist people toward rehabilitation and development. Secondly, situations may never become stable long enough for NGOs to be comfortable sending personnel as well as financial and material resources to establish programs. Finally, and all too frequently, external assistance in the face of chronic conflict can become “a comfortable mode” on the part of the recipients. Over the long term, an entire generation can grow up dependent on external
resources rather than on developing the skills necessary to achieve self-sufficiency, or at least develop skills that enable them to become more resilient to shocks\textsuperscript{1}.

This chapter serves to place my dissertation into perspective and to highlight the major issues and concerns. First, I will begin with an overview of chronic conflict and political instability and how it impacts people’s livelihoods. Liberia, as an archetype of the nature of enduring disorder, and the focus of my dissertation, will be described in the second section. The third section will provide a brief review of the advancement of external responses to chronic conflict.

**Understanding the nature of chronic conflict and political instability**

Serious armed violence persists in many parts of Africa. Liberia has experienced enduring disorder since the late 1980s. The terminology ‘chronic conflict and political instability’ has surfaced recently as a replacement for ‘complex political emergencies’ to reflect the persistent nature of these situations (Schafer 2002). Acute emergencies may surface from time to time, but chronic conflict and political instability can exist without an ‘emergency’ of the nature that elicits immediate humanitarian intervention. While there is no agreed typology to classify situations of chronic conflict and political instability, their main characteristics can be applied at either the state or regional level. According to Schafer (2002), situations of chronic conflict and political instability are considered to exist where one or more of the following aspects occur:

- A state in which public institutions (executive, judicial, legislative) are seriously weakened, or non-existent;
- External legitimacy of the state is withheld or contested;
- Strong parallel or extra-legal economy;
- Existence of, or high susceptibility to violence;
- Forced displacement: refugees and internally displaced people (IDPs);

\textsuperscript{1} That is, a diversity of skills and coping strategies enables people to recover more quickly from disturbances.
- Sections of the population are deliberately excluded from enjoying basic rights;
- Livelihoods are highly vulnerable to external shocks;
- Existence of serious poverty.

Goodhand (2003, p. 637) has noted that “many of today’s conflicts emanate from and are fought out in border regions that have historically suffered from marginality, limited voice and persistent poverty.” Chronic conflicts, particularly “those of a regionalized nature, are less susceptible to peace-making. Poor countries are at a greater risk of falling into no-exit cycles of violent conflict” (Goodhand 2003). This defines and describes the recent history of Liberia and the setting of my dissertation in particular.

Finally, within a country in chronic conflict, there is likely to be a great deal of variability from one region to another, particularly where the “frontline” keeps moving. Situations of chronic conflict and political instability may exist in localized geographical areas within countries that may otherwise be considered as stable or that have achieved peace throughout the majority of the country (or region). After the official end of Liberia’s civil war in 1997, for example, locations adjacent to the border with Sierra Leone and Guinea were still experiencing active combat by rebel forces, but peace prevailed throughout most of the rest of the country.

*The social and environmental effects of chronic conflict*

Enduring disorder has direct and indirect costs. The obvious direct impacts include battlefield deaths, disablement, and displacement of large sections of the population (both internally and externally). Protracted conflicts are likely to produce persistent poverty. This is particularly true of collapsed state, warlord type conflicts characterized by the systematic and deliberate violation of individual and group rights (Goodhand 2003). The end result of the protracted conflict is intergenerationally transmitted (IGT) poverty. The effect of IGT poverty is that there is an unending dependence on external sources of assistance as significant age cohorts in the population no longer
exist, resulting in a significant decline in human capital. The collapse of traditional social (family and community-level) networks diminishes social capital. These are all serious consequences that are not easily alleviated in the short term.

At the macro level, there are significant political, economic, and social costs. The World Bank estimates that conflict in Africa is causing a loss of two percent annual economic growth across the continent (DFID 2001). The negative impacts on food production lead to an increased reliance on imports and food aid. At the household and community level, chronic conflict has a range of effects on people’s entitlements and can lead to a catastrophic and unrecoverable collapse in livelihood options (Goodhand 2003). The collapse of state services lead to a decline in social entitlements such as health services and public education.

Equally grim is the impact of chronic conflict on natural resources. The direct consequences are: burning of forests and grasslands to flush out the enemy; bombing; unregulated logging and mining (and unsustainable extraction of other marketable resources); increased dependence on wild food sources because villages are abandoned and/or conditions make the establishment of crops impossible to accomplish. The creation and settlement of massive refugee camps results in denuded landscapes (see Figure 2.2). The net effect is a decline in resource endowments, with a serious and progressive depletion of the rural asset base. Migration may become the only livelihood option for many households. Shortened time frames caused by fear and panic lead to opportunistic behavior and the consequent degradation of natural resources. Dire situations such as these desperately need and rely on a variety of external sources of assistance. These conceptual interrelationships are expressed in Figure 2.1.
Socio-political history of Liberia

The recent history of Liberia follows this seemingly hopeless course. Established in 1847, the Republic of Liberia was technically the first independent country on the African continent. The style of government and constitution was fashioned on that of the United States. Founded by freed American slaves, Liberia is predominantly comprised of sixteen indigenous tribal groups\(^2\), with the slaves’ descendants—Americo-Liberians—consisting of five percent of the total population. For 133 years after independence, the Republic of Liberia was a one-party state ruled by the Americo-Liberian dominated True Whig Party (TWP). It is this five percent who historically have held the political power in the country and marginalized the indigenous peoples, leading up to the present crisis (Somah 1994; Sirleaf 1998; Outram 1999; Boas 2001). Liberia was nearly removed from the League of Nations during the 1930s due to charges of slavery (Outram 1999). In its internal political, social,

\(^2\) These tribal groups include: Dey, Belleh, Mende, Gbandi, Vai, Kisi, Mandingo, Gola, Krahn, Lorma, Mano, Grebo, Kru, Dan (Gio), Bassa, and Kpelle (LME 1998). My study mainly focuses on the Mano of upper Nimba County.
and economic structures and relationships, the Americo-Liberian regime was, for all intents and purposes, a settler colony—translating the black-settler elite had monopolized all political power and controlled access to the country’s resources. Their methods and attitudes made those of the later-arriving white settlers in Rhodesia look mild by comparison (Unger 1981; Sirleaf 1998; Outram 1999). Indigenous peoples were not granted formal citizenship until 1904 and voting rights until 1985 (Outram 1999).

Although Liberia was a relatively politically calm and economically thriving country, domination over indigenous tribal peoples by freed American slaves resulted in tensions that simmered beneath the surface until 1980. The result of these tensions was the overthrow of President William Tolbert by Liberian Master Sergeant Samuel Doe from the Krahn ethnic group. Doe’s coup d’etat marked the end of domination by the Americo-Liberian elite and ushered in the present era of political instability. Doe's government increasingly adopted an ethnic outlook as the Krahn soon dominated political and military life in Liberia. This caused a heightened level of tribal tension leading to frequent hostilities between the politically and militarily dominant Krahns and other tribal groups in the country. Casting himself as the liberator of Liberia's indigenous masses, Doe promised to put an end to the corrupt and oppressive domination by the Americo-Liberian elite and to establish a more equitable distribution of the nation's wealth (Berkeley 1992; Boas 2001). He pledged to return the country to civilian rule. On the contrary, he soon proved to be a lawless and brutal tyrant. He put down a widely applauded and nearly successful coup attempt by former Army Commanding General Thomas Quiwonkpa, a Gio, with horrific violence, killing hundreds—mostly members of the Gio and Mano tribes, from the remote border region of Nimba County (Unger 1981; Outram 1999).

By the late 1980’s, lawlessness and economic collapse led to the breakdown of the Liberian state and the growth of private armies and dissidents vying to attain control. Exile groups in Guinea and Côte d’Ivoire formulated plans to oust Doe and found a leader in Charles Taylor. When Taylor, Liberia's current president, launched a war against Doe in 1989, his "method was to exploit the

3 The colonial nature of the Americo-Liberian rule is reflected in the motto on the Seal of the Republic of Liberia: “The love of liberty brought us here”.

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genocidal rage of the Gio and the Mano, the two tribes that had suffered the most under Doe's Krahn tribe” (Berkeley 1992). The random killing of Liberians by these factions began on December 24, 1989 when Taylor’s National Patriotic Front came across the border from Côte d’Ivoire to Nimba County, eventually overthrowing Doe. More than a million people—about half the country—abandoned their homes (USDOS 2003). Nimba County—the location of my case study—was at the epicenter of this conflict that resulted in the near genocidal decimation of the Mano and Gio ethnic groups (HRW 1990). Officially, fighting ceased in 1997 only through the intervention of the Economic Community of West African States (ECOWAS) under the auspices of the Economic Community of Cease-Fire Monitoring Group (ECOMOG), leading to the election of Taylor as president (Sirleaf 1998; USAID 2002).

Peace has not prevailed under Taylor’s presidency. Despite an agreement to end the war, there have been recurrent outbreaks of rebel fighting along the borders with Sierra Leone, Guinea and Côte d’Ivoire since 1999, and sporadic internal conflicts since 1999. Some 700,000 refugees remained in limbo in neighboring countries (USAID 2002). Unemployment and illiteracy stood above 75%, and little investment was made in the country's infrastructure (USDOS 2003). Rather than work to improve the lives of Liberians, Taylor supported the bloody Revolutionary United Front in Sierra Leone, fomenting unrest and brutal excesses in the region, and leading to the resumption of armed rebellion from among Taylor’s former adversaries. Meanwhile fighting between Guinea and Liberia began. Guinea accused Taylor of backing armed rebels who crossed from Liberia and Sierra Leone to attack Guinean villages. Liberia in turn accused Guinea of supporting dissidents fighting government troops in northern Liberia.

In March 2000, Liberia, Guinea and Sierra Leone committed themselves to ending the use of territory for cross-border raids by rebels and planned to sign a non-aggressive pact. The U.S. and British ambassadors to the Security Council accused Taylor in August 2000 of fuelling the war in Sierra Leone and profiting from the illegal sale of diamonds mined there. The United Nations sanctions against Taylor's government finally came into effect in May 2001.
Liberia continues to face overwhelming challenges. The 1989-1997 civil conflict had grim results: a total collapse of all democratic and socio-economic institutions; the loss of approximately 250,000 (including civilians, of which a disproportionate number were the elderly); and the displacement of over 2 million people into refugee camps in neighboring countries and internally (Daieh 2003; USDOS 2003) from a total population of approximately 3.2 million. This has resulted in the loss of a significant knowledge base. People with sufficient means fled to other African counties, Europe and the United States to pursue livelihoods there. Liberian gross domestic product is US$410 million with a debt burden of US$3.1 billion; per capita income is approximately US$170. Annual population growth is 2.7 percent, with infant mortality at 235 per 1000 live births (UNDP 2003). The probability at birth of not surviving to age 40 (200-2005) is 47.2 percent (UNDP 2003). Liberian women have an average of 6.2 children (USDOS 2003). The average life expectancy at birth is 41.4 years (UNDP 2003). These are extremely formidable obstacles to improving the standard of living.

Nationally, pipe-borne water and electricity are still unavailable—only 26 percent of the population has access to safe drinking water (Kromah 2001) through the provision of deep wells funded by external aid. Intermittent electricity in the major cities is through personal generator only. Schools, hospitals, roads, and other infrastructure remain derelict. There is no formal internal or external postal service. Within Liberia, letters and other parcels are delivered by asking a person that will be traveling to a particular region or community to deliver the item(s). To send letters outside of Liberia, one must use a private carrier (e.g., FedEx or DHL), which costs approximately $85 and up. Sanitation services (e.g., garbage collection, sewers, and wastewater treatment) are non-existent; garbage is strewn everywhere and burned; sewage runs along city streets. The majority of the population lives without access to primary health care. Many Liberians cannot afford to send their children to school on a continuous basis because tuition is charged for both public and private schools (when they are in operation). Massive IDP camps, as seen in Figure 2.2, operated by the United
Nations High Commissioner for Refugees (UNHCR) and the International Committee for the Red Cross (ICRC) are found along the major road corridors throughout Liberia.

Figure 2.2 Refugee camp for internally-displaced persons (Monrovia Highway).

Even more recent is the briefing to the Security Council by Jacques Paul Klein, Special Representative of the Secretary-General for Liberia, who stated:

Today Liberia is not even listed on the UNDP human development index. Eighty-five percent of its citizens are living below the poverty line (US$1 per day); the unemployment rate is 85 percent; illiteracy is at 63 percent (88 percent in the rural areas); 50 percent of the population is under fifteen years of age. Added to this is that 70 percent of the belligerents are child soldiers, coerced, psychologically traumatized, manipulated and exploited by self-appointed military leaders. We have a phenomenon not known elsewhere in the world where the younger population is less well educated than their parents (Klein 2003).
The reality of the situation is that people live in almost constant uncertainty of the future. While there may be several years of relative peace, no one is ever certain that it will last. With no other source of information besides predominantly government-controlled radio stations, people rely on word-of-mouth from others to inform them of regional conditions. Repeated conflict means repeated looting and burning of their mud-block and zinc houses, loss of what little assets they own, and fleeing to wherever they perceive to be safe with what little they can carry with them. The processes which keep households in chronic poverty are unlikely to change suddenly in the event of a peace settlement. The effects of conflict are felt for many years after the fighting stops, and many of those who were chronically poor during the war are likely to remain so during the peace. Liberia’s economy and environment as well as people’s livelihoods are worse off today than they were decades ago (Garnett and Utas 2000). Particularly troubling is that Liberia continues to experience the same problems of political and economic exclusion that contributed to the 1989-1997 conflict (Goodhand 2003). To conclude, Liberia is dependent on outside assistance for the provision of virtually every public good and service⁴. This is why an understanding of how to design interventions that enhances people’s ability to recover and supports their livelihoods in a manner that improves their quality of life and the quality of their natural resources, is essential.

⁴ The European Union is Liberia’s largest donor, followed by the United States, which provides one-third of the total assistance provided to Liberia (Garnett and Utas 2000; USAID 2002). Other major donors include Britain, Canada, Denmark, France, the Netherlands, Sweden, Taiwan, the United Nations, the World Bank, and the International Monetary Fund. Donor activities include: assistance to improve democracy and governance, basic health care, making social services available to resettled populations, training ex-combatants, psychological care for former child soldiers and those affected by the war, re-establishing health and educational institutions, feeding vulnerable groups, constructing housing, income generation (vocational training), and most significantly related to this research-- improving food security (agricultural training and rural development programs) and rebuilding capacity.
External assistance plays a vital role in mitigating the effects of chronic poverty. However, the great humanitarian tragedies of the early 1990s—Liberia among many others—focused attention on how to respond effectively. Failing to respond effectively can best be understood in terms of the incompatibility between the responses being proffered and the kinds of problems being addressed (Hendrickson 1998). Humanitarian aid was not conceived to solve the problems it is now expected to tackle. Although much is written on immediate relief and longer term rehabilitation, there is a scarcity on the literature on the transition between short-term and long-term activities or on approaches that integrate short-term relief and long-term development at the outset (Eberdt 2003). With protracted humanitarian crises caused by chronic conflict, donors, agencies, and independent contractors have questioned the potential for relief aid to cause more harm than good by creating dependency and potentially feeding into conflict (Atkinson 1997; Schafer 2002; Goodhand 2003). Furthermore, some practitioners feel that the relief stage is particularly important as communities and households in post-catastrophe situations risk becoming dependent on short term aid activities in the absence on a transition to long-term planning (O'Keefe and Kirby 1997; Eberdt 2003).

A key dimension of the new relief agenda has been the shift towards ‘developmentist’ models of relief (Hendrickson 1998). Humanitarian support by the international community (i.e., governments, donors, and non-governmental organizations (NGOs)) has been required to make relief assistance more ‘developmental’ (ICRC 1996; Schafer 2002). International relief assistance must fill the vacuum left by declining developmental aid to unstable countries. This was spurred, in part, by a failure to recognize the protracted nature of crisis and certain new patterns of violence in many

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5 Oxfam Great Britain defines a humanitarian crisis as ‘any situation in which there is an exceptional and widespread threat to life, health or basic subsistence, that is beyond the coping capacity of individuals and the community’ (Oxfam 2002). However, the problem with chronic conflict is that the situation remains ‘critical’ for so long that the ‘norm’ is in effect redefined. What would be a situation so severe as to demand an exceptional (humanitarian) response, is judged not by any absolute standard but in relation to what has become the norm for that context. The threshold for response becomes raised (Schafer 2002).
regions where relief aid is being delivered today. In Africa, which is perhaps most illustrative of this trend, a state of emergency has prevailed in Liberia.

The first approach by NGOs to their new mandate was to apply the so-called ‘relief to development continuum’ (Schafer 2002). The continuum approach is based on the belief that a return to normalcy is linear (Macrae 2000). Mainstream development policy has promoted a model of humanitarian relief that predicts an early return to peaceful development following a state of war or crisis. This has been based on assumptions that war is somehow a temporary, abnormal, and dysfunctional feature of society, and that through processes such as ‘relief’, ‘conflict resolution’, and ‘rehabilitation’, people can be helped to weather conflict and restore their lives to what they were before (Hendrickson 1998). Thus, relief aid was considered a response to an immediate crises (e.g., health, food, safety issues). Once the crisis was over, then rehabilitation of infrastructure could take place, and then developmental programs could begin.

The shortcomings of current understandings of and responses to situations of protracted instability have gradually led to discrediting the concept of a linear progression as an inappropriate approach for two primary reasons. First, there is rarely a distinct ‘end’ to the emergency and no clear point at which a transition can be made into rehabilitation and development work (Schafer 2002). One example is the non-conventional patterns of warfare in Liberia. Relief assistance is not politically or materially sustainable. Secondly, the assumption that all parts of a country are on the same point on a continuum has been challenged by the emergence of islands of relative peace within countries in which instability also exists (White and Cliffe 2000).

In lieu of the relief-development continuum, the most recent concept embraced by humanitarian and development practitioners, is that of ‘developmental relief’ (ICRC 1996; Schafer 2002). Developmental relief is rooted in the concept of supporting livelihoods rather than simply providing basic relief. The Food and Agriculture Organization of the United Nations (FAO) noted that development objectives should not be set aside during emergencies; they need to be maintained
throughout the emergency and should incorporate elements of prevention and preparedness which reduce susceptibility to disasters (FAO 2002).

Nine key principles are advocated by the International Federation of the Red Cross and Red Crescent Societies (ICRC 1996):

1. Building on people’s capacities as well as addressing vulnerabilities.
2. Identifying the needs and capacities of the diverse groupings of disaster survivors.
3. Participation—involving disaster survivors in the decision-making process, which empowers them to retake charge of their lives.
4. Accountability to donors and program beneficiaries.
5. Strategies (developmental relief programs) based on the environment of the disaster.
6. Decentralized control—management decisions are taken as close to the beneficiary population as possible.
7. Demonstrating a concern for sustaining livelihoods.
8. Working with local institutions to build their capacities after the need for relief has passed.
9. Setting sustainable standard services (e.g., health, education, and water provision) which has a realistic chance of being sustained after the relief operation ends.

In sum, “even in the midst of conflict, people pursue livelihood strategies other than simply providing food for today or shelter for tonight” (Schafer 2002, p. 5). As a result, such strategies should be supported by [NGO] assistance. The extent to which an agency concerns itself with less obviously ‘relief’ oriented interventions and with the restoration of people’s ability to cope for themselves, is one of the defining characteristics of an agency’s approach. Agencies with a development agenda will tend to highlight the livelihood aspects of humanitarian crises. Participatory (i.e., community design principles) and sustainable livelihoods (i.e., ecological design principles) approaches have been of significant practical use in situations of chronic conflict and political
instability, when applied within a framework that observes humanitarian principles and draws on rights-based approaches.

Since 1997, relief and development agencies in Liberia have gradually had to adapt their programming and implementation in rural areas due to the realities of continuing to work in dynamic environments. However, many development agencies in Liberia, as in other chronic conflict settings, have until very recently been reluctant to overtly acknowledge the need to adapt approaches, programming, and implementation to the realities of conflict, at least according to staff of NGOs (Bishop 2002; King 2002; Bonkuo 2003; Wonyenneh and Kokeh 2003). Most development agencies simply pull staff out, or cut off funding, and hope to start up again when “things settle down.” A few long-term NGOs have adapted their programs to the unstable nature of their setting by supplying seeds (or other basic necessities), working in refugee camps, and offering training for women and orphans (Adevu 2002; King 2002; Waines and Waines 2003). It is apparent that understanding the impacts of an intervention is salient. The use of the sustainable livelihoods framework assists in determining what parts of the intervention are going “right” (i.e., what are households willing and able to adopt) and what elements require changing or adapting more appropriately to the milieu of chronic conflict and political instability.

**Summary**

This chapter introduced the nature of chronic conflict and political instability and how these conditions affect livelihoods on the macro and local level. I then related how Liberia, particularly in its recent history, follows the patterns and trends of chronic conflict. This review illustrates how the conflict in Liberia has brought about specific changes in the human and natural environment, which have resulted in certain significant effects on the lives and livelihoods within the regions affected (and presently including most of the country). Some imperative conclusions can be drawn follow from this analysis:
- Substantial development investments over decades by foreign agencies and governments have not made a significant lasting impact on the underlying causes of the conflict and have had little or no success in addressing poverty and vulnerability;
- It is unlikely that there will be an effective military or security-based solution to a conflict based on such entrenched inequalities and long-term poor governance; indeed the legitimacy of the State and state institutions are severely undermined and compromised;
- It is indisputable that the attention of the relief and development community should focus on making interventions both relief and development-oriented.

It is evident from these challenges, that studying adoption of sustainable NRM practices and its effect on promoting sustainable livelihoods under chronic conflict and political instability takes on a greater sense of necessity and significance.

In the final section, a brief overview was provided on organizational responses to situations of conflict. Enduring disorder has challenged and changed agency responses in regard to humanitarian and developmental assistance and the design of interventions. This established the focus of my dissertation. The following chapter describes the intervention program funded by the NGO, United Methodist Church Committee on Relief’s Sustainable Agriculture and Rural Development Initiative—the Integrated Pest Management-Farmer Field School—aimed at providing developmental relief to four villages in upper Nimba County, Liberia.
CHAPTER 3

INTERVENTION: THE INTEGRATED PEST MANAGEMENT-FARMER FIELD SCHOOL AS ‘DEVELOPMENTAL RELIEF’

Introduction

Since the birth of Methodism, John Wesley urged his followers:

Do all the good you can, by all the means you can, in all the ways you can, in all the places you can, at all the times you can, to all the people you can, as long as ever you can (Wesley 1742).

Liberia’s abysmal conditions, described in the previous chapter, provided the impetus for the United Methodist Committee on Relief (UMCOR) to initiate an intervention program. UMCOR funded an 18-week Integrated Pest Management-Farmer Field School (IPM-FFS) through its Sustainable Development and Rural Development Initiative (SARDI) program to respond to the ongoing environmental and humanitarian crises in Liberia based on the ‘developmental relief’ paradigm. The IPM-FFS is not a new concept, but has not typically been used as a form of developmental relief. Previous applications throughout the world have been in relatively peaceful settings. The IPM-FFS emerged out of a decade of experimentation in implementing participatory farmer training activities in the Philippines beginning in the late 1970s by the United Nations Food and Agriculture Organization (FAO). Refinements in the Philippine program and a new major effort in Indonesia in the late 1980s led to the birth of the FFS movement (Pontius 2000). It was introduced in West Africa in 1995, and has been implemented successfully in Ghana (Adevu 2002).

While the name, Integrated Pest Management-Farmer Field School implies that it is concerned with teaching farmers to manage insect pests, the actual program is much broader in scope. The educational philosophy of the IPM-FFS rests on the foundations of adult non-formal education—the field is the classroom and learning is by doing—and reflects the four elements of the 'experiential
learning cycle: 1) concrete experience, 2) observation and reflection, 3) generalization and abstract conceptualization, and 4) active experimentation (Kolb 1984).

Operationally, the IPM-FFS are organized around a season-long series of weekly meetings focusing on biology, agronomic and management issues, where farmers conduct agro-ecosystem analysis, identify problems and then design, carry out and interpret field experiments using IPM to non-IPM comparisons. This reduces the risk involved in self-experimentation and empowers people who have not had access to formal education. In addition, the IPM-FFS also includes a significant focus on group and individual capacity-building (e.g., developing human and social assets). The longer-term empowerment goals of UNFAO IPM-FFS model seek to enable graduates to continue to expand their knowledge and to help others learn and to organize activities within their communities to institutionalize IPM practices.

The IPM-FFS has a proven record of success in many other lesser-developed countries, including West African settings (Bartlett 1998; Ooi 1998; Bartlett 2000; Adevu 2002; Kenmore 2002). Farmer empowerment; the conservation of biodiversity; food security; community education; the protection of human health; and policy reform have all been explicit part of these programs. These multiple objectives have arisen from a growing recognition among governments, NGOs, donors, and participants, of the interdependence of different aspects of development, and the need to put people at the center of the development process (Bartlett 2000). These same concerns have given rise to the concept of ‘sustainable livelihoods’ (Chambers and Conway 1992), ‘community design’ (Sanoff 2000), and ‘regenerative design’ (Lyle 1994). Although IPM training programs were being implemented globally prior to the widespread use of livelihoods terminology, the current concept of sustainable livelihoods accurately describes what is going on in these programs. Within an IPM-FFS program, participatory approaches (including farmer-to-farmer training) are being used to transform a range of assets (including natural, human and social capital) into a number of livelihood outcomes including security of incomes, food supplies and health, and improvements in rural settings (Bartlett 2000). SARDI hoped that the IPM-FFS would accomplish similar objectives in Liberia.
Since 2000, peace had prevailed in the Ganta, Liberia region. While there were still many large IPD camps along the main road from Monrovia to Ganta, and World Food Programme (WFP), the International Committee for the Red Cross, and other international NGOs were providing relief assistance, significant rebuilding of infrastructure had been taking place in upper Nimba County. A variety of NGOs were implementing training programs in health education, agriculture, environmental issues, and other topics. In 2001, The United Methodist Church Committee on Relief formed a new program—the Sustainable Agriculture and Rural Development Initiative (SARDI)—aimed at assisting rural households in five West African countries to improve their quality of life and local landscapes. Because of the prolonged stability and the continued need by rural households for external assistance, the Ganta United Methodist Agricultural Program (GUMAP), in coordination with the West Africa Regional Coordinator for SARDI, decided to implement the IPM-FFS in Liberia. In addition to the training (development) component of the IPM-FFS, the relief component of ‘developmental relief’ included the distribution of vegetable seeds and a set of tools for each group to use during training.

Participants were recruited through an established contact person in each of the four villages. Each contact person had ties to the Liberian United Methodist Church (LAC-UMC)—either through previous extension programs by GUMAP or because they were United Methodist pastors. Individuals were notified approximately one to two weeks in advance of the opportunity for a two-day introductory workshop in Ganta on Integrated Pest Management and also of an opportunity to gain expertise on other topics through the upcoming farmer field school. A male and a female farmer-trainer, who had previous experience with IPM-FFS, came from Ghana to Liberia to conduct the training. A female agricultural extension staff person from GUMAP was used to translate English into the predominant tribal dialect (Mano).

1 These four villages were: Gbedin, Gbahn, Neigbein, and Pledehyee. They will be discussed in greater detail in Chapter 5.
The IPM-FFS sessions were held one day a week at a field site offered by a landowner or headman in each village. The sessions were conducted over a period of 18 weeks, from December 2001 to April 2002. Each of the four groups carried out weekly observations on small plots in the field to compare their usual cultivation practices with the pest control practices using IPM options developed by the project (Figure 3.1).

Figure 3.1 Gbahn IPM-FFS field trials.

After the field activities, participants gathered in an outdoor classroom area for training (Figure 3.2). If a participant attended all of the sessions and took an oral examination, s/he received a certificate of training.
Figure 3.2 Outdoor classroom at Gbahn IPM-FFS.
Responsiveness to local biophysical conditions and livelihood strategies

The curriculum for the Liberian IPM-FFS was based on the biophysical conditions of local landscapes and the needs and limitations of rural households in terms of their assets. Slash-and-burn agroecosystems are an integral part of Liberian smallholders’ livelihood strategies and constitute about 90 percent of total rural households’ land uses (Kromah 2001; Bonkuo 2003). Flash burning (Figure 3.3) and short-term mixed intercropping (Figure 3.4)—with an eventual return to natural plant succession—follow the partial clearing of vegetation (Figure 3.5) in mature and secondary forest.

Figure 3.3 Flash burning following fallow period.
Figure 3.4 Mixed intercropping system.

Figure 3.5 Partial clearing of secondary forest, Nimba County, Liberia.
These systems are sustainable under conditions of low land use pressure (Kleinman et al. 1995). However, since the late 1980s, evolving demographics and changing political and social environments in Liberia have made the traditional, formerly stable systems less productive. This results in an additional source of vulnerability to Liberian households. The time periods between cultivation and succession have been reduced to the point where there is inadequate nutrient cycling and acceleration of nutrient flow out of the agroecosystem (Freeman 2003). The result has been degraded soils and a livelihood strategy of agricultural extensification (as evidenced by use of steep slopes and conversion of swamps to agricultural uses).

In response to these predominant biophysical conditions and livelihood strategies, the Liberian Integrated Pest Management-Farmer Field School (IPM-FFS), took an intensification approach. This approach is based on the belief that the reason existing NRM practices are unsustainable is because agricultural cropping is overly extensive in nature. Current practices use up too much land, produce low yields, and absorb little labor. In addition, they are ecologically and economically problematic. Upland agricultural crops suffer from loss of soil fertility, crop pests and disease, and realizes little yield (Adevu 2002; Bonkuo 2003). The agroecosystem is unstable, so smallholders tend to deforest new land either on their own land, or by finding new patches to claim and clear. Thus, the argument asserts that the key to slowing or reversing degradation of resources lies in a two-pronged approach: 1) developing a sustainable means of intensifying production on already cleared land through the adoption of low-external-input and sustainable agricultural practices; and 2) promoting productive conservation practices to preserve existing forested patches.
Low-external input and sustainable agriculture practices

Agricultural crops represent the primary livelihood strategy of Nimba County households. They also represent an important set of impacts to tropical soils. Soil organic matter generally declines during the cropping period because of increased decay and limited replacement. A decline in soil organic matter leads to increased acidity, lowered nutrient levels, degradation of soil structure, reduced porosity and aeration, and lowered water infiltration capacity (Kleinman et al. 1995).

Sustainable NRM practices in agroecosystems, therefore, typically focus on the primacy of maintaining soil quality and avoiding soil degradation by optimizing the use of locally available resources and using external inputs in a complementary and efficient way. This approach, called 'low-external-input and sustainable agriculture' (LEISA), involves practices of soil and water harvesting, agroforestry, integrated pest management, intercropping, crop-livestock integration, microclimate management and the use of local species of animals and plants in food production (Reijntjes et al. 1992). LEISA builds on a combination of people’s local knowledge (e.g. human capacity), ecologically-oriented agriculture developed elsewhere, and scientific insights into agroecology (Reijntjes et al. 1992). LEISA does not aim at maximal production of short duration but rather at a stable and long-lasting production level. This reduces household vulnerability to malnutrition and to two primary biophysical sources of vulnerability concerns to Nimba County farmers—pests (grasshoppers) and soil quality. LEISA maintains and, where possible, enhances the natural resources (Reijntjes et al. 1992), thereby achieving positive outcomes to the natural environment. Accordingly, LEISA is analogous to the principles of agricultural deep design (Wann 1996).

The LEISA practices selected for the IPM-FFS curriculum were largely based on GUMAP extension staff experience and knowledge of the resources, needs, and vulnerabilities of local smallholders. The SARDI West African Regional Coordinator’s experiences with smallholders in Ghana also came into play with selecting appropriate practices. The LEISA practices included:
- Composting;
- Slash-and-mulch;
- Farm yard manure (FYM);
- Multicropping (utilizing land for more than one cropping enterprise at the same time);
- Intercropping\(^2\) (planting more than one crop in a row or alternating rows);
- Trap and decoy crops\(^3\);
- Neem (\textit{Azadirachta indica}\(^4\)), a plant-derived pesticide (Figure 3.6).

\textbf{Figure 3.6 Neem tree (\textit{Azadirachta indica}) planted by GTZ.}

\(^2\) Intercropping offers farmers the opportunity to engage nature’s principle of diversity on their farms (Lyle 1994; van der Ryn and Cowan 1996). Intercrops can be more productive than growing pure stands. Pest management benefits can also be realized from intercropping due to increased diversity.

\(^3\) Trap crops of susceptible plants are grown on land known to contain pathogens. They become infected and are then destroyed before the pathogens' life cycles are complete. Decoy crops stimulate the hatching or germination of pathogens, but the pathogens are unable to establish. In Liberia, corn was grown at the edges of bunds on swamp farm plots to limit the number of grasshoppers entering the interior of the plot. Corn was a less valuable crop and only consumed as an emergency food. The ideal decoy crop is one that has economic value and can be used in a routine crop rotation.

\(^4\) Neem leaves are dried in the shade, because ultra-violet rays from the sun break down the active ingredient. Dry leaves are crushed to a powder in a mortar and pestle. They can then be used directly for dusting crops. The powder can also be mixed with water and sprayed (Dreyer 1984).
Productive conservation practices

The second approach to the Liberian IPM-FFS included two productive conservation practices. Productive conservation is part of a socially and ecologically progressive approach intended to arrest deforestation and provide an additional revenue stream to smallholder households (Hall 1997; Brown 1999). That is, in the context of the sustainable livelihoods framework, productive conservation strives to develop economically viable and ecologically responsible ways of diversifying households’ livelihoods. Ideally, productive conservation leads to economic development among subsistence-level households with conservation of humid forest ecosystems. The Liberian program included beekeeping and domestication of indigenous African land snails because other West African programs had had successes.

For decades, researchers and international development practitioners have represented beekeeping (Figure 3.7) as having particular socio-economic characteristics that make it an ideal rural development strategy (Brown 1999). It has been promoted as a way of protecting tropical forests in South America and East Africa. Beekeeping requires relatively little labor and is considered to involve minimal capital investment. It produces a variety of valuable products, which fetch high prices at both local and regional markets. Honey (and other apian products) does not spoil if harvested, processed and packaged properly. With regard to sustainable NRM practices, beekeeping takes advantage of already-existing resources in the landscape—wild or cultivated flowers. It attempts to diminish the traditional method of harvesting wild honey—smoking them out—which destroys bees and hives. Thus, beekeeping is considered as a conservationist-oriented practice, given the fact that beekeepers rely on the surrounding forest to produce the product that forms their livelihood. Beekeeping is promoted as a valuation approach to natural resource management rather than an intensification approach (Hall 1997; Brown 1999).
Similarly, household production of indigenous giant African land snails (*Achatina achatina*) was designed as a strategy for slowing the extirpation of the species (Figures 3.8 and 3.9). During the rainy season, rural Liberian women and children go into the surrounding forests to collect land snails. The benefits of producing snails are numerous. Captive breeding ensures a year-round supply and avoids the hazards of wild collecting (e.g., bites from an array of poisonous snakes). Domestically produced snails reach market size in a shorter period of time and they reproduce faster. It provides smallholders with a diversity of income during the dry season, when prices are five to six times higher in the market (Bonkuo 2003). Snail manure makes an excellent fertilizer for the home garden.

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5 Giant African land snails (*Achatina achatina*) range from Liberia to Nigeria. The species is one of the largest land snails (ranging from 15-20 cm in length). The shell is striped in yellow and blackish brown. The pattern, and to some extent the color, can vary, even for snails from the same batch of eggs. Often the stripes will appear as long uneven patches. *Achatina achatina* deposit batches of eggs in the ground. The eggs are small (about 5 mm.) spherical and whitish. The number of eggs is normally 200 to 500 eggs per batch (Bonkuo 2003).
and snails are a nutritious food supplement for poultry (Bishop 2002). Snails are also reported to be an important food source for rural people—they are 61 percent dry weight protein, high in vitamins B-complex and C as well as good sources of potassium and phosphate (Bonkuo 2003). Locally, people use them to treat stomach ulcers, hypertension, anemia, hemorrhoids, and increase virility and vitality in men (Harley 1970).

![Giant African land snails](image)

**Figure 3.8** Giant African land snails (*Achatina achatina*).
Although both the beekeeping and snail practices have many advantages, SARDI and GUMAP staff recognized that the potential participants in the IPM-FFS program would have considerable difficulty implementing these practices on their own. These constraints were acknowledged to be the lack of financial and physical resources at their disposal, as well as the novelty of the practices. These anticipated constraints serve to introduce the final goal of the IPM-FFS program.
![Table 3.1 Summary of NRM practices in relation to supporting sustainable livelihoods.](image)

<table>
<thead>
<tr>
<th>NRM Practice</th>
<th>Vulnerability Context</th>
<th>Assets Required (H, N, $, P, S)*</th>
<th>Livelihood Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composting</td>
<td>Soil fertility, yield</td>
<td>H, N, P (shovel)</td>
<td>Agriculture-crops</td>
</tr>
<tr>
<td>Slash-and-mulch</td>
<td>Soil fertility, yield</td>
<td>H, N, P (cutlass)</td>
<td>Agriculture-crops</td>
</tr>
<tr>
<td>Farmyard Manure</td>
<td>Soil fertility, yield</td>
<td>H, N, $, P (animals)</td>
<td>Agriculture-crops</td>
</tr>
<tr>
<td>Multicropping</td>
<td>Pests, yield</td>
<td>H, N, P (cutlass)</td>
<td>Agriculture-crops</td>
</tr>
<tr>
<td>Intercropping</td>
<td>Pests, yield</td>
<td>H, N, P (cutlass)</td>
<td>Agriculture-crops</td>
</tr>
<tr>
<td>Trap and decoy</td>
<td>Pests, yield</td>
<td>H, N, P (cutlass)</td>
<td>Agriculture-crops</td>
</tr>
<tr>
<td>Neem</td>
<td>Pests, yield</td>
<td>H, N, P (sprayer)</td>
<td>Agriculture-crops</td>
</tr>
<tr>
<td>Bees</td>
<td>NR base, income</td>
<td>H, N, $, P, S</td>
<td>Diversification</td>
</tr>
<tr>
<td>Snails</td>
<td>NR base, income</td>
<td>H, N, $, P, S</td>
<td>Diversification</td>
</tr>
</tbody>
</table>

* Key to assets are: H = human; N = natural resource; $ = financial; P = physical; S = social.

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**Social and participatory capacity-building through IPM-FFS**

Recognizing the need to achieve substantive and enduring impact, the UNFAO IPM-FFS model explicitly focused on issues of local institutionalization during the training, both in terms of changes in individual behaviors regarding adoption of IPM practices, and in the development of supportive organizational structures. Similarly, UMCOR and the SARDI West African Regional Coordinator recognized that chronic conflict and political instability destroys social capital, particularly elements such as bonds of trust within communities, social networks, shared social norms and rules, and relations of reciprocity (Schafer 2002). As a result, the final goal of the IPM-FFS in Liberia was that the training would lead to organized group action for making better use of existing resources and the development of new skills. In other words, it was hoped and anticipated that the group of participants in each village would form a solidarity (community-based) organization that would work on projects together (e.g., generate income for the group to be reinvested into increasingly larger projects); recruit additional members to the group, form a cooperative marketing organization, teach other farmers the practices they learned (exemplar group, trainers of others in village), and perhaps develop their own micro-credit scheme. This would bolster smallholder
households’ conservation investment potential by enhancing their levels of social capital in the short term, and financial capital in the long term.

**Summary**

The Integrated Pest Management-Farmer Field School was introduced in Liberia as a means of providing developmental relief to the continued needs of rural smallholder households in upper Nimba County. The Liberian program was based on an already-established FAO model and adapted to meet the local context in terms of supporting livelihood strategies. The curriculum incorporated seven LEISA techniques and two productive conservation practices. These practices were a mix of already well-known traditional practices, practices that responded to changed biophysical conditions, and new practices aimed at diversifying livelihood strategies and conserving and protecting forests and indigenous species.

Collectively, the LEISA and productive conservation practices represent a complementary set of tools aimed at supporting Liberian livelihood strategies by intensifying agriculture, reducing vulnerability, and providing diversification of livelihoods. In turn, it was anticipated that it would result in positive outcomes for both human and natural ecosystems. The IPM-FFS program espouses the same principles as agricultural deep design (Wann 1996) and regenerative agriculture (Lyle 1994). Agricultural deep design is focused on whole-systems thinking. Its goals are multiple and balanced: continuous regeneration of the agroecosystem, healthful food, and human connection with the Earth. It seeks to take advantage of biological assets such as natural nutrients and natural pest control—a progressive agriculture that moves forward to a closer alignment with natural patterns (Wann 1996).

The suite of NRM practices taught during the IPM-FFS can be usefully classified into three categories (Table 3.2): 1) a return to or promotion of traditional practices; 2) adaptation of traditional methods to permanently changed biophysical [landscapes] or socioeconomic circumstances; and 3)
introduction of new NRM techniques (Barrett et al. 2000). The Liberian IPM-FFS was an attempt to recognize and appreciate the crucial details that drive smallholders’ decisions to employ traditional NRM practices such as intercropping. In other cases, the content of the IPM-FFS curriculum recognized that some traditional methods must be changed to respond to a changed context (e.g., shorter periods between cropping cycles). The inclusion of techniques such as composting and slash-and-mulch, are a response to changed biophysical conditions in Nimba County (e.g., inadequate soil nutrient cycles). Finally, the incorporation of new NRM practices, when designed to fit the context, serve to meet the needs of smallholder households when traditional systems and strategies cannot provide the returns required.

<table>
<thead>
<tr>
<th>NRM Practices taught in IPM-FFS</th>
<th>Return to or promotion of traditional practice</th>
<th>Adaptation of traditional methods</th>
<th>Introduction of new practices</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LEISA</strong></td>
<td></td>
<td></td>
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<tr>
<td>Compost</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Slash/Mulch</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Farmyard Manure</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Multi-cropping</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercropping</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trap/decoy</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Neem</td>
<td></td>
<td></td>
<td>X</td>
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<tr>
<td><strong>Productive Conservation</strong></td>
<td></td>
<td></td>
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<tr>
<td>Beekeeping</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Snails</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

The next chapter presents the research design, methods and data techniques used to determine the answers to my research questions.
CHAPTER 4
RESEARCH DESIGN, METHODS, AND ANALYSIS TECHNIQUES

Introduction

This chapter describes the research design, methods, and analysis techniques used in my dissertation. It includes a discussion of the reasons for their selection and issues related to their field application. The chapter begins with a discussion of the research design strategy using a single embedded case study (Yin 1994). The research methods that complement this approach—in-depth, semi-structured interviews and observation—are discussed, including a description of the data collection methods and issues relating to their limitations. The chapter concludes with a discussion on the grounded theory methods utilized in analyzing the data.

I chose to conduct predominantly qualitative research because of the nature of my research problem. I wanted to understand and explain adoption of NRM practices within the milieu of chronic conflict and political instability. Qualitative methods are recommended for studies that explore substantive areas about which little is known (Creswell 1994; Patton 2002). In addition, qualitative methods are used to obtain the intricate details about phenomena such as feelings and thought processes that are difficult to extract or learn about through more conventional research methods (Strauss and Corbin 1998). Quantitative methods provide “hard data”, but numbers are inadequate to explain “how” and “why.” To meet the objectives of my dissertation, an embedded case study design (Yin 1994) with the grounded theory analysis approach (Glaser and Strauss 1967; Creswell 1994; Glaser 2001; Patton 2002) was modified to explore, explain, and advocate solutions to concerns of interest.

For qualitative data collection, I developed and used in-depth, semi-structured interviews (see Appendix A). Field observations, conversations with key informants and reviews of official
documents were used in concert to verify data from the IPM-FFS respondents. Application of these approaches allowed triangulation—confirmation of evidence or findings from at least one or two independent sources (Patton 2002)—throughout the dissertation. This helped to ensure reliable, valid, and rigorous interpretations and conclusions.

**The case study as an appropriate research design**

The case study, as a research design, is recommended when the primary research questions are “what” and “how,” and examine contemporary events (Yin 1994). An understanding of the range of issues behind an individual household’s decision to adopt (or not adopt) a given NRM practice requires, and is achievable, through an in-depth study. A case study is not merely a methodological choice but a choice of what is to be studied. A case study helps make clear complex exploratory and explanatory aspects of the issues (Yin 1994; Raval 1997). Well-constructed case studies are holistic and context-sensitive to provide understanding (Birley and Moreland 1998; Patton 2002).

My dissertation is a single embedded case study since it involves more than one unit of analysis (Yin 1994). This method facilitates the portrayal of similarities and differences within and between units of analysis such as individuals and villages within a discrete case or study area. At the most basic level, this dissertation is an in-depth single case study of adoption patterns within the context of Liberia—one of several African countries experiencing chronic conflict and political instability. At the next level, it is a comparative case study of the similarities and differences in vulnerabilities, assets, and livelihood strategies of the four study villages. Finally, at the micro level, it is a case study of individuals who participated in the IPM-FFS program. These levels are essential for acquiring an understanding of, and explanation for, the phenomena of interest. A single, embedded case study of the adoption patterns of subsistence-level Liberian households represents a unique opportunity to understand and explain the situation, and to prescribe future research needs, courses of action and policy.
Birley and Moreland (1998) observe that the “relationship of the data collected to theory in case studies can be problematic.” However, they assert that it is possible to “develop grounded theory and to use the results to hold a mirror to existing theoretical perceptions and writings.” My dissertation uses predominantly qualitative data and inductive analysis via the grounded theory approach to gain holistic perspectives based on my personal contact and insight into the social, historical and temporal context of Liberia.

Selection of the villages to be included in the case study

The case study design requires that analogous cases be described and analyzed across the same or similar parameters (Yin 1994). Originally, my research plan was to collect data from only two of the four villages involved in the Ganta United Methodist Agriculture Program (GUMAP) IPM-FFS due to potential time and logistical constraints. I wanted to allow ample time to collect data. However, early communication with the GUMAP staff indicated that participants from the other two villages would feel offended and left out if they were not given the opportunity to be included in my research. While this created a rather tight schedule to interview each IPM-FFS participant still residing in the area, it allowed for greater comparison of the data.

Data collection methods

Data were collected according to the techniques described and advocated in the relevant research methods literature (Glaser and Strauss 1967; Denzin 1978; Miles and Huberman 1984; Zeisel 1984; Guba and Lincoln 1989; Creswell 1994; Yin 1994; Crotty 1998; Strauss and Corbin 1998; Glaser 2001; Patton 2002). The qualitative methods used in this dissertation consisted of three kinds of data collection: (1) semi-structured interviews; (2) photographic documentation of field observations; and (3) written documents as supported by the literature (Patton 1987; Guba and
Lincoln 1989). Qualitative data provided depth and detail through direct quotation and careful observation of people, interactions and observed behaviors (Patton 1987; Patton 2002).

Initial reconnaissance work was performed during February and March 2002 to determine an appropriate area for study and develop a research proposal. This included attending multiple sessions at all four of the IPM-FFS while they were in operation, holding discussions with the SARDI West African Regional Coordinator and GUMAP staff, and meeting with staff of NGOs operating in the Ganta, Liberia area as well as gathering documents from government agencies in Monrovia.

Field data were collected over an eight-week period commencing in January 2003. Historical land use and agricultural practices and policies were identified through oral history and interviews with key informants, and historical archives and studies (Harley 1941; Harley 1970; Kromah 2001). Focusing on Nimba County around the Ganta area, I spent equal amounts of time in the four villages interviewing a total of 54 out of the original list of 83 IPM-FFS participants (Table 4.1). Time in Monrovia was spent primarily in unanticipated interviews with governmental officials and staff of other NGOs. This provided further opportunity for data triangulation.

Table 4.1  IPM-FFS participant interviews.

<table>
<thead>
<tr>
<th></th>
<th>Gbahn</th>
<th>Gbedin</th>
<th>Neigbein</th>
<th>Pledehyee</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>F</td>
<td>M</td>
<td>F</td>
<td>M</td>
</tr>
<tr>
<td>IPM-FFS Participant Population</td>
<td>15</td>
<td>7</td>
<td>12</td>
<td>9</td>
<td>17</td>
</tr>
<tr>
<td>IPM-FFS Participants Interviewed</td>
<td>9</td>
<td>5</td>
<td>9</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>
Interview methods

Asking questions in research means posing questions systematically to find out what people think, feel, do, know, believe and expect (Zeisel 1984). Good research depends upon researcher and participants developing trust and empathy, which are necessary if respondents are to speak freely, and perhaps, to work with the researcher to tease out fresh understanding and bring some embodied or embedded things into words (Knight 2002). The goal is to understand the world as seen by the respondent (Patton 1987). Thus, a researcher would expect that each respondent would have different experiences and perceptions, and would attempt to capture these different perspectives. This tactic is appropriate for answering the first two research questions. For these reasons, I decided that a standardized semi-structured interview would be the most appropriate method for collecting qualitative data.

A literature-based, draft interview protocol was developed as part of the dissertation proposal long before going to the study area. Consent to conduct the field research was obtained through the Institutional Review Board for Human Subjects Research, North Carolina State University. The introduction (statement of research) is included as Appendix B. It should be noted that the respondents were not informed that their replies would be kept confidential. Although this appears to violate Human Subject Committee protocol, the Liberians who participated in the pre-test urged me to take this approach due to the unique situation of Liberia. Based on conversations with native Liberians in the United States and GUMAP field staff, I was strongly advised to not tell respondents that the interview would be kept confidential. The rationalization was that “if you bring it up, then they will start to worry about how you will use the information” (Boayue 2002; Bonkuo 2003; Freeman 2003). Informing people that their responses would remain confidential would cause them to worry that the information would be passed along to the government because of the situation of political instability, distrust, and fear. Transcribed interviews were kept in a secure environment and a numbering system was used in place of names (e.g. village number-respondent number such as 3-31).
The interview questions were pilot tested in the United States with a Liberian civil engineer who grew up in a village near Ganta and attended Ganta United Methodist School. After several recommendations by him, they were amended and re-tested in Liberia with GUMAP field staff shortly after my arrival in early January 2003. However, as was expected, it became apparent after re-testing in Liberia that the interview protocol had to be fine-tuned to make some questions more understandable and relevant to the IPM-FFS participants. After realizing that most households use family land by permission and very few possess a legal deed, several optional questions were placed at the end. Further revisions and clarifications were made in the wording of sentences to avoid confusion.

The interview protocol was designed with the objective of completing each interview in about an hour. All respondents were asked the same questions in the same sequence beginning with questions about the IPM-FFS. The second major group of questions investigated the person’s farming history and experience to compare past NRM techniques with the techniques they were presently using. The final set of questions covered socio-demographic information regarding age, education, home village, family information, and other forms of employment (off-farm). Questions about investments, major purchases, and regularity of children’s education served as proxies for income. The questions were worded so that responses were not “yes or no.” The major strength of this format is that it allowed for comparison of responses. It reduced the interviewer effect and any potential interviewer bias and allows others to use the instrument. This was particularly necessary when the interview questions were administered by the GUMAP extension agent and translated directly into Mano. The conversational nature of this interview method allowed for probes into a particular issue. Finally, it facilitated organization and analysis of data without forcing choices; this facet is essential for a grounded theory approach. The interview questionnaire instrument is presented in Appendix A.

Individual and group interviews were used to determine existing livelihood strategies, explore people’s rationale for adoption or non-adoption and to determine the strengths and
weaknesses in community and household assets—the range of assets that contribute to conservation-investment potential. The interviews were also used to ascertain household livelihood outcome preferences. The interview responses were recorded by hand on 5” x 8” cardstock rather than tape-recorded.

Language

Officially, the language of Liberia is English. In reality, people who have been fortunate to attend school on a regular basis are able to speak and write English with some degree of competence. Typically, rural people, especially women, speak in their local tribal dialects—primarily Mano and Gio—in Nimba County. The GUMAP field staff member assigned to assist me was fluent in both English and Mano. In addition, he grew up in a nearby village and had extended family members in three of the four study villages. This latter fact was extremely helpful because it facilitated access to village leadership and informants and served to dispel suspicion regarding my intention. Caucasian visitors typically represent relief and development agencies; villagers are not accustomed to university students. Mr. Bonkuo’s language skills enabled me to communicate with respondents who were uncomfortable speaking English; he introduced me and asked the interview questions in Mano and then provided me with a lengthy translation of the response.

All documents provided to me by GUMAP were written in English.

Interviews with staff of local NGOs were conducted in English. Serendipitous meetings and interviews with other individuals in other organizations, government ministries, and funding agencies were also conducted in English.
Selecting respondents and interview procedures

During February to March 2002, I obtained a list of IPM-FFS participants from the GUMAP director. In December 2002, I contacted Ganta United Methodist Hospital Administrator that I would be arriving in early January 2003. She had access to electronic mail in Monrovia and would alert the GUMAP director that I would be coming to conduct my dissertation research. When I returned in January 2003, I contacted the GUMAP director, who went over my initial master list of IPM-FFS participants to determine whether the person was still residing in the village. He assigned a field staff person to accompany me into the field and facilitate access to IPM-FFS participants as well as village chiefs and elders. The staff person also made initial contact with the IPM-FFS leaders in each village to tell them about my study and to begin arranging meetings with people. I found that some people had moved away or were too ill to be contacted. A few of the names were found to be incorrect, while others had been inadvertently left off the list. I interviewed all participants remaining in the area who were willing and able to be interviewed, whether they had completed the entire IPM-FFS program and received a certificate of training or not.

Within each of the four villages, I developed a procedure for setting up interviews with the IPM-FFS participants. My primary contact was the IPM-FFS leader in each of the four villages. Due to the lack of telephones, the GUMAP field staff person or I had to physically go to the IPM-FFS leader, give them my list of names, and have them contact the IPM-FFS participants to inform them of my study, and set up interview meeting times.

The first week I was in Ganta, I traveled to a study village by use of the hospital administrator's car and driver. However, I found that this means of transportation was expensive and elitist. I was fortunate to borrow a mountain bike for two months. Each day, I traveled to one of the four sites by bicycle along with the GUMAP field staff member assigned to me. We met the IPM-FFS leader and then walked to the house of the person being interviewed. The approach to every interview was unique. Most IPM-FFS participants were cordial with the GUMAP field person and
guarded and cautious with me, but once they realized I was there to learn, they tended to relax. The four of us then walked from the village to the respondent’s farm, usually accompanied by an entourage of young children. Distances varied considerably. Some farms were situated about a 10-minute walk from the village along a pathway or a wide, unpaved road; others were located about a half-hour’s walk or farther. The more distant farms involved traversing swamps and crossing streams with a variety of hand-made bridges, and passing through tiny sub-villages deep in the bush. Tours of the various farm plots an IPM-FFS participant was using sometimes covered small plots adjacent to other family members’ plots. These could generally be covered within a few minutes. Other tours involved several hours of hiking to cultivated plots in upland and lowland areas and passing through tiny sub-villages along the way. IPM-FFS participants who agreed to interviews usually agreed to photographs of their farms.

After walking around the farm and engaging in general conversation, we then walked to the farm kitchen—a thatched lean-to structure (Figure 4.1), or sat on a log at the edge of a swamp farm plot to conduct the interview. Interviews occurred mainly outdoors sitting on the ground or a log, or sometimes standing and walking (Figure 4.2).
Figure 4.1 Interview conducted at a farm kitchen near Neigbein, Liberia.

Figure 4.2 Interview conducted on farm near Gbahn, Liberia.
In some cases, the GUMAP staff member and I received a tour of the cultivated areas and took photographs first, and then sat down and conducted the interview. In other situations, the interview took place first, and then we received a tour of the farm and surrounding landscapes. Occasionally, the interview was conducted on foot while following the IPM-FFS participant around his or her farm. Many interviews and tours were concluded with a shared meal (Figure 4.3) and generous gifts of fruit.

![Figure 4.3 Sharing a meal after an interview near Neigbein, Liberia.](image)

No answers were cut off; often, conversation veered off-topic onto comments about the political situation, upcoming elections, and their experiences during the 1989-1997 civil war. These provided further insights into understanding the context. Details of my fieldwork experience are contained in Appendix C.

As my presence became rather commonplace and accepted, I was invited (and expected by the IPM-FFS leaders and the GUMAP director) to meet with local community-based organizations
and conducted group interviews (Figure 4.4). While these meetings were unscheduled, they also provided richness to the data and additional insight into social arrangements.

Figure 4.4 Interview with members of Gbukiahmon community-based organization.

Key informants—directors and staff of two NGOs with a long history of working in Nimba County (since 1986) helped to provide verification of respondents’ answers and learn about their experiences in initiating development programs. A further layer of information was gained through serendipitous meetings with Dokoden Cooperative board members, village chiefs, clan chiefs and elders. I gained knowledge about the history of each village, social norms, and cultural practices.

The interviews were purposefully not tape-recorded. Instead, I took notes on colored cardstock bound by a single binder ring. The decision was based on previous experiences (e.g., initial trip to Liberia in July-August 2001 and February-March 2002 reconnaissance expedition) and several logistical considerations. The foremost consideration was the situation of political instability and chronic poverty. A tape recorder could be stolen from luggage at the airport or seized by authorities.
Secondly, data collection was performed during the 

\textit{harmattan} season in which dry, dust-filled wind is prevalent. I felt that it would have been unwise to depend on recording equipment that would be highly subject to failure. I did not want people to be distracted by the novelty of the recorder or be inhibited by its presence. Finally, it seemed easier to jot notes quickly and transcribe them soon after (to retain the memories of the interview) rather than play and replay a tape.

\textit{Photo-documentation of field observations}

Field observations are invaluable for performing qualitative research. I found numerous advantages. The foremost was that I was able to experience and understand the context—both the social and the natural. Bicycling along dusty roads to villages and walking to farms—using all of my senses—gave me an enhanced perspective that interviews alone could not provide. Secondly, using the same modes of transportation as my respondents gained respect among them and their families (and from all residents of the villages in general—I became a familiar face). This allowed for relaxed and informal conversations to take place during long treks from villages to farms. I was able to learn bits of information—social, cultural, political opinions, historical, botanical, etc.—that would not come out in an interview. Field observations enriched the interviews, but they also served to verify information provided in the interviews.

When performing observations in villages and on people’s farms, I obtained prior permission from each person before taking photographs. Photographs and notes were taken during the walk on the respondent’s farm plots. Careful notice was taken of distance to the farm from the village (i.e., the GUMAP field assistant and I both noted the time on our watches and then estimated the distances); position(s) in the landscape; soil conditions and characteristics; evidence of LEISA practices; crops and planting technique; condition of the crops; evidence of pests; and chemical residues (if any) on the crops. I also took photographs of the various methods of housing bees and land snails. This information was used to check against interview responses.
Primary documentary data

I relied on GUMAP organizational records, reports, and accounts to obtain the IPM-FFS course content, a list of the IPM-FFS participants, the attendance records and whether or not the participant received a certificate of completion. The GUMAP library, housed at the Ganta United Methodist Mission Station, was perused to obtain maps and relevant information on agricultural practices, culture, geography and plant communities of Liberia. I obtained additional demographic and biophysical information on Liberia from Dr. Fodee Kromah, executive director of the National Environmental Committee of Liberia (NECOLIB).

Triangulation

The use of multiple sources of evidence allowed my dissertation to develop converging lines of inquiry—a process of triangulation. Triangulation is a powerful solution to the problem of relying too much on any single data source or method and thereby undermining the validity and credibility of findings. This research used data triangulation (Denzin 1978; Patton 1987). Information was collected from multiple sources, but aimed at corroborating the same fact or phenomenon.

Data analysis

Data generated by applying the interview methods were qualitative (verbal) and quantitative (numerical). Analysis reduces and prepares the data by deconstructing it in creative and logical categories. For the qualitative data, I looked critically at the relationships among the different themes by synthesizing them to find patterns and reveal new insights. The quantitative data were reduced into an Excel spreadsheet for each village. The numeric data relate to demographics, physical assets of the respondents, and adopted practices. It was used to enhance the quality and credibility of the qualitative analysis. Together, the qualitative and quantitative data were used to draw conclusions
and recommendations related to the issues and questions of my dissertation. Because my dissertation is exploratory (and to some extent explanatory), rather than based on previous theory and hypothetical propositions, I approached the analysis of my qualitative data inductively.

*Grounded theory approach to qualitative data*

The grounded theory approach was found to be the most appropriate approach to my dissertation. Qualitative analysis is grounded in “thick description.” Grounded theory is intended to build theory rather than test theory (Strauss and Corbin 1998; Patton 2002). Thick descriptions set up the necessary ingredients for thick interpretation. By thick interpretation, Patton (2002, citing Denzin on p. 503) means “connecting individual cases to larger public issues and to the programs [or interventions] that serve as the linkage between individual troubles and public concerns.” Grounded theories, because they are drawn from the data collected—the perspectives and experiences of those persons who participated in the IPM-FFS program, are likely to offer insight, enhance understanding, and provide a meaningful guide to action (Strauss and Corbin 1998).

There are several criteria essential to the grounded theory approach. The researcher must gather data about the “lives” of respondents to understand patterns of experience (Sherman *et al.* 1984). Miles and Huberman (1984) believe that these pertinent patterns only can be detected when the researcher immerses themselves in the social environment. The interviews and field observations recorded during a “lived” experience help the researcher to understand and describe social structure and patterns of behavior. Interviews allow researchers to substantiate and clarify what they thought happened, to achieve full understanding.
**Inductive analysis procedures**

The classic inductive approach is a goal-free evaluation in which the researcher gathers qualitative data through in-depth interviews and field observation without being limited to stated, predetermined goals (Patton 1987). In their book on techniques and procedures for developing grounded theory, Strauss and Corbin (1998) describe the analysis process as the interplay between researcher and data, so what grounded theory offers as a framework is a set of “coding procedures” to help provide standardization and rigor to the analytical process. It tries to “provide researchers with analytical tools for handling masses of raw data” (Patton 2002). It emphasizes being “systematic and creative simultaneously” (Strauss and Corbin 1998). Finally, grounded theory elucidates “the concepts that are the building blocks of theory” (Patton 2002).

The grounded theory method places prominence on becoming immersed in the data—being grounded—so that embedded meanings and relationships can emerge (Glaser and Strauss 1967). The analyst becomes implanted in the data; the resulting analysis grows out of that grounded-ness (Patton 2002). This was accomplished by using an iterative process known as the constant comparative method.

The first step in constant comparison involved creating a data matrix for each respondent—the raw data of responses contained in Appendix D. The matrices continued to develop throughout the analysis process until they contained information from all the sources of data collected on the respondents. The data displays that were portrayed in the matrices allowed visualization of response patterns of the respondents from each of the four villages for the purpose of within- and across-case comparisons (i.e., quickly see if there are some distinct similarities and difference or patterns). Quantitative information is contained within these matrices.

The second step of analysis was descriptive. My first attempt at “making sense” of the data was through the use of The Ethnograph™ version 5.0 software package. The software was selected to facilitate the development and comparison of emerging patterns among the four study sites.
coding approximately one-third of the interview transcripts, this method was abandoned. I realized that my focus of the semi-structured interviews was on the underlying perspectives of the IPM-FFS participants—their subjective meanings—rather than just the surface meaning of the transcripts or quantifying responses. Months of reading and re-reading the interview transcripts revealed new shades and meanings. In addition, admittedly, I found it easier to spread out interview transcripts and use a variety of pen colors to highlight and underline phrases (and iteratively going back and re-printing out additional copies as new insights came to light)—a technique advocated by Patton (2002). Essentially, I performed a content analysis subjectively by reviewing the transcripts of each interview and their corresponding photographs, and identifying and interpreting important themes.

Coding is the analytic process through which data are fractured, conceptualized, and integrated to form theory (Strauss and Corbin 1998). Transcripts of interview respondents went through a progression of data deconstruction and reconstruction. The raw data from the transcripts was deconstructed into data units—that is, the bits of thoughts—sentences, phrases, and terms used by respondents that could be taken and categorized into general themes and sub-themes. The data units contained groups of related thoughts or ideas shared by the respondents. Data units were compared to other data units processed under the same code for further data reduction through comparative pattern analysis. Essentially, this is the process of convergence—the task of figuring out what things fit together. This leads to a classification system for the data.

Guba (1989) offers guidelines for converging field notes, interview transcripts, and observations about issues and concerns into systematic categories. I began by looking for “recurring regularities” in the data. These represent patterns that can be sorted into categories. The categories were then scrutinized by two criteria: internal homogeneity and external heterogeneity (Patton 1987). The first criterion concerns the extent to which the data that belong together in a particular category hold together in a meaningful way. The second criterion concerns the extent to which differences among categories are bold and clear. This was not a trivial feat as differences were not often clear between categories and responses illustrated more than one theme or pattern.
In adopting the inductive approach to interpreting the data, I had to recognize and carefully, and consistently, put aside personal bias and judgment based on the evidence. The analytical process took approximately fourteen months. Interpreting the data shortly after collecting it revealed one set of meanings to me; the passage of several months (i.e., setting the data aside for a time) and the fresh outbreak of conflict in Liberia during 2003 led me to consider other meanings underlying the literal phrases and sentences. Through illumination of key phrases or sentences from interview transcripts, the developing category system remained close to participant responses about the topic of interest. Accordingly, the language was that of the respondents, not my own. The result is a thick description balanced by analysis and interpretation.

Theoretical saturation

The purpose of using the grounded theory approach is to generate theory more systematically by using explicit classification and analysis procedures; to suggest many categories, properties, and hypotheses about the issues being studied (processes, conditions, consequences, dimensions, types, etc.). This method requires saturation of the data, rather than consideration of all data. Glaser and Strauss (1967) and Strauss and Corbin (1998) describe theoretical saturation as the point in analysis in which no additional new properties, dimensions or relationships emerge whereby the researcher can develop properties of the category. As I began to see similar instances over and over again (i.e., similar responses to questions and similar themes), and less variety in the responses, I was confident that a category was sufficiently saturated to form a picture of how households manage under conditions of uncertainty and why particular practices were adopted or not adopted.
Identifying dominant concepts for grounded theory formation

During this phase of the analysis, as categories became more saturated, they were compared to each other in an effort to identify dominant concepts. The purpose of comparing categories was to enable me to analytically connect and integrate data. Reconstruction of the data was initiated in the form of weaving together influences resulting from the themes containing the individual data units. This interweaving was accomplished by comparing emerging concepts and their properties to each other to begin theoretical sorting. Sorting of themes permitted the integration of concepts into existing or emerging (grounded) theory. In this dissertation, the SL framework provided the theoretical framework from which to provide explanation of my results.

The final level of analysis involved sorting and synthesizing emergent concepts to determine how they would fit into the existing framework. The emerging concepts were subsequently analyzed for commonalities and differences within and between the categories of data sets. This analysis was used to begin to develop and consider the processes in the livelihoods framework (depicted in Figure 1.2) and how they contribute to or inhibit adoption of NRM practices. In reporting the data description through content analysis and the data interpretation through inductive analysis, I use direct quotes from the responses to illustrate and provide evidence for point of meanings and their nuances.
Summary

This chapter describes the research design and methods adopted in my dissertation. The case study as an overarching research design is explained. The interview and field observation methods used for data collection are also discussed. The analysis used the grounded theory method. The analytic progression moved from “telling individual stories” about a specific phenomenon to constructing a “map” which contained more formal elements of the “story” and identified key concepts (Miles and Huberman 1984). The final step of analysis served to further synthesize and interpret data to understand and explain the relationships between elements in the sustainable livelihoods framework for the purpose of answering the research questions. The major purpose of the analysis was to organize IPM-FFS participant responses in such a way that overall patterns would become clear. The emphasis throughout is on letting the respondents speak for themselves.

The next chapter introduces the four study villages in terms of natural resources and culture. This chapter also presents results of my data collection at the community level. Community assets, history, and social norms play an essential role both in understanding and explaining adoption at the household level and in designing appropriate interventions.
CHAPTER 5

STUDY VILLAGES—RESOURCES, PRACTICES, AND CULTURE

Introduction

Understanding Liberian smallholder households’ ability and willingness to adopt sustainable NRM practices and then to design appropriate intervention responses, necessitates an understanding of the interactions between nature and culture. Environmental concerns associated with agroecosystems relate primarily to maintaining the sustainability of the resource base for agricultural production (e.g., soil quality), protecting biodiversity and habitats, and the environmental services of resources influenced by agricultural land uses (e.g., carbon sequestration). Degradation of soil and biotic resources threaten agricultural productivity, biodiversity, and water quality and availability, which in turn, results in biophysical sources of vulnerability to the smallholder households dependent on them. These synergies reveal sources of vulnerability as well as community [village] level assets.

This chapter serves to introduce the context of my dissertation study sites and the individuals and community groups interviewed in each of them. Information was provided through individual and group interviews with IPM-FFS participants, local community-based organizations, key informants, and documents. The first section will first give a brief overview of the geography and natural resource assets of upper Nimba County to highlight the assets available to households in the four study villages. Next, I will discuss agroecosystems and the traditional management practices of smallholders in Nimba County in terms of human assets and access to land. Finally, I will introduce the four villages in Nimba County that received the IPM-FFS training. Included is a brief history including previous interventions, as well as physical and social assets. These elements play critical roles in supporting household livelihood strategies and preferred outcomes, and designing appropriate intervention responses.
Geography

Liberia, West Africa, lies almost entirely within the humid tropics between the meridians of 7°30’ west and 11°30 west and the parallels of 4°18 north and 8°30 north (Figure 5.1). The total area of Liberia is approximately 111,400 square kilometers (43,000 square miles)—slightly larger than the Commonwealth of Virginia. Of this area, about 15,000 square kilometers is water. The drainage system consists of six major rivers, which generally flow from northeast to southwest.

The equatorial position and the distribution of high and low-pressure belts over the African continent and the Atlantic Ocean determine the climate of Liberia and more generally of West African. The seasons are determined by the prevailing rainfall patterns rather than temperature. The rainy season occurs from late April to November and is caused by the South Atlantic Sub-tropical high called the South-West Monsoon. A mid-dry season occurs from June to August. The annual rainfall ranges from 1600 mm inland to 4600 mm on the coast. The Inter-tropical Front, a boundary of air mass that moves south from the Sahara, creates a dry season from November to May. It is characterized by hot, Harmattan winds from mid-November to mid-May with temperatures ranging from 24° to 30° Celsius (75° to 86° F). These winds fill the air with a fine, reddish dust.

Much of the vegetation is low bush because of the shifting cultivation system of farming in the upland areas. The low bush refers to young secondary forest that is included in the sequence of shifting (slash-and-burn) agriculture. Until the early 1990s, vegetation was felled and burned approximately every five to fifteen years (Voorhoeve 1979; IFAD 1989; Bonkuo 2003; Wonyenneh and Kokeh 2003) and the cleared area is farmed for two years—rice the first year and cassava the second year. The farm was then abandoned and a dense tangle of herbs, vines and low shrubs became immediately established. Musanga cecropioides (corkwood or umbrella tree) is usually the first species to re-establish. Limited relics of high forest are to be found all over the country, often on rocky hills and sometimes as ‘devil bush’ or ‘Poro bush’ (Harley 1941; Voorhoeve 1979). While no
official inventory of wetlands have been conducted, there are about eight major wetlands areas identified in Liberia; four are coastal, one inland, and three are riverine (Kromah 2001).

More than 80 percent of Liberia's soils can be used for agriculture. About 75 percent of all soils were formed on the extremely old, largely granites gneisses and other gneissic and schistic bedrock that underlie most of the country (Kromah 2001). Classified as latisols, they have been intensively leached by high temperatures and heavy tropical rainfall and are of only medium to low fertility. These are the soils on which upland rice, the largest single food crop, is grown. Soils on the uplands are generally moderately to seriously degraded, lacking micro-nutrients and organic matter. This results, without the use of organic or chemical fertilizer, a constant shifting of cultivation to new fields to maintain subsistence production levels. Large areas of these soils also support the country's major tree crops.

Of the remaining soils, an estimated 17 percent, found mostly in hilly and mountainous areas, are lithisols—characterized by imperfect weathering and low humus and mineral nutrient content (USAID 2002). Although they support tree and other woody vegetation, these soils have little value for agriculture. Other soils include alluvial soils found in river bottoms and swamps. The alluvial soils, when drained and fertilized, are well suited to growing swamp rice and other crops. Hydric soils (about 4 percent), especially those known as half bog soils, are naturally rich in humus, and when drained also provide excellent conditions for swamp rice and vegetables (Kromah 2001).
Figure 5.1 Map of Liberia, West Africa
Natural resource assets: Nimba County geography and plant communities

The locus of my dissertation study area is the densely populated commercial center of Ganta. With a 2001 estimated population of 290,000 (USDOS 2003) in upper Nimba County, it is approximately 247 km north of Monrovia and two kilometers from the border with Guinea. The St. John River forms the border. Ganta is situated at an elevation of approximately 300 meters (1000 feet).

According to Voorhoeve (1979), the plant communities found here include:

- Swamp forest: characterized by *Mitragyna ciliata* (Bo in Mano) in swampy valleys which are not flooded the entire year, but where the roots have access to ground water. Other dominant species include *Heritiera utilis* (known commercially as whismore or naingon) and *Gilbertiodendron splendidum* and *Piasava* palm (introduced from Brazil).

- River borders: characterized by a specific flora.

- Semi-deciduous forest: this plant community is technically not “evergreen”; they lose their leaves over the entire year. New flushes of leaves are brilliantly red-colored (example: *Lophira*, *Cynometra* and *Aubrevillea*).

- Northern savannah zone: a product of human-induced activities, resulting in secondary forest. The flora is generally in a poor state and dominated by elephant grass, which attains heights of up to 3 meters.

The FAO has estimated that forest cover in Liberia has been reduced from 38.1 percent to 31.3 percent between 1990 and 2000. By the end of 2000 Liberia contained 42 percent of the Upper Guinea Forest of West Africa; the largest portion possessed by a single country in the region. The remaining portions are unevenly scattered in fragments across the region in Côte d’Ivoire (28 percent), Ghana (16 percent), Guinea (8 percent), Sierra Leone (5 percent) and Togo (1 percent) (FAO 2000).
Deforestation in Liberia has been caused by four factors other than direct logging—the last two of which have direct bearing on this research. The first, and most localized causes of deforestation, has been mining (e.g., gold, diamond, and iron), which has created intense localized disturbances, as well as river and riparian zone disturbance downstream of mining activities. One of these is the Liberian-American-Swedish Minerals Company (LAMCO) in the Mount Nimba area. The second cause of deforestation in recent decades has been the development of a logging road network, which also facilitates easier access to the forest for hunters, miners and farmers. Road development is clearly linked to forest change and fragmentation. Third, fuelwood and charcoal production (Figure 5.2) have become major sources of livelihood strategies for subsistence-level households.

Figure 5.2 Charcoal production near Neigbein, Liberia
The enormous demand for fuelwood and charcoal in urban centers (as a result of no electricity or other energy sources) and IDP camps has created a vast market for these products. Households have the assurance of being able to sell these products easily and eliminate the risks they would experience in selling food crops (e.g., from spoilage during transport and fluctuations in prices). The final cause of deforestation, subsistence agriculture, is the most significant human factor influencing forests, in the form of shifting cultivation, or slash-and-burn agriculture. Large areas are cleared to grow crops for a short period, which are then left to regenerate. Forests no longer have sufficient time to regenerate in the face of new pressures from the movement of displaced persons and improved access from new logging roads.

Despite being commercially logged in the late 1970s to early 1980s, upper Nimba County still possesses valuable natural resources. Mount Nimba, located at the borders of Liberia, Guinea, and Côte d’Ivoire was designated as a ‘strict nature preserve’1 in 1944 on the Guinean and Côte d’Ivoire portions and as a World Heritage site by the International Union for the Conservation of Nature (IUCN) in 1981. The Liberian side has been degraded by poaching, mining, and slash-and-burn agriculture. In 1992, the Mount Nimba Strict Nature Reserve was placed on a list of endangered sites by the World Heritage Committee (UNESCO 2000; CI 2001). It remains on this list presently due to the large number of refugees who have fled Liberia to areas around the Guinean part of the World Heritage site. However, the IUCN proposed that the Liberian sector of Mount Nimba could serve as a buffer zone for the World Heritage site if hunting were controlled, or as an “artificial park” (UNEP 1990).

In October 2003, based on work prepared by the Liberia Forest Re-assessment project, the National Legislature approved and Acting President Blah signed acts creating the East Nimba Nature Reserve (13,400 hectares). The Protected Forest Area Network Law was passed along with the

Nimba Nature Reserve and Sapo Park Acts, and restores the provisions of an earlier 1988 Wildlife and National Parks Law. It also incorporates elements of the Conservation International-Government of Liberia Memorandum of Understanding, committing Liberia to protect at least 30 percent of its forests, or 1.5 million hectares within a protected forest network (Peal 2003).

Given the critical commercial, socio-economic, biological and cultural importance of forests and natural resources in Liberia, the Liberia Forest Reassessment Project is trying to lay the foundation for balancing the different interests with legitimate claims to Liberia’s forests and natural resources, i.e. balancing commercial, community and conservation interests in the forest sector (the so-called three C’s of the Liberian forest management). To do this, it is preparing recommendations on a decision-making framework and criteria to assist in finding an appropriate balance between the commercial, communal, and conservation uses of Liberia’s forests and establish the capacity to implement these recommendations (Kromah 2003). The framework and criteria will furthermore provide guidance on balancing forest management concerns, taken together with other concerns that may compete with or be complemented by forest management such as agriculture.

As a final point, the Liberian Forest Development Authority (FDA) and the National Environmental Commission for Liberia (NECOLIB now renamed the Environmental Protection Agency) have recognized and reported that slash-and-burn agriculture and other unsustainable practices have contributed to forest degradation. Recent years have witnessed pressures from huge movements of the population to rural areas. As a result, traditional shifting agricultural practices have become unsustainable, since forests no longer have the time to regenerate. The transitional Liberian government hopes to re-initiate better management of its’ natural resources. They have recognized that a majority of the rural population is dependent on these methods for their livelihoods, and have acknowledged the need to develop alternatives, such as intercropping, agro-forestry, tree crops, animal husbandry, and appropriate use of swamp cultivation (Kromah 2003; Peal 2003). This dissertation attempts to understand and shed light on the ability of smallholder households to adopt such practices.
Agroecosystems in Nimba County

Central to analyzing the IPM-FFS as an appropriate intervention aimed at supporting Liberian livelihoods, is a basic knowledge of the predominant land management practices in Nimba County, Liberia and traditional agricultural systems. This information reveals sources of vulnerability as well as assets (e.g., the natural resources, physical, financial, social, and human assets) that are available (or deficient) at the community and household level.

Predominant crops and traditional agroecosystem management practices

Smallholders produce the majority of Liberia’s food crops. Due to the lack of other employment options or livelihood strategies, the smallholder farm sector is comprised of some 200,000 farm households (Kromah 2001). Rice is the main staple crop with about 86 percent of the farmers growing it for household use (IFAD 1989). Cassava is often intermixed with rice in upland areas. Other crops include maize, yams, taro, okra, assorted vegetables, sugarcane (often the main crop in some communities), and groundnuts. Oil palm, coffee, cocoa and sugarcane are important cash crops and were encouraged by the Liberian Ministry of Agriculture (MOA) during the 1970s and 1980s. When the civil war erupted in 1989, this practice ceased. Consequently, coffee and cocoa are no longer actively cultivated by smallholders in Nimba County. Social and cultural values are linked to cash (for example, there is typically a cash requirement for ceremonies such as deaths, marriage, sacrifices, Poró or Sande bush society initiation, circumcision, etc.). It explains why economic

2 The Liberian diet generally consists of rice, greens, and whatever meat is available. While Liberians also consume cassava and its byproducts—dumboy and fufu—rice has a special place in the Liberian diet and culture. Besides being a staple food for the population, rice also holds symbolic value in traditional religion, the collective identity of Liberian society, and individual status rankings. Liberians will eat rice for breakfast, lunch and dinner, if available. In fact, they do not consider themselves to have eaten at all if they have not consumed rice during the day. It was the increase in the price of rice in 1979 that ignited the rice riots, which subsequently lead to the military coup of 1980. Subsistence-level farmers do not produce enough rice to feed their families; as a result, rice must be imported.
agricultural activities were historically directed towards those lucrative crops. Bananas, plantains, mango, papaya, kola nut, citrus and other fruit have traditionally been grown around farm kitchens and around the house if there is a home garden.

Liberian agroecosystems are rainfed rather than irrigated, unstable, heterogeneous, and have two growing seasons. In order to decrease vulnerability to biophysical shocks, smallholder households in my study villages utilize the uplands during the rainy season and the lowlands (“swamp”) during the Harmattan or dry season (November to late-April/early May). Slash-and-burn or shifting agriculture is the predominant practice, which involves three stages: clearing and burning; cropping; and fallow. In the clearing and burning stage, removal of vegetation serves the purpose of removing shading canopies, reducing pest competition and removing other physical impediments to cropping. Burning releases nutrients stored in plant biomass to be released, making them available for crop use if the fire intensity is low (Kleinman et al. 1995). Cropping practices vary widely, along with their ecological consequences. Liberian smallholders do not generally practice soil conservation measures in shifting agroecosystems. Fallows, or managed plant succession, are reasonably sustainable coping strategies for low crop yields and increased pest pressure. In functional terms, fallows serve to restore the resources (e.g., above-ground biomass, soil nutrients and structure, soil micro- and macro-fauna, nutrient cycling, etc.) that were degraded or removed by clearing and cropping. Land with mature trees is considered “fresh”—fewer pests and more fertile. In the absence of mature forests, however, households rely on visual cues for locating good land for agricultural purposes. During a walk out to a Gbahn respondent’s farm, these visual cues were explained:

During mid-to late February, a husband and wife go out to the bush to look for a new piece of land to cultivate. They look at the vegetation, evidence of worm feces, and the number of termite hills. These are indicators that the soil

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3 The rainy season (May to September) is referred to locally as, “the hunger season”—less food is available while this season’s crops wait to ripen. Due to increased land pressure and technical training provided by international development agencies during the late 1990s, upper Nimba County households have increasingly turned to the practice of “laying out swamps”—hand-digging canals and relocating streams to control the flow of water—despite its labor intensiveness.
is fertile. When they find these in abundance, they select it by clearing a small portion and placing a stick upright in the soil with fresh leaves on the ground around it. In March, they will burn. The size of the farm varies according to a household’s needs and available labor (1-3 2003)\(^4\).

Coordination of the farming season to the land fallow method allows for regeneration of the flora, and to some extent soil fertility before farming resumes again in the same area. Respondents noted that they look for a particular tree to achieve a height of 15 to 20 feet before they consider the land “ready.”

The generally low fertility of soils and the nutrient needs of Liberian crops (i.e., cassava, rice, and greens) to produce a reasonable harvest, forces smallholders to clear new land each year for their crops. In the new area, most of the large trees are cut down and burned. The ashes return to the soil minerals that, along with organic materials accumulated during the fallow period, furnish sufficient nutrients for one crop of rice (Freeman 2003). If the soil is not too infertile, it is used for a second or third year to grow cassava and peanuts, after which it is abandoned, to return to bush fallow. The system of short cultivation periods and the succeeding fallow term of traditionally eight or more years maintain an ecological balance without noticeable erosion and destruction of the soil.

However, when the fallow is reduced and the land cropped for longer periods, serious degradation is readily observed. Cassava plants will not develop an adequate tuber—soil nutrients are too low—and smallholders are able to use only the leaves for consumption.

*Human resource assets: distribution of responsibilities and sources*

Liberian farming, particularly in Nimba County, is typically small-scale (rarely do crop farmers cultivate more than 10 hectares; the median is probably under 5 hectares for field crops such as cassava and rice; vegetable crops are 0.5 to 1 ha according to what I observed). The size of the

\(^4\) To protect respondents’ identities, I developed a number code. The first number represents the village and the second number represents the respondent. This convention will be used in citing direct quotations from interviews.
farm depends on the size of the household and the labor requirements that it could meet. In the early 1980s, the average subsistence household, estimated to consist of five to seven people, cultivated about one to two hectares of upland rice and one-half to one hectare of other crops (Kromah 2001).

The tools used for cultivation are strictly hand-held—cutlass, shovel, hoe, and axe. Draft animals are nonexistent. Tractors and tillers are extremely rare and only supplied by external sources. Thus, agricultural practices are extremely labor-intensive. Resident household members provide the main source of labor. Duties are not generally gender-specific, however, men are responsible for felling large trees (mature forest) and for harvesting palm nuts (women are forbidden to climb). Men also are responsible for constructing fences and using pesticides. Men and women work the same land together, although women can be seen more frequently performing the day-to-day work such as brushing (weeding).

Additional labor is provided by participation in the *kuu* system (Figure 5.3). The *kuu* is a social labor-sharing arrangement among extended family and/or neighbors to work on each other’s land. Arrangements can be fairly informal to rather formalized. For example, one respondent mentioned that the name of his *kuu* is called “Nine Power”. A *kuu* can be as small as a two-person group to up to 30 people; it is not gender-specific. There can be all female *kuus*, all male groups, or mixed groups working together. The tasks and duration are pre-arranged according to a household’s labor needs and also how extensively they want to commit to working on other households’ land (e.g., a decision balancing labor and time demands). For example, a substantial labor force is needed at the beginning of the season to clear secondary forest. *Kuus* are also arranged to cut sugarcane and harvest rice. *Kuus* do not typically perform the day-to-day maintenance (e.g., planting or weeding); extended family members perform these tasks. If the *kuu* is set up so that each member works on the other members’ farms, then it is work in exchange for labor. However, a group of hired laborers is also referred to as a *kuu*. It is customary for participants in a *kuu* group to bring their own cutlass and a cup of rice for the mid-day meal. The woman and/or older girls of the household are typically responsible for preparing a mid-day meal for the workers.
Access to land

Another fundamental process in analyzing household adoption and decision-making is gaining an understanding how households gain access to land. Prior to 1986, when the Liberian Constitution was approved, almost all land was the property of the state (Kromah 2001). The principal exception consisted of a relatively limited amount held in freehold, located almost entirely in urban areas; some plantation and other commercial farm operations were also privately owned. Where land is held in fee simple, only citizens of Liberia can hold it. A considerable part of public land is statutorily held by subsistence agriculturists under a system of tenure based on tribal traditions. The traditional principles and practices of land tenure differ in detail among various tribal groups, but all are based on the fundamental concept of communal rather than individual

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5 An estate in land held for life or with the right to pass it on through inheritance.
proprietorship—commonly practiced throughout West Africa. The land itself is under the control of a clan chief or family head, which holds onto the land in the form of an ancestral trust and administers it as the legal representative of the community. With the permission of the chief or headman, each household selects an area to be farmed for its own needs. Extended family members, including women, feel well within their rights to ask for land to use from clan chiefs and family heads. However, it must be emphasized that women are dependent on men for access to land—either through male relatives or “fiancés.” Among the Mano people, a new patch of land is customarily “claimed” by a person by clearing the area and setting a stick upright in the middle of the cleared section.

Subsistence-level households, in general, are secure in their tenure under customary law, but the lack of a registered title in some cases appears to act as a disincentive to land improvement because of the inability of the farmer to obtain credit for its development (at the national level when it exists). Respondents reported that they felt like everything was being “bought up” and that if they didn’t have a legal title, they were going to have access issues in the near future (1-3 2003; 3-34 2003; 4-54 2003). The expansion of roads in rural areas has reportedly resulted in the speculative securing of titles to land by non-farmers. In the areas encompassed by the government's major agricultural development projects (e.g., Gbedin), project authorities were assisting family heads to obtain title before infrastructure improvements attracted outside land buyers (2-30 2003).
Nimba County case study villages

The *Mano* and *Gio* tribes of upper Nimba County were particularly hard-hit by casualties and atrocities during the civil war since government forces (and the whole of Liberia) blamed them initiating the conflict (HRW 1990). Most Nimba County residents fled to Guinea and Côte d’Ivoire in 1990. Some returned after a short stay, but fled again when fighting re-intensified in 1993-1994; others stayed in exile and did not return until 1997 when the war was officially over. As a result of repeated looting and burning of villages, Nimba County has had nearly continuous intervention in the form of immediate relief assistance (e.g., WFP food distribution and other emergency relief), as well as intermittent efforts to initiate development programs.

This section describes the four villages in the Ganta area of Nimba County (Figure 5.4) that received training through UMCOR’s developmental relief intervention—the IPM-FFS. Historical and cultural information is included, to the extent that this was shared with me, as well as the previous intervention efforts provided by other external sources. At the end of the chapter, I summarize the major sources of community-level assets and vulnerabilities. This information is salient to understanding household-level management of uncertainty and adoption/non-adoption decisions. Furthermore, it illustrates what assets are available or deficient at the community level in promoting sustainable livelihoods and appropriate interventions.
Figure 5.4 Map of Nimba County, Liberia
**Gbahn**

Gbahn (Figure 5.5) is located approximately six miles from Ganta along the Tappita Highway. Although the Tappita Highway is unpaved soon after leaving the Ganta city limits, it is a major transportation corridor. The village is situated near the Gunuh River and several smaller tributaries. Agricultural activities are primarily conducted on upland areas, but swamps are increasingly being converted to agricultural uses. Secondary forests predominate, with relict primary forest patches reserved for windbreaks, protection of drinking water supplies, and secret bush society (i.e., *Poro* and *Sande*) use.

![Figure 5.5 Village of Gbahn, Nimba County, Liberia.](image)
Gbahn was first settled around 1920, when there was tribal fighting in Guinea. Charles D.B. King was president of Liberia at the time. The first families originated from Guinea. Additional families also came to reside in Gbahn through intermarriage. At that time, the method of establishing the town was to use a hook and a long rope. “You dropped it in the bush and dragged it along. Where it got stuck on something—that was where you put the village. Our forefathers were warriors” according to the clan chief and elders of the village.

Gbahn is comprised of the Mano tribal group and has an approximate population of 300 to 350. It is divided into two large quarters, each with its own quarter chief and elders. Gbahn quarter is the oldest. There are about 20 to 30 houses in this quarter. Lao quarter is the second quarter, with a total of 18 houses. Each quarter has its own taboos. In Gbahn quarter, eating snakes, dogs and bamboo is taboo.

Each quarter has a particular area for people to farm and the quarter chief apportions land. People generally feel that there is no scarcity of land; that each person has enough to use. There are rules about women’s land (1-4 2003; 1-11 2003; 1-12 2003; 1-13 2003; 1-14 2003). Where you have land that was bought by a husband and wife, the widow becomes the owner (the surviving spouse). Other farmers can farm her land if she approves it. She can collect rent from them for using her land. A single woman can own land if they have purchasing power (financial means). Women generally prefer working in the swamp because they do not have the capital to hire labor for clearing.

The Poro (male bush society) is a predominant force within the village. A sacred forest of several acres is located adjacent to the village. It is considered village land and no one is allowed to enter it (non-Poro men). It is forbidden to women. The Liberian government knows about it and knows not to touch it. The Sande (women’s bush society) used to have a place, but the land returned to the owner about three years ago (1-12 2003).

Gbahn is a major sugarcane growing area (Figures 5.6 and 5.7). The sugarcane is crushed and the juice distilled to produce a high proof alcohol known as “canejuice” or “African gin” (Figures 5.8, 5.9, and 5.10). Use of the swamp (bottomland) is limited, vegetable crops are new to
Gbahn residents. As a result, most food is purchased from Ganta or supplemented by hunting and fishing. Honey and snails comprise a seasonal part of household diets.

Figure 5.6 Sugarcane field near Gbahn, Liberia.

Figure 5.7 Transporting sugarcane for processing, Gbahn, Liberia.
Figure 5.8 Crushing the sugarcane in a mill. Gbahn, Liberia.

Figure 5.9 African gin production. Gbahn, Liberia.
Gbahn residents grow rice for household use (not enough surplus to sell) and sell drums of “African gin” to marketers from Ganta, Monrovia, Saclepea and Tappita. The typical farmer can produce 30 drums of African gin (also referred to as cane juice) a year (1-2 2003). The strength of the African gin market buffers households to some extent from biophysical sources of vulnerability at the expense of nutrition levels. Transportation options include taxi hire or a “make-a-way” car on the rail (Figure 5.11). No one in Gbahn owns a bicycle; “it costs as much as a bundle of zinc” (1-3 2003).
During 2001, a community-based rice farming organization was formed—*Slehdorkorku* ("Community Development Together" or literally translated as, “Gbahn nation-building group of hands” in Mano). *Slehdorkorku* has a charter and elected officers, although the number of members is unknown at this time. The group’s primary activity is rice and vegetable cultivation; they have 22 36-foot by 36-foot plots. Proceeds from the rice harvest are shared among the members. In 2002, the NGO, Equip initiated public health and nutrition training in the village. Africare, another NGO, holds periodic health workshops.
Gbedin

Gbedin (Figures 5.12 and 5.13) is located almost 20 miles from Ganta along both sides of the Monrovia-Sanniquellie Highway. The asphalt pavement soon turns into an extremely rutted dirt road several miles outside of Ganta. The poor condition and steep grades of the roadway makes it nearly impassible during the rainy season. Situated on the St. John River, and located within the Upper Guinea humid forest and the foothills of the Nimba Range, it is an inland-extended swamp area, and was founded as a national center for swamp rice production. Due to the mountainous terrain, primary forest has been reserved in large (100-200-acre) tracts (2-30 2003).

Figure 5.12 Village of Gbedin, Liberia
The older section of Gbedin was established as a company town for LAMCO during the late 1950s to early 1960s and is referred to as Gbedin Camp Three. The iron-mining company was developing a transportation corridor (both rail and motor vehicle) from Monrovia to Yekepa. The Liberian government ascertained the Gbedin vicinity as having a particularly large swamp valley (Figure 5.14) with extremely fertile soils, and designated it as a rice-production region in hopes of reducing the need for imported rice.
Figure 5.14 Swamp valley, Gbedin, Liberia.

In 1961, the Government of Liberia developed a large-scale rice project called the Gbedin Special Agricultural Project. Poor households from all over Liberia were encouraged to relocate to the area and establish a new sub-village known as Gbedin Camp Three. Approximately 96 family heads resettled in the new village. Consequently, it is an unusually diverse community with tribal representation from the Mano, Kru, Loma, and Kissi ethnic groups.6

In 1963, the Dokodan Cooperative was established as a rice-growing cooperative using a predominantly Chinese model. The name means, “Leave it a bit, have a taste.” A total of 4500 acres was surveyed and 240 acres came under cultivation. Twenty varieties of paddy rice were tested on swamp areas under the supervision of Taiwanese specialists.

The Cooperative is a formalized organization with officers and board of directors, charter and bylaws, as well as a credit committee. Labor on Cooperative land is performed in assigned kuu

6 Villages comprised of one to two tribal groups are the norm. Except for urban areas, heterogeneous tribal representation is generally only found in leper communities.
groups. There are six groups; each group is assigned a 100-acre section to maintain for the Cooperative. To become a member, a person must contact a group head to find a vacancy. In addition, membership requires a letter of application, a $50LD entrance fee, and a formal interview to assess capability, conduct, mental fitness, ability to work cooperatively with others, and seriousness” (2-16 2003; 2-17 2003; 2-25 2003). A one-time fee of $250LD is required to become a shareholder. Based on the Cooperative’s assessment, a person is assigned a one-acre plot initially for personal use.

They start you out on a training field and test you out. It is a sort of trial period the first year. Then they give you more land—an acre, sometimes two-three acres...(2-24 2003).

After you demonstrate your ability and seriousness, they can assign you more land (2-22 2003).

Another gave a more detailed explanation of the Dokodan Cooperative’s system:

I registered with the Cooperative to be a farmer. It costs $250LD to be a partner and $300LD to own a share certificate—that is, to be recognized as a bona fide farmer. The Cooperative gives you a swamp plot and an upland plot. I started with an acre in the swamp and planted rice. The method I used wasn’t a local method. With the Cooperative, you pay for a power tiller to service the swamp. They own the equipment. You pay $500LD for this service or you have the option to purchase 3 gallons of gasoline to do it for yourself. The Cooperative has a sliding scale of fees to help beginning farmers (2-30 2003).

The Cooperative supplies agro-chemicals, equipment, and medical care on a credit basis (deducted from the sale of the rice harvest). Cooperative members who are deemed motivated are selected by the Cooperative to receive technical training at agricultural education centers in Liberia (e.g., CARI in Gbarnga), Ghana, and Nigeria (2-25 2003). Funding for the training is provided by UNFAO.

In 1965 mainland Chinese agricultural specialists provided technical assistance and constructed a rice-processing mill and barracks. A 60-acre oil palm plantation was established. The Chinese left in 1970 (2-15 2003). However, such large-scale experimental results could not be adapted to subsistence or traditional farming methods. Until the civil conflict broke out in late 1989, the MOA supported the farmers with mechanized equipment. It is the only community in Nimba
County that has used mechanized farm implements (tractors, tillers, harvesting equipment, etc.).

Before the 1989-1997 war, most households owned cars, power tillers, etc. The Cooperative owned several tractors. According to Dokodan Cooperative board members (Figure 5.15), Gbedin supplied approximately 56 percent of Liberia with food. Wholesale marketers came to Gbedin to purchase rice. During the 1970s and 1980s, the Nimba County Rural Development Program, funded by GTZ, conducted agricultural training (including LEISA practices) and planted neem trees in the village.

In 1998, a Chinese technical mission constructed a dam and other water-control devices within the Dokodan swamp rice project lands, and rehabilitated a second one after repairing the irrigation system. A total of 150 acres of lowland rice fields were rehabilitated in 1999, which has increased to 560 acres since then. The Chinese have not come to Gbedin since 2001.

FAO has initiated various projects since 2000. These projects included hybrid rice multiplication, vegetable farming, and construction of toilets and water control devices (i.e., dams,

Figure 5.15  Dokodan Cooperative board members, Gbedin, Liberia.
riser boards). Also, an unspecified NGO conducted a micro-loan program for several years beginning in 2000. During 2001, an NGO from the European Union came and helped to establish the *Kwadoo* ("we are one") Cooperative for growing vegetables (2-30 2003). Action Côté le Faim trained people in groundnut farming during 2002 (2-27 2003).

Gbedin is attractive to internally-displaced persons who cannot return to their home villages (i.e., it is still unsafe in counties bordering Sierra Leone and Côte d’Ivoire), former urban dwellers who lost all of their resources, as well as people discouraged by the instability and fighting—it [Gbedin] is close to the border with Guinea [across the St. John River] and is convenient if you have to run (2-24 2003; 2-27 2003). The benefits of residing in an agricultural production center using a Socialist model (i.e., the Dokodan Cooperative) are many. External funding assistance from international donors to the Cooperative is frequent, particularly from China and Taiwan. This allows for the provision of physical assets needed for large-scale rice production. Risk is spread among all the members of the Cooperative. Relative wealth and education levels of households are higher than the other study villages. Households engage in additional cultivation on non-Cooperative land to provide vegetables for personal consumption and additional revenue. These agricultural activities occur along the floodplains of the St. John River and its’ tributaries. Fishing and gigging for frogs supplement cultivated food crops. Honey and snails are consumed during the dry and rainy seasons, respectively.

Wholesalers come from Monrovia to Gbedin to purchase rice from the Cooperative and vegetables from resident producers. Some farmers charter transportation to take their goods to Monrovia or use a “make-a-way” car on the rail. Local markets for vegetables include Dieke, Guinea on Mondays and Zuluyee village [in Nimba County, Liberia] market on Thursdays.
Neigbein

Neigbein (Figure 5.16) is located approximately five miles from Ganta on the Monrovia Highway. This section of the highway is asphalt, albeit in rather rutted condition. This area of Nimba County was commercially logged during the 1970s and 1980s. Extensive rubber plantations replaced natural forest. There were also smaller plantations of coffee, cacao and oil palms. Secondary forests and untended plantations predominate the landscape; primary forests occur as small patches.

Figure 5.16 Village of Neigbein

According to the town chief, Mr. Alan Gofan, Neigbein was formed as a result of several families—the Bain clan—fleeing tribal warfare in Guinea. Several small settlements—Kplewele, Kpawee, Gbeye, Kpuozohn, and Moala—came together to form Neigbein. People from the Kpelle tribe also came to settle in the area, although the IPM-FFS interview respondents were mainly Mano.
These settlements were divided into the quarters forming Neigbein. *Kpuozohn* was the central portion of what became Neigbein. The people were malnourished, but the water from the creek called *Lea* (“fine” in *Mano*) cured them. There was a second creek called *Meayekoan* that people use for ceremonial purposes. *Poro* and *Sande* bush societies play a dominant role in Neigbein; there is a sacred forest located nearby. There had been many traditional laws and taboos governing behavior and diet, but they have largely been lost over the years. Elders attribute this to the loss of strong leadership since 1979 as well as the effects of the war.

According to a long-time resident, Mr. Topia Cooper of Pledehyee, brought knowledge of swamp conversion techniques back to Neigbein. Despite its’ labor-intensiveness (it can take three months or longer to hand-dig canals and relocate small streams), households increasingly turned to the swamp for seasonal crops. As a result, Neigbein became established as a commercial vegetable crop center.

During 1996-1997, Zao Agricultural Development Council distributed an improved variety of cassava. Global Relief gave out tools and cabbage seeds in 1998-1999. In 1998, Catholic Relief Services (CRS) came and repaired the school buildings; Environmental Foundation for Africa (EFA) did some agro-forestry and conservation awareness/environmental education training; and Ganta United Methodist Agriculture Program (GUMAP) initiated a poultry program. Sometime during 1999 and 2000, Neigbein residents started a financial club. The club started with 75 members (3-36 2003; 3-39 2003). Last year, the club had 75 members and in 2003, they have 211 members. “You pay $5 LD for 12 months; the interest was $150 LD per person. The money was distributed at Christmas. I bought zinc and cement and paid someone to make bricks for my house” (3-39 2003).

The NGO, Equip, came in 2001 to teach health education and nutrition. Hope for the Nations, another NGO allied with Equip, began working with women farmers in 2002 to teach nutrition and methods of improving soil fertility. They also constructed an orphanage and a church.

As a result of increased socio-political stability over the past several years, three community-based organizations (CBOs) formed during 2002. *Gbukiahmon* (“to help one another”) formed on
November 18, 2002 and has 43 women members. It is primarily a rice-growing organization and they work together on Tuesdays. The women joined together because they realized they needed each other’s help to produce more food to save for the rainy season. They said that food is scarce then and they usually go to the bush to dig wild yam and collect snails. They also burn coal and cut wood to get money to buy food for their children. Seledowah (“to build our country”) was formed during January 2002. They have 36 members (men and women). They are growing cassava and groundnuts (peanuts) as two separate crops—cassava in the upland field and groundnuts in the swamp. They sell some and use some for personal household consumption. They learned from people in Guinea, while they were refugees, about growing groundnuts. Kokoleh (“we are for you”) has 29 members. They formed in August 2002. They grow cassava and rice and work together on Mondays.

Neigbein residents grow rice for household use; cassava and vegetables are sold to wholesalers in Monrovia. Hunting and fishing supplement this food. Honey and snails provide seasonal food. Farmers either take a bus or hire a taxi to Monrovia, or wholesalers drive from Monrovia on Sunday nights (to purchase vegetables early on Mondays). Other markets include Ganta on Thursdays or Domah’s Town on Fridays.
Pledehyee

Pledehyee (Figures 5.17 and 5.18) is a sub-village to Neigbein and located on one of the oldest unpaved roads in Liberia. Landscapes are similar to Neigbein. Farm fields are intermingled with those of Neigbein residents and several other sub-villages.

Figure 5.17 Sub-village of Pledehyee
According to the town chief and elders, Pledehyee (“new town” in Mano) was established in the 1930s as a result of an inter-tribal war in Guinea. The people left and came across the St. John River to the Liberian side. They built a fence and drained the swamp to establish a village. Kpelle people from Bong County, Liberia also came. There was a second tribal war during the 1950s. The people then moved from the valley to the hill. There was one clan—the Bain clan.

Pledehyee is divided into four quarters, representing different clans. Each clan has their own taboo:

- **Bain**: dogs are forbidden for consumption.
- **Garr**: people do not eat pig or eddoe.
- **Zahn**: people must not eat snails.
- **Gbayee**: people are forbidden from eating snakes.
Although the taboos forbid people to eat these things, it is perfectly allowable for people to raise these animals or crops for commercial purposes. Knowledge of local taboos and how they can potentially impact development interventions and adoption of NRM practices is useful because they still have an impact on rural people’s behavior.

During the 1970s and 1980s, the Nimba County Rural Development Program (NCRDP), which was funded through GTZ, conducted projects in Pledehyee to educate farmers on improved practices. They had a central office in Monrovia and regional offices in Saclepea (4-43 2003). NCRDP included planting neem trees and teaching people the various uses of this tree. At one time, there were about 40 known uses ranging from using it as a wood preservative, an organic pesticide as well as using it in the treatment of malaria.

In 1973, Mr. Topia Cooper, a resident of Pledehyee, introduced the irrigation method used in swamp (lowland) areas. He had worked with the MOA rice project in Gbedin and taught this method to the villagers of Pledehyee. A series of canals are dug to drain excess water from the swamp during rainy season and plugged during the dry season. This method can be seen among the farms of both Pledehyee and Neingbein residents.

The town chief makes the laws. For example, in 1994, a law was passed that requires all men in the village to stay around when a woman is in labor in case she gets into trouble and needs carrying to the hospital. If the delivery goes well, then they can leave to go about their usual business. This law was the result of a woman whose delivery did not go well. Her husband was carrying her to Ganta Hospital in a wheelbarrow and she died along the way. While not directly pertinent to the adoption of sustainable NRM practices, investigating local customs and protocols gives insight into the social capital present in a given village setting. One consequence of chronic conflict in Liberia is the damage done to social networks and community cohesion. However, this anecdotal evidence gives encouragement to the revival and enhancement of existing social bonds, which are critical in developing household resiliency to external shocks.
At this point in time, there are only 13 houses in Pledehyee; the population is approximately 100-200. Each family head lives in the house; some families live on their farms due to lack of housing in the village. Most natives of Pledehyee had parents working for mining and rubber plantation concessions—LAMCO, Bong Mines, Firestone, etc. When they lost their jobs just prior to the outbreak of the 1989 war, they returned to the village. During the war, many fled to Guinea after attempting to hide in the bush. After the end of the civil war, when people returned from exile in Guinea, they returned to their home villages because there were no jobs. “They thought they would only live in the village and farm a year or two and then go back to their previous jobs” (4-50 2003). However, the Liberian economy never rebounded. As a result, there are not enough houses in the village to accommodate the extended family members who have come here, and many of them live in makeshift shelters on the farm (4-54 2003). Land has also becoming increasingly scarce. People farmed on family land. As people expanded their farm and grow more crops and animals, they tended to move onto their farm as a way of protecting their assets. Theft of fruit, rice and livestock was rampant, particularly before Christmas and the times when school tuition is due.

The year following the end of the civil war, 1998, saw several major initiatives by relief and development agencies. GUMAP began a poultry project in Pledehyee with a small (8-10) group of farmers; each person was given eight fertile eggs (Bishop 2003). These were hybrid chickens (Rhode Island Red cock bred to a local hen). The intent was to increase the robustness of local chickens and to introduce production techniques to Pledehyee households (e.g., sustainable economic development). Global Rescue initiated a swamp rice project and Equip started public health and nutrition training. In 2001, as a result of prolonged stability, Seledowah (“to build our country”) was organized as a rice-growing CBO. It boasted 125 members from Pledehyee and other nearby sub-villages (4-54 2003). Equip and Hope for the Nations continued to work in Pledehyee to train women in midwifery, nutrition, and sustainable agricultural practices.

Rice is grown for household use only (there is no surplus to sell); hunting and fishing supply additional sources of food. Cassava and vegetables are sold wholesale to marketers in Monrovia,
Ganta market on Thursdays or Domah’s Town market on Fridays. Transportation is by hired bus or taxi or by foot.

Summary

Interventions aimed at improving livelihood and natural resource outcomes must reflect a clear understanding of the natural and social history of the region in question. This chapter related the natural and socio-cultural context of Nimba County and the study villages to better comprehend how households manage under conditions of chronic conflict and political instability, the constraints and opportunities to household adoption of NRM practices, as well as develop appropriate strategies for building resiliency. Knowledge of the village-level interaction between nature and culture as well and appraising the community assets available to resident households contribute to this understanding. Table 5.1 provides a summary of these assets. It can be easily established where assets are strong and can be used to initiate sustainable development interventions, and where assets are deficient and require bolstering.

The next chapter provides smallholder household results of the data collected through the semi-structured interviews. This data provides the evidence needed to answer the first two research questions.
<table>
<thead>
<tr>
<th>Assets</th>
<th>Gbahn</th>
<th>Gbedin</th>
<th>Neigbein</th>
<th>Pledehyee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial</td>
<td>None</td>
<td>Credit through Dokodan Cooperative; extensive external funding to Coop.</td>
<td>Informal financial club</td>
<td>None</td>
</tr>
<tr>
<td>Physical</td>
<td>Major transportation corridor; established local, regional and national markets. 6 mi to hospital; public + private schools; questionable drinking well.</td>
<td>Major trans corridor; dams; established local, regional and national markets; No med. clinic or schools; questionable drinking well. Dokodan Coop provides tools, machinery.</td>
<td>Major trans. corridor; established local, regional and national markets. 5 mi to hospital; Public school. Safe drinking well.</td>
<td>Bridges, old motor road; established local, regional and national markets. 7 mi to hospital; Public school nearby. No local deep well; use one in Neigbein.</td>
</tr>
<tr>
<td>Social</td>
<td>Local gov't.; <em>Poro/Sande</em>; <em>Sledorkorku CBO</em></td>
<td>Local gov't.; Dokodan Coop.; Kwadoo Coop.</td>
<td>Local gov't.; <em>Poro/Sande</em>; CBOs--<em>Gbukiahmon</em>, <em>Seledowah</em>, and <em>Kokoleh</em>.</td>
<td>Local gov't.; <em>Poro/Sande</em>; <em>Seledowah CBO</em>.</td>
</tr>
<tr>
<td>Human</td>
<td><em>Kuu</em> groups</td>
<td><em>Kuu</em> groups; Coop technicians, add't'l training thru Cooperative.</td>
<td><em>Kuu</em> groups</td>
<td><em>Kuu</em> groups</td>
</tr>
<tr>
<td>Vulnerability Sources</td>
<td>CC &amp; PI; forest conversion to charcoal; swamp conversion to agri; agri pests--grasshoppers; soil quality; water quality; over-hunting and fishing.</td>
<td>CC &amp; PI; swamp conversion to agri; agri pests--grasshoppers; water quality; over-fishing.</td>
<td>CC &amp; PI; forest conversion to charcoal; swamp conversion to agri; agri pests--grasshoppers; soil quality; water quality; over-hunting and fishing.</td>
<td>CC &amp; PI; forest conversion to charcoal; swamp conversion to agri; agri pests--grasshoppers; soil quality; water quality; over-hunting and fishing.</td>
</tr>
</tbody>
</table>
CHAPTER 6
RESULTS OF THE CASE STUDY AND DISCUSSION

Introduction

This chapter describes the results of the analysis of the data obtained through the 54 semi-structured interviews and additional information provided through key informant interviews and photo-documented field observations. Together, this information answered the research questions restated here:

1. How do rural households manage under conditions of uncertainty? How are decisions made under these circumstances?
2. What NRM practices were adopted or not adopted and why? How do nature and culture inform these decisions?

Understanding and explaining these questions leads to interventions that support people’s livelihoods. Inextricably related to supporting people’s livelihoods, in turn, is helping people to achieve their dreams and aspirations.

The findings of these two questions will be presented through the lens of the Sustainable Livelihoods framework presented in Chapter 1 (Figure 1.2). The first section will discuss household management strategies under conditions of uncertainty. The second major section will discuss household adoption and non-adoption of NRM practices in terms of the constraints and incentives provided through exposure to risks and allocation of assets.

Managing under conditions of uncertainty

The complex of influences (i.e., the various types of shocks, trends, and seasonality factors) that comprise the vulnerability context in the Sustainable Livelihoods framework are important because they directly or indirectly influence households’ coping strategies (i.e., survival strategies),
management of limited assets, and the livelihood options that are open to them. Each of the major
shocks, trends, and seasonality issues that contribute to household vulnerability in the Liberian case
studies will be discussed.

Shocks resulting from conflict and household coping strategies

The foremost shock that Liberian households must confront is that of direct conflict and continued political instability. Evidence provided through content and inductive analysis of the semi-
structured interviews revealed that everyone has been deeply affected by conflict and prolonged
instability. Early warning signs are not always visible in the various uprisings and offenses due to the
lack of mass electronic communication. Thus, those who can afford transistor radios walk around
with them glued to their ears during news broadcasts. Information is related by word-of-mouth
reports from passersby on the roadways (e.g., people walking from villages to commercial centers).
Strangers and friends are greeted with, “What news?” To the outsider, this phrase may seem like an
inquiry about a person’s family or a probe for ‘small talk’. It is, instead, a valuable means of gauging
the relative stability on an ongoing basis. However, intelligence reports are not always accurate, nor
are people able to act on reports in an informed or timely manner. The primary choice faced by
households in these instances is either flight or accommodation.

Of those respondents who chose to flee the fighting, several tactics were employed. Flight
into the dense secondary forest or “bush” surrounding villages often constituted the first recourse.
This period of refuge lasted from a few days to as long as several months in some cases; some
respondents never left. Others ended up in IDP camps located throughout Liberia. In some cases
where flight was not an option or not the preferred option, some respondents made the conscious

1 There are several government-controlled radio stations in urban centers such as Monrovia and some tiny radio
stations with broadcast ranges of one to ten miles.
decision to remain in situ and hope for reasonable treatment at the hands of the advancing faction. This strategy produced mixed results. As one man reported:

During the war, I never left. I hid out in the bush on my land and continued to farm and live off the land (1-3 2003).

A man from Pledehyee showed me the location where he and his family hid (Figure 6.1). He talked about living in constant fear and not being able to use fire for cooking or clearing land or hunting with a rifle for fear of being detected by the rebels. This strategy was practiced on a household level or by entire villages when sufficient warning time permitted.

Figure 6.1 Farm kitchens were used as temporary shelter during conflict. Nimba Co.

Flight to the capital city of Monrovia or to other large cities often became another recourse of households in the four study villages (and also of Ganta residents) faced with imminent attack. Households carried what they could with them and walked several hundred kilometers. Others chose to flee to Guinea or Côte d’Ivoire (residing in vast refugee camps), although this often occurred as an
alternative second recourse after initial flight into the bush or some other location. Men from Pledehyee related their experiences:

Before the war, I was going to school and helping my mother. I was born in Neigbein, but my mother was from Pledehyee. When the war broke out in 1990, I went to Monrovia; my father was a journalist there. Then I walked back to Neigbein and started farming on my own in 1995 (4-50 2003).

I was born in Pledehyee and graduated high school in 1985. In 1986, I started farming using some of my father’s land. I planted tobacco. The Monrovia Tobacco Company was located in this area and this crop was the predominant crop grown by local people. In 1989, MTC left because of the confusion. The place was captured by rebels. I took my family to Guinea in 1990, but returned because we suffered there. My mother took sick and died; my father also died after a brief illness. I lost two sisters during the war; I took in her children (4-54 2003).

A woman shared her experiences:

I grew up in Gbahn, married and went to live in Bong County, and then lower Nimba County. During the war I went to Guinea. Part of the time, I hid on the family land. Afterwards, I came back to my home village (1-4 2003).

Two men from Neigbein recounted their experiences:

In 1990, I went to Guinea. I lost all of my belongings and my brother was killed. I was there for one year. Then I came back and farmed on my people’s land (3-31 2003).

When the war broke out, I fled from my home to Guinea. I stayed there two years. Our house was burned down (3-34 2003).

Respondents reported multiple flights to Guinea or Côte d’Ivoire—during the initial fighting in 1990 and again around 1993-1994, when the war re-intensified. Taking asylum required either the financial means to purchase transportation (a rare occurrence) or the physical stamina to walk or ability to swim across the St. John River. Crossings during the rainy season often resulted in drowning deaths. Other respondents seemed to move around extensively, not knowing where to go for safety, and finally settling in Gbedin due to its proximity to Guinea:
From 1991-1997 I went to Guinea (for short periods), then to Bong County, then to Monrovia. Then I came here [to Gbedin] in 1998 (2-17 2003).

I was farming in Sanniquellie from 1970 until the war broke out. We went to Guinea twice—1990 and 1994. We went to Gbedin in 1993. It is close to the border with Guinea and is convenient if you have to run (2-24 2003).

In the rural areas of upper Nimba County, hunger comprised a crucial problem for the respondents during active conflict. Displaced villagers lived off the land on eddoes (taro root), wild yams, roots, fruits, and whatever could be gathered. Whenever possible, people hunted with slingshots, because rifles and dogs would alert combatants to their presence. Crop cultivation was, for the most part, impossible during occupation, except for forced agricultural production on behalf of the fighters. Households that had managed to save precious stocks of seed rice resorted to consuming them out of sheer necessity. Bulgur wheat distributed by UNHCR and WFP were sold openly on the street as a strategy for obtaining seeds and rice.

**Vulnerabilities arising from trends—managing biophysical sources of uncertainty**

The second major category of risk-related concerns stem from biophysical trends. These include: 1) land scarcity/small land holdings, 2) shorter fallow cycles (i.e., lack of soil fertility and declining yields), 3) erosion, and 4) agricultural pests, particularly grasshoppers.

*Land scarcity* has been an outcome of the large-scale out-migration from urban centers to rural villages. Household farm holdings have become smaller due to constraints on land availability and they are more fragmented. Respondents walk long distances (3 to 5 miles each way) to reach their farms. Some farms took a half hour or longer to walk to from the village.

Since 1997, cultivation has increasingly pushed onto steep slopes and into wetlands. Fallow periods have become shorter on the uplands (from 10-12 years a decade ago to 4-6 years today), and cultivation periods have grown longer (or continuous) despite the degraded quality of the soil and low yields. This was reflected in the following explanation:
The land rests for one year in the swamp, no more, because I have no other land to go to and there are too many people in the farming business (2-18 2003).

As discussed in additional detail in Chapter 4, one of the key biophysical issues is soil nutrient depletion due to shortening of the fallow periods within the upland swidden (slash-and-burn) agroecosystem. Commonly observed strategies for increasing soil fertility include burning—“ashes make the soil more fertile”—and using the black soil from the swamp to mix in with the upland soil. One respondent replied that they use swamp water to fertilize plants on the uplands; others control the flow of water within swamp farms and flood them to replenish nutrients. They also felt that flooding “kills diseases” in the soil. A few respondents claimed that they did not know what to do when soils were depleted—you just experiment until you find suitable soil. It was unclear whether the trial-and-error methods were due to lack of experience or the consequence of short fallows (insufficient regeneration).

Despite its widespread occurrence, strategies for preventing soil erosion seemed to be lacking. Most abandoned land if the soil washed away. “You just look for a different spot” (3-37 2003). A few respondents mentioned that they control soil loss by laying brush on the slopes.

Finally, households have dealt with agricultural pests in a variety of traditional ways. Burning is the cure for all pests—above and below ground. Once crops are in the ground, a surprisingly common method for controlling grasshoppers, however, is to place a stick or pole in the middle of a field because they like to climb on it. In the evenings, the grasshoppers are removed and thrown in an oil drum with water and allowed to decompose. The fermented “grasshopper juice” is then sprayed on crops as a pesticide. Other methods involved mixing hot peppers and ashes with water, or creating a ‘witches’ brew’ of “soap, ashe, water and kerosene” (3-33 2003). However, a woman from Gbahn related the use of Pentaclethra macrophylla—kue in Mano—a leguminous tree species for natural grasshopper control. The empty seedpods are burned and the ashes scattered to keep grasshoppers away (1-4 2003).
The above examples of strategies used by Mano households, and others detailed in the previous chapter, have many parallels to John Lyle’s (1994, pp. 37-48) “strategies for regenerative design”, ecological design principles as espoused by van der Ryn and Cowan (1996), and the principles advocated in agricultural deep design (Wann 1996). Lamentably, knowledge of many of these traditional practices is waning due to modernization—youth do not desire to be considered “primitive” (1-3 2003); loss of social cohesion as a result of the civil conflict (“every person for themselves” philosophy); and a significant loss of the older adult population because of conflict and its aftermath.

Managing vulnerability arising from seasonality

The final source of vulnerability arises from seasonal trends. These consist of seasonal variations in food supplies, weather, and employment opportunities. As mentioned earlier, the rainy season is referred to as “the hunger time”. Most households rely on the strategy of “growing different things in different places according to season. They plant on the uplands during the rainy season and use the swamp during the dry season. Or, as John Lyle (1994, p. 38) states it, “letting nature do the work.” Some respondents grow crops for contingency purposes. For example, a woman remarked that she “grows sweet corn as ‘emergency food’ during the hunger time” (3-35 2003). Other strategies are to collect honey during the dry season—an activity conducted by men, and gather snails during the rainy season—an activity conducted by women and children.

Respondents in the study villages also mentioned their method of dealing with the seasonal high winds that the harmattan brings. Cultural practices forbid the removal of cotton trees, as they protect the village from windstorms. Likewise, forest patches are used as windbreaks to protect crops:

There’s a little forest on our family land. It is reserved to use as a windbreak and for the herbs and medicine plants found there...(4-45 2003).
Lastly, the substantial amount of precipitation (i.e., 60 to 80 inches) during the May-October rainy season limits employment opportunities, particularly construction activities to the dry season. Vehicular travel is slow-going to virtually impossible because of poorly maintained, unpaved roads.

**Acquiring and managing limited household assets**

Chronic conflict results in severe loss of life and the virtually total loss of household and community-level *assets* through looting and burning of houses, agricultural fields, and forests. Household and community recovery following a severe shock such as conflict is somewhat akin to the successional processes of natural ecosystems following a disturbance. Progressive, directional change in the structure of a natural ecosystem does not follow a linear progression, although there are phases in the process.

Correspondingly, three distinctive phases emerged in how households re-acquire and manage limited assets (i.e., natural resource, financial, physical, human, and social assets) in the milieu of chronic conflict and political instability:

1. Strategies aimed at acquiring assets and rebounding as quickly as possible;
2. Risk reduction and management strategies (i.e., deciding which assets are worthwhile to reinvest in); and

This recovery pattern was employed by households in all four of the study villages, even though, to some limited extent, residents of Gbedin are sheltered by the Dokodan Cooperative.

**Strategies aimed at acquiring assets and getting ‘fast money’**

Flight from other regions of Liberia and urban centers, as a result of direct conflict or lack of employment opportunities (or both), means that people must begin the recovery process by gaining
access to land for starting farms. When individuals or households become internally displaced, their only hope of survival means finding someone willing to rent or use their land with permission, or forming a relationship out of necessity. Five of the 54 respondents were IDPs and had found local people to rely on. Ten respondents had been employed in various professions in urban centers (e.g., Liberian government employees, mining, education). They had moved to their home villages because it was the only livelihood option available. A man discussed how the Neigbein-Pledehyee area became so populous:

Most people here had parents working for concessions—LAMCO, Bong Mines, Firestone, etc. When they lost their jobs just before the war broke out, they returned here. Now there are lots of people making farms here (4-44 2003).

Access to ancestral land is a form of “social security.” This is a commonly-reported coping strategy in situations of war (Le Billon 2000). Traditional Liberian land tenure practices assure that a person can gain access to land from their family heads. With the permission of the clan chief or family head, each household selects an area to be used for their own needs. As various respondents explained:

Land use is regulated by the Quarter chief. You must have an arrangement to come live here. You cannot use land without permission. Strangers who don’t know anyone cannot move here to settle. You must be related or know someone and then it must be approved by the Town Chief and Elders. We know who belongs on the footpaths; if you find a stranger on the path, you know they don’t belong there and you turn them away (3-33 2003).

I use my grandmother’s land. When she died, three men—all brothers—took control of the land. The eldest, Nya, controls the land and decides who gets a particular area of land to farm. The others are in the United States (3-34 2003).

I am using my uncle’s land; I ask him for permission to use it. I think there are seven people making farms on the 150 acres that he owns. There are also some IDPs from Bong County using the land for farms (4-42 2003).

I have 800 acres that belonged to my people. There was 1000 acres total, but 200 were sold off to a PRC member who now lives in the States. He was a relative to the family. They wanted to settle with the deed so there would be
no confusion in the future. About half of Neigbein uses this land—I don’t know how many people...they ask the town chief, Mr. Alan Gofan. He’s my stepbrother. My mother has the deed to the land (4-44 2003).

In Gbedin, most respondents are members of the Dokodan Cooperative; a few obtained additional land by renting from others. Because of the population pressure in Neigbein, one woman was borrowing her uncle’s land rather than using her father’s land—it is closer to the village and she has eight young children. Another respondent chose to rent land located closer to the village for cultivating vegetable crops and used the family land for field crops (i.e., cassava and rice). As he explained it:

I am using Yenneh’s land for swamp farming. I have personal land, but it’s far off—behind Pledehyee. I have 150 acres. Mostly, my brother uses that land. Sometimes other people ask me for permission to make rice farms there. I inherited it in 1978; when my father died, I took over the place (3-31 2003).

Prior to the war, it was unusual for land to be rented. However, with changed circumstances (e.g., a large number of IDPs seeking land), it has become a more common occurrence. The “rent” charged is typically a portion of the harvest—a bag of rice or a drum of African gin. It is customary to prepare a feast at harvest time for the landowner to show a token of appreciation.

These varied means of gaining access to land are depicted in Table 6.1.

<table>
<thead>
<tr>
<th>Land Tenure</th>
<th>Gbahn</th>
<th>Gbedin</th>
<th>Neigbein</th>
<th>Pledehyee</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M (9)</td>
<td>F (5)</td>
<td>M (9)</td>
<td>F (7)</td>
<td>M (9)</td>
</tr>
<tr>
<td>Family land</td>
<td>2</td>
<td>5</td>
<td>7</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Deed (legal title)</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Rent</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Dokodan Cooperative</td>
<td>6</td>
<td>4</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Co-op. + rent</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family land + rent</td>
<td>1</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Secondly, the destruction of agricultural crops and/or subsequent return/resettlement to a village after fleeing requires household asset re-establishment as quickly as possible. Emergency
assistance (e.g., distribution of bulgur) occurs, if at all, until the emergency is declared over. Chronic conflict and political instability necessitates the development of strategies to derive cash or assets that can be quickly converted to cash (i.e., liquid assets); credit does not exist. Formal employment opportunities are non-existent. Respondents related that they frequently engage in informal, off-farm income-generating activities. These activities are collectively categorized as, ‘ways of getting quick money’. For the most part, these endeavors are not full- or part-time occupations, but rather coping strategies aimed at obtaining cash and liquid assets. They include a variety of both sustainable and unsustainable coping strategies for dealing with high levels of uncertainty, feeding themselves and their families, and generating income for emergency situations. These activities include: hunting and selling bushmeat (common activity for men in all four villages); charcoal production (Neigbein and Pledehyee households); making soap, tie-and-dye clothing, and selling baked goods or cooked food such as fufu and rice (Gbahn and Gbedin women). Women in all of the study villages collect and sell snails during the rainy season. As numerous respondents reported:

I make charcoal to sell and I cut wild palm and collect honey in the bush. My wife sells greens and collects wild snails to sell (4-44 2003).

My wife sells small things. This was started in 1997. We discussed that she should do this to earn more money. She goes out in the morning and comes back in the evening (1-10 2003).

I’ve been farming since 1985 to help my family...I stayed here during the war...when the war re-intensified in 1993-1994, I sold small provisions and didn’t make a farm (2-28 2003).

Poorer households are characterized by desperation and their involvement in opportunistic behavior. This includes the consumption of anything deemed edible including rats, snakes, and fish as small as an inch, and the production and sale of charcoal and construction poles, despite the labor-intensity of such products. The production of charcoal in the Ganta region is a relatively new activity that apparently transpired after the 1989-1997 war. According to a long-time resident, “It started with
the second onset of the war [1993-1994]. In Gbahn, it started around 1999” (1-12 2003). However, as one woman justified it:

We make charcoal for quick money. For instance, we need bags and buckets for when the bitter ball is ready to harvest. We will make charcoal to buy these items. Also, when things go down, you take the easy way (3-32 2003).

Most respondents shared her sentiments. Bags and bundles of these products line the Monrovia Highway waiting for wholesale marketers to purchase them.

Risk reduction and risk management strategies

The second stage in the recovery process, or sub-theme, is that of managing scarce household assets and limiting exposure to risk. Even when things “settle down” and became peaceful for several years, people are extremely cognizant of the short-lived nature of peace. This has resulted in a culture of short planning horizons and decisions based on rapid returns of time, labor, and inputs. Risks were managed by shunning crops that may bring higher returns but take longer. One woman and her husband reasoned that it was better to invest money in chemical fertilizers than organic methods, because:

We need quick money and chemicals will get the plants growing faster. If we’re the first at market, we’ll get the best prices (3-32 2003).

A respondent from Gbahn provided another example of this logic:

Oil palm only takes 4-6 years to mature, is easy money, and we eat it; rubber takes 7-8 years. I don’t grow coffee or cocoa. I want to grow only food crops, not commodities. Food crops have economic strength and are fast growing and make money (1-3 2003).

Households forgo notions of sustainability due to the lack of other options available or known to them. This was evident in remarks such as:
The fallow period depends on the size of your land. You have to allow the bush to stay for a long time before it is ready again. If you have small land, then you have to ask another person to borrow his land (4-54 2003).

We don’t use the upland anymore; the soil is no good. We work mainly in the swamp. The fallow is short; there isn’t much land for farming. The population is too high (4-45 2003).

The upland fallow period for me is one year. I plant a crop three times in a row and then switch to a different crop (2-16 2003).

<table>
<thead>
<tr>
<th></th>
<th>Gbahn</th>
<th>Gbedin</th>
<th>Neigbein</th>
<th>Pledehyee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upland</td>
<td>7</td>
<td>1</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Swamp</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Choices in agricultural crops and other investments are primarily a delicate balancing act of managing risk and limited household finances. Crops are based on whatever seeds have been multiplied and saved from the previous season or what is available for purchase (and deemed worth the risk of investing limited household funds, time, labor, etc.). It takes time for agri-businesses to re-establish following conflict and be able to offer seeds, tools, chicks, and nursery stock. For example, a Gbahn respondent remarked, “I am planting palm oil seedlings because they’re available now” (1-1 2003). Reinvestment in livestock was based on quick returns exemplified in the following statement:

Pigs are better than goats. They are faster [to mature] and you get 10 piglets rather than two or three goats (3-35 2003).

Another balancing act is choosing to forgo an investment in physical assets that would be inevitably lost. One readily observable example of this coping mechanism is that households in all of the study villages keep very small numbers of free-range livestock such as poultry (e.g., chickens and ducks), pigs, goats, and sheep. As one man replied:

I have a few chickens, goats, and pigs. But these are used to sell very occasionally. We do not slaughter an animal too often, only on special events. If I sell an animal, someone comes to me; if I carried it to the market, people would think it was sick. Animals are profitable, but gardens [vegetables] are fast money (1-10 2003).
Another example is people’s reluctance (and financial inability) to reconstruct farm buildings. A man reported that he had a farm building, but it was destroyed during the war. He was storing his rice and farm tools in a portion of his house. Adequate storage is a significant issue. Often, households experience profound losses of rice and other field crops by storing it the open (Figure 6.2).

![Figure 6.2 Open-air storage of rice near a farm kitchen in Neigbein, Liberia.](image)

Respondents related that Nimba County households have not kept cattle since the mid-1980s. The explanation given is that small livestock are easy to carry away if there is trouble (i.e., take with them). Also, they reason that confined poultry is not a worthwhile investment to make despite numerous benefits in the long run. The most frequent explanation was:

> We used to raise cattle and keep rabbits and other animals long ago, but now we only keep a few small, small animals. We don’t sell them; they are special occasion food. They [small livestock] are easy to take if you have to run (4-54 2003).

Men from Gbahn expressed their rationale in a similar manner:
We only keep a few for feast times. Animals are needed for weddings, funerals, circumcision ceremonies and other auspicious occasions. Small livestock is easy to carry away if there is trouble (1-1 2003; 1-7 2003).

Accordingly, respondents were disinclined to re-establish tree crops—fruits, oil palm, rubber, coffee, cocoa. Younger households do not have the financial means to afford it, and they may not be around to realize the benefits of their efforts.

Other respondents took a different approach to rebuilding assets and managing risks. Rather than make the relatively large investments in land and financial resources that plantations require, a few households (five in Gbahn, seven in Gbedin, and one in Neigbein) had recently begun planting home gardens (Figure 6.3).

Figure 6.3 Home garden of an IPM-FFS participant. Gbahn, Liberia.
The respondents shared the reasons why they started a home garden and how they use it:

I made a home garden in June 2002. I grow potato greens, bitter ball, and peppers; trees include pawpaw, plantains, and bananas. It is used for emergencies and doesn’t bring much income. My home garden is used for feeding my family and if there is a surplus, for selling. I buy soap and needs for the day from surplus produce. The home garden helps to produce a balanced diet for my family (1-4 2003).

Last year [2002], I made a home garden with my mother. There are some chickens in it and we grow bananas, pumpkins, peppers, and sweet potato greens. It is used for family consumption and assists the far-away farm (1-8 2003).

I started a home garden in February 2002. The reason I did this is because the other garden is far from town. The home garden is used to sustain us instead of buying from the market (2-16 2003).

Several respondents noted that they desire to re-locate from their village to the family land. One woman from Neigbein stated that their immediate goal was to build a house near the farm. She and her husband had invested heavily in purchasing machinery and constructing a distillery. As she saw it, “building a house by the farm is the best way of protecting your investments so that the animals and machinery aren’t stolen” (3-32 2003). A man from Gbahn also had dreams of constructing a house on his land. Until that dream is realized, respondents reported staying overnight on their land to safeguard their crops (3-34 2003; 4-54 2003).

Respondents felt that labor was in short supply. Despite the initial high labor requirements, swamp [lowland] farming has gained rapid acceptance. Vegetable crop production is fast—approximately three months to maturity. Eliminating fallow periods altogether on existing gardens on easy [swamp] terrain has been adopted as a strategy because it reduces the risk of wasting labor investment/time (i.e. human capital) in new garden development in the event of sudden warfare. Swamp farms require annual maintenance to “clean out” the canals from sediment deposits (erosion control techniques are not used to prevent soil from washing into streams and canals), but the basic construction is a one-time outlay of labor. Because of the deep organic soil layer, swamp farming also offers the advantage of continuous cultivation—rather than abandoning the land after two years.
Women expressed a preference for cultivating the swamp areas because they do not have the capital to finance the work it takes to farm the uplands. They have to hire a *kuu* of men to do the heavy work of clearing.

Other management decisions based on *labor requirements* and *time considerations* were communicated as:

- Rice makes more money, but is labor-intensive. I grow more sugarcane than rice because it is easy money (1-1 2003).
- The size of the farm varies. Some years it is bigger and some years, smaller. It depends on labor. If I want a big farm, I join a large *kuu*—as large as 35 to 40 people. If I can afford it, I hire a *kuu* to do the work. Also, it depends on if the husband has plans...(1-12 2003).
- My farm size is based on available labor and how busy I am with other things (3-37 2003).
- This was also expressed as, “the size of my farm varies according to my family size” (4-48 2003). Virtually every smallholder household plans their farm this way.

**Long-term asset building**

As mid-to long-term strategies, Liberian households aspire to send their children to primary school. Ability to send them onto higher education is a distant dream. However, every respondent perceives children’s education as a way of improving their own life conditions (i.e., long-term asset building) because of the traditional family social structure. Children are considered the “backbone” for aging parents (1-4 2003), and are expected to support them when they grow old. The ability to send children to school is also a proxy for relative wealth. Tuition is charged by both the government schools ($1000 LD per semester (4-54 2003)), and private schools, which range from $2000LD to $4000LD per semester per child (Bonkuo 2003). While many respondents noted that their children attend every semester, it was difficult to determine the reliability of their answers. In general, this is not the case. Attendance is sporadic as a consequence of political instability (e.g., closing or
destruction of schools) and lack of household resources. Male children are more likely to attend than female children, and older children are more likely to attend than younger children. Disruptions in education result in children that are considerably older than would normally be expected for a particular grade (e.g., it is not unusual for 12-year old children to attend first grade or for men in their thirties to attend high school).

*Educational programs*, including IPM-FFS were also perceived by all respondents as a way of improving their situation and reducing vulnerabilities in the long run. They freely discussed why they joined the IPM-FFS and had many suggestions for other programs:

I joined [IPM-FFS] because I wanted to learn to plant a better way, about how to grow more on less land (1-4 2003).

I went to the IPM training because I wanted to know about [vegetable] crops and protecting them against insects. I wanted to learn how to make a good garden; I didn’t know about proper spacing...I think that any program that could come and uplift Gbahn—any developmental organization would be welcomed. Agriculture is important because I’ve heard that scholarships are available in the agricultural area (1-5 2003).

IPM-FFS sounded like a good agricultural project that can educate me. A training where you can make your own chemicals. This was my first experience with modern farm practices. I don’t know anything about vegetables and I feel that I need more training in this area. It seems profitable...I have eight children; I want to be able to send them to school (1-10 2003).

I take training in Ganta on water treatment through the Liberia Water and Sewer Corporation—it is funded through the EU. I am a community servant and treat wells with chlorine. I think we need more water purification training. I need more financial support for my farm...the NGOs don’t bring money anymore. In order to open my farm; I need funds. I would like to advance further in agriculture (3-34 2003).

I wanted to receive the IPM training because I have been disturbed by the grasshopper and diseases. What I heard about the IPM way was encouraging. I would like to see health programs here...we need a clinic, clean water...we need groups for women on health and credit. We need help to get us to stand on our own...I’d also like to see training on poultry and piggeries—that would help us financially and provide us with the manure for the fields (3-31 2003).
Another strategy pursued by households for creating long-term assets is planting tree crops or reserving forested tracts of land. Households that choose to cultivate tree crops, either by maintaining trees that their fathers or uncles had planted or initiating their own plantation, indicate several important aspects:

- Greater relative wealth compared to other households.
- Stable access to land.
- Perception of prolonged socio-political stability.
- Longer planning horizons.

Sixteen of the 54 respondents indicated that they were tending existing plantations (started by their fathers) or had established new plantations in the past three years. The oldest respondents had grown tree crops (i.e., coffee, rubber, cocoa, oil palm, etc.) in the past because government policies at the time encouraged commodities and cash crops (2-15 2003; 3-31 2003; 4-54 2003). Eleven men and one woman, in their late 30s to mid-40s\(^2\) were starting to replant oil palms as they gained access to more land and acquired the financial resources to purchase seedlings. As they explained:

> In 2000, I started a palm farm on Dokodan land. I have 23 trees. I started growing it to help the family (2-28 2003).

> I started an oil palm farm because in the long run, I’ll get old and won’t have the strength to support my family. It brings good old age money and is low-maintenance (3-31 2003).

Only two older men who possessed legal title to their land were actively engaged in reserving forested land and replanting timber species (Figure 6.4), while few others expressed the desire to purchase land, reserve forests, and learn about forest management:

> I have approximately two acres of forest and have enhanced this with mahogany and *Terminalia*. There was some forestry extension through Forest Development Authority. Also, some university students were educating local people to replant after they cut trees. I am planting *foe* [*Mano for Heritiera*

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2 Recall from Chapter 2 that the average life expectancy in Liberia is 41.4 years (UNDP 2003).
utilis, also known as whismore or niagon). A plank of this wood is expensive; you can also eat the seeds. The tree is good for the commercial market and my boys—they can use it to build houses for themselves when they grow up. I planted the trees in November 2000; they take approximately 15 to 20 years to reach 3 to 5 feet in diameter...(4-5 2003).

There’s an old farmer who owns 175 acres. None of his children want to farm; they have gone off to other places. He said that if I buy zinc for his roof, I can have half of his land. I would like to grow trees on it and invest for the future (2-30 2003).

EFA came and planted trees in Neigbein...the forests are going, so when these things are going, we need to replace them to use as a windbreak so our houses don’t break down...I am interested in learning about agro-forestry and reforestation for my personal land (3-31 2003).

Figure 6.4 An older man proudly showed his native tree seedlings. Gbahn, Liberia.

Finally, wealthier or relatively more successful households (and consequently, older, more established households) purchase lots and construct houses in the towns of Ganta and Sanniquillie—the county seat of Nimba County—rather than make improvements to their primary residence. This
approach allows households to improve their quality of life and achieve their aspirations more rapidly given the limited range of livelihood opportunities. In other cases, they rent out a second house to NGOs. As several respondents communicated:

I built a house in Ganta three years ago. We live there during the week and go to Neigbein on the weekends. The schools there are much better and you can make good money renting houses to the UN people (3-39 2003).

My husband and I bought a lot in Ganta in 1999. We intend to build a house there so that the children have better access to good schools. I will live there and come to Gbedin with the children on the weekends (2-17 2003).

This strategy helps to protect and hide assets from neighbors and is largely driven by cultural traditions, beliefs and power. It also serves to protect assets from combatants to some extent. However, several respondents mentioned land and rubber plantations that were located in Lofa County and completely inaccessible.

Livelihood strategies

The extreme lack of employment opportunities resulting from chronic conflict and the sheer necessity to survive means that the principal livelihood strategy pursued by households in all four villages is agriculture and agri-business (e.g., African gin production). Table 6.3 indicates that most respondents were not engaged in agriculture as a first profession.

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<td>2</td>
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<td></td>
<td></td>
<td></td>
<td>1</td>
<td>1</td>
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<td>4</td>
<td></td>
<td>2</td>
<td>2</td>
<td></td>
<td>2</td>
<td>16</td>
</tr>
</tbody>
</table>

137
Sixteen respondents identified themselves as lifelong farmers. However, an alarming number—28 out of the 54 respondents—were primary or secondary school students living with their parents. Respondents in their mid-30s and younger were overwhelmingly attended school prior to establishing farms on their own. They dropped out of school because their parents lacked the financial resources and because of the onset of the war. They were never able to return and complete their education. Most of them had started families and had children to support. In addition, the loss of family members, and severe economic circumstances during the past fifteen years meant that their only option was to establish their own farm and contribute towards supporting their extended family.

As these respondents related:

I went to Guinea with my family during the war. Our house was burned, my people were worrying all the time; everything in my life changed. I started farming on my own in 1992; you can’t rely on parents when you’re getting big. I also had my own family to consider. In 1993, I went back to school briefly. In 1994, my uncle was killed when the fighting started again (3-36 2003).

I stopped my education in the 9th grade. The war broke out and I started having children. I started farming because I had no financial support. My mother said that I needed to earn money to buy composition books and pay school tuition and learn to stand alone. My father died, so I have to do things on my own (3-38 2003).

I was a student before the war. During the war, we fled to Guinea. I worked on a rubber farm to get money. In 1996, I started my own farm with my fiancé because my mother died then. I had to help out with my siblings; my father wasn’t strong enough to farm (4-42 2003).

Ten respondents had been employed in various trades or professional positions, or financially secure enough to work inside the home. As one respondent noted, “I was a teacher, but farming is a more reliable source of income” (1-2 2003). Another man added,

...In the past, I made and sold bread with my father in Sanniquillie from 1984-1987. I stopped doing that because when I came to the interior side—here in Pledehyee—you can only carry on farming for a living...(4-50 2003).

Unemployment and the need to survive and feed their families forced them from urban settings to their home villages (e.g., Gbahn, Neigbein, and Pledehyee), where they were able to gain access to
land through extended family members. Others settled in Gbedin because of ease of access to agricultural land through the Dokodan Cooperative:

I worked for Roberts International Airport and my wife worked in the home. When the war broke out, we moved to Grand Bassa County and my wife started farming. I found work with the Liberian Agriculture Company, but when Gbarnga fell in 1994, we fled to Guinea. We left on 26 July 1997—Liberia’s Independence Day and settled in Gbedin and became members of the Cooperative (2-22 2003; 2-23 2003).

I’ve been farming for 30 years maybe…I don’t know. I farmed in Lofa County and grew pepper and rice. The situation with Sierra Leone drove me to Monrovia; I made a business at Waterside Market. The war drove me here. I lost my parents during the war. I started over in Gbedin in 1996 (2-29 2003).

As discussed in the previous chapter, Gbedin respondents are typically members of the Dokodan Cooperative, which produces rice to supply Liberia. The Socialist structure of the Cooperative and the national market for their product serve to buffer households from most forms of uncertainty. Gbedin households lack representation for ensuring fair market prices for vegetable crops.

In Gbahn, the production of African gin is the prevailing agricultural strategy and the risks are minor. Spoilage during transportation to markets is not an issue. There are well-established markets for the product; labor demands are fairly minimal—sugarcane is perennial and requires only occasional brushing; and the crop requires no inputs. Because of the stability and predictability that sugarcane and cane juice production provides, even the IPM-FFS participants’ households were reluctant to experiment with vegetable crops, despite the observation that malnutrition is extremely high and people purchase vegetables rather than grow their own. A few were starting to notice the relative advantage of vegetables and consider diversifying their income sources:

Vegetables only take three months to mature whereas sugarcane takes six, seven months. So, vegetables are easy and quick money (1-2 2003).

I plan on doing vegetables when I get old and can’t do this [operate the steam mill]. The mill operation is physically demanding work. Vegetables are easy
work. You can cover a small area and make fast money. A vegetable garden is a good backup (1-9 2003).

I started growing vegetables last year after learning about them in IPM-FFS. They are a quick way to get money. The experiments convinced me that it was good to try—you can get good money within two to three months (1-10 2003).

Households in Neigbein and Pledehyee grow vegetable crops for resale in Monrovia and other commercial centers. They lack the relative security afforded by the Dokodan Cooperative to provide credit and market representation—farmers must negotiate prices on their own with a wholesale buyer. Furthermore, respondents cited high rates of spoilage when transporting vegetables to Monrovia.

Supplemental livelihood strategies

While many of the respondents reported that they and their spouses engaged in farming exclusively, others divide their time between agriculture and additional livelihood strategies, mainly on a part-time or seasonal basis. Teachers and clergy are not paid, but do receive tokens of food and other items. This information is contained in Table 6.4. Respondents from Gbedin engage in other activities more frequently and have more professional-level opportunities available.

Table 6.4 Off-farm occupations of respondents and their households.

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Gbahn</th>
<th>Gbedin</th>
<th>Neigbein</th>
<th>Pledehyee</th>
<th>Tot.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>F</td>
<td>M</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>Construction</td>
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<td>1</td>
<td></td>
<td></td>
<td>4</td>
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<td>21</td>
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<td></td>
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<tr>
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<td></td>
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<td>7</td>
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<tr>
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<tr>
<td>Driver</td>
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<tr>
<td><strong>TOTAL</strong></td>
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<td>4</td>
<td>11</td>
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Understanding household choices in adoption/non-adoption of NRM practices

The goal of a developmental relief program is to be able to support livelihoods and help people achieve their aspirations through appropriate interventions. Households experience directly the effects of ecological design research when they adopt the resulting NRM practices. Therefore, it is important to examine facilitating processes and constraints to adoption on several levels: differences between men and women, and between villages. This helps to identify sources that might benefit or exclude various groups from the direct benefits. The Sustainable Livelihoods Framework (DFID 1999) is used here as a way of understanding adoption and non-adoption of the NRM practices.

Two dominant themes emerged as the IPM-FFS participants reflected on their experiences with the NRM practices: 1) whether or not they felt the NRM practices were compatible with perceived or real vulnerability; and 2) the role of limited household assets in promoting or inhibiting adoption. Permeating these two areas are relationships with cultural beliefs and power; gender issues; and traditions and social norms that can help explain how people are positioned with respect to vulnerability and assets, and whether they adopt NRM practices learned through the IPM-FFS intervention.

Quantitative information on adoption is displayed in Table 6.5. Adoption of a particular NRM practice is noted by sex and by village.
Table 6.5 Respondent adoption patterns by village

<table>
<thead>
<tr>
<th>NRM Practice</th>
<th>Gbahn</th>
<th>Gbedin</th>
<th>Neigbein</th>
<th>Pledehyee</th>
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<td>8</td>
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</tr>
<tr>
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<td>7</td>
<td>5</td>
<td>8</td>
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Adoption/non-adoption in relation to vulnerability

One of the most poignant characteristics of the Liberian respondents is not just their extreme poverty, but also their vulnerability to many hazards, including basic safety, loss of income, assets, and health. Vulnerability occurs from multiple sources: chronic conflict and political instability; lack of security within communities; biophysical; and cultural beliefs and power relations. The NRM practices taught during the IPM-FFS were aimed at alleviating vulnerability. Concerns about each source of vulnerability were significant determinants of adoption. Some of the NRM practices, in particular, increased people’s vulnerability. For example, allocating some portion of time, land, and labor to the cultivation of vegetable crops for the sugarcane farmers of Gbahn, or adoption of beekeeping—which would require households to make a significant commitment of financial resources for a physical asset that may take six months or longer to bring returns and is not easily transportable in the event they have to flee. Conversely, practices that reduced dependence on purchased inputs (e.g., practices that reduced predation by grasshoppers) were adopted because they reduced people’s vulnerability. The next three sub-sections explain adoption in relation to vulnerability. Vulnerability in regard to cultural issues will be addressed in a separate section.

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3 Farmyard manure was adopted passively by seven respondents. These respondents had constructed home gardens recently and were allowing free-range chickens to roam inside the fenced garden.
Chronic conflict and political instability

The paramount source of vulnerability is the milieu of chronic conflict and political stability. All of the respondents experienced displacement at least twice since 1989. Households residing within the Ganta area experienced active fighting in 1989-1990 and again in 1993-1994. Respondents from other regions of Liberia who relocated to the villages surrounding Ganta have been displaced for longer periods of time. As a result, news of violent outbreaks in the region creates great fear and panic among people. One woman had ambitiously constructed two snail trenches but seemed rather discouraged with the practice at the time of the interview. She admitted:

I have one trench for snails; I don’t have very many [snails] right now. When the trouble started in Gbarnga [a commercial center several hours away] last May [2002], I removed all the snails and sold them for quick money in case we had to run (2-27 2003).

This woman’s experience provides an example of the liquidity of “farm-raised” snails. One could argue that it demonstrates how the IPM-FFS content perfectly matched the context by providing diversification of livelihood strategies, short-term planning horizons (i.e., short time needed for snails to reach marketable size), and providing a source of “quick money”.

As discussed in the previous section, instability creates a cruel cycle that limits people’s ability to establish (or re-establish) long-term operations. The respondents seemed to make investments based on their calculations (or perceptions) of the risks involved and the relative benefits to them. Chronic conflict and political instability has the added dimension of limiting availability of goods and materials, even households possess the motivation to re-establish agricultural endeavors. Although one man observed that, “Chicken manure works best on our vegetables and makes the soil good” (3-33 2003), it simply is not generally available. Respondents mentioned that “chicken manure is hard to get—not enough chickens around” (3-31 2003). Indeed, use of any type of manure on upland soils was not observed; the soils are completely devoid of organic matter. Commercial poultry farms in the nearest commercial centers (e.g., Gbarnga and Yekepa) were destroyed during
the 1989-1997 war and never re-established (Wonyenneh and Kokeh 2003). Subsequently, obtaining chicks is cost-prohibitive for most people (Bonkuo 2003).

Not surprisingly, prolonged instability transforms people’s outlook on life. In some cases, it creates morbid incentives for gaining new knowledge and improving their management expertise. A man who had signed up his entire family for the IPM-FFS training expressed his way of thinking as, “My whole family needs to know these things in case I’m not around” (4-54 2003). The full impact of his statement was not evident to me until several months later. After several weeks of conducting interviews, it was evident that many of the IPM-FFS participants were closely related to each other.

In other cases, enduring disorder de-motivates people. A woman who originated from Lofa County and had been internally displaced for nearly ten years, forlornly seemed to sum up the prevailing sentiment:

God will decide. I don’t know about tomorrow. Liberia still seems unstable to me. I cannot have a future to plan on. The election [for president] will be in October. Then I know how things will be. If things go well and settle down, then I am interested in getting serious about all this IPM business (3-35 2003).

Interestingly, she had adopted five of the seven LEISA practices (all but the use of farmyard manure and slash-and-mulch). Other respondents shared her mood, but were not as outspoken.

**Petty theft and security concerns**

Chronic conflict and the resultant extreme poverty have led to social breakdown and desperate behaviors. Petty theft is rampant everywhere—the four study villages, the Ganta United Methodist Mission Station, and at other local NGO headquarters. People will steal anything that is perceived to of use or value if it is not locked up or hidden. Unripe fruit, livestock, tools, and so forth are stolen. During particular times of the year, theft is predictably higher: around Christmas and just before the start of each school term (when tuition is due). It is not unusual to observe people buying back their belongings on the streets of Ganta. The themes of thievery, frustration over loss, and the
lack of secure facilities to store items were dominant concerns expressed by the 54 respondents and eight local key informants. A woman from Neigbein casually mentioned that she owns pigs and a goat, but she gave the goat to someone else for better security. Her chickens were recently stolen. An older woman from Gbahn remarked, “People trouble you at home and take things (1-4 2003).

Twelve of the 54 respondents had adopted the snail practice. All of them universally voiced their frustration with repeated theft of their snails and a lack of security around their houses. Each of the IPM-FFS leaders expressed frustration in trying to protect the group’s snails. The Neigbein IPM-FFS group tried to solve the issue by constructing a box and putting a latch and lock on it (Figure 6.5), rather than the traditional method of digging a trench in the ground to house the snails. Someone ran off with the entire box. “Rogues come in the night and take them” was a frequent lament. A woman from Gbedin voiced her extreme aggravation:

I tried the snails, but it has been difficult. I have one trench. The first time I tried, all the snails were stolen; they were stolen three times, so I have gotten discouraged. It’s really a good practice and easy to do, but the thievery is vexing me” (2-24 2003).

Other problems in relation to the home snail production practice were destruction by children and free-range pigs—they rooted through the trenches.
Economic and nutritional vulnerability

High levels of uncertainty lead to a deeply entrenched way of life. Respondents from Gbahn were particularly disinclined to adopt any of the practices taught at the IPM-FFS (they adopted an average of two practices). Sugarcane is widely grown and processed locally into African gin. As a crop, sugarcane requires little labor and no inputs of fertilizers or pesticides. There are a number of processing mills and distilleries in the area. Markets are well established. The Gbahn respondents widely acknowledged that they grow sugarcane and that vegetables are a new practice to them. Stated bluntly, “Gbahn is a sugarcane-growing area; we do not grow vegetables” (1-1 2003). Another reported:
The topics taught during the IPM school are very new to us; we do not grow vegetables. We learned about vegetable crops and how to construct beds and about planting in a line (1-5 2003).

For Gbahn households, African gin is a reliable source of income. Despite widespread social problems\(^4\) and malnutrition\(^5\), and the acknowledgement that “food crops have economic strength and are fast-growing”, farmers are hesitant to give up sugarcane crops and grow vegetables. As one man put it:

I sell gin and bushmeat...I haven’t tried any of the IPM practices; I want to try this year. I will discuss it with my head wife. Sugarcane is easy; you just leave it (1-8 2003).

The IPM-FFS was tailored to the Gbahn participants to emphasize and educate them on nutritional crops, such as vegetables, and how to grow them (e.g., making a nursery, transplanting in the field, proper spacing, etc.). Thus, the decision to abandon sugarcane, or even diversify crops, would require households to allocate land and labor as well as purchase additional tools (e.g., shovels, hoes, rakes, watering cans, sprayers, etc.). In this way, one could make a case that adoption of LEISA practices, which would be needed if a household chose to grow vegetables, could potentially expose a household to increased economic vulnerability on one hand, but solve their nutritional problems (and save them the expense of purchasing vegetables from the market).

The need to observe others experiment with a practice before adopting on their own was primarily articulated by Gbahn respondents, and to a much lesser extent by Neigbein and Pledehyee respondents. This is common coping strategy for people experiencing high levels of vulnerability (Fitzgerald 2004). Older respondents verified that, “in Liberia, people are reluctant to try new things. Most won’t try them on their own. They want to see someone else try it first as an experiment and

\(^4\) Drunkenness among the sugarcane growers, mill workers, and distillers is common. Sleeping men and boys, bloodshot eyes, slurred speech, and the strong smell of alcohol on the breath were the norm during interviews and field observations.

\(^5\) Children were observed with the signs of extreme malnutrition—distended stomachs and discolored hair. Among the Mano, malnutrition is believed to be caused by ‘witching’. Tragically, this belief causes many families to disregard the importance of healthy food for children (Waines and Waines 2003).
then come see it.” Several key informants confirmed, “People don’t want to be at the forefront. They want someone else to try it out first” (Wonyenneh and Kokeh 2003).

Contrastingly, the Gbedin respondents seemed to have an overall higher standard of living and some economic protection afforded by membership in the Dokadan Cooperative. As a result, a slightly higher number of IPM-FFS participants and their households adopted the snails than participants from the other three villages (Table 6.5). As a group activity, the Gbedin IPM-FFS participants seemed to place a priority on making beekeeping an economic success.

### Biophysical causes of vulnerability and adoption/non-adoption

The seven LEISA practices were aimed at reducing two of the greatest biophysical causes of vulnerability in Nimba County households—low crop yield caused by declining soil quality, and agricultural pests and diseases. Because these practices addressed direct threats to their major livelihood, the IPM-FFS participants, in theory, had a strong incentive to adopt them.

As discussed in Chapter 5 and earlier in this chapter, declining soil quality on upland areas is a severe problem. The increase in rural populations in the Ganta area created a situation where fallows has been reduced to nearly half their historic rates (i.e., five to six years rather than the eight to twelve-year fallow period prior to the outbreak of civil war). In addition, land scarcity drives households to cultivate on increasingly steep slopes where organic layers are considerably shallower. Some households responded to these problems by farming exclusively in the swamp valleys and abandoning the uplands. The LEISA practices directed at ameliorating soil fertility issues included: composting, slash-and-mulch, and farmyard manure.

*Composting* was implemented five respondents and the IPM-FFS leaders—the lowest rate of all of the LEISA practices. Reasons for rejecting this practice seemed to be both biophysical and cultural. Although respondents cited a lack of space around the house to start a compost pile, or the lack of wheelbarrows to transport it to their farms, it was unclear at first why they would not choose
to start a compost pile on the farm, near their farm kitchens (where there would be a source of food scraps). Houses in Liberian villages are frequently constructed close together, and indeed, there is often precious little space for additional household activities (e.g., snail trenches, sheds, or home gardens). Observation and further inquiry provided clues. Houses are completely devoid of landscape plants, and trees are scarce within villages. Leaf litter is swept away from houses and tree roots to prevent termites (Figure 6.6).

![Image](90x710)

**Figure 6.6 Leaf litter is swept away from trees and houses within the village.**
Compost piles would create a habitat for termites and other unwanted fauna.

*Slash-and-mulch* (Figure 6.7) also seemed to have biophysical as well as cultural reasons behind respondents’ reluctance to adopt the practice. Fifteen out of the 54 respondents adopted slash-and-mulch and were observed using the practice on their farms. Respondents were hesitant by and large to adopt the use of slash-and-mulch to improve depleted soils for similar concerns—an overriding fear of poisonous snakes\(^6\) establishing themselves under the slash. All of the respondents

\(^6\) This is not a trivial concern, particularly since medical intervention would not be expedient. Poisonous snakes in Liberia include: West African bush viper (*Atheris chlorerchis*), puff adder (*Bitis arietans*), Gabon viper (*Bitis gabonica*), rhinoceros-horned viper (*Bitis nasicornis*), rhombic night adder (*Causus rhombeatus*), Jameson’s mamba (*Dendroaspis jamesoni*), black mamba (*Dendroaspis polylepis*), West African green mamba (*Dendroaspis viridis*), forest cobra (*Naja melanoleuca*), black spitting cobra (*Naja nigrigollis*), and the black tree cobra (*Pseudohaje niga*) (TLC 2003).
prefer to burn the fields before planting, because they believe it “adds something to the soil and kills termites and nematodes” (3-33 2003; 3-41 2003).

Figure 6.7 Use of slash-and-mulch on a respondent’s farm. Neigbein, Liberia.

The desire for a solution to the chronic problem of grasshopper predation was evident by statements such as, “grasshoppers are embarrassing my crops” (4-46 2003) and “I have been disturbed by pests” (3-33 2003). Those who had some familiarity using pesticides had observed that insects had developed resistance to them. They were mixing chemicals in high concentrations (Figure 6.8).
Figure 6.8 Agro-chemicals are mixed at varying levels to combat pests.

The LEISA practices aimed at these problems included: multicropping, intercropping, trap-and-decoy crops, and neem—a biologically-derived pesticide. Indeed, adoption was quite high among three of these four practices:

- Multicropping—46 of 54 respondents;
- Intercropping—46 of 54 respondents;
- Trap and decoy—27 respondents;
- Neem—47 respondents.
The IPM-FFS participants queried about their experiences with these NRM practices felt that it reduced their crop losses. Field observations confirmed a distinct difference between non-participants growing a single crop in a plot and relying on hand-picking and IPM-FFS participants who had adopted a variety of LEISA practices aimed at pest control. Non-participants’ fields were passed on the way to walk around and observe IPM-FFS participants’ fields. Neem merited the response from a Pledehyee couple that it “works well, but slow, slow, slow; chemicals work much faster (4-42 2003; 4-43 2003).

Household assets and adoption/non-adoption

Poor households generally have fewer assets than less poor households. This means that NRM practices that require a high level of assets to adopt are more likely to exclude the poorest households from direct benefits. Liberians are among the poorest of the poor because of repeated loss.

Reardon and Vosti’s (1997) concept of ‘conservation investment poverty’ highlights poor households’ limited capacity to mobilize the necessary resources for even highly profitable and effective NRM practices. All of the NRM practices taught during the IPM-FFS require some combination of assets, but those practices that build upon already-existing assets are more likely to be adopted than those that require large investments (e.g., significant knowledge base, labor, financial resources, tools, or group capabilities).

This section discusses adoption in relation to the following assets listed in Chapter 1: 1) natural resources, 2) human (i.e. education, knowledge, skills, health, and labor requirements), 3) financial, 4) physical assets (tools, and infrastructure), and 5) social assets.
Natural resource assets

Land is the foremost natural resource asset required to adopt a given practice. All of the LEISA practices could be adopted on any size holding. Additionally, because none of these practices require long-term investment (a necessary consideration in the milieu of chronic conflict and political instability), even tenants could adopt. Examination of the complete quantitative results (found in Appendix D), reveal no discernable differences between those who rent or borrow land, and those who use family land. Even poor, female-headed households (FHH) could adopt the practices if they desired.

Soil quality varied among the four villages. Gbedin households cultivate vegetables on floodplain soils. Respondents deemed their soils “already rich.” They claimed they never added anything, “and still don’t after IPM.” They remarked that their land floods on a regular basis providing sufficient nutrients. Conversely, respondents from the other three villages experienced decreasing yields on upland farms. Respondents reported that they dealt with that by: abandoning the land and making a new farm somewhere else and/or burning to increase soil fertility. However, as reflected in Table 6.5, the three LEISA methods for improving soil fertility saw low adoption.

Human assets

Human assets include the education, knowledge, skills, health, and labor requirements required to adopt a given practice. Education levels among the respondents, and their households, were expectedly low. This was anticipated, and the IPM-FFS was designed accordingly (e.g., Mano translators, use of field experiments and pictures). Interviewees universally agreed that a lack of education did not prove to be a hindrance to adoption. Women who had never before had any formal school education were especially delighted to participate in the training program. Men also responded favorably to the approach:
I liked the IPM training. It was good because it was taught in a practical way rather than in a classroom all the time. The EFA training was mostly handouts on paper. This was not very effective; it was too theoretical (3-34 2003).

Pre-existing knowledge (i.e., expertise) played a major role in adoption of NRM practices. *Multicropping* and *intercropping* were adopted by 46 of the 54 respondents. Observation of their farms confirmed the use of these simple methods of pest and disease control. This was because people already possessed this knowledge—these were practices they had either learned from their parents or from older farmers. In fact, people did not report these as new practices, but traditional ones. This was evident in statements such as, “I take a bunch of seeds and mix them in my hand together before I plant” (1-4 2003). What was new to them was *why* they should plant that way and planting techniques (i.e., planting seeds or transplanted seedlings in a row rather than broadcasting seed). They did not know that there were numerous beneficial reasons for multicropping and intercropping:

I didn’t know why we did things that way; I just did it out of habit. My people taught me those ways (1-14 2003; 4-42 2003).

These two practices promote agroecosystem diversity, which leads to a more stable, natural system, thereby significantly lowering vulnerability from biophysical sources (Lyle 1985; Aber and Melillo 1991; Lyle 1994; van der Ryn and Cowan 1996; Sullivan 2003).

Half the respondents (Table 6.5) indicated that they were using trap and decoy crops as a means of reducing crop damage by grasshoppers—the predominant pest. This may be attributed to the fact that the trap and decoy practice *adapts* or modifies a traditional practice. The trap and decoy method involved planting corn at the edges of vegetable plots and along the bunds of swamp canals to reduce the number of grasshoppers penetrating the fields, and to provide a decoy crop of a vegetable that is not typically consumed by Liberians. Some farmers removed the grasshoppers from the corn by hand and others just left the corn alone.
Neem was adopted by 47 out of 54 of the respondents. The respondents viewed this practice as an adaptation of a traditional practice. Liberians have a host of flora used for medicinal purposes (Harley 1970). Therefore, use of plant parts and derivatives for use in controlling pests would seem rather customary. The German development agency, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), had planted neem trees in Nimba County villages during the 1970s and 1980s. GTZ and Nimba County Rural Development Program (NCRDP) developed nearly 70 different uses for neem, but much of this former knowledge had been lost (Bonkuo 2003; Wonyenneh and Kokeh 2003). Respondents often referred to neem as “country leaf” or “NCRDP leaf”.

New knowledge—information gained during the IPM-FFS—served in promoting adoption of the LEISA pest-control practices and fostering experiments on their own farms. Respondents were able to recall several different methods for controlling pests and increasing soil fertility. They articulated their preferred methods and why they had changed their practices. Comments from the respondents reflected a new level of knowledge and self-confidence. They were eager to share their experiences; some articulated zeal to learn more things. This was evident through statements such as:

I was innocent of the dangers of Karate® [a commonly-used pesticide]. Seeing the pictures of people who used chemicals and how it would affect me made me aware of the dangers. Now that I know, I won’t use them anymore (1-3 2003; 2-20 2003).

I learned about differences in insects—beneficial ones and the damaging ones. I learned that the preying mantis is the farmer’s friend (1-3 2003; 1-10 2003; 2-18 2003).

I used to grow the same crop over and over, but I saw good results on the IPM crops (3-36 2003; 4-43 2003).

I am experimenting in a small way in my home garden (1-6 2003).

My farming is more “organized”; the IPM was my first experience with modern farming (1-5 2003; 1-10 2003; 1-12 2003; 1-14 2003).


Now I know how to make my own fertilizer and pesticides (2-16 2003).
When I see plants that look bad, I uproot them and throw them in the river so they don’t infect other plants. I also wash my tools before using them on my own farm so my plants don’t get diseases (2-24 2003).

I am interested in learning about other issues like reforestation (4-54 2003).

My husband is encouraging me to stick with this IPM business; modern ways will help us out in the long run (3-32 2003).

We have to learn to do better and make sure that the knowledge doesn’t go away; other villages need to know these things (3-38 2003).

From the IPM school I learned about animal manure and how good it is for the crops…if things settle down, I hope to raise rabbits. They are fast money and a good source of manure for my crops (3-39 2003).

I learned many practical ideas about farming; I want to learn more because we need to stand on our own (4-49 2003).

After IPM, I started using the neem because I don’t believe in chemicals anymore. What made me change is seeing those pictures of the people and how it would affect me. Also, I’ve had some bad experiences when using them. It got my throat and nose sore and my eyes were not so clear—it’s a slow poison. I used to use Karate® and Kartagen®. We bought it in Guinea (4-50 2003).

Themes about self-sufficiency and the ability to feed their family, were prevalent in many of the interviews.

The development of new knowledge spilled over in respondents’ desire to tell others about what they had seen and experienced on the IPM-FFS field trials and on their own farms. The new methods to control grasshoppers—particularly how to prepare neem—were the most frequently transmitted information. However, in Gbedin, it seemed as though there was disconnect between the knowledge gained and implementing it on all crops. One respondent summed up the way he was implementing the new practices:

For the vegetables, I use NPK 15-15. It is purchased from the market in Monrovia. The technicians taught us to use chemical fertilizers on the rice. I also use chicken manure and the slash-and-mulch method. I use neem or the grasshopper spray on the vegetables and pesticides on the rice. The Ministry of Agriculture supplies us with U-46 herbicide (2-16 2003).
Health issues are also an important component of human assets. Twenty-two out of the 54 IPM-FFS participants interviewed were unable to complete the entire 18-week training (Table 6.6).

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A frequent explanation for dropping out was illness. For example, a man in Gbahn was reported to have dropped out because of illness related to rheumatism (1-3 2003). Women were particularly subject to abandoning the program as a consequence of poor health and pregnancy complications:

I attended about four times...I got sick and couldn’t continue (2-21 2003).

I went for a few weeks, but then I had a problem with my pregnancy that required a hospital stay (2-26 2003).

In Gbahn, only one of the five women interviewed was able to complete the training and receive a certificate.

Lastly, the labor requirements of a NRM practice seemed to play a pivotal role in decision-making. Choosing one practice or rejecting another seemed to be based on labor requirements—expressed as a time-saving or time-consuming activity. Adopting neem meant saving time. A male respondent noted, “I can’t be on the farm constantly handpicking grasshoppers.” A woman observed:

I use neem with the same frequency as the decomposed grasshoppers—and equally effective, but is easier to do (3-32 2003).

Farmyard manure merited the observation:

Manure is effective, but labor-intensive (4-54 2003).

I have to sweep it up, dry it, and then pound it in a mortar to a powder. Then I have to carry it to the farm and mix it with water (4-42 2003; 4-50 2003).
In some instances, stated reasons for adopting or rejecting a practice appeared to be inconsistent with observed behavior and practices. Despite a lack of wheelbarrows, a few respondents noted that they will “move black soil from the swamps to mix with the upland soils to improve soil fertility” (1-5 2003) and similarly 1-6 2003. People who did not adopt any practices vaguely stated that they were “too busy” with other activities. In most cases, they were mill operators and distillers, and derived the greater part of their livelihood from African gin production.

Despite being responsible for the bulk of the household duties, women did not indicate that particular practices involved additional labor requirements. Beekeeping and spraying neem on crops seemed to be the only two gendered NRM practices. Women commented that these were considered “men’s work”.

Financial assets—cost and availability of inputs

Ease of implementation from a human capacity standpoint is not the only explanation for the attractiveness or adoptability of particular NRM practices. Practices were more likely to be adopted when the necessary inputs were readily (and freely) available. Local people use chemical pesticides infrequently because it is cost-prohibitive; they rely on labor-intensive methods of control (e.g., hand-picking) instead (or doing nothing). Households that do use chemicals on their crops do so by forgoing necessities or aspirations. Respondents reported to base their adoption of neem on: 1) the financial obstacles to purchased inputs; 2) a dire need to limit crop damage; and 3) the general availability of the neem leaves. The high cost of chemical inputs (i.e., fertilizers and pesticides), and a feeling of helplessness to control grasshopper damage, was strong motivation for participants to learn and adopt methods that did not require financial assets.

Chemical fertilizer costs $2000LD per 25kg bag. Most farmers don’t have that kind of money (4-54 2003).
Daily field observations of respondents’ farms, as well as investigation of the local mercantile in Ganta, verified that both pesticides and fertilizers are infrequently used and unavailable for sale. In eight weeks, I saw chemicals being applied once—in a swamp valley farmed by residents of Neigbein and Pledeyhee. People must travel to Monrovia or Dieke, Guinea to purchase these items. The respondents, and the friends and neighbors they shared the information with, used neem because it was free, however, with the caveat that trees had to be nearby. Gbahn did not have neem trees. Some respondents indicated that they were able to obtain leaves in Ganta (six miles away); others replied that it was too hard to do (since there were no trees around).

Beekeeping and snails—the two productive conservation practices—were the most difficult to adopt. Everyone acknowledged the potential profitability and ease of marketability of honey and snails. However, no one was able to adopt beekeeping on his or her own. Constructing hives was cost-prohibitive. The predominant response to the introduction of productive conservation practices was that it takes “financial strength” to purchase planks for constructing beehives and making covers for the snail trenches.

You have to go and buy planks. We only have one sawyer in the village. It is expensive. If we had a micro-credit program, that would get it going faster. We do not have extra money to invest in these kinds of projects. We really do want to do it—wild honey is scarce, so it sells very quickly in the market and gets a good price (1-3 2003).

Another man responded, “I am not doing the snails or the bees—I can’t afford it” (4-48 2003). Two of the most frequently repeated refrains were, I don’t have the materials to make the boxes, and I don’t have the financial strength to do bees or snails. This sentiment was echoed by virtually everyone. Eight respondents out of 54—primarily the Gbedin IPM-FFS participants and the IPM-FFS leaders from each village, were experimenting with the snails and had devised various ways of housing them (Figures 6.9, 6.10, 6.11, and 6.12). Respondents from Gbahn, Neigbein and Pledeheye were only experimenting with the snails as a group project (with varying levels of enthusiasm in evidence).
Seventeen respondents claimed to be using farmyard manure as a means of increasing soil fertility. This was difficult to verify. However, respondents that admitted they were not using the practice attributed it to a lack of manure. This was also difficult to confirm through field observation. Households do keep small quantities of free-range livestock (i.e. pigs, goats, sheep, ducks, and chickens) in the villages. However, Pledehyee and Gbedin were swept daily and waste was discarded (somewhere); Gbahn and Neigbein were replete with human and animal waste.

Figure 6.9 Household snail trenches. Gbedin.
Figure 6.10  Snail trenches incorporated into lanai design. Gbedin.

Figure 6.11  Simple snail trench. Gbedin.
Physical assets

Of all the impediments to adoption, respondents cited the lack of tools as being the most critical explanation. Ten of the 14 respondents from Gbahn affirmed that their household owned only one cutlass (no other tools); one respondent had no tools. Gbedin respondents reported a similar lack of tools—ten of 16 respondents shared one tool among household members; two respondents reported no household tools. Neigbein respondents seemed to have many household tools; only two respondents reported ownership of one household tool. Finally, five of 13 respondents in Pledehyee reported ownership of only one tool in their household. Poorer households, typically female-headed households, owned one cutlass, if that. As one woman stated:

The biggest obstacle to adopting IPM practices for me is the lack of tools; I don’t own any… (1-12 2003).
As discussed in the previous chapter, land management operations are entirely accomplished by hand tools (i.e., cutlass, axe, hand hoes, shovels); there is no mechanization. Chronic conflict over a 15-year span has resulted in the repeated loss of assets. The one tool deemed absolutely essential is the cutlass. It is used to perform a variety of tasks—clearing, digging, weeding/brushing, etc.). When other tools are needed, people try to borrow from others.

Social assets

Despite the inability of households to adopt the two productive conservation practices on their own, there was strong evidence of the participatory and social capacity-building elements of the IPM-FFS coming into play. This occurred on three levels. The first involved individual participants telling other household members as well sharing their experiences with other relatives and neighbors. The second was the transformation of each IPM-FFS group into CBOs after the training had ended. The third was the expectation that the four IPM-FFS leaders would become ‘model farmers’ who serve as examples to others in the community (by using all of the practices on their farms).

Most respondents reported that they had told their friends and neighbors and other family members about the practices, especially, neem. It was difficult to corroborate the extent to which respondents actually shared their newfound knowledge with others, but their level of enthusiasm was impressive. One man offered:

One of my friends came to me with a grasshopper problem. I showed him how to mix up neem. He has a drum; we can make large quantities of it for everyone to use (3-41 2003).

Another added:

I told other farmers from Gbuyee about the neem spray. They are using it and gave me positive feedback (3-38 2003).
The respondents admitted that not all of their friends were convinced of neem’s effectiveness and were certain that chemicals worked better.

As referred to in Chapter 3, the beekeeping and snail practices were anticipated by SARDI and GUMAP to be difficult for households to adopt. These practices were presented as introductory topics during the IPM-FFS. Additional beekeeping training was planned for March 2003. Accordingly, these two practices were mainly aimed as group projects. This provided an alternative to the combination of human, physical, and financial assets requisite for household adoption. As one woman remarked:

I decided not to try bees and snails...I would never do beekeeping alone. It’s a man’s job and requires teamwork...when something is new, it is better to try it as a group so they can all figure it out and see what it takes… (1-4 2003).

Group beehives and snail trenches/boxes substitute social capital—a proxy for which is the strength and functioning of group membership—for financial and physical capital. This allows subsistence-level smallholder households to gain confidence in their abilities and adopt these practices over the long-term, provided the IPM-FFS groups can be sustained. SARDI had hoped that core of participants in the four IPM-FFS groups would stay together to form a local CBO and recruit additional members.

The four IPM-FFS groups appeared to have varying levels of functioning in regard to social capacity. The Gbahn IPM-FFS seemed to be struggling to stay together. Most of the participants were still skeptical about the efficacy of the NRM practices. The leader related that:

Organizing the group is taking time and going slow. I have given a piece of my land for us to experiment on. In Liberia, people are reluctant to try new things...most won’t try on their own—they want to see someone else try it first as an experiment and then come see it. Some of the original members have moved away, although we have gained a new member. He wanted to participate in the [IPM-FFS] training, but was ill with rheumatism at the time. The Neem tree seeds died….beekeeping is going slower due to the financial strength it takes...we have eight boxes as a group and our trying to get colonized. We are hoping it will work out eventually. We would like GUMAP to support us by starting a micro-credit program. That would help us
get the bees going faster. Our members do not have much extra money to invest in the group projects such as beekeeping. We really want to do it. We are hoping that over time, we can expand and market the honey (1-3 2003).

He admitted that culturally entrenched beliefs and practices made his job as a model farmer crucial if things were ever going to change.

Neigbein’s IPM-FFS leader related her experiences over the past year:

My group has been trying to promote the snails as a home garden project by women. We were taught to dig trenches in the ground near the home, cover it, and it would be a ‘home enterprise’. We found problems with this method. When we were away in the fields working, children would come and steal the snails and eat them, pigs would run through and dig up the snails, etc. In September [2002], we built a raised box and have about 60 snails in there. They are presently laying eggs. When they hatch, we hope to divide up the snails among our group so members can start their own boxes. They want to be able to sell them... During the IPM, we built some bee boxes; they were colonized in September. It takes about six months to get honey. We’d like to stay together as a cooperative group and sell honey.

[During my extra training in Ghana] I was required to develop an ‘action plan’. I am training the CBOs here—Gbukiamon, Seledowah, and Kokeleh (3-33 2003).

The IPM-FFS leader of the Pledehyee group related that he has “talked to a lot of the farmers around here” (4-54 2003), but was having difficulty getting the group projects going. He and his wife were actively involved in the local CBOs—both the agricultural one and the health and nutrition groups.

At the other end of the spectrum, the Gbedin IPM-FFS and their leader seemed to be energetic. It actively promoted beekeeping among its members. The IPM-FFS group had stayed together after the training and formed a community-based organization, which met weekly to work together on projects. The proceeds from their various projects were invested in the construction of beehives. Six of their members kept the hives near their homes and were responsible for safeguarding them. The leader of the Gbedin IPM-FFS was vibrant and enthusiastic about the progress his group was making. He beamed while he told of his experiences:
I am really excited about IPM and the things I learned. I go around during my own time to each farmer and get him interested. I keep talking to each one about the different things I learned.

Our IPM-FFS has remained together since the training. We are very active. We started meeting every Saturday evening when farming is in full swing. We meet on Saturday to make our plans for the following Wednesday. Wednesday is our day when we get together and work on our group’s projects. We started our own micro-loan program. We gave out $300LD in loans. Interest is $25LD per hundred dollars (LD). The repayment period is three months.

Our IPM-FFS group went into cabbage production together and realized $5000LD. We decided to invest in beekeeping, so we didn’t have to seek capital to start this project. The next thing our group would like to do is invest in corn. I learned about corn in Ghana and brought back cups of seed corn. We do not grow it much here. Corn is useful for feeding chickens and pigs; they grow larger and are healthier.

There are four things that I think contribute to our success and ability to start and complete so many projects. They are: (1) an understanding among the group members. Each member has to have the same mindset in order to achieve results; (2) respect for each other; (3) regularly scheduled meetings; and (4) members who are highly interested. I have to admit that we have lost members—two women. One woman left to move to Monrovia. The other woman took a loan from our micro-credit program but didn’t have the right understanding. She didn’t repay. We had to use a small ‘iron hand’ on her. She got kicked out of the group for failure to repay...we did get the money back eventually (2-30 2003).

Related to group functioning and social capacity building was the role of GUMAP staff.

Follow up and social support by GUMAP staff seemed to be non-existent in all of the villages except Gbedin. This vexed the IPM-FFS leaders. As three of the IPM-FFS leaders collectively responded in a group interview:

We would like to see encouragement by GUMAP. In order for farmers to try it for themselves, they need the extensionists to come out on a regular basis—even if it’s only once a month...I’d be willing to go around once a week and talk to the farmers. But, the only time we see them is when they’re bringing a visitor—like you or the UMCOR people.
Influence of cultural beliefs and power

Interwoven into the primary issues of vulnerability and assets in explaining respondents’ (and their households’) willingness and ability to adopt NRM practices, is the function of cultural traditions, beliefs, and power in Mano society. The Mano comprise numerous kinds of social structure, such as firmly marked kin groups, political hierarchies and societies for diverse purposes: training adolescent boys and girls in appropriate behavior, protection against enemies or curing illnesses. The society is based on lineages in which the chief is the oldest and most capable man; the heads of families, owners of the land, distribute it among the family members. The village chiefs, who belong to the founding lineage, are subordinate to a king, whose authority is limited to the domain of politics.

There are two main traditional societies among the Mano, which are divided by gender. They are the Poro, for men, and the Sande, for women, and are open to anyone in the village. Spiritual figures, including zoes, "heart men"—who perform rituals—and devils, play a key role in Liberia through the workings of the Poro societies, which rely on magic, charms and talking with dead ancestors (Harley 1941). Women have their own association, the Sande, which consists of a school in the bush where young girls receive the necessary instruction before marriage. These retreats of the Poro and the Sande into their sacred bush create bonds of solidarity and interdependence between groups of the same age. Initiates of both sexes are circumcised and tattooed with geometrical designs upon the body. These marking may also denote a man or woman’s standing in the community as well as membership in the society (Harley 1941).

They are often referred to as secret societies, because their actions are hidden from the eyes of uninitiated children and members of the opposite sex. Little is known about the secret workings of the Poro with members sworn to secrecy during the long and arduous initiation ceremonies. However, all Liberians know their existence and purpose. The primary role of both is to teach individuals about the expectations of the community. Such organizations function to institute
community morals and act as a very efficient means of social control (Scott 1976; Anderson 1996). Thus, in some respects, households residing in communities with a strong *Poro* influence could be considered to have stronger social assets.

However, the function and influence of the *Poro*, in particular, does not stop after the puberty rites are performed and the class of boys is graduated. On the contrary, it forms a very powerful and secret organ to control its members, and this means all the adult male members of the tribe. The leaders of the society hold sway over the common men in a village, impose laws upon them, and keep them in check by the fear of the supernatural power in which they are believed to be endowed (Harley 1941). This fear lies behind all chiefs and political leaders, behind all heads of families and men of standing.

Even presently, *Poro* has an enormous influence in regulating the social and economic life of the people (Harley 1970; Waines and Waines 2003). Local people and international NGO leaders are fearful to discuss *Poro* openly. While I was collecting this data, the Liberian National Police obtained a search warrant and raided the home of a long-time NGO director and his family because he was accused of speaking against the *Poro* by the local Liberian staff that worked for him. The significance of social controls cannot be understated. Successful or ambitious villagers avoid malicious gossip or accusations of witchcraft only at the price of an exaggerated generosity. *Poro* requires successful households to provide feasts and to “cook for the devil.” Households are charged in huge amounts of cane juice and bags of rice (Harley 1941). Similarly, perceived infractions or violations of *Poro* rules result in payments of livestock, rice, and cane juice. Harley (1941) hypothesized that the lack of progress in West African tribes was in no small measure to their

7 In fact, warring factions in Liberia from the 1990s up to present, have misused the rituals of initiation of *Poro* to achieve their objectives. Many of child combatants in the NPFL wore wedding gowns, wigs, dresses, commencement gowns from high schools, and several forms of ‘voodoo’ regalia. All rebels wore cotton strings around the wrist and around the neck and shoulder. They all displayed black tattoos on the arm, slightly below the shoulder. They believed that any person who wore these talismans and tattoos, and strictly adhered to the taboos of not eating pumpkin, having sex, touching lime and taking a bath, could not be killed in battle by enemy fire (Ellis 2003; Johnson 2004).
socialistic totality, pulling down and destroying the progressive individual, or sacrificing him
deliberately to their conservative ideals. Inventive genius was not only suppressed, it was taboo in
such a system.

Field observations and confirmation through key informants revealed that this is true even in
the present day and age. Although most respondents from Gbahn, Neigbein and Pledehyee bore the
marks of the Poro or Sande, they were extremely reluctant to speak about it. Physical assets were
kept hidden and secret. In all four case study villages, the dwellings were of similar size and
condition. However, I learned that more successful households tended to purchase land and construct
houses in Ganta and other towns—rather than make improvements made to their own houses.

The total effect of Poro on a community is an ultra-conservative outlook. A person does not
want to appear outwardly successful. Personal wealth is also opposed by rival poisoning. Any
individual inclined to be too progressive for the community as a whole, especially if his family
standing did not allow it (e.g., younger farmers), is doomed eventually to destruction by some jealous
rival, or even by common consent of the other men. Respondents from Neigbein and Pledehyee
stated that they were fearful to appear “better” than their neighbors—more successful or more
educated—and of being mistaken for witches. Several had experienced the repercussions of success:
poisoned livestock. When one woman was asked about her sources of labor, she replied that she was
part of a kuu. This response was fairly typical. However, her reasons, while perhaps shared by many
others, were rather bold statements. She stated:

My husband is very industrious and therefore has been very successful with
farming and increasing our farms. As a result, people think he is a witch since
he’s successful. So, in order to keep them from thinking that I am too big for
them, I have joined a kuu. It is good to get out and be social and spend time
with people so they don’t think you are too big for them (3-32 2003).

Diffusing jealousy and maintaining social connections with others in the community is a coping
strategy for this household. They would run the risk of retaliation and “violating rules” if they did not
participate in *kuus* and other social groups. Key informants related that they had similar experiences when trying to initiate public health projects and other educational programs. The object of the *Poro* was to “hold you back” (Waines and Waines 2003; Wonyenneh and Kokeh 2003).

These findings have parallels to a study of Zimbabwean farmers. Perception of vulnerability to witchcraft—or their fear of using witchcraft—as a result of showing too much interest in neighbor’s fields provided a constraint to technology diffusion of farmers learning from their neighbors (Meinzen-Dick *et al.* 2003).

**Gender issues and women’s participation**

FAO now estimates that on average, women produced between 60 to 80 percent of the food in the developing world (Trujillo 2000). The Liberian Ministry of Planning and Economic Affairs estimates that 75 percent of subsistence farmers are women (MPEA 2000). In the Liberian culture, it is frowned upon for adult men and women to be single, particularly in rural villages (1-12 2003; 3-33 2003). People gossip and make fun of unmarried young adults (Bonkuo 2003). Marriage\(^8\) also is a means of gaining access to land. Women seldom own cash crop trees because it requires a strong financial background and secure tenure to land (3-33 2003). Women are taken advantage of if they are alone, so they seek out a husband. Polygamy is widespread; most wives in polygamous arrangements are responsible for working particular pieces of land and maintaining their own households (1-12 2003). In households where polygamy is not practiced, joint production of the farm is common. Liberian women seek empowerment to own property on their own without a husband or to retain property in the case of divorce.

\(^8\) Few people are “married” in the Western sense. It is too expensive. Marriage requires paying a bride price (dowry) and preparing a suitable feast. Respondents referred to themselves as “married” but explained it as an “African marriage” in which they live together as husband and wife. Sometimes they referred to their partner as a “husband” or “wife”; other times they referred to their partner as a ‘fiancé/ fiancée’.
What are the factors that prevent women from participating in IPM-FFS? The greatest constraint experienced by women is time. This constraint is also experienced in IPM-FFS in other countries (Tuyen 2002). Women assist their husbands or fiancés on special plots managed by him. These can account for considerable constraints to participation in training and other forms of intervention programs. An older woman explained:

Wives are responsible for making their own household and farms, and feeding her own children [in a polygamous marriage]. The size of my farms has varied, depending on my needs and my husband’s plans. For instance, if he wants to buy a [sugar] cane mill or build a house, then it is up to us wives to provide him with the financial means to accomplish this. No wife wants to be considered lazy. Women are always fighting to carry a good name. There is pressure to make sure he meets his goals and that you pay your yearly share, even if a wife has to borrow money from her parents. One time I borrowed from my brother. Sometimes we wives disagree with how much we should pay our husband, but it’s the husband’s choice. He tells the wife what to do and how much she should contribute to him. The amount is based on the wife’s financial background and problems (1-12 2003).

Women have to divide their time between tasks in the home and in agriculture. Women (and children) are responsible for supplying household food, fuel, and water. The woman from Gbahn continued:

What problems do women have? Taking care of children, all the responsibilities…farming. We wash the clothes, prepare food, wash dishes. Around here, women are responsible for getting the firewood, not men. I get it from the farm about two or three miles away (1-12 2003).

Another woman respondent related her experiences:

In the evening, before going to the Field School, I have to prepare the feed for the pigs for the next day. Although my children can help me, I don't want them to work while I am out studying (3-33 2003).

Time is also more 'costly' for the poorest households, for female-headed households, and for women with small children.

Besides their farm activities and housework, women often work to earn the extra income they need by doing off-farm activities such as petty commerce (selling produce or home-made items in the
local markets) or wage labor. If the time spent on earning additional income could be compensated, then the lowest income groups (i.e., female-headed households) would be better represented in the IPM-FFS.

Although the Liberian IPM-FFS intended to have an equal amount of female participants, and had both a female farmer-teacher and a female GUMAP staff member to translate English to Mano, women made up less than half of the group in each village. Men usually took part in training activities because they decided to do so. Women often have to seek their husband's or family's approval first, and be able to borrow a cutlass from someone. In a discussion with a women’s CBO in Neigbein, one woman said:

Whether or not a woman comes to this training depends on the attitude of her husband. I am lucky. My husband understands me and my desire for 'improvements' and when I go to the course, my mother and sister help me with the household work. If they didn't I would not be able to go each time (3-32 2003).

In Neigbein, for example, only three women participated in the IPM-FFS. Only one woman out of five was able to complete the training in Gbahn. For many older women, the IPM-FFS was their first opportunity to receive formal education or training of any manner. Despite their overwhelming enthusiasm about the training, they acknowledged that they had too short of an advance notice of the training (approximately one week), and created difficulties in arranging for childcare.

Women respondents tended to take female farmer-teachers as their example, and become more self-confident as a result. They found it easier to communicate and talk openly with trainers who are also women. Group interviews with women IPM-FFS participants revealed that they were especially animated about having female trainers, noting, “a woman knows the problems of women” (1-12 2003). However, they do universally feel comfortable training together with men and are not afraid to ask questions. They believe that they are in this together and that they have much to learn from each other.
Finally, on the encouraging side, despite the lack of women attendees in Neigbein, they initiated a community-based organization (CBO). The women CBO members were enthusiastic to learn about IPM and had even made up a song about it. Despite the hardships presented by chronic conflict and political instability, these women possessed a great deal of passion and a surprising amount of optimism for the future. The CBO members sold their produce in the local market and used a portion of the profits to reinvest, as well as distribute among themselves. Group interviews with several women’s and mixed-sex CBOs from Ganta, Neigbein, and Gbahn, revealed opinions such as, “when we work in a group we are better able to face our problems.” Social cohesion and networks such as CBOs are vitally important assets to restore in the milieu of chronic conflict and political instability.

*Cultural traditions and social norms*

The productive conservation practices were completely unfamiliar to the Liberians. Respondents from all four villages frequently remarked, “bees and snails are strange to us”. Some people were not convinced at first; others experienced neighbors who ridiculed them (1-3 2003; 1-6 2003; 2-19 2003). A woman (3-33 2003) remarked that her friends said, “How can you keep bees in a box?” Another respondent added, “People think it’s harmful to keep bees” (1-13 2003).

People laughed and ridiculed me for cultivating snails since you can find them in the bush; now they are convinced (1-3 2003).

The obstacles of novel practices are relatively easy to overcome with time and experience. However, a more formidable challenge is overcoming a phenomenon that has resulted from 15 years of chronic conflict and political instability for the past 22 years—the culture of *dependency*. When you realize that the average age in Liberia is approximately 15 years old, and that most adults have never known stability, this experience should not be surprising. People have spent their entire childhoods (and young adult lives) receiving relief assistance from international agencies. Only
people in their mid-40s and older have known life before the era of chronic conflict and political instability, and considering the considerable loss of life and the low average lifespan of Liberians, persons in these age groups are scarce.

While the majority respondents articulated a genuine desire to advance their skills and learn new practices, professions of personal motivation seemed to be highly colored with ulterior motives. Discussions with donor agency staff revealed that most of the IPM-FFS participants were related—husbands, wives, sons, brothers, sisters, and so on. This was not merely the consequence of small villages composed of several clans or family groups. Rather, it was primarily the result of how people were recruited for participation in the training. One person stated outright that, “Everyone in my family needs to join IPM to realize the benefits” (4-54 2003). I naively thought that those benefits were those that come from acquiring new skills and knowledge. A conversation with two older farmers from Neigbein, who work as farmer-teachers for another NGO, set me straight. They elaborated:

People hear about a program or an NGO coming and they sign their whole family up expecting to receive ‘benefits’. These ‘benefits’ are tools, seeds or money. They don’t feel like a program or training has benefited them unless they get these things; the knowledge gained isn’t valued in itself (Wonyenneh and Kokeh 2003).

Indeed, during the interviews, when queried about previous NGOs and what programs or training had been conducted in their village, and if they or someone in their family had participated, many respondents readily recalled various groups and their activities. Some had even participated. However, when I inquired how the training or program had been beneficial to them, they answered that it hadn’t been; they had learned some things, but didn’t get anything.” Practitioners from several NGOs interviewed in the course of my research cited dependency as a real problem in places that have been the target of repeated relief aid (Adevu 2002; Bishop 2002; King 2002; Waines and Waines 2003). Other international NGOs working in Liberia reported the same concerns (Schowengerdt et al. 1998).
Livelihood outcome preferences

A final aspect of assessing and improving interventions using the Sustainable Livelihoods Framework (DFID 1999) is identifying people’s livelihood outcome preferences. It is not enough to support livelihood strategies and build elements of sustainability into them. The overall goal of an intervention is to improve people’s quality of life and the quality of their landscapes—both agroecosystems and all of the other natural resources households depend on for their daily lives.

The IPM-FFS participants in Nimba County are no different in many respects than people everywhere—they want peace. However, the respondents also aspire to learn better agricultural techniques because of the lack of other prospects to fall back on. They have a genuine need to feed themselves and their families out of sheer survival. Food distribution programs through international donors do not last indefinitely; they have virtually no job opportunities or financial resources to draw on. This is evident from responses such as:

You can earn more money through agriculture (1-1 2003).

We’re all farmers here and need to enable our families to live (4-48 2003).

We need to eat all the time (3-35 2003).

However, despite the seemingly insurmountable difficulties that Nimba County households face, respondents also regarded the IPM-FFS training as an opportunity to improve their lives and make a better future. One woman stated:

I joined the IPM-FFS because I want to learn to plant a better way-- about how to grow more on less land, and how to work as a group (1-4 2003).

Men were equally eager to become self-sufficient and learn new ways. This was reflected in,

I see training as a way of giving me future help (2-16 2003).

I want to be a nation-builder and provide food for the family (3-37 2003).
I want a better life and less suffering. The IPM things will improve our living conditions. This will help us grow more on less land (4-47 2003).

As one man summed it, “This is Africa—agriculture needs to be at the forefront” (3-31 2003).

Children’s education was a desire frequently expressed by the respondents—both the desire for increased household income to provide tuition and the need for infrastructure. An inquiry regarding suggestions for future training programs and/or projects yielded a wide variety of responses. People saw the need for additional agricultural training—for themselves and for other villages who have not had the benefit of the IPM-FFS. Respondents also suggested training on home gardens and agro-forestry techniques. Other frequently cited needs were for health training specifically in the area of midwifery, and micro-credit programs. Additional ideas included the need for assistance with how to save land for forests, and home income-generation training. The ideas for projects mainly focused on infrastructure needs—safe drinking water supplies and health clinics particularly in Gbedin (the furthest away from the nearest hospitals).
Conclusions from the findings

This research was concerned with: 1) understanding how households manage under conditions of uncertainty, and 2) understanding households’ ability to adopt NRM practices taught during the IPM-FFS.

The findings indicate that the IPM-FFS participants in Nimba County have developed a number of coping strategies in response to the vulnerabilities they face. Traditional strategies closely resemble many of the strategies advocated by John Lyle (1994), van der Ryn and Cowan (1996), and Sullivan (2003). For example:

- Planting by location and season (i.e., letting nature do the work); and
- Using visual cues in the landscape to plan farm sites (i.e., using information to replace power).

However, chronic conflict and political instability have created shortened planning horizons and the implementation of unsustainable coping strategies. Among these are:

- Inadequate regeneration of land (resulting in depleted soils);
- Extensive agriculture; and
- Deforestation to produce charcoal and fuelwood.

Application of the Sustainable Livelihoods Framework (DFID 1999), indicated that households are confronted with a number of situations that make them vulnerable. These include:

- Shocks—the foremost being chronic conflict and political instability. They respond to direct conflict by either fleeing or accommodating the invaders.
- Biophysical trends—land scarcity, shorter fallow periods, declining soil quality, and increasing agricultural pest problems.
- Seasonality—distinct seasons limit the agricultural season and inhibit off-farm activities. Households are increasingly turning to the swamp lands to extend the
growing season (i.e., uplands are cultivated during rainy season; swamps for dry
season crops).

Long-term chronic conflict and political instability—the past 22 years—have resulted in a
distinct coping pattern by households—the art of survival. This pattern has three stages: 1) acquiring
assets and rebounding as quickly as possible; 2) risk reduction and management strategies; and 3)
long-term asset-building. This is not a linear pattern, but characterized by the frequency and severity
of perturbations (e.g., direct conflict, biophysical conditions, illnesses, etc.) and the robustness of a
household’s assets.

A household head’s home village, and the family land located there, is essentially the only
safety net available in Liberia. It is customary to allow extended family members to use family land
to sustain themselves. Agricultural activities are the predominant livelihood strategy due to the
extreme lack of other employment opportunities. Rebounding as quickly as possible often means
engaging in activities that are not sustainable. The predominant activity conducted to convert assets
into cash is the production of charcoal. Lack of electricity anywhere in Liberia provides a strong
market for this product. Risk is largely managed by not investing in items or livestock (e.g., large
livestock such as cattle, or large amounts of small livestock) that are not easily transportable or would
be looted/destroyed. Virtually no one has extra assets to invest; most households live very close to
the bare margin of existence. Households aspire to build assets over the long-term by sending
children to school, and by planting tree crops (e.g., oil palm).

The direct impacts of the IPM-FFS as an intervention in ‘developmental relief’ indicate the
following:

- **Vulnerability contexts play a pivotal role in deciding whether or not to adopt a
  particular NRM practice.**

Households did not adopt NRM practices that involve significant risk-taking. For example,
beekeeping was rejected because it would require a commitment of substantial financial resources
and/or material to construct beehives. Practices that respondents believed would reduce vulnerability
were almost universally adopted. These practices were the three LEISA techniques aimed at reducing crop losses from agricultural pests: intercropping, multicropping, and neem. To a slightly lesser extent, trap-and-decoy crops were adopted. Reardon and Vosti’s (1997) concept of conservation investment poverty does not capture the milieu of chronic conflict and political instability and the choices households make under these situations. However, adoption of intercropping, multicropping, and neem can be explained with Reardon and Vosti’s (1997) theory. Respondents had the requisite combination of assets to adopt these practices.

While vulnerability caused by declining soil quality is a serious issue in Nimba County, the three LEISA practices aimed at increasing soil fertility were not widely adopted. Barriers to adoption of composting and slash-and-mulch were cultural and biophysical. Impediments to the use of farmyard manure were the lack of sufficient livestock to produce waste.

- The NRM practices taught during the IPM-FFS addressed local people’s livelihoods to a great degree.

While the IPM-FFS program identified needs and developed NRM practices aimed at addressing those needs, it was apparent that only a subset of agricultural livelihoods was addressed. Gbahn respondents derive their livelihoods from sugarcane and African gin production rather than vegetable crops. Gbedin respondents derive their livelihoods from rice production through the Dokodan Cooperative and supplement (i.e., diversify) their livelihoods through vegetable production. The IPM-FFS program was designed to address agricultural production issues (i.e., soil fertility and pest problems), livelihood diversification, as well as the nutritional needs of the local villagers. It was not their aim to promote greater production of African gin.

- Chronic conflict and political instability influences every aspect of a household’s decision making. This, in turn, impacts adoption/non-adoption of NRM practices.

What was not fully explored in examining adoption or non-adoption was the role of personal motivation and the influence of the psychological effects of chronic conflict and political instability.
These factors were not addressed directly in the interview protocol, and very few respondents discussed the impacts of the war on their lives or their decision-making at length.

- **Snails are a commodity that can be easily converted to cash in the event of impending conflict.**

  Despite the lack of security in all of the villages, resulting in theft or destruction of snails (and frustration on the part of participants that adopted the practice), households that adopted the snail practice were able to liquidate their inventory quickly by selling them in the local market.

- **Reardon and Vosti’s (1997) concept of conservation investment poverty illustrates poor households’ limited capacity to mobilize the necessary assets for even highly profitable and/or effective NRM practices.**

  Respondents largely rejected NRM practices that required “high” levels of assets or combinations of assets such as skills/knowledge (expertise), financial, and material assets. Lack of financial and/or physical assets was a strong motivator for adopting low to no input practices and a barrier to adoption of high-input practices. LEISA practices required little or no financial or physical assets—merely the ownership of a cutlass and a sprayer (to apply neem). Similarly, NRM practices that were completely new were the most difficult for them to accept and adopt. These practices included: composting, farmyard manure, beekeeping and snail production.

- **Human assets play a strong role in adoption, but their intricacies are not completely captured by the Sustainable Livelihoods framework.**

  Traditional NRM practices such as multicropping and intercropping saw high adoption. Novel practices had the lowest adoption levels. This is not an unusual occurrence in adoption studies. While human assets such as education, skills, and knowledge are included in the SL framework, what is not explicitly captured is the role of traditional knowledge. Respondents reported that they learned multicropping and intercropping from their parents, but did not know the reasons behind the practice (i.e., the IPM benefits). Furthermore, while many adopted neem, there was a one time, knowledge of
a myriad number of uses for the tree. This knowledge, as well as medicinal plant knowledge, has largely been lost through the ravages of chronic conflict and political instability.

Secondly, the role of perception in assessing human assets is not completely explained in the SL framework in terms of NRM practice adoption. For example, the three LEISA practices aimed at soil fertility saw fairly low adoption levels. What is unclear is whether it was actually because the three practices were unacceptable, or because the IPM-FFS participants did not perceive soil fertility to be a pressing issue. Declining soil fertility is a subtle effect. Respondents reported that they based their decisions on fear of poisonous snakes, cultural norms (e.g., sweep organic matter away to discourage termites), and lack of livestock for producing manure. Furthermore, they reported that they addressed soil fertility issues by: abandoning land and finding more suitable land; burning (to add ashes to the soil); or using floodplain soils (Gbedin respondents). Contrastingly, the four LEISA methods to address agricultural pest problems—grasshoppers—saw high levels of adoption. However, these practices were predominantly familiar (i.e., traditional practices), and the problem of grasshoppers is obvious. Grasshoppers and the damage they incur, are highly visible.

Finally, despite the fact that Gbedin had the least number of participants that completed the entire 18-week IPM-FFS, they adopted more NRM practices than the other three villages. Gbedin is unique in that MOA technicians and UNFAO have provided technology and agricultural technicians for nearly five decades. Repeated exposure to innovations reduces the “learning curve” and reluctance to experiment with unfamiliar practices.

- **Human assets, particularly, skills and knowledge, increased through the IPM-FFS training.**

Respondents’ education, skills, and knowledge were at fairly rudimentary levels. Only sixteen of the 54 respondents had always been farmers. The remaining 38 respondents were students (who worked on their parents’ farms), housewives, or were engaged in other occupations before becoming farmers. Few respondents have the benefit of a high school diploma or previous [formal] agricultural training, and much traditional knowledge has been lost. However, the IPM-FFS seemed
to empower both men and women participants. Respondents were enthusiastic about their experiences and what they had learned through the program. They exhibited varying levels of self-confidence and feelings of capability. They shared their new knowledge with others. For women, in particular, who had little or no formal education, the IPM-FFS has provided an opportunity to learn new ideas and receive validation as a person.

- **Sufficient tools and good health are needed for participants to remain in the training program from beginning to end.**

  While indirectly related to adoption, the ability of potential participants to furnish the necessary tools, and remain healthy during the entire course of training, is essential to learning new practices and implementing them on their own. Women, in particular, suffer from lack of basic tools and poor health.

- **Respondents perceived beekeeping and snails as viable options for income diversification.**

  While not adopted by individuals and their households at the present time, the productive conservation practices were viewed positively as routes or options for diversifying and profitability if the socio-political situation stabilizes.

- **Social asset building was an integral part of IPM-FFS training.**

  The IPM-FFS groups stayed together following the training and became more formalized as community-based organizations. As CBOs, each of the four IPM-FFS groups worked on projects together including the productive conservation practices. This served to strengthen collective action and social capital. The four groups have been actively recruiting new members, and initiating projects with varying levels of success.

- **Cultural beliefs and power play a subtle, but influential role in household decision-making.**
Traditional culture and beliefs play a powerful role in influencing people’s decision-making and actions. However, it is a difficult aspect to study and fully comprehend due to people’s reluctance to openly discuss secret bush societies.

- **Women face many challenges to participation.**

  Among these challenges are: permission to attend training; household responsibilities, particularly young children; lack of tools; and poor health. Understanding and addressing these issues is essential if women are to be included in any type of outreach or developmental relief program.

- **The culture of ‘dependency’ is a formidable challenge.**

  Chronic conflict and political stability has shaped people’s lives and behavioral responses to external assistance. This is a behavioral pattern born out of sheer necessity (a survival strategy derived from extreme poverty), and social norms (more than one generation of Liberians have grown up dependent on external assistance).

  Finally, focusing on the direct effects of the IPM-FFS program through the adoption or non-adoption of NRM practices, gives only a partial picture of the impact. There may also be substantial *indirect* impacts that have not been investigated in this research.

  The next, and final, chapter presents the grounded theories derived from the research, recommendations, and the community and ecological design implications.
CHAPTER 7

GROUNDED THEORIES, RECOMMENDATIONS, AND DESIGN IMPLICATIONS

Introduction

This journey was the consequence of my keen interest in the interaction between nature and culture, and the complex issues that arise out of those interactions. From the perspectives of community and ecological design, my research was concerned with developing appropriate solutions to such complex issues. Specifically, this dissertation deals with understanding and explaining smallholders’ adoption of sustainable natural resources management practices in the milieu of chronic conflict and political instability. Chapter 1 introduced the discourse of adoption of NRM practices within the context of persistent poverty and enduring disorder and the mission of (human and ecosystem) ecological design research and practice. Three fundamental themes: 1) the interaction between natural resources and rural livelihoods; 2) the influence of chronic conflict and political instability on rural livelihoods; and 3) the role and mission of ecological design were presented. These thematic areas, as well as lessons learned from previous adoption studies, guided the development of the research questions.

A review of the literature, and the lack of prior research conducted in active conflict zones, suggested that household adoption of sustainable NRM practices might be more clearly understood by using the sustainable livelihoods framework. This framework could be used to evaluate an intervention by examining the various issues that promote or constrain adoption.

The premise of this research has been that understanding the constraints and opportunities that are faced by IPM-FFS participants (and their households) could provide a sound basis and direction for a more holistic approach. In essence, design and build on interventions that better support livelihoods, promote positive outcomes for human and natural ecosystems, and build resiliency to external shocks.
My dissertation examined the results of semi-structured interviews, field observations, and agency documents to understand the array of issues that inform smallholder household decision-making in regard to deriving an existence—a form of livelihood. These interviews indicated that a critical concern of ecological design researchers and practitioners must be to understand holistically, subsistence-level smallholder households’ ability to adopt NRM practices that promote positive outcomes for households and their local biophysical landscapes.

This final chapter is focused around answers to the final two interrelated questions (restated here from Chapter 1), which forms the grounded theories that emerged from the data analysis:

- What strategies can NGOs take to ensure that practices appropriate to high states of uncertainty are adopted?
- How can ‘developmental relief’ programs be designed to be profitable, ecologically responsible, and yet also ‘short term’—responsive to the dynamic nature of chronic conflict and political instability?

The chapter concludes with a reflection on the implications for community and ecological design and for future interventions.

**Grounded theories regarding adoption under uncertainty**

What are the implications of the findings for the development of NRM practices? A major goal of ecosystem analysis is the “prediction of system responses to various forms of disturbance, based on the interactions of the component parts” (Aber and Melillo 1991). Similarly, ensuring the adoption of practices involves focusing on the strategies, needs, and limitations of households using the Sustainable Livelihoods framework proposed by DFID (1999). Three grounded theories were derived from the research. They are presented here followed by a discussion of recommended actions:
1. Potential NRM practices must be compatible with predominant livelihood strategies and address sources of vulnerability.

Attention should be paid to moveable and transferable skills such as training (developing human capital), as well as the promotion of social capital. Correlated to the issue of ensuring adoption in the face of uncertainty is the design of intervention programs to support people’s livelihoods. Introducing new NRM practices as group or community-based projects has the advantage of reducing the most formidable barriers to household adoption, and building and reinvigorating social capacity within a village.

2. Anything that increases a household’s exposure to risk—or their perceptions of exposure to risk—will seem less attractive, even if it could potentially provide dependable and lucrative sources of income.

Households are extremely vulnerable to shocks arising from chronic conflict and political instability; the unstable nature of agroecosystems; external and internal trends (e.g., rapid population growth, markets conditions, etc.); and seasonality effects. Respondents placed a high priority on managing and minimizing risk.

Pest-management practices (e.g., multicropping, intercropping, trap-and-decoy, and neem) were widely adopted because they addressed people’s primary concerns—loss of crops from grasshoppers and other agricultural pests—and did not require “high” levels of assets.

Soil fertility practices (e.g., composting, slash-and-mulch, and farmyard manure) experienced lower levels of adoption. This was related to perceptions of risk (e.g., snakebites), less familiarity, perception of labor demands, unavailability of sufficient quantities manure (meager livestock resources), and incompatibility with cultural practices. The soil fertility practices were fairly unfamiliar to the IPM-FFS participants. As expected, practices that are less familiar will take longer for households to adopt. Secondly, people have a well-founded fear of snakes. Liberia has eleven...
species of poisonous snakes (TLC 2003). Risk management practices included burning and reducing the leaf litter around houses to eliminate potential snake and termite habitat.

Finally, productive conservation practices (e.g., beekeeping and snails) were the least-adopted practices despite being potentially the most lucrative and theoretically ideal for home-based income generation. The material (i.e., wood planks) and financial requirements for construction of the hives proved to be a barrier to adoption on a household basis, but was progressing slowly as a group project. Agencies must be knowledgeable about, and responsive to, the limitations of household assets including, but not limited to financial resources.

3. **NRM practices will not succeed without a commitment to low input requirements—especially financial requirements—for households to be able to adopt.**

To be successful, efforts to initiate sustainable NRM practices should address smallholders’ concerns and be responsive to the economic needs of subsistence-level smallholders. Chronic conflict reduces the amount and availability of assets. Fields and forests are burned (eliminating natural resource and agricultural assets such as seeds); fleeing results in abandonment of physical assets (i.e., tools, livestock, and other items); and the inevitable looting and burning of dwellings essentially results in having nothing to return to.

By and large, households were able to implement the four *pest management practices* because these practices utilized existing knowledge, did not require the purchase of inputs, and, in the case of neem, were widely available. Gbahn IPM-FFS households indicated that neem trees were not present in the village and this proved to be a hindrance to adoption.

Methods for increasing *soil fertility* must similarly required little or no external inputs. Households are unwilling to invest in livestock (sources of farmyard manure) that could inevitably be lost to conflict.

*Productive conservation practices* require financial and physical inputs that are beyond the reach of most households. Beekeeping and home snail production are lofty goals, but agencies must
realize that in the absence of skills, materials, financial resources, and the highly uncertain environment of chronic conflict and political instability, these will take longer for households to adopt on their own.

The lack of tools mainly proved to be a hindrance in IPM-FFS attendance rather than an obstacle to adopting particular NRM practices. The provision of tools during agricultural training programs, such as the IPM-FFS, should be given strong consideration by the donor organization to enable participation, particularly by women (who frequently do not own even a tool as basic as a cutlass).

The following section discusses the ecological design implications of these grounded theories.

**Ecological design implications for NRM practices in the milieu of uncertainty**

The three grounded theories point to a number of ecological design implications. In Liberia, the predominant livelihood strategy is agriculture. Sustainable agriculture, also known as regenerative agriculture (Lyle 1994) seeks, at least in principle, to use nature as the model for designing agricultural systems. Since natural ecosystems consistently integrate plants and animals into a diverse landscape, a major tenet is to design agroecosystems that create and maintain diversity (Lyle 1994; van der Ryn and Cowan 1996; Sullivan 2003). Growing different varieties and diverse crops helps farmers to fine-tune their farming systems to local environmental conditions, to maintain food security and to utilize crop related benefits (Bushamuka 1998; Eberdt 2003). Thus, diverse ecosystems (and agroecosystems) are more stable, thus providing more resilience to shocks such as pests and disease, and trends such as decreasing crop yields, thereby reducing sources of vulnerability for smallholder households. When natural ecosystems are in the early stages of succession, or when they have lost diversity due to natural catastrophe or human actions, they are prone to major fluctuations, both in types of species present and in their numbers. Disease outbreaks in plants and
animals occur more frequently—as do outbreaks of weed, insect, bird, or rodent pests. The more complex and diverse communities become, the fewer the fluctuations in numbers of a given species, and the more stable communities tend to be (Aber and Melillo 1991; Lyle 1994; van der Ryn and Cowan 1996; Sullivan 2003). As the number of species increases, so does the web of interdependencies. Complex agroecosystems reduce or eliminate completely, the need for purchased inputs such as chemical fertilizers, pesticides, weed control agents, and fungicides—items that are simply too expensive for Liberian households and would require a tradeoff between other household needs if purchased.

In agroecosystems, context is essential—landscape, climate, household economics, and culture determine what NRM practices and agroecosystems will work in a given setting, and these are endlessly diverse. The milieu of uncertainty provides another layer of complexity and considerations in providing appropriate relief interventions and designing appropriate NRM practices. Eberdt (2003) notes that seed distributions are the post-disaster strategies that have the most direct impact on biodiversity. Farmers’ participation in developing varietal selections for seed distribution following human or natural catastrophes is essential is such settings. Ecological designers and others responsible for planning interventions in these settings must have sufficient knowledge of the interconnected components of local farming systems. Tremendous opportunities exist for ecological designers to develop appropriate farmscaping (Dufour 2000; Sullivan 2003) to increase agroecosystem diversity. Farmscaping includes plantings such as borders (e.g., hedgerows, living fences), windbreaks, and special plantings for natural enemies of pests to provide habitats for beneficial organisms.

Similarly, intercropping and multicropping, which were widely adopted among the IPM-FFS participants, can be expanded in the short term to include additional NRM methods to increase soil fertility. The introduction of nitrogen-fixing plants such as pulses (i.e., legumes) would serve to increase soil fertility without exposing households to poisonous snakes. The main issue is availability of seeds. In the mid- to long-term (given prolonged socio-political stability), the introduction of a
wide range of agro-forestry practices would also serve to increase soil fertility and provide a host of additional benefits.

Secondly, rather than simply planting randomly mixed seeds (e.g., a variety of seeds mixed in a person’s hands as is the current practice), intercropping techniques and crop choices should be designed intentionally to increase crop yield, extend length of harvest (thereby increasing the economic returns of households’ agricultural endeavors), lower resource demands, maximize pest control, and increase soil fertility. Intentional intercropping includes considerations such as:

- Spatial arrangement (row, strip, mixed, and relay intercropping);
- Plant density (adjusting seeding rate of each crop in the mixture);
- Maturity dates of the crops being grown (to achieve staggered maturity dates);
- Plant architecture (considering crops as overstory and understory plants).

Thirdly, greater agroecosystem diversity can be achieved by integrating the free-range livestock (single or mixed species) into the cropping plan as consumers of crop residues. Poultry and other small livestock can be managed on croplands to reduce pests, increase income, and increase diversity (Sullivan 2003). Even in situations of chronic conflict and political instability, there are ways of incorporating animals into cropping without a household getting into animal husbandry or ownership directly. Collaboration with neighbors who own animals will benefit both croppers and livestock owners. Small livestock, such as sheep and goats, can also be effective in reducing the labor demands of periodically brushing oil palm plantations. Research has proven that even pigs can be allowed into croplands if they are fitted with humane nose rings to prevent rooting and consumption of young lambs and goats (Sullivan 2003).

Finally, small-scale, less risky experimentation of intercropping, multicropping, and other NRM practices can occur on home gardens (where housing density in the village allows enough space for establishment). Respondents viewed home gardens as important resources for providing food for household consumption and supplemental income. While only thirteen of the 54 IPM-FFS respondents had home gardens, most respondents were eager to learn more about them and to
experiment with them on their own. Home gardens also have the advantage of being highly visible within the village; reluctant, or hesitant adopters can see others’ home gardens as small model farms.

The subsequent section discusses the considerations involved in developing appropriate programs in the milieu of chronic conflict and political instability.

**Grounded theories concerning ‘developmental relief’ and ecological design implications**

The milieu of chronic conflict and political instability presents a number of challenges. The Liberian situation has been characterized by:

- The absence of any functional national government during and after the 1989-1997 conflict period, despite several attempts to install a transitional administration.
- Protracted conflict between multiple factions from 1999 to present, with little consistent control of any portion of Liberia by any particular faction—except for central Liberia.
- Persistent flux between periods of peak crisis and stability. Intensive fighting lasted anywhere from several weeks to two years while relative peace lasted three years or more. Different sections of Liberia experienced varying levels of conflict intensity at any given point in time.
- Extensive forced displaced of the population (approximately 80 percent or 2.1 million people) to neighboring countries and within Liberia.
- Continued overwhelming obstacles—loss of infrastructure, extreme illiteracy and unemployment rates, low life expectancy and average age of population, and psychological trauma.

In the face of direct conflict, the prime challenge is the art of survival. Physical survival strategies implemented by Liberians ranged from flight into the bush, neighboring countries, larger urban areas, and IDP camps to passive accommodation of invading forces. These range of options
were employed as the situation at the time warranted. Every one of these strategies carried with it the requirements of physical stamina, financial means, or geographic proximity. Each option provided both a safe haven as well as a hazard at different stages of the conflict. Those seeking protection in larger cities, IPD camps, and refugee camps in Guinea and Côte d’Ivoire often had the benefit of international humanitarian assistance but also experienced harm from exploitation and public health crises. Those remaining in the villages or hiding in the bush were obliged to fend for themselves, subsisting on bush foods and seed rice stocks.

Generally speaking, there is little that can be done from “within” to stop this type of shock. The main interventions and alterations tend to be at the macro/policy and global, regional, and national institutional level and beyond the scope of this research. However, the Liberian case implies that in the milieu of chronic conflict and political instability, where there is fluctuation in conflict conditions, developmental relief interventions can and should occur.

Seven grounded theories were developed that address agency responses and policy implications in regard to developmental relief in the context of chronic conflict and political instability and/or complex humanitarian emergencies resulting from human or natural causes.

1. The onus on relief and development agencies is to operate with high ethical and moral standards in situations of chronic conflict and political instability.

Conflict zones and unstable settings are dangerous; safety conditions fluctuate constantly. Even local or longtime expatriate staff is at extreme risk. Furthermore, dire situations lead to desperate behaviors. Humanitarian principles, political neutrality, transparency, participation, flexibility and so forth, are standards that should be adopted regardless of socio-political context. In conflict zones and politically tenuous environments, however, agencies must apply extra rigor to their actions. For example, funding sources have the potential to leave an agency vulnerable to attack

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from opposing forces. Retribution may be taken out on expatriates as well as local staff for receiving funds from donors with a particular motivation or political agenda. Agency best management practices should be reviewed to ensure political impartiality. While the participatory approach has been advocated in the development literature for years (Chambers 1983), it is essential at all stages of the programming cycle for reasons of transparency, neutrality, and personal safety.

The notion of participation should also be extended to agency staff. Bonds of trust are established when staff join in with participants on group projects (i.e., contribute their time and labor). Program participants can then see that the staff is serious about helping them. All too many agencies and programs have failed or faced immense setbacks in Liberia because an untrustworthy leader or middleman absconded with the finances and materials.

2. **When situations are dire, assessing and supporting livelihoods is crucial.**

*Participatory planning methodologies are essential in performing needs assessments and developing appropriate strategies.*

Assessing household and community resources is essential in formulating solutions. Programs must be responsive to people’s stated needs and desired outcomes. Relevant issues must be jointly identified and prioritized so that realistic strategies and options can be pursued. Assessment and support can be tailored to the level of interest (e.g., macro—identification of national issues and priorities down to regional, community, or household levels), although, it should be realized that every issue or need cannot be addressed by a given agency. It is important to at least pinpoint and understand the processes that occur above the level of interest (i.e., processes occur at national and regional levels which have direct and indirect impacts on communities and households).

Creativity in problem-solving—forming partnerships with other agencies to address interrelated issues—can be accomplished through the SL approach. Interventions and programs should recognize and build upon household and community coping strategies for managing a variety of shocks, trends, and/or seasonal shifts creating household vulnerability.
Agencies must be accommodating about adapting interventions to changes in dynamics, as well as be flexible to fluctuating settings and operating conditions. Iterative needs assessments and continued participation should be integrated into agency policies so that planned activities can meaningfully respond to changing conditions. Donor agencies, local staffs, and key actors within the community must share a consensual vision of action plans and end goals.

Given the magnitude of complex problems in the milieu of chronic conflict and political instability, participatory and gendered planning that accurately represents a diverse cross-section of the community is essential. In settings such as Liberia where half the population is under the age of fifteen (Klein 2003), participation must also include children.

3. **Providing ‘developmental relief’ is akin to ecosystem recovery following a perturbation. Relief and development should be conducted in concert.**

Natural ecosystems follow predictable response patterns following a disturbance. For example, there are cyclic patterns involving continuous recovery from small-scale disturbances within a mature forest and other recovery patterns when there are large-scale disturbances. Despite predictability about types and frequencies of disturbances and recovery patterns, natural ecosystem regeneration does not follow a linear progression toward a “climax” stage. Furthermore, in large-scale disturbances, regeneration may be initiated through external means.

Similarly, the humanitarian community must be able to recognize patterns of local coping mechanisms employed by households (and communities) to diminish the effects and/or recover from a variety of disturbances (i.e., understand the shocks, trends, and seasonal shifts that cause vulnerability). There is a growing body of literature suggesting that researching the strengths of past and contemporary traditional farming systems will reveal the resilience and its capacity to recover normal function (Eberdt 2003). The subsequent developmental relief programs must be flexible and responsive and promote these resilient aspects.
In the short term—the relief component of ‘developmental relief’—this means trying to assist households and communities in avoiding the shocks; managing the potential effects; and mitigating the impacts—helping people recover and improving the ability of households to “bounce” back. Using the ecosystem analogy, there are situations when external assistance is needed to “jump start” the regeneration process following a disturbance. When disturbances are severe, frequent, and/or large-scale, recovery cannot be accomplished by households or communities on their own. Assistance such as re-seeding and replanting are necessary to prevent or reduce both human and natural catastrophes (i.e., soil erosion on steep slopes during rainstorms). During, and immediately following “peaks” (i.e., active conflict), immediate relief is crucial to eventual self-sufficiency (e.g., provision of seeds when fields have been burned and households have none stored from the previous season). Thus, despite the criticisms regarding humanitarian aid (e.g., the promotion of the ‘dependency syndrome’), donors and agencies must recognize that relief must be an indispensable component of “development” efforts in conflict situations to prevent further tragedy and suffering.

In rural communities, such as Nimba County, Liberia, where agriculture is the predominant livelihood, when the integrated socioeconomic, environmental, and cultural elements of the farming system are damaged through conflict (or other human or natural catastrophes), the ability to maintain seed security may be compromised. Seed security is the access by farmers to adequate good quality seed of locally adapted varieties (Eberdt 2003). Seed availability is of paramount importance in ameliorating or eliminating a prime source of household vulnerability. Consideration should be given to the potential role of local seed systems in the recovery and rehabilitation process, rather than relying on formal agricultural structures.

In exceptional cases, when rural livelihood systems have been severely damaged, agencies should consider distributing seeds and tools immediately and efficiently to enable the benefits of a crop in the first available season. That is, provision of assistance for one or two seasons as a ‘start up’ role (O'Keefe and Kirby 1997). As noted in previous sections, some people chose to remain in the villages or nearby in the bush. These households, and the most marginalized members of a
community—female-headed households—should be given primary consideration in seed distributions. In all cases, it is essential to integrate the unique social and economic composition of the population into participatory targeting of assistance in order to help those who are most in need (Eberdt 2003).

In the short term, another significant point to be made is the provision of developmental relief interventions in refugee camps. The conventional wisdom of humanitarian relief professionals is that “training people in a period of transience or displacement is a waste of time” (Schowengerdt et al. 1998). However, in chronic conflict situations, transience or displacement can last indefinitely, perhaps even years. Human and social asset building should start or continue in refugee camps (e.g., IDP camps in Liberia or refugee camps in neighboring countries). This is necessary for several reasons. First is that even though refugees were provided with some (limited) food rations from WFP and other humanitarian agencies, once the situation outside the camps was determined to be normalized, refugees were required to plant their own small gardens within a camp. This was a strategy taken by WFP and other relief agencies in Liberia for a variety of reasons and was thought to encourage agriculture and market commerce in the IDP camps (Schowengerdt et al. 1998). Limiting food rations or providing people with bulgur wheat rather than their preferred staple diet (e.g., rice in Liberia) has been utilized by relief agencies in other chronic conflict settings (Bradbury 1998; Schowengerdt et al. 1998; Eberdt 2003). Fear of creating relief dependency, and "institutionalizing relief" drove agency strategies in northern Sudan, and was used to rationalize a cut in food rations (Bradbury 1998).

Secondly, training programs are useful in initiating the healing process that is critical in conflict zones. The psychological impact of knowing that other people care about them and their dire situation is essential in alleviating some of the trauma. Oftentimes, the local staffs of NGOs are in the same situation as the very people they are trying to help. They, too, have fled and are situated in a refugee camp. Most of the Ganta Mission Station staff fled to Guinea and tried to provide assistance to fellow Liberian refugees.
The final justification for training in refugee camps lies in its democratizing power. The underlying causes of chronic conflict and political instability in Liberia are poverty and lack of resources. It is irrelevant whether or not the purpose of internationally-funded interventions is defined as helping people to help themselves (development) or preventing loss. Equipping vulnerable households with better coping skills and strategies while they are in refugee camps enables them to survive the miserable conditions which have been imposed on them, and supports them toward recovery when they are able to return to their homes or resettle elsewhere.

Numerous lulls in the Liberian conflict have afforded opportunities to strengthen human and social assets, which in turn, provides tremendous psychological support for traumatized people. The IPM-FFS took place during such a lull. In the medium term—during prolonged periods of stability—this means:

- Improving the sustainability of household and community-level assets;
- Reducing vulnerability to the inevitable natural resource, financial, human, and social shocks.
- Developing greater diversity in livelihood strategies available to households (e.g., new products, small enterprise development, etc.) in concert with on-going human and social capacity building.
- Improving the productivity of the land through LEISA and other sustainable practices that enable agricultural intensity and promote ecological design principles.
- Assisting smallholders in planting low-input, fast-growing food crops.

4. Programs must improve people’s ability to recover, especially in the longer term.

The aim of developmental relief is to assist households and communities to attain sustainable livelihoods. The expectation is that community participation and local capacity building will ensure sustainability. Interventions that focus on strengthening social and economic variables in the long
term contribute to household [community level] sustainability and self-sufficiency through all but the most severe perturbations.

The most transportable asset in a chronic conflict setting is human capital, especially people’s knowledge and skills. However, as discussed in Chapter Two, people in Liberia have less capacity to sustain development at present than they had before the conflict began. As a consequence, in light of the extreme shortage of physical and financial assets, and labor to a lesser extent, community-based organizations (CBOs) are an invaluable resource in developing resiliency. One way that a CBO can enhance local resiliency is by creating communal seed banks that can be accessed by villagers in times of need. Benefits to this approach are that seed banks can function with limited external assistance and serve as both preventative and post-disaster recovery measures (Eberdt 2003). CBOs also provide a safe haven for experimentation with NRM practices that require assets beyond those found in most smallholder households.

Secondly, agencies must provide social support to ensure adoption and continuance of NRM practices. Follow-up visits and mutually agreeable level of technical assistance, are essential for promoting adoption among slow adopters. Most respondents indicated that they did not necessarily have technical questions or problems; they merely wanted encouragement. Encouragement, through periodic on-farm visits, can also alleviate the “dependency syndrome”. An extension agent, NGO or CBO leader, for example, who conducts regular follow-up visits can better evaluate the seriousness of participants (i.e., motivation) and identify areas where additional training is needed.

The kinds of knowledge and skills that are particularly salient to Liberia are:

- Observation skills to compensate for lack of resources;
- Organizational/leadership (harnessing social and other capital);
- Alternative production techniques (especially sustainable small-scale agriculture), and alternative products, particularly home-based products;
- Health, nutrition, and literacy (based on the priority level, and on the support resources available at the time).
5. Rather than conduct *ex ante* research on potential dissemination options, it is wiser to use all means possible in the milieu of chronic conflict and political instability.

Collectively, the findings in Chapter 6 reinforce the notion that there is no single best method for disseminating information to build human and social capacity. There were three main routes along which information was disseminated: (1) IPM-FFS participants informally shared their new knowledge with other household members, extended family, neighbors and friends; (2) IPM-FFS leaders became ‘model farmers’ and used their farms to demonstrate the NRM practices, and became active in community-based agricultural organizations as farmer-teachers; (3) IPM-FFS groups stayed together after the training was completed and became a formal organization (i.e., a community-based organization with charter, bylaws, and officers). Thus, diversity in information conveyance is indispensable to reach different types of individuals and households.

In fact, additional resources for dissemination are available in the Ganta area. Many villagers own radios. Radio Kergheamahn (“We are together” in Kpelle) in Ganta (Figures 7.1, 7.2 and 7.3) provides daily market information, farm advice, health tips, and other community service information. Although their signal transmits a short distance, Ganta is a busy commercial area. Villagers make frequent trips into Ganta to conduct business. Thus, GUMAP staff could utilize the radio station to notify people about upcoming events, as well as provide agricultural information (e.g., 15-minute to half-hours programs on beneficial insects, IPM, and other topics that would be useful to local farmers).
Figure 7.1 Welcome to Radio Kergheamahn—a community-service radio station.

Figure 7.2 Station manager and disc jockey at Radio Kergheamhn, Ganta.
6. Despite the view that chronic conflict and political instability produces a culture of dependency, solutions must be developed without driving households to unsustainable coping strategies.

A key premise of many government and NGO/INGO programs is that international emergency relief produces a ‘relief mentality’ and a ‘dependency syndrome’ and is an obstacle to sustainable development (Bradbury 1998). Admittedly, agencies do have difficulty accomplishing their aims when the primary motivation for people’s participation is the “benefits” they anticipate receiving are tools, seeds, and/or cash rather than newfound skills and knowledge. All too often, program participants do not perceive training in a particular set of skills or knowledge as a benefit. One solution to reduce the “dependency syndrome” is to provide tools during the training sessions.
and collect them at the end of the session. The tools could be given to participants upon completion of the entire training. Another approach is to provide incentives and additional opportunities such as the potential for leadership training.

7. **The key to the design of ‘developmental relief’ programs lies in taking cues from community and ecological design.**

In the milieu of chronic conflict and political instability, such as the Liberian case, there is a continuous flux of “peaks” and “valleys” in conflict intensity. Both relief and development are needed, and they are not mutually exclusive. A linear model is not possible. Agencies must adapt their programs to the milieu of CC & PI to become more flexible (i.e., develop multiple pathways), small-scale, match practices and programs to people’s livelihoods and stated needs, and minimize the use of scarce assets. For example, due to the lack of formal credit institutions, many of the respondents were interested in schemes in which liquidity is provided up front by an external intermediary (e.g., the Ganta United Methodist Agriculture Program). People are accustomed to paying a token to the landowner at harvest. The NGO would absorb the risk of not recovering the investment should the harvest fail or active conflict ensue. Some respondents suggested that the GUMAP could provide sawn planks for constructing hives and collect the price of these materials when honey (or other apian products) was sold. Addressing households’ lack of financial assets through the provision of credit may enable them to reduce unsustainable activities (e.g., charcoal production); adopt a longer-term perspective (during periods of relative stability); and motivate them to invest in sustainable activities. The credit program could also serve as a means for building local capacity for leadership and business management skills.

Finally, there is a need to consider both the direct and indirect effects of an intervention program, such as the IPM-FFS in Liberia, to build on successes and learn from program limitations or setbacks. Both community and ecological design promote the participatory approach—the notion that agency “experts” have much to learn from participants, including women and children. Community
and ecological design acknowledge a deeply participatory process in which technical disciplinary languages and barriers are exchanged for a shared understanding of the design problem (van der Ryn and Cowan 1996). Program analysis should include participatory methods that capture both qualitative and quantitative information about the program and why people choose to adopt or not adopt a given practice. The qualitative approach is essential in elucidating people’s actions and feelings, while quantitative approaches measure the rates of change (e.g., increases or decreases in yield, soil fertility, pest reduction, household income changes, etc.). Together, this information helps provide feedback so that programs expand, evolve, and form into new and different areas of outreach.

Ecological design implies that sustainability is a cultural process rather than an expert one (van der Ryn and Cowan 1996). At the village or community level, ecological design is a fulfillment of democracy. In the community sustainability planning process, everyone is a designer. Conceivably, over time, what once began as a program to help individual households improve agricultural and natural resource sustainability could potentially be transformed into an awareness of community-level/landscape issues such as water quality, water availability, and reforestation. Land use planning to ensure sustainable use of the swamps and forests is just one of the many programs and projects that should be given future investigation. The possibilities for community and ecological design outreach are limitless, even in the most challenging circumstances that chronic conflict and political instability provides, given a willing spirit to reach out to all those who are in need.
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APPENDIX A. INTERVIEW QUESTIONS

The questionnaire presented here is a revised version of its third draft I have developed as Appendix A of my dissertation study plan in November 2002. It was initially distributed for my committee’s and the North Carolina State University Institutional Review Board’s review and approval at that time. It was intended to share with my doctoral committee members the type of data collection instruments I would be using in the field as well as the direction and issues I was addressing in this research. Liberians residing in the Raleigh, North Carolina area, also provided feedback on the questionnaire. After several pilot tests in Liberia, it was revised again.

I. Questions related to the IPM-Farmer Field School, adoption/diffusion, previous interventions, and stated preferences regarding future training opportunities

1. How did you hear about the IPM-FFS (how were you notified)?
2. When were you notified?
3. How many times did you attend?
4. Did you receive a Certificate?
5. Is this the first time you have received formal training about agriculture?
6. If not, please tell me about other training you have received (where, when, topics)?
7. Why did you go to the IPM-FFS training?
8. Have you used any of these practices before?
9. Which ones have you used?
10. Which practices were new to you?
11. Which IPM-FFS practices have you tried?
12. Why did you decide to try these?
13. Which practices have you decided not to try?
14. Why?
15. Did you consult with anyone about these decisions?
16. Who did you talk to?
17. When did you first start trying the IPM-FFS practices?
18. What was your experience?
19. Have you taught or showed someone else about a practice(s)?
20. Who?
21. What things did you tell them about?
22. What was their experience?
23. Have other NGO’s come to your village?
24. Which ones?
25. When did they come?
26. What did they do?
27. Did you participate?
28. What effect did the NGO’s program or training have on you and your family?
29. What kinds of programs would you like to see in your village?
30. Why?
31. What kinds of training would you like to have in the future?
32. Why?
33. Who do you talk to when you need farming advice?

II. Questions regarding farming history and resource management practices, physical assets, livelihood strategies, markets and transportation

1. When did you start making farms on your own?
2. Why?
3. What did you do before you became a farmer?
4. Who taught you how to farm?
5. What land did you use for farming?
6. Is it the same land you are using now?
7. Has your farm changed in size over the years?
8. In what ways has it changed?
9. What did you grow when you first started farming?
10. What are you growing now?
11. What made you decide to grow these crops?
12. Do you farm the same way as when you first started farming?
13. What are you doing differently?
14. What made you decide to do this a different way?
15. Who taught you how to do this?
16. When did you first use the “improved swamp development method”?
17. Who taught you how to do this?
18. Why did you decide to use this method?
19. How many years was the land able to rest when you first started farming?
20. How many years is the land allowed to rest now?
21. Why do you think it is this way now?
22. What methods do you know of to control for pests?
23. What methods have you used in the past?
24. What made you decide to use a different method?
25. What methods do you know to make the soil better?
26. What methods do you use?
27. What made you decide to use this method?
28. Who taught you how to do this?
29. Do you farm full time?
30. Do you have other (off-farm) jobs?
31. Have you had other (off-farm) jobs in the past?
32. When did you begin/end your off-farm job?
33. Why did you decide to do this?
34. What tools do you own?
35. What tools does your husband/wife own?
36. What investments do you have (e.g., land, house(s), machinery, etc.)?
37. When did you purchase these?
38. Why did you make this investment?
39. What do you do to earn “fast money”? 
40. Who helps you with your farm?
41. What do you sell?
42. Where do you sell it?
43. What forms of transportation do you use?
• Taxi/bus/truck
• Car
• Motorbike
• Bicycle
• Walking
44. Do you own or borrow a car, motorbike or bicycle?
45. What do you think are the biggest problems facing farmers?
46. Why?

III. Demographic Questions: human and physical assets; other livelihood strategies

1. What is your age?
2. Where are you from?
3. What is your tribal group?
4. Are you single/married/divorced/widowed?
5. What is your highest level of education?
6. Where is your spouse from?
7. What is your spouse’s tribal group?
8. What is your spouse’s highest level of education?
9. Does your spouse have an off-farm job?
10. What do they do?
11. How often do they do this job?
12. Do they help you on the farm?
13. What do they do?
14. Do you have children?
15. How many?
16. Do they go to school?
17. How often do they attend school?
18. Do they help you on the farm?
19. What do they do?
20. When do they help you?
21. What other things do they do around the house?
22. Do they have jobs off the farm?

IV. Questions for Landowners and Family Heads [OPTIONAL]

1. How many acres of land do you have?
2. How many family members make farms on your land?
3. How many non-family members make farms on your land?
4. What is the present number of years the land is allowed to rest?
5. How has this changed over the years?
6. Why do you think it has changed?
7. Do you believe that you have enough land for you and your family?
8. Why/why not?
9. Do you have forested areas on your land?
10. What is the approximate size of the forest?
11. What is the benefit of these forested areas?
12. What are your thoughts on re-forestation?
13. What does “agro-forestry” mean to you? How would you describe it?
14. Would you like to learn more about agro-forestry?
15. Why/why not?
V. Questions about the Home Garden [OPTIONAL]

1. Do you have a home garden?
2. How many years have you had one?
3. Why did you decide to make one?
4. What do you grow?
5. Do you have poultry in it?
6. How do you use the home garden?
7. Do you want to learn more about home gardens?
8. Why/why not?
I was introduced to the IPM-FFS participants by Mr. Billoh Sei Bonkuo, field supervisor of the Ganta United Methodist Church Agriculture Program. Mr. Bonkuo was assigned to accompany me because he was from the local area and spoke the tribal dialect. His introduction of my research intentions were as follows:

Please welcome Miss Cynthia Van Der Wiele. She is a university student from the United States and here to conduct research. She will be talking to farmers like you who participated in the IPM-Farmer Field School in order to understand your thoughts and opinions. She will collect this information in the form of a report to present to the [Liberian] United Methodist Church’s Agriculture Program. She is trying to find ways to improve the conditions of the people of Nimba County while trying to conserve and protect the forests and land in a better way.

Cynthia wants to learn from you because you are a farmer in Nimba County and know the land here. You are an expert on this area and therefore, your thoughts, opinions and experiences are very valuable to her. She wants to understand the way you farm and the things that made you farm the way you do. She also wants to understand your problems and concerns and how they relate to the problems of the land, what can or should be done about these, and how we can collectively or individually do something about it.

If you do not understand her questions, please stop me and ask about it so that I can make it clear. It is up to you if you choose not to answer some of the questions. However, if you are able to talk to us with an open heart, then hopefully it will benefit all of us.
## Village 1: Gbahn

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**Tool Codes:**
- C = cutlass
- H = hoe
- S = shovel
- A = axe
- B = brother
- W = wife
- C = children
- K = kuu
### Village 1: Gbahn

#### Demographic

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#### Tool Codes:
- C = cutlass
- H = hoe
- S = shovel
- A = axe

#### Labor Codes:
- B = brother
- W = wife
- C = children
- K = kuu
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### Adopted NRM Practices

| Compost | Y  | Y  |
| Farmyard Manure | home gardn | Y |
| Multi-crop | Y  | Y  | Y  |
| Intercrop | Y  | Y  | Y  | Y  |
| Trap/decoy | Y  | Y  |    |
| Neem extract | Y  | Y  | Y  |
| Snail production | Y  | Y  |    |
| Beekeeping |    |    |    |

### Family Info.

| Spouse Tribe | Gio | Gio | Mano |
| Spouse Village | Butuo | Gbedin |    |
| Spouse Ed. | 0  | 6th | 9th |
| Spouse Job | Selling | Selling |    |
| Spouse Tools |    |    |    |
| No. Children | 6  | 3  | 5  | 10 |
| Attend school? | N  | N  | Y  | N  |

**Tool Codes:**  
C = cutlass  
W = wheelbarrow  
H = hoe  
S = shovel  
A = axe  
B = brother  
H = husband  
W = wife  
C = children  
K = kuu group
### Village 2: Gbedin

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#### Adopted NRM Practices

- **Compost**: Y
- **Slash/Mulch**: Y
- **Farmyard Manure**: Y, Y
- **Multi-crop**: Y, Y, Y, Y
- **Intercrop**: Y, Y, Y
- **Trap/decoy**: Y
- **Neem extract**: Y, Y, Y
- **Snail production**: Y, Y
- **Beekeeping**

#### Family Info.

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**Tool Codes:**
- C = cutlass
- H = hoe
- S = shovel
- A = axe

**Labor Codes:**
- B = brother
- W = wife
- C = children
- K = kuu
### Village 2: Gbedin

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**Adopted NRM Practices**

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**Tool Codes:**

- C = cutlass
- H = hoe
- S = shovel
- A = axe

**Labor Codes:**

- B = brother
- W = wife
- C = children
- K = kuu
## Village 3: Neigbein

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**Tool Codes:**
- C = cutlass
- H = hoe
- S = shovel
- A = axe

**Labor Codes:**
- B = brother
- W = wife
- C = children
- K = kuu
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**Tool Codes:**
- C = cutlass
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- S = shovel
- A = axe

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- B = brother
- W = wife
- C = children
- K = kuu
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**Adopted NRM Practice**

| Compost | Y |
| Slash/Mulch | Y | Y |
| FYM | Y | Y |
| Multi-crop | Y | Y | Y | Y | Y | Y | Y |
| Intercrop | Y | Y | Y | Y | Y | Y |
| Trap/decoy | Y | Y | Y | Y | Y |
| Neem extract | Y | Y | Y | Y | Y |
| Snail product'n | Y |
| Beekeeping | Y |

**Family Info.**

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**Tool Codes:**

- C = cutlass
- B = brother
- H = hoe
- W = wife
- S = shovel
- A = axe
- K = kuu
APPENDIX D. FIELDWORK EXPERIENCE

The fieldwork in Liberia was accomplished by nothing short of a miracle. Preparation before leaving was extensive. Mundane but crucial preparation included the usual academic coursework and the preliminary examinations for doctoral candidacy, development and approval of the dissertation proposal including a draft of the semi-structured interview, and acceptance of a permission letter by the Institutional Review Board for Human Subjects Research, North Carolina State University, to carry out my doctoral research using the proposed data collection methods and instruments. I also conducted a long and ultimately successful struggle to receive funding for travel through the North Carolina State Africana Studies Program. Obtaining permission for an educational leave through my employer took eight months. Permission was finally obtained approximately three weeks before departure for Liberia—during the December holiday season. I had hoped, and anticipated, the granting of leave, so I proactively sent off the necessary paperwork to the Liberian Embassy in Washington, D.C. to receive a travel visa. They would not be in operation during the numerous holidays in December. Finally, considerable correspondence through my only Liberian contact with access to electronic mail, the Reverend Anne Girton—a missionary from the United States who was serving as administrator of the Ganta United Methodist Hospital—made the fieldwork possible. Because Rev. Girton routinely traveled between Monrovia and Ganta, she was able to get word to the Ganta United Methodist Agriculture Program staff that I was interested in conducting a study and when I would be arriving. She encouraged me to pursue this dissertation research and provided the use of her house in Ganta and permission to use her vehicle and driver as needed.

When I arrived in Liberia in early January 2003, I stayed at the United Methodist Compound in Monrovia. I had stayed there twice before on mission trips. I was granted use of their vehicles and drivers to take care of business in Monrovia before proceeding upcountry. This involved registering with the United States Embassy to inform them of my travel plans and contact information. As a result of the political instability, frequent travel warnings are issued by the Embassy. Registering
your presence is more than merely a nicety; it may become a necessity if there is a need to evacuate non-essential American personnel. I also made contact with Liberian Annual Conference-United Methodist Church’s agriculture director, Mr. Edward Brewer. He had been aware that I would be arriving in January; I wanted to greet him and inform him of my intentions. I also wanted to gain his support and receive his blessing on my fieldwork. He was a source of valuable information on local customs and social protocols. Before traveling to Ganta, I also picked up a wide range of staples at the local supermarket, because these would be unavailable outside of Monrovia. After two or three days, I made the five-hour journey along one of the only paved thoroughfares in Liberia.

My base for performing the fieldwork was at the Ganta United Methodist Mission Station where I stayed in the guest bedroom at the house of the Rev. Anne Girton. My first afternoon was spent getting organized and making contact with the director of the Ganta United Methodist Agriculture Program, Mr. Ezekiel Freeman (Figure C.1). He would be invaluable in making the first contacts with the Integrated Pest Management-Farmer Field School leaders in each of the villages.

Figure C.1 Working out research details with Mr. Ezekiel Freeman, GUMAP Director
Since there are no telephones or other “quick” ways of contacting people—it has to done in person—Ezekiel Freeman set out by motorbike to let the leaders know that I was a university student and interested in gathering information about people’s experiences with the IPM-FFS. The GUMAP director also assigned me one of his staff, Mr. Biloh Bonkuo to assist and accompany me on my field collection.

As I had noted in Chapter 5, I had originally planned to interview participants from only two of the four villages that had the IPM-FFS training. I had previous experience with the pace of life and the difficulty in communications (e.g., setting appointments in person) and with a limited amount of time in country, I did not want to set myself up for data collection disaster (and stress). However, I the GUMAP staff informed me that if I did not interview or visit all four villages, word would get out and the IPM-FFS participants would feel insulted. I calculated what that would mean—long days with as many as four interviews and farm visits—but it appeared that I could accomplish this feat.

Semi-structured, in-depth interviews and photo documentation of field observations were used as major data collection instruments, as discussed in greater detail in Chapter 5. Even though a draft interview protocol was developed and pre-tested with Liberians living in Raleigh, North Carolina, it became apparent (as anticipated), that it had to be revised and fine-tuned. Ezekiel Freeman went over my interview protocol and made some suggestions; he also found a man and woman who would agree to pre-test my questions. This made the interview questions more relevant and understandable. One of the most distinct changes was asking the question, “What do you do to get quick money?”

Ezekiel Freeman was instrumental in setting up my first interview contacts. My original plan was to borrow Rev. Girton’s vehicle and driver for the duration of my stay. However, this means of transportation was both expensive (gasoline is $4.00 per gallon and the driver was $5.00 per day). More importantly, it seemed too elitist and awkward to be arriving with an entourage. I wanted people to feel more at ease with me and be able to convince them that I was, indeed, a student (not a journalist as some had rumored), and not affiliated with an international NGO. Fortunately, Mr.
Lewis Momoh, the chief pharmacist at Ganta United Methodist Hospital, had a mountain bike that he was willing to lend me. I was absolutely thrilled because I am an ultra-distance cyclist and had some concerns about going several months without regular exercise. Billoh Bonkuo already had a bicycle and was agreeable to changing our mode of transportation. Traveling by bicycle had an immediate impact on both Ganta residents and villagers. I became a recognizable sight (i.e., perhaps a curiosity—no other white women in the area bicycled) and developed a reputation for having stamina (white people are thought to be weak). Bicycling and walking to the IPM-FFS participants’ houses and farms also had the benefit of helping me ease into the local setting. I was better able to experience what each person and their family goes through on a daily basis by walking. This mode involved traversing a variety of handmade bridges (Figures C.2 and C. 3), which was at times rather terrifying.

Figure C.2 Local bridge near Gbedin, Liberia (the river was approximately 30 feet below).
Walking to a respondent’s farm sometimes meant passing through tiny sub-villages—a cluster of five to twenty houses. On one occasion, a sub-village was celebrating the circumcision of one of the young men. This is an auspicious occasion requiring the family to prepare a feast replete with sufficient quantities of African gin. Spotting a white woman was a novelty (the residents were very startled at first), and it was required that I participate in the festivities (and, of course, bestow the young man with a token). A return hike from one farm led to inadvertently walking into a funeral for a quarter chief’s son. Of course, the chief requested that I join in the ceremonies.
The many hours of conversations during these long walks led to learning about local flora and their medicinal uses as well as cultural and political insights. Sometimes these conversations led to serendipitous meetings with snake handlers (members of the *Poro* bush society). I met clan chiefs, paramount chiefs, elders, town chiefs and quarter chiefs (Figures C.4 and C.5).

Figure C.4 Paramount chief, Nimba County, Liberia.

Figure C.5 Village elder conveying town’s history. Nimba County, Liberia.
A conversation one morning with Billoh Bonkuo led to a tour of the local radio station in Ganta—Radio Kergheamahn, FM 94.5). This tiny, community-based volunteer radio station, established in June 2002, operates on several 12-volt automobile batteries, a “boom” box and a microphone, and transmitter. The antenna was basically a long bamboo pole and some wire. The station’s range is approximately five to eleven miles. They run a variety of community-service programming, including interviews with local elders to retell local history and folklore, public health education programs, farming tips, market reports, local news, folk music, information for IDPs, and a host of other programs. The station manager related to me that they are on the air as long as the batteries last.

Oftentimes, the IPM-FFS participants invited me to join them for their mid-day meal. I respectfully joined them, knowing that it was an honor. I sampled African gin and drank palm wine. I delighted in local, roadside treats sold by children. I ate bushmeat and purchased greens in the markets.

Amazingly, I was able to interview every IPM-FFS member still remaining in the area and healthy enough to participate in my research. As a reward for the hard work of the two gentlemen who assisted me most—Billoh Bonkuo and Anthony Sekie—and as an excuse to treat myself to some site-seeing, we made excursions to a waterfall on the St. John River (near the border with Guinea), and to Mount Nimba (which borders Guinea and Côte d’Ivoire) during the last week I was in Ganta. Neither of them had been to these places! The completion of my data collection also coincided with a local celebration for Rev. Anne Girton and Mr. Timothy Kumeh who had wed in January. The festivities were a wonderful way to say goodbye to my new friends and colleagues in Ganta.

Due to the proximity to Guinea and the report of an armed force of 5,000 nearby, the hike to the waterfall required a military escort (Figure C.6). At one time, there was a road to the waterfall and Europeans working for LAMCO would head to the falls during weekends.
Mount Nimba is located near the iron-mining town of Yekepa. Until the mid-1980s, Yekepa was a thriving company town. LAMCO ceased operations prior to the outbreak of war. Today, it is a ghost town with few residents. My Liberian friends had never had the privilege of sightseeing in their own country. With a local United Methodist contact to guide us, we hiked up the mountains (Figure C.7) and found native orchids (Figure C.8). It was the close to an unforgettable experience.
Figure C.7  Sunset over the Nimba mountains. Yekepa, Liberia.

Figure C.8  Local orchid (perhaps Polystachia concreta). Nimba Range.
The final week in Monrovia set a hectic pace of wrapping things up—meeting with UMC-LAC staff and conducting serendipitous interviews with heads of international NGOs and the executive director of the Liberian environmental agency (NECOLIB). In typical circumstances, I would expect to have extreme difficulty and months of prior communication to gain access to a high-ranking government official. In Liberia, any outsider willing to learn about the country and potentially to offer assistance is given immediate access. At the time, I had no idea of the dramatic turn of events that would occur just a fortnight later.

Conducting fieldwork abroad is nerve-wracking, exciting, boring, and unforgettable.
At the time of my arrival in January 2003, Ganta was a thriving commercial town in Nimba County, 247 km north of Monrovia. During the last weeks of February, political stability once again rapidly declined. I witnessed truckloads of government forces drive into Ganta and “arrest” men and male children. They were grabbed up off the streets, out of local “hang outs”, and out of classrooms. They were reportedly taken to training camps and to the “front lines.” Fighting was occurring on both sides of Liberia—on the border areas with Sierra Leone and Côte d’Ivoire. Schools were closed so that teachers and students could hide. The streets of once-bustling downtown Ganta were eerily quiet—only women with babies, old men and expatriates working for NGOs were seen walking around. The terror was visible on everyone’s faces. People I had come to know during my time in Ganta had been forcibly seized—the local mechanic, a Ganta United Methodist school principal, several students...There were whispered tales of men and schoolboys escaping from the camps and returning battered and naked to their families. I had wanted to take the “scenic route” back to Monrovia before I left. Local people with access to transistor radios sternly warned me not to go that way; there was active combat in Toe Town and insurgents would surely confiscate the vehicle. On the day I returned to Monrovia by the main highway, a group of rebels along this “scenic route” attacked an SUV transporting three Adventist Church workers. They were robbed, killed, and burned. Approximately two weeks after I completed my field research and left Liberia, the town of Ganta succumbed to rebel forces.

From late March until October 2003, Ganta was the scene of intense combat between former government fighters and rebels of the Liberians United for Reconciliation and Democracy (LURD) group. Besides LURD and government forces, fighters of a second rebel group, the Movement for Democracy in Liberia (MODEL), have also been active in the area. As the Liberian government lost control of most of the country (approximately 90 percent), missionaries and expatriates working for United Nations and international NGOs were evacuated by charter flights, ships, and finally, for those
who refused to leave, by helicopter. Only a handful of workers representing Médecins Sans
Frontières and other emergency relief agencies stayed on—in Monrovia, near the US Embassy in
Mamba Point.

Residents of Ganta and surrounding villages fled to nearby Guinea or sought safety in
Monrovia, which proved to be lethal decision. A report by one of my key informants, Mr. David
Waines, Equip, related his experiences via electronic mail:

September 18th 2003: There are too many children in Monrovia with missing
arms and legs. The war damage is fresh and hanging everywhere over this
town. Pray for peace. I'm back in Monrovia. Much rejoicing to see so many
dear friends who had made it through the shelling. Most people in Monrovia
have glad and grateful hearts following their deliverance from war. Most are
starting over with zero. "They looted everything from us down to the wires
from the wall!" is often heard on first greeting.

September 19th 2003: The mortar detonated as soon as it came in contact with
the roof of the house next door to ours [Waines' house] on Mamba Point.
Every one of the family of six was home and were all wounded by the red hot
metal bomb fragments. Alpha, the husband, lifts up his t-shirt to show me
where a chunk of metal is still embedded in his shoulder. Musu, their six-year
old daughter, with a delightfully shy smile, had her right arm ripped up. It had
to be amputated below the elbow. She greets me many times a day as I come
and go down the footpath away from our house. "Hello White Man", she says
softly waving her handless right arm out of habit, then remembering it's not the
same anymore and waving with her left hand instead. Musu has an old Barbie
doll she hugs very tight. Her Barbie is also missing her right arm.

September 22nd 2003: The attention grabbing "BOOWHABOOWHA" of US
and ECOMIL Military helicopters is overhead constantly here in Monrovia.
Two more just flew low right over us on another shuttle to the two US
warships, which are just off the coast. In movies, the sound of these Apache
attack helicopters is always associated with the dread of an incoming attack.
This morning, at the Inland Church, Elder Prince Sawan's message got
drowned out by three sets of Apaches flying over. Prince paused to "praise
God for how thundering loud those choppers are that's the sound of our blessed
peace being maintained—God sent those choppers right over us to remind us
that he answered all our desperate prayers for peace."

September 27th 2003: I am very glad to be back in Liberia working to help
people to rebuild their lives. Malnutrition amongst children is at the worst
levels we have ever seen. During the height of combat and hunger in August,
one cup of rice sold for $100 LD. Everyone has lost a lot of weight through
the war. There is ongoing fighting outside Monrovia and the violence and
arms are thick and ever present even in Monrovia. Despite all this we see that
God is opening before us a great window of opportunity to save lives and make a difference in the way this nation comes up out of this tragic war.

September 30th 2003: The up to 8000 people at the Masonic temple use to leave their waste all over the rocks and in the grass along the same foot path leading from our house to Benson street. There was an outbreak of watery dysentery. More latrines were made and the Equip staff started intensive health education and monitoring of the area. The education and assigning 25 refugees to keep certain areas clean for incentives has dramatically cleaned things up. Health has improved greatly—you can now walk down the path without holding your nose and constantly watching where you step.

October 5th 2003: I woke up early with people at the door needing help with Hawa's infected leg. Then we did the rounds of the sick and malnourished children amongst the 8000 refugees seeking shelter in the Masonic temple next door to us. We had bought another huge bale of children's cloths and gave them out to the children with rags or nothing on. We kept going all day organizing treatments, health trainings etc. The day ended at 11:00 pm with a couple bringing a little unconscious baby to my attention - seemed like a medication overdose - so off we went to Catholic hospital. After midnight I had some work I urgently needed to do when I got home but feel asleep with my clothes on under the glow of the computer screen. Too much work; too little help; not enough money—these are the default settings in post war Liberia. You can't throw a stone without hitting a desperate need in this ongoing state of emergency.

Please pray for my trip behind the frontlines into Ganta tomorrow (Oct. 13th). There is fighting in nearby Duo and no law or order in Nimba. The UN Military Helicopter has agreed to carry me and our "cold boxes" of vaccines in to support our EQUIP CHA emergency health teams restart vaccination coverage: 350,000 people in Nimba are cut off from Monrovia and all other humanitarian assistance. Hundreds of children are dying in Nimba because medicines, vaccines and food can not get through. At the time of writing, no UN or NGO Aid groups, except EQUIP, are operational in Nimba, as they have not been able to re-supply their clinics or feeding centres for months.

I am in awe of the dedication of our four EQUIP Liberia CHA Frontline Emergency Health Teams who with overcoming faith are doing the seemingly impossible. They are risking their lives on flimsy rafts bringing medicines across the raging St. John River from Guinea. They endure threats and abuse at checkpoints as they buy locally available high protein biscuits and corn soya blend plus fish peanuts, beans, sesame seeds to feed approximately 100 moderately-to-severely malnourished children every day in four areas.

No one can drive a motorcycle or vehicle in Nimba because it will be stolen from the fighters. NGO staff charter trips on motorbikes and vehicles controlled by the fighters! You cannot carry money in across the frontlines so we transfer money to re-supply our teams through Floyd's General Merchant in Sanniquellie. This keeps the emergency medical work and the feeding of malnourished children going."
Because of the continued active combat on the borders of Nimba County, the approximately 350,000 IDPs and war-affected residents in Nimba have become isolated behind the front lines and are highly vulnerable. Nimba County is currently cut off from all humanitarian assistance from Monrovia and the rest of Liberia. The MODEL attack on Gbloley on September 23, 2003 caused terror in Ganta, as it coincided with the weekly market day. Many were killed and at least five buildings, including the clinic were destroyed. As the fighting continues in Nimba, virtually the entire population of the County are becoming internally displaced and in desperate need for health care and food. They are trapped in Nimba with LURD pushing up from the southwest and MODEL attacking the eastern flank. Most people remaining in Nimba believe both Ivory Coast and Guinea are hostile towards them and they will likely be targeted for revenge if they flee there.

As of October 2003, it was estimated that there were approximately 350,000 internally displaced people in Nimba County alone. In late October 2003, the UN High Commission on Relief (UNHCR) reported that “a large portion of the population still prefer to remain in the bushes until security can be guaranteed.” Residents, UNHCR added, anticipated that it would take the presence of UN Peacekeeping Forces to return the security situation in the area to normal. Dedicated NGO staff continued to try and reach people in Nimba County. David Waines [Equip] reported:

“October 13th 2003: Vaccine success! We have precious vaccines to get to the children of Nimba County. Our Russian MI 8 Helicopter didn’t start at 8:45 as planned. Perhaps, having been a little too long in Liberia, I recommended that we all push and jump-start it. None of the UN soldiers or officers laughed. The technicians spent three hours and lots of fuel trying to get the starters working right. By 1:00 pm we were on our way to Gbarnga. On the helicopter flight, we were shot at. The pilot swerved and dove to the right. Cracking of machine gun fire. The general and the convoy drove up to the Balia Bridge, which was supposed to be the front lines, but there has been active fighting today and yesterday. LURD fighters, with their huge BZD gun mounted in the back of a pick up, want to make a quick retreat when our convoy of UN soldiers arrive, but they have to push-start five times before their old Ford pick up fires to life. There is lots of shooting in the air. The UN Force Commander is getting nervous. On the way back to Gbarnga he tells me there is not enough time, not enough fuel not enough security in the area to go to Ganta and drop the vaccines as planned. I plead, “General O’Pande I will name my next child after you. PLEASE, at least to get the vaccines to the children.” He motions that I should say not another word about it he has made
up his mind we are not going. I pray hard for the next twenty minutes. Just as the chopper is about to lift off, it is announced we will go to Ganta. I cheer; arms in the air. We drop the vaccines quickly, but Ruth is not there. Where is she? The command is to leave the engines going, drop the boxes, and get right back up in the air. I have cash for Ruth to care for needy children with; cash for Joseph to run the health work with...no one to give it to. A jeep arrives, then a pick-up. No Ruth. The UN point soldier rushes over and grabs my arm. "The commander says if you are not in the chopper now, we are lifting off without you!" "I will be there ... in one minute!" Then I see Ruth rushing towards me. I give her a huge hug, pass the money and other gifts, run back and jump on the helicopter. We lift off before I get to my seat. Mission accomplished. The General first said no, but God said yes.

October 23rd 2003: EQUIP teams re-supply 14 Clinics around Nimba County. With 970 Kg of medicine, 14 clinics were re-supplied with drugs and medical supplies in the midst of the last war zone in Liberia. The Russian MI26 is the largest helicopter in the world. It is called MI26 because it carries 26 tonnes! There were two pick-up trucks full of UN soldiers on board who descended in Sanniquellie, and then drove down the road towards Monrovia. We reached the clinics with drugs they have desperately needed for months. The cases that have been flooding to the clinics are in very serious condition. Our teams are still the only NGO working in Nimba. General O’Pande says it will be February before UN troops are stationed in Nimba and the road secured. I pray hard for the road to be open much faster than that.

October 25th 2003: WE MANAGED TO DRIVE UP THE ROAD FROM MONROVIA TO GANTA AND SACLEPEA! There was no shooting and no harassment. As we rolled into Nimba, there was great celebration at every village. Singing and dancing children, women and men emptied the small villages and circled our Land Cruiser. Often they broke into chanting, "No more War! We want Peace!!" Every town and village along the way gave us this incredible Palm Sunday welcome. The General said, “not till February” but God said He would open the road TODAY as a channel of rescue for his beloved people cut off and perishing in Nimba County. Praise God. Pray for UN Military to deploy in Ganta, Saclepea, and Tappita very soon to help stop the fighting which causes so much misery.

If you have no security you can do nothing else. There is still lots of fear and fighting, looting, and raping going on. Only the bravest able-bodied people are in Ganta protecting their homes from looters. The families—women and children—are in the bush in small villages and on farms, so if any group is coming towards them, they will have a chance to escape down the paths.

So many malnourished children. The worst amount and severity of cases I have ever seen in my 17 years in Liberia. Suffering mothers, starving children. The number of women who had ribs showing. Many who were supposed to be breast-feeding babies were in need of supplemental feeding themselves. We are increasing the number of malnourished children we are feeding from 120 per day to over 200 per day.
The main streets of Ganta are filled with rubble. Whole buildings are gone. Along the main roads in the center, every roof has been burned, every wall has been smashed. Slack-jawed, frozen-eyed (Ex-Taylor "Government Militia") fighters with AK47s and Rocket Propelled Grenades swarm the main street as we arrive. The LURD forces, which the militia drove out, put thousands of man-hours of hard work into destroying Ganta. [Harley's] “Stone House” is gone. One of the UMC hospital buildings and a school building are burned out shells. Miraculously, the old stone church is completely intact (minor damage) with piles of explosives remnants lying all around it. Despite the destruction, the mission and Ganta are still very beautiful with most of their buildings still intact.”

In November 2003, the United Nations Mission in Liberia (UNMIL) started making progress towards disarmament and peacekeeping. This meant that large amounts of help were now getting through. The security situation was quickly improving and people had renewed hope and were busy trying to rebuild their lives—cautiously at this point—but life was changing for the better with the road to Nimba open and other NGOs returning to the area.

By February 2004, staff were starting to return to Ganta United Methodist Mission Station. United Methodist churches in central North Carolina banded together and collected items to be sent by sea container. Missionaries, Rev. Herbert and Mary Zigbuo, detailed the many relief and development needs in the area:

“Education is necessary for the development of any nation. Your donations of assorted textbooks make it possible for children and young adults to go to school and learn. Textbooks are in short supply in this country and most times many students share one textbook. Packing and sending textbooks for our schools insures Liberia's future development and economic capacity aimed at enabling all people to have a chance at raising their standard of living and quality of life.

Clothes cover our nakedness, and enable us to live and move around with some degree of dignity. Many people have lost most of what little clothing they had and cannot afford to replace them. They will be very grateful for the ones you are sending, and a very special "touch" is to include a great number of underwear!!

We are looking forward to moving to Ganta by the third week in February. We have been able to visit Ganta twice. District church people and Mission Station personnel are hard at work cleaning the campus and getting a few houses and buildings ready to enable the reopening of school, hospital, leprosy clinic. We are grateful for funds, which enabled us purchase some building
supplies to do patch up work to essential buildings and some residences. The Ganta United Methodist School will very soon begin a tutorial program aimed at completing the second semester work that was interrupted during last year's civil unrest. Students are excited about returning to school.

Medical services are greatly needed as many people who sought refuge in hard to reach outlying villages are now returning to Ganta after living in crude shelters with limited food for many months. Most people of this region are subsistence farmers and they have been unable to plant their gardens, so there is not food harvest for them. They must hunt and trap and glean food from old gardens. Agriculture out reach programs will assist the farmers to get back on their feet and provide them with skills to insure larger and more nutritiously diversified crop yields.

The UN Peacekeeping Force has deployed troops in many areas of the country and is still in the process of deployment to base troops throughout the country. This is a first for Liberia since the civil unrest started in March 2003. By the grace of God, through the presence and intervention of the UN peacekeepers, Liberians will finally experience peace and stability. The Zigbuos, reporting back on the situation in upper Nimba County, provided the following update in mid-March 2003:

“With the reassuring presence of the United Nations Peacekeeping Force at Ganta since February 2, many people have returned to Ganta and the surrounding towns and villages. Food is still difficult to come by. Most farmers were unable to plant their farms during 2003, so there is nothing to harvest. People exist by hunting, trapping, and gleaning old gardens and farms. There is much malnutrition and there have been many deaths as a result of extended poor diets, coupled with the fact that people have had to live in crudely made structures for prolonged periods of time. This situation is both pitiful and urgent. The people of northeastern Liberia are subsistence farmers. Their yearly income is equivalent to approximately USD$400.00 to $600.00. For most subsistence farmers, it is an overwhelming effort to cater to the family's basic needs (food, clothing, and shelter). Families are hard stressed to try to cater to medical needs.”

The UN Peacekeeping Force finally started disarming former combatants in the Ganta area on 19 August 2004. Will peace prevail? Or will the sad cycle continue? Only time will tell. In the meantime, we have work to do.