INVESTING IN TREES AND LANDSCAPE RESTORATION IN AFRICA

WHAT, WHERE, AND HOW

PROFOR
PROGRAM ON FORESTS

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FOREWORD

THE GIVING TREE

In 2011, the Horn of Africa experienced the worst drought in 60 years. Millions of people went hungry. They abandoned their farms in search of jobs or crowded refugee camps. Tens of thousands perished. The lucky ones turned to trees for timber, woodfuel, food, and fodder to cope with the lack of rainfed crops.

In field after barren field, trees stood out as survivors, protectors, and providers. With their long root systems drilling toward the water table, trees are more drought-resistant than annual crops. Trees help retain moisture, nutrients, and carbon in the soil, while protecting farms from wind erosion. And trees provide critical products—fruits, leaves, nuts, gum, charcoal, and timber—that people can eat, feed to their animals, or trade for food in times of need.

The good news is that smallholder farmers in Kenya, Niger, and elsewhere recognize the importance of trees on farms and are investing in saplings, nurturing trees from existing roots, and putting their trust in agroforestry. The incentives for farmers are immediate and tangible: increased crop yields, diversified income sources, and reduced vulnerability to climate extremes. Trees on farms also help support animal life, control erosion, and protect watersheds. The global benefits are less visible but crucial: Improved agricultural practices that include trees, conservation tillage, mulching, and other proven sustainable land management techniques sequester more carbon than mainstream farming techniques and can help mitigate climate change.

What has always been obvious at the farm level is becoming increasingly so for larger scale private investors. Unprecedented opportunities exist for private investors and entrepreneurs in the business of planting and managing trees in forests and on farmland in Africa. Reforestation measures for degraded lands, strategies for the sustainable management of forest resources, and agroforestry practices that incorporate trees into farming systems have demonstrated their promise for producing commercialized tree products. The level of investment so far has been modest; the challenge now is to find ways to scale up promising investments so they have a clear impact at the landscape level.

With the right programs and policies in place, the climate-smart investment opportunities described in this volume could occur on a much greater scale: restoring entire landscapes to productive, functional ecosystems that achieve the "triple wins" of increasing rural incomes, making yields more resilient in the face of climate extremes, and making agriculture part of the solution to climate change rather than part of the problem.

— Andrew Steer, World Bank Special Envoy for Climate Change

OVERVIEW

Reforestation measures for degraded lands, strategies for the sustainable management of forest resources, and agroforestry practices that incorporate trees into farming systems are increasingly demonstrating their promise for producing commercialized tree products. Although the level of investment so far has remained modest, the challenge is to find ways to scale up promising investments in a way that will have a clear impact at the landscape level. These types of investments can help achieve the "triple wins" of climate-smart agriculture: increased incomes and yields, climate change adaptation and greenhouse gas mitigation.

TREE-BASED TECHNOLOGIES WITH PROVEN BENEFITS

Market trends are promising for a wide range of tree-based technologies, including tropical fruits, cashews, honey, timber and wood products, lipids, gums and resins, tree crops, and agroforestry systems. The following observations stand out from a review of existing investment opportunities:

- Many tree-based investments are highly profitable and are projected to remain so.
- Many-tree based investments are critically important for providing environmental services and restoring landscapes; for example, fertilizer tree systems, parkland systems, and exclosure-based systems.
- Some tree-based investments (for example, the parkland systems) provide win-win outcomes in terms of profits and ecological services.
- Some tree-based investments could be improved upon to better deliver both profits and ecological benefits; for example, integrating high-value trees into tree crop systems.
- Achieving large-scale restoration almost always requires a combination of investments in tree and non-tree technologies; for example, vegetation regeneration, soil conservation, planning for woodland-riparian management.

SCALING UP LANDSCAPE INVESTMENT APPROACHES IN AFRICA

In many cases, African entrepreneurs, farmers, civil society, and governments have responded dynamically to the widespread challenge of land degradation. The continent is dotted with landscapes where production of trees on farms and in managed forests has grown dramatically to meet market and subsistence needs; sustainable agricultural practices and revegetation have restored soils and watersheds; and key conservation areas are being protected.

However, this is not happening at the scale required by societal needs in Africa. In part, this is due to a lack of strategic cooperation and coordination between private sector investors and land managers (who are focused on realizing profitable opportunities and meeting their own needs) and public and civil society actors (who are focused on restoring forest cover and ecosystem services). Such coordination is only possible when the biophysical potential for landscape restoration, private sector investment opportunity and incentives, and societal demand for multiple benefits converge.

Much can be learned from examples of large-scale landscape restoration in Ethiopia, Kenya, Niger, Tanzania, and Zambia, and the variable roles of the private sector, farmers, government, and civil society in supporting and undertaking investment.

A review of large-scale examples finds that private incentives for landscape restoration depend on ecological features of production systems, market infrastructure, eco-certified markets, and payments for ecosystem services. Spatial patterns of land and forest tenure, international investment, good governance, and armed conflict also matter. New mechanisms are engaging private investors and businesses more effectively in multistakeholder landscape restoration planning and action. More explicit analysis of the convergence of private and public interests in landscape restoration can help identify promising opportunities for cooperation.

INVESTMENT OPPORTUNITIES AND CONSTRAINTS

Investing in land and forestry simply to raise yields for fiber, food, and fuel—perhaps by achieving economies of scale—is a narrow objective that, more often than not, does not consider the long-term ecological, economic, and social consequences of land use change. Chapter 3 in this volume explains how forests and landscapes, particularly in Africa, can satisfy the needs of investors who are seeking an attractive rate of return combined with a sustainable and socially responsible impact.

There is great investment potential in releasing the latent energy of the small and medium-sized enterprise (SME) sector. Local enterprises can manage and restore landscapes in a manner that reflects the need for achieving social, environmental, and economic objectives. These landscapes are populated by people who have certain rights over the land and the resources it provides. Climate-smart investment needs to consider the role local people play in the landscape, particularly in addressing the drivers of deforestation.

However, investing in such enterprises involves constraints, such as low capacity, unclear tenure, and weak institutions. These constraints can be overcome if "soft" investment—from donors, multilaterals, and governments—precedes "hard" investment to improve the enabling environment and reduce transaction costs; for example, by supporting institutional reform and financing intermediaries that are often crucial in helping SMEs overcome their isolation from markets, investors, and political influence.

Building a partnership among different types of investors, intermediaries, and SMEs requires trust, patience, and transparency. Certain steps are needed in the process to ensure a clear understanding of goals and the means by which issues such as benefit sharing and quality improvement will be handled in a businesslike manner. To turn opportunities into trees and landscapes, appropriate investments must be made in people and enterprises that have a value proposition and the wherewithal to carry

out their plans. This vision of climate-smart investing is optimistic about the opportunity to restore forests and landscapes while also stimulating grassroots economic and social development.

POLICY IMPLICATIONS

Various policy responses could support an improved climate for private investment in trees and landscape restoration.

Policies and institutions need to be reoriented to ensure that investments in trees and landscape restoration are addressed in the decentralization agenda. The devolution of full control over land and other natural resources to local institutions and organizations is increasingly seen as a requirement for bringing about better natural resource management. While decentralization is not a guarantee of success, local control increases the chances for improved management and benefits. The challenges are to enhance the legitimacy of local management organizations, ensure that these organizations can put in place effective management mechanisms, and see that local organizations have the capacity to limit elite capture.

Improving value addition at the local level can increase incentives for better management of landscapes and trees in farming systems. Local value added can be enhanced through various policy and regulatory mechanisms; these include simplifying the regulatory regime to reduce transaction costs for poor producers and developing a framework for providing greater support for producer organizations and user groups. In many ways, regulatory regimes have acted as a trade barrier: limiting competition, restricting market entry, and keeping producer margins low and consumer prices high. A simplified regulatory regime that favors the capacity of producers to manage trees could contribute to expanding markets. Trade associations have shown that they can play a role in promoting market diversification, improving the prospects for niche market entry, and establishing product standards.

Payments for environmental services can help. Markets for environmental services from trees and from better managed farming landscapes are potentially quite important for carbon sequestration, biodiversity conservation, tourism, and watershed management. These markets could be more fully developed in line with the emergence of new financing instruments and international commitments. Experience so far has suggested that these types of initiatives are most successful when they are integrated with other rural development activities. Combined with direct benefits, such as productivity increases and improved climate resilience, payments for environmental services may provide additional incentives for local people to manage trees and landscapes more sustainably.

Forest organizations need to be revitalized. Forest organizations are generally underfunded and not aligned with the major thrusts of rural development efforts. These organizations often resist change, even though their failure to adapt increases their marginalization. Perhaps the biggest challenge for forest organizations in the region is the need for a reorientation from their earlier roles, which were largely regulatory, to roles with a much stronger service delivery orientation aligned with the poverty mitigation agenda. The skill set that characterizes forest organizations in much of Africa and the budget processes that allocate public resources for forest management are largely irrelevant for meeting the challenges of managing trees in farming systems. Similarly, with only a few exceptions, forest research institutions have demonstrated a limited understanding of the complexities of tree

cultivation and management to meet local needs. It may be that responsibilities for service delivery should shift to other institutions with greater capacity for engaging local stakeholders in improving natural resource management.

Rural development efforts should work across sectors to encourage synergies. To increase investment in trees and landscape restoration on a meaningful scale, government- and donor-led initiatives must go beyond forest sector authorities and engage a wide range of public and private stakeholders, including water, agriculture, livestock, energy, lands, and environmental finance and planning authorities; producer groups; civil society organizations, including business associations; food companies; and private investors.

Policies that support good governance encourage private investment. Throughout Africa, countries that have the strongest framework for good governance consistently generate the most significant sources of private investment. This is no less true for investing in trees and landscape restoration, as investors must have the confidence that their rights and investment outcomes are protected.

Conversely, policies that improve land, water, and tree governance can minimize the risks of large-scale land acquisitions. Large-scale land acquisitions are increasingly a reality in Africa and present both risks and opportunities. Policies that strengthen information access and protect existing land rights can help ensure that land transfers are voluntary and beneficial to local people. A sound policy framework can help attract responsible agro-investors who respect a set of basic principles and can strengthen food security rather than putting it in jeopardy. At the individual farmer level, adequate legislation that recognizes farmers' rights to the trees on their farms can provide incentives for land restoration and sustainable land management practices.

ABBREVIATIONS

ACT	African Conservation Tillage Network
ADB	African Development Bank
BDSP	business development service provider
CA	conservation agriculture
CBI	cocoa butter improver/improvement
CDM	clean development mechanism
CFU	Conservation Farming Unit (Zambia)
CGIAR	Consultative Group on International Agricultural Research
CI	Conservation International
CIFOR	Center for International Forestry Research
COMACO	Community Markets for Conservation (Zambia)
COMESA	Common Market for Eastern and Southern Africa
CSR	corporate social responsibility
CTV	Centro Terra Viva
DFID	UK Department for International Development
EITI	Extractive Industries Transparency Initiative
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	FAO Statistical Database
FCPF	Forest Carbon Partnership Facility
FIP	Forest Investment Program
FLEGT	Forest Law Enforcement, Governance, and Trade
FMNR	farmer-managed natural regeneration
FPIC	free, prior, and informed consent

FSC	Forest Stewardship Council
GACF	Global Alliance of Community Forestry
GEF	Global Environment Facility or Global Environment Fund
GFP	Growing Forest Partnerships
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GLADA	Global Assessment of Land Degredation
GLASOD	Global Assessment of Soil Degradation
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
IAITPTF	International Alliance of Indigenous and Tribal Peoples of Tropical Forests
ICRAF	World Agroforestry Centre
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IFFA	International Family Forest Alliance
IIED	International Institute for Environment and Development
IPCC	Intergovernmental Panel on Climate Change
IRR	internal rate of return
IUCN	International Union for Conservation of Nature
KCC	Kenya Cooperative Creameries
LADA	land degradation assessment
LAVEMP	Lake Victoria Ecosystem Management Project
NAMA	Nationally Appropriate Mitigation Action
NAPA	National Adaptation Programme of Action
NARS	national agricultural research system
NEPAD	New Partnership for Africa's Development
NGO	nongovernment organization
NPP	net primary productivity
NTFP	nontimber forest product
OFWE	Oromia Forest and Wildlife Enterprise (Ethiopia)
PES	payment for environmental services

PROFOR	Program on Forests
RA	Rainforest Alliance
REDD	Reduced Emissions from Deforestation and Forest Degradation
REIT	real estate investment trust
SADC	South African Development Community
SAGCOT	Southern Agricultural Growth Corridor of Tanzania
SFM	sustainable forest management
SLM	sustainable land management
SME	small and medium-sized enterprise
SOE	state-owned enterprise
SRI	socially responsible investing/investor
TAMP	Transboundary Agro-ecosystem Management Programme
TCC	Tropical Commodity Coalition
TFD	The Forests Dialogue
TIMO	timberland investment management organization
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNEP-GRID	UNEP Global Resource Information Database
VPA	Voluntary Partnership Agreement
WFP	World Food Programme
WOCAT	World Overview of Conservation Approaches and Technologies
WRI	World Resources Institute
WWF	World Wildlife Fund
ZNFU	Zambia National Farmers Union

ALL DOLLAR AMOUNTS ARE IN U.S. DOLLARS UNLESS OTHERWISE INDICATED.

INTRODUCTION

WHAT DO WE MEAN WHEN WE TALK ABOUT LANDSCAPES AND LANDSCAPE RESTORATION?

In the past few years, the term "landscape" has increasingly permeated discussions regarding rural development. A landscape is often defined as a cluster of local ecosystems with a particular configuration of topography, vegetation, land use, and settlement. Maintaining biodiversity and ecosystem services, managing agricultural production sustainably, and contributing to improved rural livelihoods cannot be achieved at just the farm or plot level, but are linked at the landscape scale. To make an impact, we must consider all the elements of a landscape as a whole.

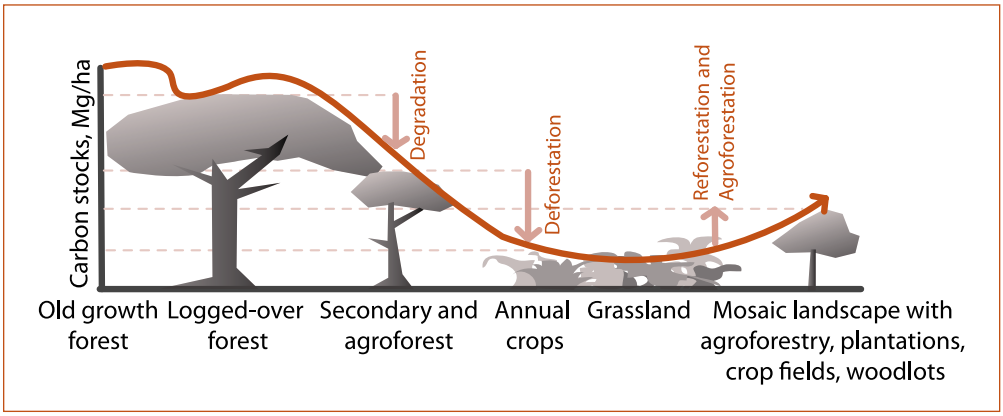
How a landscape is defined depends on the local context (natural, historical, and cultural processes, activities, or values), and landscapes vary greatly by size. Landscapes can incorporate many different features; all the features have some influence or effect on the others.

At one end of the spectrum, trees in landscapes can occupy specialized niches at the farm level, producing commodities for sale or for home consumption and increasing the resilience of crop production systems. They can help even out the household's use of seasonal labor or create reserves of capital for new investment and can contribute to clarifying who has tenure over land demarcated by trees.

At the other end of the spectrum, forest landscapes can range from large, contiguous tracts of forest used for multiple purposes (production; cultural, recreational, or environmental services; and the like) to mosaics of forests and blocks of trees within the rural landscape. They can be managed with varying degrees of intensity and may become integrated into mixed agro-silvicultural systems. In drier parts of Africa, woodland and woodland mosaics produce valuable inputs into farming systems, including leaf litter for cropping systems and livestock browse and fodder. In Southeast Asia, forest landscapes spread throughout rural farming systems and enable people to exploit mountain slopes in ways that yield a diversity of crops, maintain soil fertility and watershed functions, and retain indigenous biodiversity.

Forest landscapes typically go through a transition as populations increase, with increasingly anthropomorphic influences on forests and trees, resulting first in forest degradation and deforestation but eventually transitioning into landscapes where planted and managed trees and forest patches are fully integrated into productive farming systems and agricultural landscapes.

FIGURE I.1: FOREST AND LAND USE TRANSITION CURVE



Source: Consultative Group on International Agricultural Research (CGIAR), *Research Program 6 on Forests, Trees and Agroforestry*, Center for International Forestry Research (CIFOR).

Increasingly, the term "landscape approach" has been used to describe geographical spaces of interest. A landscape approach is a conceptual framework that allows for a structured way of viewing the broader impacts and implications of any major investment or intervention in the rural sector. It describes interventions at spatial scales that attempt to optimize spatial relations and interactions among a range of land cover types, institutions, and human activities in an area of interest.

The ideas of landscape restoration, landscape planning, and eco-agriculture all build on landscape approaches and principles.

A tree-oriented approach to landscape restoration is meant to complement and enrich more narrowly defined approaches to afforestation, reforestation, and land and water conservation. Central to this approach is the need to improve both human livelihoods and ecological integrity. Landscape restoration includes the following goals:

- To restore a balance of environmental, social, and economic benefits from forests and trees within a broader pattern of land use.
- To enhance the functionality of a landscape and the supply of environmental services across the range of land uses and not focus on maximizing new forest cover.
- To have an impact on the whole landscape, not just individual sites. This allows for trade-offs but also introduces particular challenges with respect to scaling up; accordingly, site-level activities accommodate, or are nested in, landscape-level objectives.
- To stimulate grassroots economic development that supports sustainable livelihoods and thus diminishes some of the drivers of landscape degradation.
- To involve people as central elements of the landscape and, thus, enhance local stakeholder involvement in decision making and implementation.
- To recognize that the dynamic nature of ecosystems and socioeconomic systems makes it impossible to gather complete information regarding any system. Accordingly, explicit efforts are made to integrate and adapt plans, programs, and projects that are active in a landscape, including sharing new knowledge and information.

The approach can involve the use of a wide range of restoration options that may include active promotion of natural regeneration as well as different types of tree planting and agricultural and sustainable land management strategies. The expectation is that these approaches would not lead to the conversion of natural forests or other ecologically important landscape features into plantations or ecologically degrading farming systems.

WHY INVEST IN LANDSCAPE RESTORATION?

Reforestation measures for degraded lands, strategies for the sustainable management of forest resources, and agroforestry practices that incorporate trees into farming systems are increasingly demonstrating their promise for producing commercialized tree products. While the level of investment so far has been modest, the challenge is to find ways to scale up investments in a way that will have a clear effect at the landscape level. These types of investments can help achieve climate-smart agriculture's "triple wins" of increasing rural incomes, making yields more resilient in the face of climate extremes, and making agriculture a solution to the climate change problem rather than part of the problem.

At the same time, changing global markets and prices for key commodities are making scaled-up investments like these increasingly viable and attractive:

- New technologies and management practices are more productive and profitable, and can generate high co-benefits for local partners.
- Governments are increasingly supporting policy measures that enable private agricultural investment and are improving the overall framework for forest governance.
- New markets for forest and tree products are creating incentives for tree and forest planting and management.
- Landscape-level measures are helping target priority areas for private agroforestry and forest investments.
- New sources of finance are becoming available; for example, from private investment funds, pension funds, and environmental services markets for socially responsible investors.
- New tools are available to identify where the potential for investment in landscape restoration is greatest.
- Participatory approaches are being used to negotiate agreementss with local rights-holders.

WHO ARE THE INVESTORS?

Investors in trees and landscape restoration fall into multiple categories. At the household level, of course, individual farmers make carefully considered decisions about the use of their land, labor, and capital; in some areas, these decisions have resulted in the very extensive use of agricultural land for planting trees. Agribusinesses and other commercial interests have also expressed growing enthusiasm for incorporating trees into their investment decisions, whether for the production of timber and other tree products or as part of integrated land use strategies that seek to develop local partnerships with communities and individual farmers. Some investors are interested in more

limited parts of the supply chain; for example, investing in processing facilities with the aim of supplying particular markets but investing little in the production of raw materials. Various financial intermediaries—such as investment funds, pension funds, and financial institutions—are another type of investor.

Other investors expect different types of returns. Governments, for example, may invest in research, extension, and even market development because they believe economic growth is a long-term objective in which public funds should be invested. Environmental and other nongovernment organizations (NGOs) may tie their investments in landscape restoration to less tangible returns, such as biodiversity conservation, climate change mitigation, social equity, or food security. While many donor agencies expect their investments in trees and landscape restoration to yield positive economic returns in the long run, they seldom expect a hard financial return on their investments in the short or medium run.

Generally, investors fall into these groups:

- Smallholders and local communities.
- Local entrepreneurs looking to develop new supplies of tree products.
- Processing enterprises; for example, small and medium forest enterprises, sawmills, and food processors.
- Larger-scale private sector forest companies—sometimes giving special emphasis to developing mutually beneficial partnership arrangements with local communities and smallholders.
- Agribusiness companies that are financing the development of agricultural tree crops (namely coffee, cocoa, tea, rubber, oil palm and coconut); again, with emphasis on companies that are developing partnerships with smallholders.
- Financial intermediaries such as investment funds, pension funds, and other private sector financial institutions.
- Conservation and other NGOs such as the World Wildlife Fund (WWF), the International Union for Conservation of Nature (IUCN) , and Conservation International (CI).
- National governments and their ministries of agriculture, forestry, energy, infrastructure, industry, economic planning, and finance.
- Multilateral and bilateral donor agencies.
- Environmental funds, including specialized funds such as the Global Environment Facility (GEF), Forest Carbon Partnership Facility (FCPF), Forest Investment Program (FIP), and the BioCarbon Fund.

Investors can be characterized as either "soft" (those who pursue social or economic rather than financial returns) or "hard" (those who expect risk-adjusted financial returns). Some investors have both soft and hard characteristics. Governments, for example, are willing to make heavy investments in policy reforms or infrastructure without much anticipation of an immediate financial return, but they expect tax revenues to pay for these investments down the road.

HOW CAN WE GENERATE INVESTMENT?

Despite a very considerable body of on-farm experience in testing agroforestry and other tree-based technologies for their effect on increasing productivity and generating rural income, investment in these approaches has lagged. A lot of attention has been given to mobilizing sources of public investment in these approaches. Substantial sources of private investment exist for forest- and tree-based investments, but a limited understanding of potential investment opportunities or of the best-suited technologies—coupled with policy, regulatory, and institutional constraints—has prevented these sources of investment from being tapped in a way that could contribute to improving the productivity of rural farming systems and enhancing the resilience of rural production systems.

This Investment Forum—its preparation as well as any follow-up—was conceived as an element in a strategy shared by the sponsors (the World Bank, IUCN, EcoAgriculture Partners, TerrAfrica, and the World Agroforestry Centre, with support from PROFOR) and other partners to raise awareness among and engage with key policy makers and decision makers in Africa to catalyze policy reforms and investments to scale up landscape restoration and management systems. The challenge ahead is not so much a shortage of scientific knowledge about suitable agroforestry or more intensive farm-forestry systems but rather a lack of understanding of farmers' specific constraints to adoption and deficiencies in policy support and investments to scale up proven techniques. The Investment Forum is meant to capitalize on the very large body of knowledge and experience on agroforestry and other landscape management techniques acquired over the past three decades, to focus on disseminating the most promising systems and generating interest in investment.

This volume contains three analytic pieces that were commissioned to help inform and guide the deliberations at the forum:

- The first chapter describes the ***tree-based technologies and approaches*** that can restore and enhance the functionality of rural farming landscapes in Africa and, at the same time, generate private investment interest.
- The second chapter describes ***areas in which landscape restoration measures have the greatest potential*** in Africa. It considers the spatial potential for restoration as well as overlays of tenure and ownership to identify the places where tree-planting measures would have the greatest potential to generate private investment.
- The third chapter describes ***constraints and opportunities for investment***, focusing on the factors that constrain the private sector from investing in tree-based landscape rehabilitation measures as well as the factors that increase private sector interest in investing in enterprises that manage forests and trees in landscapes.

Together, the three chapters cover the what, where, and how of investments in tree-based landscape restoration technologies. Annex III provides a summary of the proceedings of the forum, which was organized around these three themes, and Annex IV provides a list of participants.

1 TREE-BASED AND OTHER LAND MANAGEMENT TECHNOLOGIES FOR LANDSCAPE RESTORATION AND LIVELIHOOD IN AFRICA

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1.1 INTRODUCTION

The main objective of this chapter is to present an overview of key tree and landscape restoration investment opportunities for Africa. The chapter is broad in scope, examining a variety of technologies applicable to the different climatic zones of Africa.[1] The terms "trees" and "tree-based technologies" as used here refer to a wide spectrum of systems and associated species in which trees play a critical role. Often, the main product is a tree product—directly harvested or derived—such as wood, gum, or fruit. In other cases, the trees may provide an input into the major product, such as tree fodder for milk, tree nectar for honey, or tree leaves for crops. Environmental services from trees in larger systems are an added benefit to be considered.

"Landscape restoration" covers a wide range of practices that enrich the quality of the land resource and provide additional environmental benefits, such as watershed protection and biodiversity. The practices described may be applied in a number of different land use types, such as forests, woodlands, rangelands, and farmlands. The word "landscape" conveys the notion of large scale, thus landscape restoration involves a significant area. Restoration at scale can be achieved by a single investor or a community, and possibly through a single management plan or investment. However, in many African contexts, restoration reflects a combination of individual and collective investments on the part of a large number of rural residents, as in the regreening of parklands in Niger Republic.

This chapter has the following specific major objectives:

1. Provide information about tree-based and other sustainable land management (SLM) technologies that provide significant economic or ecological benefits (e.g., soil health, water flows) and thus form important components of both private investment and land restoration strategies.
2. Highlight technologies that can provide both economic and ecological benefits.
3. Provide information on demand and supply trends that shape incentives for private investment in these technologies.

The emphasis on tree-based technologies is based on the proven success of many tree-based systems in Africa and evidence that demand for tree products and services is growing. As an example, table 1 shows the global export value of major nontimber products of relevance to Africa. The total international trade of such products was valued at a whopping $142 billion in 2009. The actual production levels are much higher, considering that for products such as fruit, as much as 90 percent of production is consumed domestically. Of the products listed in table 1, Africa is a major producer of most, such as coffee, cocoa, tea, coconut, cashew, kolanut, gum Arabic, and other natural products such as shea kernels. Africa is increasing production in locally significant commodities such as avocado and honey, for which global demand is also increasing. In some prominent cases, these products are part of large-scale land uses, such as coffee in East Africa; cocoa in West Africa; cashew in coastal areas; and shea, kola, and gums in the Sahel.

TABLE 1.1. GLOBAL EXPORT VALUE OF SOME MAJOR TREE PRODUCTS IN AFRICA (US$, THOUSANDS)

COMMODITY	2001	2003	2005	2007	2008
Coffee	8,661,842	9,769,085	15,637,891	22,061,510	26,800,406
Citrus	7,709,475	10,217,484	11,597,821	15,869,879	17,689,609
Cocoa	2,208,064	4,200,355	4,954,083	5,708,236	7,246,038
Tea	2,820,992	2,942,887	3,582,778	4,0426,36	5,520,560
Coconut	895,924	1,210,337	1,876,246	1,996,676	2,895,301
Cashew	947,931	1,118,091	1,850,100	2,025,783	2,735,722
Natural rubber	428,511	808,637	1,055,177	1,910,370	2,052,320
Honey, natural	440,134	952,515	717,222	903,082	1,290,940
Avocado	320,124	545,553	844,884	1,281,887	1,279,566
Mango	428,299	578,874	646,821	918,524	1,001,681
Oil of castor beans	162,196	158,904	254,711	363,456	566,613
Silk, raw	276,138	239,010	287,825	377,750	362,587
Cinnamon	107,135	109,066	139,606	185,115	199,092
Papaya	124,014	161,481	185,248	186,153	188,050
Vanilla	175,958	339,358	117,639	116,372	125,405
Fig	23,073	38,283	44,751	57,030	83,125
Shea kernel	10,452	22,807	7,167	30,399	42,410
Plant-based gums	6,628	11,656	8,311	6,747	6,513
Kola nut	6,932	1,668	477	1,916	1,904

Source: Compiled from FAOSTAT.

Macro Trends That Affect Demand for Tree Products

Many factors shape both the demand for and supply of tree-based products and services, whether viewed from a global, regional, or local perspective. Critical among drivers are population growth and urbanization, income growth, changes in energy prices and sources, and emerging global attention to climate change mitigation and adaptation responses.

Trends and changes in key sectors around the globe have direct effects on global demand for tree and wood products. These changes include (1) increases in global population, estimated to reach 7.5 billion in 2020 and 8.2 billion in 2030; (2) increases in economic growth, with global GDP projected to increase from $47 trillion in 2005 to about $100 trillion by 2030; (3) rapid increases in the rate of urbanization around the globe, especially in developing countries; and (4) rapid changes in income growth and its distribution among the populations of developing economies, particularly in Asia (FAO 2009). In the African context, population growth rates will remain above those in other continents for the next few decades. While urbanization will accelerate, high population growth rates will result in higher absolute numbers of rural people until about 2040 (IFAD 2010). While GDP growth is expected to enter a more rapid phase in Africa, the high population growth rates will keep per capita income growth rates modest.

Recent increases in energy prices and continuing concerns about the availability of fossil fuels in the context of rapidly growing Chinese and Indian economies has led to greater attention to renewable resources. Under some Intergovernmental Panel on Climate Change (IPCC) scenarios, fuelwood assumes a greater role in meeting energy demand. Some analyses based on this assumption have found that this would have a major effect on wood prices and that real prices would continue to increase for several decades (Raunikar et al. 2010). Thus, the political and market forces related to the energy sector are critical in shaping profitability and opportunities in wood and other tree product enterprises. Similarly, the emergence of financing for climate change mitigation and adaptation programs (e.g., REDD+) have the potential to shift incentives for tree growing, management, and harvesting. Greater stewardship of forests and woodlands (i.e., protection) by governments could lead to higher prices and increased tree planting in plantations and on farms. Some countries (e.g., India and Kenya) have already imposed forest logging bans, which have resulted in higher prices and more favorable market opportunities for investment in tree growing and forestry-related enterprises by the private sector (Cheboiwo et al. 2010).

Finally, there are increasing calls for "climate-smart agriculture," "sustainable agricultural intensification," "environmentally friendly agriculture," "eco-agriculture," and even an "evergreen revolution" for Africa (ICRAF 2009). A growing consensus is emerging, driven by increasing awareness of soil degradation, continued paltry use of mineral fertilizer, low staple food yields (which have hardly changed in decades), and increased attention to the effects of climate change. With increasing population, higher agricultural yields must be attained in a practical way that farmers and societies can afford both financially and ecologically. Attention has focused on sustainable land management (SLM) practices, which combine soil conservation, organic nutrient application, and the use of mineral fertilizer to enhance yields of foods and feeds (World Bank 2008). Evergreen agriculture is the integration of trees, along with other SLM practices, into farming systems for increased agricultural productivity and sustainability. Evergreen agriculture and other SLM methods and technologies are climate-smart in that they can mitigate or create a buffer that helps smallholder farmers cope with local climate effects, such as temperature stress (e.g., by increasing shade) or

water stress (e.g., by improving soil moisture from mulching), seasonal uncertainty, and increasing frequency of extreme weather events. Many of these practices (e.g., agroforestry) also contribute to carbon sequestration, thus aiding global efforts to mitigate climate change by reducing carbon dioxide in the atmosphere.

Implications of Global Forces on Tree-Based Investment

These factors and trends lead broadly to increased demand for a host of tree products and services, as well as a change in the type and range of products and services demanded.

Higher population, especially in Africa, is likely to continue to drive demand for wood. In Sub-Saharan Africa, fuelwood dominates the use of wood, as it is the most important energy source (FAO 2009). Furthermore, fuelwood consumption in Africa is predicted to increase by about 34 percent between 2000 and 2020 (FAO 2003a). At the same time, as incomes rise, demand for other wood products (such as industrial roundwood, wood panels, and paper) is expected to rise as it has on other continents. Thus, a noticeable shift in consumption is expected within a few decades to higher value-added wood products and a reduction in the use of fuelwood. This shift may have an effect on production opportunities, because although all fuelwood is sourced domestically, other wood products may be sourced from abroad (for example, North Africa imports a significant amount of wood products from Europe).

Higher population and higher incomes are likely to lead to more demand for fruits and nuts from trees. Tropical fresh fruit such as mango, guava, papaya, avocado, and grape have recorded the highest growth in imports globally since the early 1990s; the value of imports of pineapples, mangoes, guavas, papayas, and avocados was six times greater in 2006 than in 1990 (USDA 2008). Increasing demand for fresh fruit products is also driven by increased nutritional awareness. Increased consumption of imported fruits and processed fruit products is facilitated by improvements in packing and shipping methods, which ensure that fruits can be shipped long distances and still maintain high quality.

The emergence of climate change mitigation responses (e.g., Kyoto, REDD) has resulted in the development of a large carbon market, amounting to $64 billion in 2007—twice the figure recorded in the previous year. A number of private sector operators and foundations have recently become involved in voluntary markets and carbon finance initiatives to support tree-based projects in several countries. Climate change adaptation initiatives, such as the National Adaptation Programme of Action (NAPA), have emphasized sustainable land management practices, including tree management, as priority areas for investment. Payment schemes for other environmental services, notably watershed protection, are also on the increase. These schemes also promote more investment in SLM and tree management.

In most of Africa where agriculture is rainfed, productivity is much below its potential because of the unpredictability of rainy seasons and prolonged dry spells (Chikowo 2011). Management systems that positively alter the soil-crop environment are believed to help farmers cope with the negative effects of climate change and limited access to production resources. The addition of trees into agricultural landscapes has been shown to positively affect the soil-crop environment, and the practice of agroforestry in cropfields has increased in Africa over the past few decades.

In this context, investment opportunities for restoration of productive African landscapes through tree-based enterprises are extremely attractive. In some situations, investment by large-scale producers can result in a confluence of interests, generating multiple wins for the economy, for employment, and for the ecological integrity of whole landscapes. In many other situations, tens of millions of African households can ably serve global markets with a wide array of agricultural commodities and natural products that offer profitability at scale to the farmer and investor alike.

1.2 MAJOR TREE-BASED INVESTMENT OPPORTUNITIES

Many of the tree-based technologies are viable investment opportunities now and will remain so in the future. In addition, some nascent investment opportunities have high potential. This section describes a number of these opportunities. Data on tree products—with regard to forecasting, prices, production, and profits—are spotty, so some of the information presented here is limited to a particular species or location. Certainly, an investor would have to do more analysis in terms of due diligence, but this section identifies a number of promising opportunities.

Tropical Fruit

The tropical fruit market has evolved significantly since the 1980s as a result of rising incomes, improved technology, and evolving international agreements (Huang 2004). Tropical fruit crops are important for food security and cash income in many developing countries, from a nutritional perspective and owing to their contribution to farmer income and export earnings. The value of international trade of fresh tropical fruit in 2008 was $4.5 billion, compared with $7.5 billion for bananas, $6.2 billion for apples, and $3.3 billion for oranges. Processed tropical fruit transactions were valued at $1.9 billion in 2008 (FAOSTAT). As major players in global trade, Japan, the United States, and other developed countries expanded their imports of fruit juices significantly after the mid-1990s, when citrus and noncitrus juice import restrictions were liberalized (Feleke and Kilmer 2009). About 90 percent of tropical fruits produced globally are sold and consumed within the producing countries, so the traded value is but a small fraction of the value of production.

Africa has witnessed a massive production increase in fruits such as mangoes, citrus fruits, and bananas. African production of fruit and vegetables grew by 9 percent between 1990 and 2003. Output was anticipated to increase from 961,000 metric tons (MT) in 1998–2000 to 1.1 million MT by 2010. Currently, Africa accounts for 16 percent of global papaya production, 11 percent of mango production, and 10 percent of avocado production. However, the share of fruit exports from Africa is low and, despite massive production dating back to the 1950s, export share has been dwindling since the 1980s, while that of Asia and Latin America has increased, owing to variable quality of fruits from large numbers of producers that do not comply with export requirements and an oligopolistic market structure that favors a few exporters. For example, in 2005, there were only four private exporting companies in Uganda, all of which focused exclusively on exportation of raw cocoa (Gibbon, Lin, and Jones 2009).

Projections indicate that global production of tropical fruits will increase from 70 million tons in 2006 to 81 million tons in 2015, an increase of 16 percent in a decade. Developed countries are expected to continue to dominate import demand for fruits by 2015. Annual export growth rates in the near term are expected to be 1.4 percent for mangos, 2 percent for avocados, and 5.6 percent

for papayas (FAO 2004). Africa is projected to have faster growth in avocado and papaya production (both over 4 percent per annum) than the world average but slower growth in mango production. Indeed, recent growth in avocado production in eastern Africa has been staggering, increasing by 420 percent from 1990 to 2008, compared with a 79 percent global increase (FAOSTAT). Global prices for tropical fruits fluctuate and are influenced by exchange rate movements of buying and producing countries, in addition to aggregate supply and demand factors. Among the tropical fruits, prices for papayas rose most between 2003 and 2008 (from €2.2 to €2.5per kg), followed by avocados. Although price data in Africa are hard to come by, prices of avocados, mangos, and passion fruit increased about 50 percent from 2007 through 2009, significantly faster than the inflation rate (Kenya Horticulture Development Programme 2010).

Growth of per capita consumption of fruits in developed countries appears to have slowed. For example, over the period 1980 to 2003, the per capita consumption of citrus fruits (oranges, grapefruit, lemons, and limes) in these countries grew at an average rate of 1 percent per annum. However, demand for fruit products has been increasing faster, especially for juices. For example, in the United Kingdom, market value of fruit juice increased 37 percent from 1999 through 2004, resulting in a market value of £3 billion.

Within Africa, per capita consumption of fruit and fruit products is expected to grow more rapidly. Expenditure analysis has shown that for each 1 percent increase in income in an average African household, the purchase of fruits increases at a relatively high rate of 6–7 percent (Ruel, Minot, and Smith 2005).[2] As a result of income and population growth, it is estimated that fruit demand in Africa will increase at a rate of about 5 percent per year over the next 10 years. Using FAO's figures of current consumption in Africa, this is approximately an annual increase of more than 10 million MT over the next decade, which equates to around $2 billion in farm gate value at current prices.

Up-to-date data on production costs and returns for fruit growing are scarce. Table 2 shows estimated revenues per hectare from Kenya, which uses current prices and actual average yields from farms.

TABLE 1.2. ESTIMATED PRODUCTION COSTS AND REVENUE FOR VARIOUS FRUITS IN KENYA

TYPE OF FRUIT	PRODUCTION (TON/HA)	PRICE OF FRUIT (K SH/KG)	TOTAL REVENUE (US$/HA)
Guava	5	15	950
Tomato	8	15	1,500
Grapes	3	35	1,300
Papaya	30	15	5,625
Passion	12.5	30	4,685
Citrus	8	20	2,000
Avocado	13	15	2,437
Mango	12	16	2,440

Source: Kenya Horticulture Crops Development Authority 2008.

Note: ha = hectare, K Sh = Kenya shilling.

Indigenous Fruits, Nuts, and Kernels

In terms of the value of marketed products, the most important fruits are often exotics. However, when taken as a group, African indigenous fruits are also very valuable. This section highlights a few of these.

Dacryodesedulis spp (African plum), known locally as *safou*; is a tree highly valued for its fruits in Cameroon, Nigeria, and elsewhere in humid West Africa. Yields are 20–50 kg per year, and an orchard can produce up to 10 tons per ha (Verheij 2002). With prices at around $0.20 per kg, this implies a revenue per hectare of about $2,000. Awono et al. (2002) report that $2.4 million worth of safou fruit was exported to Europe in 1999, while demand in Cameroon alone was about seven times that.

Irvingia gabonensis and *I. wambolu* (bush mango) are found in the lowlands of West Africa. They occur naturally on farms in Cameroon, and farmers in Nigeria plant them in home gardens. Good-producing trees can generate up to 180 kg of fruit per tree and 100 kg of kernels. The fruits are eaten and traded locally, but the kernels have a wider traded value—they are a key ingredient in soups and stews. Ndoye, Ruiz Perez, and Eyebe (1997) estimated that the demand for kernels in southern Nigeria is about 80,000 MT per year (value of $40 million).

Ricinodendron heudeloth (njansang) produces highly valued kernels that are ground and used in cooking. The kernels are high in protein and are used as a spice and thickener. Exports of the kernels from Cameroon to neighboring countries were about $1 million in 1996 (Perez, Ndoye, and Eyebe 1999).

Uapaca kirkiana, known locally as *masuku*, is a fruit tree found in the Miombo ecosystem. It is not commercially planted, but many people harvest fruits and market them domestically. A study in Zimbabwe showed that households in several regions earned $10–$40 annually from sales of this fruit (Mithoefer and Waibel 2003).

Adansonia digitata (baobab) is a tree indigenous to the arid and semi-arid savannah of western, eastern, and southern Africa. Baobab provides highly nutritious leaves and fruit for local consumption and other products that serve a multiplicity of uses, including water storage and medicinal, fodder, fiber, and fuel products, some of which have been studied by scientists for nutritional, cosmetic, pharmaceutical, and veterinary applications. Compared on a weight basis with other dried fruits, baobab fruit pulp offers more than twice the dietary fiber of apples, more than twice the calcium of milk, more than twice the iron of spinach, and significantly more potassium and magnesium than banana (PhytoTrade/Afriplex 2009).

IUCN estimated that baobab production in the 10 South African Development Community (SADC) countries alone represents an $11 million industry and involves over a million households, with great potential for growth (Bennet 2006, Gruenwald and Galizia 2005).

Other Food Products

Cashew

Cashew *(Anacardium occidentale)* is a global success story: Export trade nearly trebled in the decade from 1998 to 2008, from 243,000 MT to over 707,000 MT, and the value of shelled

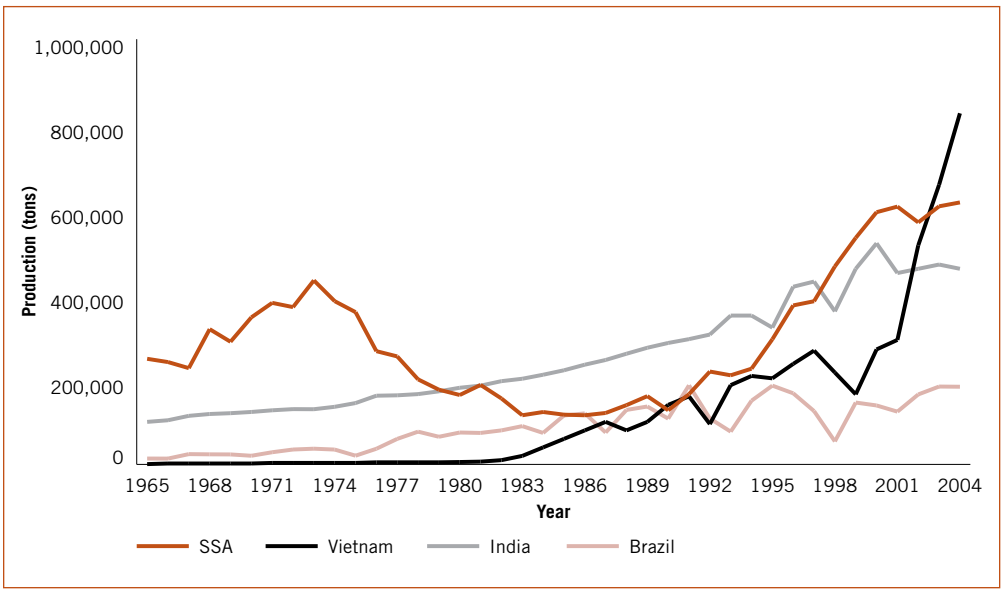
cashew exports nearly trebled over the same period, from $724 million to over $2 billion. West African countries—notably Cote d'Ivoire, Guinea Bissau, and Nigeria—produce about 475,000 MT of cashews each year, which is about 25 percent of global production (Boillereau and Adam 2007). Of this, about 10 percent is processed each year in the region; the farm value is about $21 million, while the processed retail value is about $134 million. In recent decades, the dynamics of production and processing have evolved rapidly, with new and emerging opportunities for African producers and significant potential for restoration of existing plantations and smallholder stands of cashews in the coastal lowlands of both eastern and western Africa.

Recent decades have seen a fall and a rise in Africa's position as a supplier of processed cashew to the global marketplace. It is estimated that if Africa's crop were processed domestically, it would generate more than $150 million in added value and add more than 250,000 jobs, particularly benefiting women in rural areas (WATH 2010).

Cashew grows on very poor, sandy soils; is drought-tolerant; and is commonly intercropped with cultivated food crops such as cassava, thus providing a buffer against failure of rainfed annual crops in an era of climatic uncertainty (Mitchell 2004). From an ecological perspective, the cashew tree has been shown to have high potential for the restoration of severely degraded lands, including sand tailings from mining operations in Sierra Leone (Dick et al. forthcoming).

The private sector seems to be stepping up, with investment in processing facilities and commitment to commercial viability and sustainability of operations over time. One example is the manual processing plant established by the multinational commodity company Olamat Mtwara in a remote and underserved area of southwest Tanzania; it supports replanting of old cashew stands and has grown from an initial 350 employees producing 4 MT of cashews a day to 4,500 workers producing 72 MT a day in 2009 (Olam 2009).

FIGURE 1.1. RAW CASHEW NUT PRODUCTION IN BRAZIL, INDIA, VIETNAM, AND SUB-SAHARAN AFRICA



Source: FAOSTAT

Honey

The global trade in honey is valued at approximately $1.4 billion per annum; the main consumers are the 15 countries of the European Union (EU), 20–25 percent; China, 15 percent; and the United States, 10 percent (CBI 2009). Whereas global demand for honey and bee products is growing, the supply is in decline in regions such as North America and Europe. Other producing regions have seen similar productivity declines in recent years; for example, South America and India were down by 30–40 percent owing to inclement weather in 2011. These production declines have resulted in high prices, a trend that is likely to continue given stable or increasing demand (Kamberg 2011). Africa is uniquely positioned to benefit from the opportunities presented by this trend.

Honey is produced widely across Africa—in deep forest, savanna, lowland, and highland—including some distinctive specialty honeys found nowhere else in the world. Internal demand for honey in many African countries is growing rapidly, as middle classes become more aware of the negative health effects of sugar consumption compared with the perceived health benefits of natural honey. The advantages of serving local and national market opportunities first include lower transaction costs (including marketing), less stringent quality criteria, and acceptability of smaller volumes, as well as reduced transactional risks overall (UNCTAD 2006).

Although some generic honeys of African origin are dark and smoky as a result of traditional methods of smoking the hive, fine light honeys of specific provenance are available (Slow Food Presidium 2010) as well as the distinctive Mt. Oku white honey of the Cameroon highlands (Niba and Ingram 2008) and the exquisite monofloral shea flower honey of Fada N'Gourma, Burkina Faso.

Quality assurance presents some challenges (Bradbear 2009), but good examples exist of private sector initiatives on product development and marketing of African honey, some with targeted support by bilateral and multilateral donors with technical support from NGOs and the national agricultural research systems (NARS) supported by the Consultative Group on International Research (CGIAR).

Honey Care Africa has operations in Kenya, Tanzania, Uganda, and Sudan, incorporating 12,000 household honey suppliers into the product's value chain. The organization has introduced improved hives and beekeeping management that increased honey yield per hive from 15 to 40 kg a year. Farmers purchase the hives on credit; after repaying the loan, the typical household earns $180 to $250 a year from honey sales. Studies have found honey production to be profitable and growing in other countries as well, such as Ghana and Ethiopia.

Timber and Wood Products

In Africa, wood production doubled in two decades, increasing from 340 million m^3 in 1980 to 699 million m^3 in 2000. Over 90 percent of all wood produced in Africa was used as fuel, including offtakes from forests, where 618 m^3 of 688 m^3 of forest removals in 2008 were for fuelwood (FAO 2010a). The wood supply-demand balance varies by subregion. North Africa is the most wood-deficit subregion and depends mainly on imports. West Africa has also exhibited a deficit in recent years, while in East Africa supply and demand are in relative balance. Africa's share of global wood production has declined progressively in recent years (FAO 2003b).

Similarly, while the global value of traded forest products increased from $57 billion to $143 billion between 1980 and 2000, Africa's portion went from $1.6 billion to $2.9 billion—losing share of

production value. China's consumption of Africa's log exports has increased significantly since the 1990s, while that of Europe has decreased. In fact, exports from West Africa and the Congo Basin to China were significantly more than exports to the rest of the world combined: almost 2 million m^3 to China in 2009 compared with 0.4 million m^3 to the EU and just under 0.4 million m^3 to the rest of the world. In an attempt to increase export market share, there has been a movement among African countries to qualify for certification programs that might increase market opportunities for forest products. To date, about a million hectares of African forests and plantations have been accepted into certification schemes. Although most countries are keen to develop wood-processing industries, almost all of Africa's wood is exported with little or no processing. South Africa is the only notable exporter of value-added wood products.

In terms of specific wood products, Africa produces only a small proportion of global industrial roundwood, accounting for 4–5 percent of the global production in the past two decades and only 1 percent of global paper and paperboard production. Southern Africa leads the other regions in the production of both of these wood products, mainly because of South Africa's well-developed industry. Production of sawnwood is low, estimated at 8–9 million MT annually, or only about 2 percent of the global quantity of this type of wood.

It is useful to compare wood consumption patterns in Africa with those in other regions, because as incomes rise, African consumption patterns may become more congruent with those in places like Asia. Table 3 shows that African consumption is relatively high for roundwood and fuelwood but less in all the other categories, notably wood panels and paper. Demand in these other product categories is likely to accelerate in the medium term, with prolonged income growth. Although the importance of fuelwood and other forms of biomass energy is expected to decline as incomes rise and alternative sources of energy become available, it is estimated that the consumption of fuelwood in Africa will increase by about 34 percent between 2000 and 2020 (FAO 2003b).

TABLE 1.3. PER CAPITA CONSUMPTION OF WOOD PRODUCTS BY REGION, 2008 (CUBIC METERS OR METRIC TONS PER 1,000 PEOPLE)

PRODUCT	AFRICA	EUROPE	NORTH AMERICA	LATIN AMERICA	ASIA	WORLD
Roundwood (m^3/cap)	714	869	1,532	831	256	511
Fuelwood (m^3/cap)	646	207	135	496	185	280
Industrial roundwood (m^3/cap)	69	662	1,398	334	71	231
Sawnwood (m^3/cap)	12	155	320	74	27	59
Wood panels (m^3/cap)	3	104	146	22	27	38
Pulp and paper	9	214	440	58	49	82

Source: Compiled from FAO 2010b.

Sawnwood, which is used mainly in the construction and furniture industries, is one of the most important end uses for industrial roundwood. The UN Food and Agriculture Organization (FAO) predicts that while Africa recorded a 75 percent self-sufficiency in sawnwood in 2005, this ratio will decline to 58 percent by 2020 and further to 54 percent by 2030 (see table 4). Paper products are another line for which Africa relies on imports. In 2000, production of printing and writing paper in Africa accounted for only 46 percent of consumption, necessitating substantial imports to fill the gap; this gap is expected to continue through the next two decades (FAO 2003b).

TABLE 1.4. PRODUCTION AND CONSUMPTION OF SAWNWOOD IN 2005 AND PROJECTIONS TO 2020 AND 2030

REGION	2005		2020		2030	
	Production (million m^3)	Consumption (million m^3)	Production (million m^3)	Consumption (million m^3)	Production (million m^3)	Consumption (million m^3)
Africa	9	12	11	19	14	26
Europe	136	121	175	151	201	171
North America	156	158	191	188	219	211
Asia and the Pacific	71	84	83	97	97	113
Latin America and the Caribbean	39	32	50	42	60	50
World	417	421	520	515	603	594

Source: Compiled from FAO 2009.

It is clear that demand in Africa will increase for a variety of wood products, ranging from lower value fuelwood to higher value wood panels; however, it is not clear whether the demand will be met by African producers or from imports. In the case of paper and paper products, the only well-developed industry in Sub-Saharan Africa is in South Africa, and FAO estimates do not project this industry developing in other African countries, given the rather low increments in demand growth over the coming years (FAO 2003b). This projection also applies to other higher value products, where demand may be too fragmented to spur investment in local industry. This is obviously an area that merits attention, for it could have enormous implications for the management of tree and forest resources.

Supply Conditions in Africa

Traditionally, most wood products have been sourced from Africa's forests and woodlands. However, between 1990 and 2000, Africa lost 40.7 million hectares of forest, with 31 percent cleared in southern Africa and 44 percent in Zambia, Sudan, and the Democratic Republic of Congo (DRC). Deforestation slowed between 2000 and 2010; nonetheless, 34.1 million hectares were lost. Nigeria, Zimbabwe, Tanzania, and DRC are in the top 10 countries in terms of area deforested between 2000 and 2010 (FAO 2010a).

The Forest Resource Assessment (FAO 2010a) estimates that only 2.3 percent of forests in Africa are planted (compared with 35.3 percent in East Asia), with 8 million hectares of plantations in Africa as a whole. Plantation area in Africa started from a very low base and is growing by only about 1.75 percent a year, which is below the global rate. The global trend toward plantation forests has been limited in Africa to a few countries, especially South Africa, Swaziland, and Zimbabwe (FAO 2003b). Most plantations are in forest-poor countries; very limited planting takes place in countries that still have large tracts of natural forest.

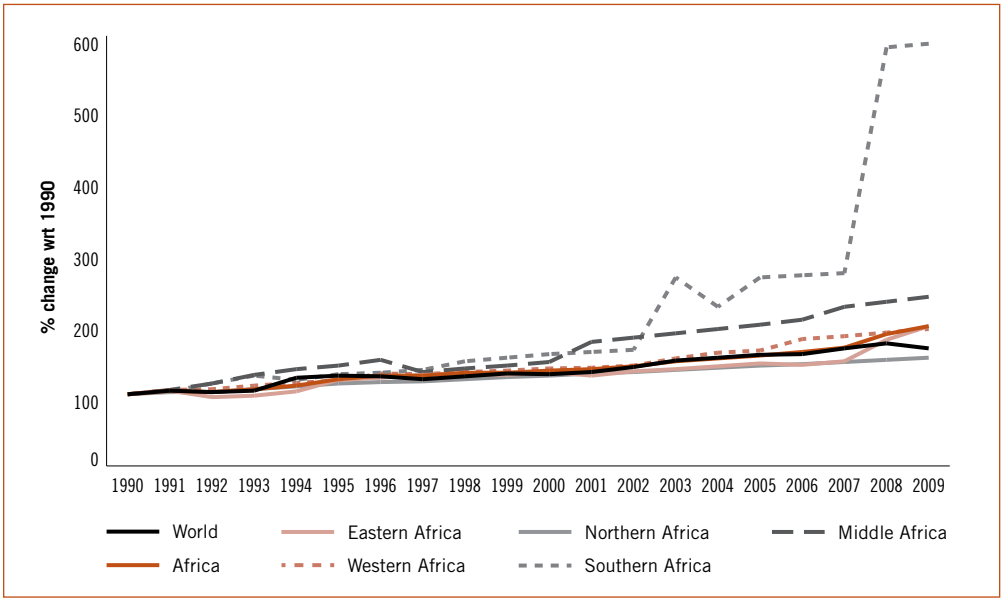
In this context, agricultural land will become an increasingly important frontier for tree growing. Tree growing on farmland is already common in Africa, including growing trees for wood. Some of the private plantations, such as those in South Africa, are industrial plantations, but many are small woodlots or boundary plantings—these are particularly common in the East African highlands. Timber growing in South Africa and Zimbabwe features a number of outgrower schemes, in most cases with small plantations of 1–3 hectares. Woodlots in densely populated East Africa are much smaller, but they occupy a significant area. Aerial photos from across 30 districts in Kenya showed that about 2 percent of all land area was under woodlots, with much denser plantings in some districts, such as Vihiga (Place et al. 2006). In Rwanda, more area was private plantation than state-owned plantation as long ago as 1990 (Mihigo 1999).

Eucalyptus is the most commonly planted timber tree in Africa, with sizable stands in Ethiopia, Rwanda, Kenya, and Sudan. *Grevillea robusta* is also widely grown and gaining in area. It is the dominant tree in central Kenya for demarcating external and internal borders. *Casuarin aequisitifolia* is an important timber species in coastal areas, and *Acacia mearnsi* is common in central and western Kenya. FAO foresees tree growing on agricultural land as the major bright spot in forestry for Africa (FAO 2003b), especially the expansion of private woodlots, increased planting in home gardens, and increased use of outgrower schemes.

Charcoal Production

The world market for charcoal was estimated at $6.8 billion in 2010, or about $15 billion if informal sales are included (Pauli 2011). In Kenya alone, the value was estimated at $375 million in 2004 (ESDA 2005). In Malawi, the value of charcoal in the four largest urban markets made it the third largest industry in the country, behind tobacco and tea (Kambewa et al. 2007). Africa produces over half of the global quantity of wood charcoal. From producing 52 percent of global charcoal in the early 1990s, charcoal production in Africa has increased slightly over the years to 63 percent in 2009. In terms of absolute quantity, production has also increased tremendously, from 15 million MT in 1990 to 28 million MT in 2009 (figure 3). Nigeria and Ethiopia each produce about 3.5 million MT of charcoal annually (Pauli 2011).

FIGURE 1.2. PRODUCTION OF WOOD CHARCOAL IN AFRICA (TONNES)



Source: Compiled from FAOSTAT.

With overall forest cover declining and rewards for carbon and other environmental services from forests increasing, forests are likely to be further regulated. The projected increase in demand (for example, 50 percent by 2030 in Kenya [UNEP 2006]) means that prices will rise, providing greater incentives for wood production for charcoal. This is already occurring in, for example, South Africa and Kenya; further expansion is almost certain. At the same time, charcoal production is becoming legalized and deregulated in some countries, which is expected to have the effect of promoting investment in charcoal-making equipment and methods. The majority of households in Africa will

continue to depend on charcoal and fuelwood to meet their energy needs in the near to medium term (Harsch 2001).

The high demand for charcoal production in both local and international markets (Harsch 2001) can spur private investors to take advantage of the gap between the growing demand and the wood energy supply. The following are a few examples of large-scale private investment in charcoal production:

- Charcoal Investment, Inc., is one of Nigeria's leading producers of wood charcoal. It produces charcoal for use in industry, restaurants, and homes. Its charcoal sales are estimated at 400 MT per month.
- E&C Charcoal and its predecessors have been producing charcoal from wattle trees since the 1930s. It is the largest charcoal producer in South Africa, producing over 32,000 tons of products a year from three main production sites. E&C Charcoal was accredited by the Forest Stewardship Council (FSC) in 1997.
- Green Charcoal Enterprises is an environmental business enterprise that provides cost-effective energy for domestic and industrial uses in countries that are highly dependent on wood charcoal. The company helps operators meet local charcoal energy needs in a cost-effective and environmentally friendly manner. It is located in the United States but has business links in some countries in Africa, such as Mali.

Lipids, Gums, and Resins

Shea

The shea butter tree *(Vitellaria paradoxa)* occurs in a narrow band of vegetation extending some 5,000 km from Senegal in the west to Uganda and Ethiopia in the south and east of the range. The shea tree provides a bounty of nutritious fruit to rural communities during the annual "hungry season." The seeds of the shea fruit are large kernels that contain a high percentage of edible oil (shea butter) that is a very important nutritional and economic resource for households and communities across the shea parkland savanna.

According to recent trade figures, regional shea butter exports are increasing exponentially, having multiplied fourfold between 2003 and 2007; shea butter emports to the EU increased tenfold between 2000 and 2005. Ghana has become the most important source of shea kernel and shea butter of all the producing countries. Shea kernel is largely destined for industrial extraction and fractionation into olein and stearin. The latter is used as a cocoa butter improver (CBI) for chocolate sold in the EU; the countries that allow its manufacture are the United Kingdom, Denmark, Sweden, Portugal, Ireland, Russia, and Japan.[3] Shea kernel historically comprised some 95 percent of shea exports from the African continent before the establishment of the ADM (Archer-Daniels-Midland) complex at Tema, but current trends point to an increasing export share of shea butter.

As recently as 2005, buyers for cosmetic manufacturers and formulators were exclusively interested in refined shea butter—an odorless, hard white fat. In 2005, a regional process of elaboration of product quality grades and standards under the ProKarité project led to the development of new standards, which came into effect in 2007. This opened up the possibility for exports of high-quality unrefined natural shea butter and, indeed, these markets have expanded considerably.

Most of the shea butter currently exported from West Africa is procured by export agents directly from the pickers or from a network of local intermediaries without regard to quality, and no quality premium is available to reward a producer's efforts to produce a higher quality shea kernel. Quality assurance is a challenge for the sector; improvements in this area would be in important part of an investment program.

The market demand for shea butter of African origin is currently estimated at roughly 5,000–8,000 MT a year. North America, the United Kingdom, and Europe are the primary destination markets, with Japan not far behind; however, interest is increasing on the part of cosmetics manufacturers in emerging economies such as those of eastern Europe and Russia. Brazil is a fairly recent addition to the ranks of shea-consuming countries; its chocolate industry allows the use of shea butter as a cocoa butter improver, and several cosmetic companies use shea butter in their product lines.

Allanblackia

Allanblackia spp. is an indigenous African species that has a commercially important feature: Like shea, its seed produces an oil that is solid at room temperature, which makes it an ideal ingredient in spreads such as margarine. Because of this, Unilever has estimated that a potential 200,000 MT could be bought and used each year. This could have an annual value of near $2 billion for farmers.

One of the bottlenecks in the domestication of the species has been methods for its propagation and multiplication. It does not germinate well from seed, and even when it does, growth is slow—about 20 years until full production. But vegetative propagation methods now exist for establishing *Allanblackia* that reduce by 50 percent the time to full production and increase production levels through selection of germplasm from best performing trees.

It is too early for financial analyses of the domestication initiative, but ex ante calculations in the key growing regions of humid Ghana, Nigeria, and Tanzania show that an individual tree can produce an average of 100–150 fruits per season, each fruit containing up to 40 separate seeds. Ten fruits yield approximately 3 kg of dried seeds containing around 1 kg of *Allanblackia* oil. So an individual tree could generate up to 30 kg of oil. A dense stand of *Allanblackia* is about 90 trees per hectare, so at full production, about 2.7 tons of oil are produced. At the current price, this translates into about $800 in revenue. Although the establishment cost for 90 trees is about $400, annual maintenance is low: only weeding for the first four years, and then only harvesting labor, which is negligible. So net annual benefits would increase from $250 to $600 per hectare from years 5 to 10, then reach about $750/ha per year (Pye-Smith 2009).

Biofuels

There has been much hype about the potential of biofuels, including *Jatropha*, to become a major cash crop for African farmers, particularly those in less favorable lands. Part of the optimism comes from experiences in India, where regulations prescribe that a minimum level of biofuels be used in public transportation systems. *Jatropha* has been promoted in many countries in eastern and southern Africa. However, agronomic and financial analyses on the first five years of *Jatropha* system planting in Tanzania, Zimbabwe, and Kenya show that yields are very low, well under a mean of 1 kg/tree, compared with projections of more than five times that amount (Iiyama et al. 2011). Under such conditions, there are no profits. Compounding the poor agronomic results are the facts that marketing chains are not well developed and potential profits depend on oil prices. More analyses will need to be done on the sector as the recent large- and small-scale plantations mature.

Tree Crops

Coffee is one of the top traded commodities in the world, and Africa is the source of a considerable proportion of global production of the Arabica and Robusta varieties. In the 2000 decade, there were approximately 700,000 smallholder coffee growers in Ethiopia, 400,000 in Kenya, and 500,000 in Uganda. Production in Ethiopia, the largest Arabica-producing country in Africa, has been increasing by about 1.6 percent annually; it reached 207,000 MT in 2010. Production of tea in Kenya—from both large estates and an estimated 350,000 smallholders—has increased significantly in the past decades, to the point that Kenya has become the world's number one exporter: 441,000 MT in 2010.[4] In eastern Africa as a whole, tea production increased from 306,000 MT to 521,000 MT (70 percent) from 1990 to 2009, a higher rate than anywhere else in the world. In Rwanda, tea export earnings increased to $58 million in 2010 from $48 million in 2009, and the government is pursuing an increase to $90 million by 2015 (*The East African* 2011). Africa's share of global cocoa production is just below 70 percent; about 50 percent of all cocoa exports are produced in Côte d'Ivoire by an estimated 800,000 farmers. Another 700,000 farmers grow cocoa in Ghana. Cocoa cultivation in the West African forest zone increased in some areas (western Ghana and southwestern Côte d'Ivoire in particular) at rates of over 15 percent per annum over the past decade (Gockowski and Sonwa 2008, fig. 2).

Although investment opportunities may exist in expanding the area under tree crops, given the large area already under tree crops and growing competition from Asian countries, perhaps the more important investments are related to upgrading and enriching existing tree crop systems. Upgrading opportunities exist in the form of superior varieties of tree crops that could raise yields significantly. Enrichment opportunities exist in the form of better land management, including the introduction of other trees to form agroforestry systems. The latter can benefit farmers through both income from the new enterprises and premiums paid for meeting certification standards. Some of the coffee systems, notably those in Ethiopia, are traditional forest or home-garden agroforestry systems that support a high degree of plant biodiversity (Hylander and Nemomissa 2008). The following section discusses the potential benefits and challenges in moving toward a more diversified tree crop system for cocoa.

Cocoa agroforestry

The potential for profit making in cocoa growing in suitable areas, such as the humid lowlands of West Africa, is well known. Cocoa prices have increased recently, offering even stronger incentives for production. On the other hand, competition exists outside Africa, so efforts to increase profitability are constantly being examined. A key management consideration is growing cocoa in diversified systems that (1) offer shade for cocoa, (2) provide alternative (mainly tree) products, and (3) can provide environmental services that may be recognized in reward or certification schemes. This approach has been recognized by the development of a guideline for tree diversification in cocoa systems (Asare and David 2010).

Historically shade-grown in multistrata agroforests, traditional cocoa production systems were characterized by a high degree of biodiversity and crop diversification. Recent trends have seen a decline in both productivity and the ecological integrity of production systems, as farmers have opted for full-sun cocoa that has become higher yielding owing to research advances. Full-sun production can offer yields as much as three times higher than shaded agroforestry systems, but it is heavily reliant on chemical inputs to sustain productivity and requires replacement much sooner

than shade-grown systems (at 10–20 years compared with 40–60 years), so the limited availability of planting material is also a constraint (Ruf and Zadi 1998). However, a WWF-led global study on best practice models indicates that smallholder cocoa has potential as both an agent of ecosystem fragmentation and as protection, depending on whether it is grown in extensive systems (largely responsible for forest thinning or clearing) or intensive systems such as the multistrata cocoa agroforests, which typically also provide farmers with a diversified range of edible tree fruits and other food crops for nutritional and economic sustainability (WWF 2006).

Recent studies (see Somarriba and Beer 2011) indicate that shade trees do not reduce cocoa yields, at least during the initial 10–12 years of production, but another motivation of cocoa farmers to clear existing forest without replanting lies in the lack of policies favoring ownership and use of timber trees by farmers. For example, lack of private rights to trees is a major factor behind Ghanaian cocoa farmers' shift toward full-sun varieties (Ruf 2011).

In their detailed financial analysis of shaded coffee production in Ghana, Obiri and others concluded that "cocoa production is, in general, profitable. The change from the traditional system to one with hybrid cocoa raised the Internal Rate of Retrun [internal rate of return] from 31 percent to 57 percent with planted shade and 67 percent without, although extra agrochemical costs would tend to reduce the profitability of unshaded hybrid cocoa in particular." The study determined that the "optimum economic rotation for the hybrid cocoa is between 18 and 29 years, much less than the traditional system" (Obiri et al. 2007). So the integration of improved varieties into shade systems can be competitive with cocoa monocrops and can become even more profitable with an appropriate selection of other fruit or timber trees.

Agroforestry Systems for Improved Cereal Crop Productivity

The addition of trees into agricultural landscapes has been shown to positively alter the soil-crop environment by improving soil aggregation and enhancing water infiltration and waterholding capacity, which reduces water runoff and soil erosion and thus contributes to reduction of the effects of drought periods on soils under trees (Phiri et al. 2003). Experiments lasting more than a decade in Zambia and Nigeria showed that rainfall use efficiency (crop production per unit of rainwater) was consistently higher in agricultural fields where trees were grown than where they were not (Sileshi et al. 2011). Equally important, nitrogen-fixing trees used in fallow or intercrop systems enrich soils through the generation and application of more than 200 kgs of nitrogen per hectare. They can also provide other nutrients and, of course, important mulch cover that can suppress weed growth. There are several examples of the large-scale use of agroforestry for soil and crop improvement. One example is the parkland system, in which indigenous trees are regenerated in cropfields. In Niger, more than 5 million hectares have been rehabilitated through farmer-managed natural regeneration (Reij, Tappan, and Smale 2009). *Faidherbia albida*, an indigenous nitrogen-fixing species in many Sahelian parklands, is being planted at scale in Zambia (200,000 farms) as part of a conservation program of farming with trees (Aagaard 2011). Finally, exotic leguminous trees that can withstand frequent cutting, such as *Gliricidia*, are being used in a wide scaling up of agroforestry for food security in Malawi (Akinnifesi et al. 2010). Some of these systems are described in more detail below.

Faidherbia albida intercropping systems

A variety of agroforestry systems can enrich soils and increase crop yields at low cost. One is the use of *Faidherbia albida*. *Faidherbia* has a wide natural distribution in Africa, from Senegal eastward to Ethiopia and then south to Zimbabwe and Namibia. It is the signature species in many Sahelian parkland systems, where densities vary from just a few per hectare to more than 50. There, it is rarely planted by farmers but establishes through regeneration from seed or from offshoots of roots. It is easily recognized in the rainy season by its absence of leaves. Indeed, it has a unique phenology in that it drops its leaves just before the rainy season in unimodal areas. Since it is a nitrogen-fixing tree, the leaf litter brings significant nitrogen and other nutrients to the soil. Without leaves, there is no light competition from the trees. In addition, the species sinks a deep taproot to draw most of its water from deep layers so as not to compete for water with crops.

Its effect on millet and sorghum yields are well known in western Africa, but data are just becoming available for southern Africa. In Zambia, data from the 2010 season show that mean maize yields obtained under canopies of *Faidherbia* were 5,460 kg/ha, which is significantly higher than the 2,360 kg/ha recorded in plots outside the canopies of the tree (Shitumbanuma 2010). The factors behind the increase in yield include the nitrogen rich leaves that fall and are either incorporated into the soils or left as a mulch. Studies have found that the litterfall beneath *Faidherbia* contains over 100 kg nitrogen per hectare (Phombeya 1999). There is also a water effect: Studies show that soil moisture in the crop root zone is higher under *Faidherbia* than outside the tree's canopy (Rhoades 1997).

A project or investor might be interested in moving from regeneration to planting. This is the approach taken by the conservation project in Zambia, where they are promoting the planting of *Faidherbia* at 10x10 meter spacing. The seedling costs are minimal (less than $0.30 each), so the cash outlay is a one-time cost of $30 per hectare. However, results on crops take several years (between 3 and 8, depending on the climate), so other methods, including other agroforestry practices, are necessary in the early years and can be continued at modest rates when the *Faidherbia* systems have matured.

Other fertilizer tree systems

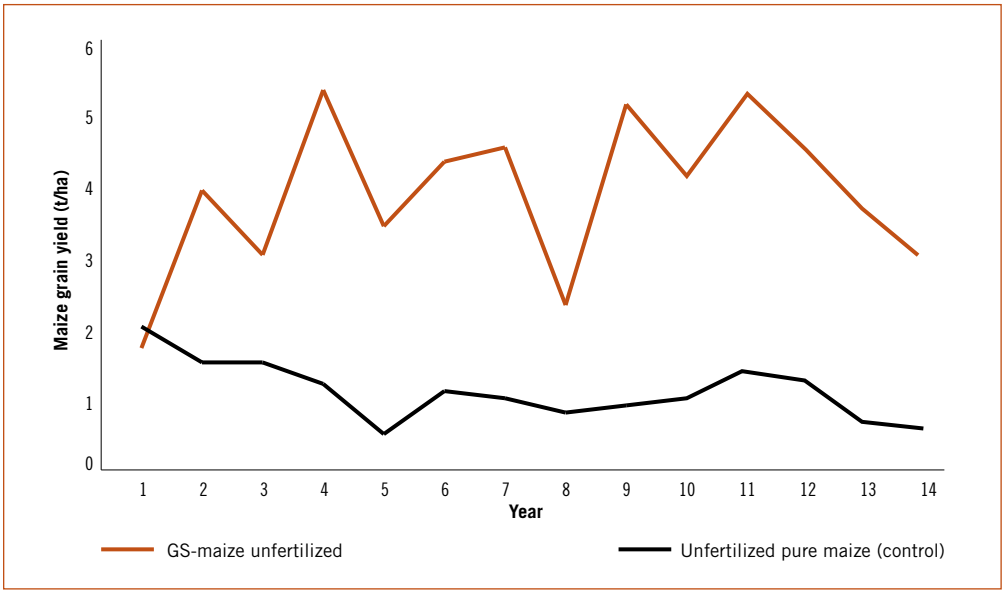
Two agroforestry systems that have been extended primarily in southern Africa are the improved fallow and intercrop systems. An improved tree fallow involves a short-term (1- to 3-year) improved or managed fallow to allow for rapid replenishment of soil fertility. *Sesbania sesban, Tephrosia vogelii* and *T. candida, Gliricidia sepium, Crotolaria grahamiana*, and *Leucaena leucocephala* are the most promising nitrogen-fixing trees identified for soil fertility replenishment in southern Africa (Kwesiga et al. 1999). The ability for nitrogen-fixation and the high quality or decomposability of litter and pruning tissues characterize improved tree fallows with the greatest potential for increased soil nitrogen availability (Barrios et al. 1997). Such systems increase maize productivity and greatly increase economic returns compared with natural fallowing or continuous maize growing without fertilizer inputs (Ajayi et al. 2007, Kwesiga et al. 2003, Place et al. 2002). (For a detailed review of the implications of choices on duration, species, density, and combinations, see Kwesiga et al. 2003.) As with all agroforestry systems, using judicious amounts of mineral fertilizer in combination is often the best practice, in both agronomic and economic terms.

Field studies from Zambia show that improved fallows generate much higher economic returns than continuous maize production without fertilizer (Ajayi et al. 2007, Franzel 2004). Over a five-year cycle, the net profit from unfertilized maize was $130 per hectare, compared with $269 and $307 for maize grown with *Gliricidia* or *Sesbania*, respectively.

A second system—a permanent intercrop—has been tested and disseminated widely in Malawi. A tree crop intercrop system using *Gliricidia sepium* was developed to address the needs of small farmers who could neither fallow their land nor afford fertilizer (Akinnifesi et al. 2010). It is a modification of the alley farming system to address key shortcomings that affected crop performance, including eliminating the "hedge competition effect" (the competition for light, water, and nutrients that can occur between trees and crops if not managed properly). It allows concurrent cultivation of trees with crops during rainy seasons and fallow during off-seasons up to 20 years without replanting (Akinnifesi et al. 2008). The density of trees is extremely high; for example, 1x2 meter spacing. The tree is cut to ground level just before the crop is seeded. As a result, the tree remains in a dormant stage long enough for the crop (maize, in the case of Malawi) to germinate and grow above the stump. After a month or so, the tree begins to regrow, but the maize remains well above the tree to capture all the light it needs.

The advantage of the intercrop over the improved fallow is that the trees need to be planted only once, although they require multiple prunings during the year. Yields have been shown to be consistently higher with the *Gliricidia* system than those of continuous cropping with no fertilizer. Figure 3 shows a comparison of those yields over 14 years in Malawi.

FIGURE 1.3. MAIZE YIELDS OF *GLIRICIDIA* INTERCROP AND MAIZE MONOCROP SYSTEMS OVER 14 YEARS IN MAKOKA, MALAWI



Source: Akinnifesi, A., W. Makumba and F.R. Kwesiga, 2006.

Note: t/ha = tonnes per hectare

Carbon storage in fertilizer tree systems

Carbon storage in tree biomass and in soils is one of the most important strategies to mitigate the global greenhouse gas effect. Nair, Kumar, and Nair studied soil carbon under-tree systems in five countries (Brazil, India, Mali, Spain, and the United States) and concluded that "tree-based agricultural systems, compared to treeless systems, stored more carbon in deeper soil layers up to 1 m depth under comparable conditions" (Nair et al. 2009). They also found that higher species richness and tree density were associated with higher soil organic carbon and that C3 plants appeared to generate more stable carbon in the soil than C4 plants. Studies in southern Africa have shown that improved fallows can store large quantities of carbon stocks in plant biomass and in the soil (Kaonga 2005, Makumba et al. 2007) and thus provide the opportunity to potentially mitigate global greenhouse gas emissions (Sileshi et al. 2007). Several studies and reviews have highlighted soil carbon stored at depths below the plow layer. The amount of carbon sequestered varies depending on the type of fertilizer tree system, the specific tree species, and the depth of the soil.

Depommier, Janodet, and Oliver (1992) documented a 54 percent increase in soil organic carbon in the first 20 cm soil depth and a 35 percent increase in the 20–40 cm depth under mature *Faidherbia* compared with away from *Faidherbia* in Burkina Faso. Okorio documented a 9.3 percent increase in soil organic carbon with seven-year-old *Faidherbia* trees in Tanzania. The data in table 5 support the theory that carbon stocks can be brought above 100 tonnes per hectare in eastern Africa, where rainfall is sufficient. Contrast that to the performance of *Gliricidia* in Mali, with 300 mm rainfall, in the study by Takimoto, Nair, and Nair (2008). West African systems may develop the same levels of soil carbon (see Dossa et al. 2007) but must be in a rainfall zone sufficient for biomass production.

TABLE 1.5. CARBON SEQUESTRATION IN FERTILIZER TREE SYSTEMS (ALL FIGURES IN TONNES PER HECTARE)

AUTHOR	TREE	SOIL DEPTH (cm)	BIOMASS		SOIL	TOTAL
			Aboveground	Belowground		
Dossa et al.	Shade coffee	40	62	15	97.3	174
	Nonshade coffee	40	13.8	9.2	95.8	119
Kaonga et al.	(Msek-2 yr-coppicing)		6.1 (4.3–9.5)[a]	2.4 (1.7–3.7)		
	(Kalu-2 yr-coppicing)		5.5 (2.1–9.5)	1.8 (0.8–3.2)		
	(Kalu-2 yr-noncoppicing)	200	5.75 (3.0–7.9)	3.3 (1.5–9.0)	25.7 (23–31)	34.75
	(Kali-2 yr-noncoppicing)	200			78 (48–127)	
	(Msek-4-noncoppicing)	200			120 (102.0–184.5)	
	(Msek-10-noncoppicing)	200			255 (154–291)	
Makumba et al.	(MZ12-*Gliricidia*)	20	negligible	negligible		30
		200	negligible	negligible		123
Makumba et al.	(MZ21-*Gliricidia*)	20	negligible	negligible		30

AUTHOR	TREE	SOIL DEPTH (cm)	BIOMASS		SOIL	TOTAL
			Aboveground	Belowground		
Makumba et al. (continued)		200	negligible	negligible		149
Phombeya	(*Faidherbia albida*)	20	106	35	38.1	179[b]
Takimoto et al.	(Faidherbia albida)	10	*40.5*[c]	*13.5*	*5.8*	59.8
		40	*40.5*	*13.5*	*16.8*	70.8
		100	*40.5*	*13.5*	*33.3*	87.3
Takimoto et al.	(*Gliricidia* fodder bank)	10				4.8
		40				14.0
		100				35.6
Walker & Desanker	(miombo)	150				82.5
	(maize-based cropping)	150				49.0
	(miombo-fallow)	150				52.2
Woomer, 2005	(miombo woodland)	20	28	48		
	(after maize cropping)	0	9	9		

Source: Compiled by authors from references listed above.

a. Ranges of data.
b. Back of envelope calculation; data were not gathered for carbon measurement.
c. Numbers in italics are estimated from figures in the respective papers.

Fodder Shrubs for Dairy Systems

Milk is one of the most significant agricultural commodities in terms of worldwide traded value. A recent estimate projects that milk demand will increase by 8 million tons between 2009 and 2019, while production will increase by only 5.6 million tons (Fonterra 2011). That is more than the current level of milk production in Kenya, which has one of the highest milk-consumption-per-capita figures in the developing world (145 liters/person) and almost 1.5 million dairy cattle. Thus, significant investment will be required to build high-quality dairy herds.

Investment will also be needed in livestock feeding systems, and one component of these systems is likely to be trees and shrubs. Trees and shrubs are important sources of high-quality fodder in all ecozones of Africa and for a variety of animals. For example, leaves and pods from species such as *Pterocarpus* and *Piliostigma* are important dry season feeds in the Sahel. A more intensively managed shrub system is expanding rapidly in East Africa for intensive cut-and-carry dairy systems. Some fodder shrubs are easy to grow, can withstand repeated pruning, and do not compete with food crops. The plants mature in about 12 months, after which they can be pruned and fed to livestock for up to 20 years. By maintaining 500 shrubs, a farmer will be able to feed about 2 kg of dry leaf matter each day. This supplementary amount has been found to raise milk yield by 1.5 to 2 kg per day among smallholder farmers, translating into more than $100 extra revenue per cow per year (Franzel 2004, Place et al. 2009). The most promising species for the eastern African highlands are *Calliandra, Leucaena*, Tree Lucerne (for the high elevations), and mulberry (for the drier climates). By 2009, more than 200,000 farmers in Kenya, Uganda, and Rwanda had adopted the technology.

Marketing and Processing Investments in Tree-Based Products

In addition to the production investments in the examples above, there will be scope for investment in marketing, processing, and other value-adding activities related to tree and forest products. The export and domestic markets offer different opportunities.

Exports of processed tree products may provide fewer short-term opportunities, because most of Africa's tree products are exported with little or minimal processing/value adding. Processing is generally not a feasible undertaking for countries in which industries are not well developed. A possible exception would be for the more developed wood-manufacturing industries in South Africa to supply the furniture, panel, or paper needs of consumers in other African countries.

The opportunities may be greater for domestic markets, although FAO analysts believe that the fragmented and slowly growing nature of demand for processed wood products may be filled by more efficient and cheaper imports (FAO 2003a). There are some exceptions, however. One is light manufacturing of wood (e.g., for furniture), in which imports may be from distant countries that originally sourced the raw wood material from Africa. Fruit juice production could be another promising area. Although mature juice producers exist in South Africa (Ceres, Liquifruit) and relatively new ones in other countries such as Kenya (Del Monte, Pick N Peel) and Uganda (Britannia-Splash), many of the concentrates used are imported, mainly from South America. (The exceptions are grapes and apples in South Africa and pineapples in Kenya.) However, the East African companies are all investing in trying to boost local sources of fruit pulp. In addition, Coca-Cola has announced a major investment in the region—especially in Kenya—to develop fruit juice supply chains involving smallholder farmers. This seems a natural downstream investment to take advantage of the large number of fruit growers; however, many obstacles will have to be overcome, notably the range of varieties and the production quality of fruits grown, and the dispersed nature of the growers. To realize the potential for market growth in fruits, improvements are needed in the field-to-market supply chain of the fruits, in new technologies, and in enhancement of distribution networks to enable fruit industry players to operate at lower costs throughout the value chain and to remain competitive.

1.3 BROADER LANDSCAPE RESTORATION AND ECOSYSTEM SERVICES

Forests and trees are vital land uses for restoring degraded landscapes (for example, to combat hillside erosion in Rwanda or Ethiopia) and for providing environmental services such as carbon sequestration, watershed protection, and biodiversity conservation. The environmental services provided by trees and forests—including protecting and revitalizing soils, regulating water regimes for rural producers and urban consumers, providing habitat for pollinators and seed dispersers, and absorbing and storing carbon—are valued in the tens of billions of dollars annually (Costanza et al. 1997). As many as 97 of the 180 Natural World Heritage Sites listed by UNESCO are in forested areas (UNESCO 2010).

Not all tree-based systems will provide the same degree of environmental services. For example, although trees can play important roles in regulating water flow, they are also users of water, which must be taken into account. Some nitrogen-fixing trees can bring new nitrogen into soils, but others

can only recycle nutrients from soil depths. All trees can sequester carbon, but some trees grown for wood will be cut; others may be regularly pruned for livestock feeds and never reach a significant size.

Recent literature includes guidelines for the use of sustainable land management (SLM) practices for agriculture and other land uses, such as integrated soil fertility management, soil conservation methods, conservation agriculture, rainwater harvesting and irrigation management and integrated crop-livestock management. The following are two key publications:

- *Sustainable Land Management Sourcebook* (World Bank 2008)
- *Using Sustainable Land Management Practices to Adapt to and Mitigate Climate Change in Sub-Saharan Africa* (Woodfine 2009)

There is also a Web portal that contains practical examples of SLM from around the world: the World Overview of Conservation Approaches and Technologies (WOCAT) at http://www.wocat.net.

In this section, we touch briefly on two practices: sustainable rangeland and forest management.

Pastoralism and Rangeland Management

Many important practices can improve productivity and reinforce environmental stability for livestock and rangeland management. These include sustainable grazing management, which focuses on recovery periods for grasses and other vegetation; reduced use of rangeland fires to prevent loss of soil carbon; and silvopastoral management, which involves balancing vegetation and biomass to meet a variety of needs (Woodfine 2009). Most management techniques are designed around regenerating resources to facilitate fresh grass and shrub biomass growth. In more intensive systems or in strategically placed sites, purposeful planting of grasses and shrubs can also be undertaken, benefiting from research on improved species and establishment methods. Although overstocking is often cited as a culprit behind apparent rangeland degradation, the holistic approach to grazing management emphasizes the importance of rotations and recovery periods for the resource; if these are done properly, they can greatly improve productivity and carrying capacity.

Sustainable Forest Management

Conversion of forest lands into cultivated mosaics has had adverse effects on water flows, has greatly reduced plant and animal biodiversity, and has been a chief emitter of greenhouse gases. While some forests need to be conserved and protected, many new examples of integrated management involve sustainable use of forests and forest products. According to FAO (2010a), sustainable forest management aims to ensure that the goods and services derived from the forest meet current needs while securing their continued availability and contribution to long-term development. Certain silvicultural practices guide governments and other managers on sustainable harvesting and offtake for various species. New management models include some form of local ownership or rights, through which local communities have vested interests in the long-term health of the forest. The rights can vary from home consumption of forest products (e.g., fuelwood) to marketing specified products (e.g., fruits) to establishment of eco-tourism businesses.

1.4 VALUE CHAIN INNOVATIONS FOR PROMOTING INVESTMENT

Numerous marketing and financial arrangements can foster large-scale investment in trees and land restoration. Historical data on domestic private investment are difficult to come by in Sub-Saharan African countries, particularly at the sectoral level. A significant proportion of such investment is in small to medium-scale producers and enterprises, and it tends to be informal and thus not captured in national statistics. With limited access to credit and capital, African entrepreneurs rely on personal savings to finance their business entities (Mhlanga 2010). With the exception of Malawi, Tanzania, and Uganda, commercial banks in Sub-Saharan Africa lend less than 10 percent of their total credit to the agricultural sector.

Because of this credit gap, there is more emphasis on vertical integration of value chains; for example, where large agribusiness interests acquire land for production or where outgrower arrangements are established. These arrangements often involve the transfer of finance from buyers/processors to producers, enabling investments that will help meet the production quantity and quality needs of buyers. There is an increasing trend for multinationals and foreign companies to purchase or lease large land areas in African countries for export-oriented agricultural production. Most of the transactions are arranged between the foreign private investors and the targeted host governments (Mhlanga 2010). These agricultural land investments could provide opportunities for increased investment in Sub-Saharan African agriculture if principles for responsible agro-investment are respected (Deininger et al. 2011).

Three important investment directions for tree-based systems are through outgrower schemes/cooperatives, through certification schemes based on ecologically friendly production, and through payments for environmental services. Tree crop systems have long been supported by government investment in providing inputs on credit, in funding local collection infrastructure, and in participating in export marketing chains. The outgrower model is a private sector corollary in which agribusiness companies contract with farmers, small and large, for tree products. Participation in certification schemes does not often help farmers finance inputs, but these schemes can provide higher returns through opportunities to access new markets that attract higher commodity prices.

Contract Farming and Outgrower Schemes

Successful outgrower schemes are in place for many products in Africa, including timber/wood production. The following are some of the arrangements that have been developed for trading wood between growers and the processing industry:

- Wood-processing companies obtain their supplies through trading intermediaries (market agents) and do not have a direct relationship with farmers/growers.
- Wood-processing companies lease land under contract for a specific period from landholders to grow the trees themselves.
- Wood-processing companies enter into a contract with farmers to grow trees that are then sold to the companies.
- Cropshare joint ventures involve contract agreements between landowners and a wood-processing company (investor), specifying the responsibilities of each partner and the sharing of costs and benefits throughout the life of the tree crop. The returns from the harvest are determined by the market price.

- A guaranteed tree venture is an arrangement in which a wood processor guarantees the sale of trees/wood for the tree grower based on specified market price. In return, the tree grower offers the processing company partner the first option to purchase the trees/wood, with a provision that the grower may sell to another purchaser who offers a better price. The guaranteed market offer provides incentives to tree growers, because it gives them a worst-case scenario—the minimum price they can expect for their wood and tree products.

Each of these schemes is observed in various outgrower arrangements for wood in Africa (Mayers and Vermeulen 2002).

Tree outgrower schemes are beneficial to wood companies and tree growers in different ways. To wood-processing companies, the scheme provides access to additional, more secure, or cheaper supplies of wood and tree products; diversifies the sources of raw materials; and avoids the overhead and fixed costs usually associated with direct tree growing by companies. To tree growers/farmers and local communities, outgrower schemes provide access to financial support while trees mature, higher net returns from trees, and relatively more secure markets for wood (Desmond and Race 2000). Sappi and Mondi are the key companies in the pulp and paper industry in South Africa, and both have flourishing outgrower schemes, especially in Kwazulu-Natal province. Sappi began to establish plantations (1.2 ha on average) in the mid-1980s; the company provides subsidized inputs, technical field support, and loans to growers against the final harvest. In return, the growers agree to sell their trees and wood to the company. By 1999, the two companies supported more than 12,500 smallholder outgrowers, who had established about 27,000 hectares of eucalyptus woodlots and delivered over 200,000 tonnes of wood to the industry (FAO 2003). In Ghana, Swiss Lumber Company operates a tree outgrower scheme to supply its sawmill with adequate wood supply. The company developed strategies to attract outgrowers to grow trees on land that was degraded and had low crop yields. Potential exists to expand these arrangements in places where many farmers are already growing trees (such as Ghana, Kenya, Burundi, and Rwanda) and where land is available for more private plantations (Mozambique, Tanzania, and Zambia).

Certified Organic Production of Fruits and Tree Products

Moving from conventional farming to organic and environmentally friendly farming involves some conversion costs: certification, specialized training, and initial conversion-related shocks (e.g., temporary crop failures and reduced crop yield). These initial costs can be offset by external or public support through the payment of conversion subsidies to newly certified farmers. External private subsidies and coordination are required to enable smallholders to convert to organic farming for export. Almost all the certified organic export smallholder production in tropical Africa has developed under these conditions. However, the use of synthetic inputs in conventional farming in tropical Africa is very low, so conversion to organic agriculture is less radical than in some other countries. Changes such as reductions in crop yield, labor inputs, savings from reduced use of synthetic inputs, and farm profitability are expected to be considerably limited compared with the situation in developed countries (Gibbon and Bolwig 2007).

The past decade has seen a tremendous increase in the market for certified organic agricultural products in North America and the EU. From an insignificant level in the past, the market for organic produce has risen to 1.5–2.5 percent of total food sales in these two regions. The rising demand and increasing profile of organic farm products in international agricultural trade has encouraged the promotion of certified organic export production in a number of tropical African countries.

In Africa, farms that engaged in certified organic export production were found to be significantly more profitable in terms of net farm income earnings than those that engaged in conventional production (Gibbon and Bolwig 2007). This profitability gap is due to differences in gross incomes and production costs between organic and conventional farms. However, there are wide variations in the net profit of various crops grown using an organic approach.

Payment for Environmental Services

A major new source of financing for tree-based systems and other land restoration practices is through payment for environmental services (PES), most notably market-based systems that reward quantifiable sequestration of carbon through tree planting or avoided deforestation. A number of financial mechanisms and incentives are in use to encourage farmers and investors to adopt practices and systems that will generate carbon sequestration and other environmental benefits. These incentives seek to align farmers' and investors' incentives with those of the national or global society, and to encourage both groups to be cognizant of environmental effects when they make agricultural/forestry production decisions. The goal is to unlock the potential of eco-friendly systems to satisfy food production needs and provide global environmental services. The following sections describe some examples of incentives to promote investment.

Reward mechanism for eco-friendly systems

Most eco-friendly systems are profitable over time (i.e., they have positive net present values), but private investors often have to wait several years before they begin to realize these benefits. This poses a challenge for farmers, especially in Africa, where the cost of capital and the discounting factor are high. During the waiting period, investors are at their most financially vulnerable and may need some form of support. Total Land Care in Malawi gives priority to farmers to access subsidized farm inputs in the first couple years on the condition that these farmers have established plots in which eco-friendly production methods are used. So far, this mechanism is primarily used to promote conservation agriculture.

Another example is Community Markets for Conservation (COMACO) in Zambia, which targets poor and food-insecure families. The families are organized into producer groups and sign an agreement with COMACO that gives conservation dividends to farmers for adhering to sustainable land use practices. As part of the incentive, COMACO buys any surplus crops grown by member farmers at fair market prices. Reward schemes need not be monetary: The HKM program of the Indonesian government rewards communities with increased security of tenure in exchange for environmental stewardship.

Direct payment for carbon sequestration

Several programs of direct payments to land managers are implemented in tree and agroforestry projects to sequester carbon. These incentives include paying the monetary equivalent of the estimated amount of carbon that trees sequester. The Plan Vivo carbon payment scheme is in effect in a number of African countries; other voluntary carbon credit schemes are funded by private foundations. Some governments, such as the current Malawi government, pay farmers to plant trees for sequestration of carbon. The first soil carbon payment program in Africa has recently been established in western Kenya with Vi Agroforestry.

Direct payment for watershed protection

In watershed protection schemes, investors and farmers receive various amounts of money in return for planting trees and undertaking land management practices that provide certain watershed functions. These functions include improvement of water quality (usually paid by water corporations and utility boards) and "green water" credit schemes, which reward land managers for reducing surface runoff and river siltation. Under the auspices of the Millennium Challenge Account, the U.S. government recently paid over $300 million to Malawi; part of this money is to be used to support tree planting along the Shire River.

Tax holidays

Investors may receive complete tax holidays or access to reduced tax rates to encourage them to adopt eco-friendly systems of production.

1.5 CONCLUSIONS

1. Many tree-based investments are highly profitable and are projected to remain so.

Furthermore, such systems often require relatively little labor and diversify income streams (fruits, timber, tree crops, etc). A trade-off is that investors in many tree products face a delay of several years before reaping the majority of benefits. This is not always the case, however, as fodder systems, leguminous trees for soils, and grafted fruits can all yield significant early benefits. It is important to select the right species and even the right variety (or establishment method) for the particular circumstance—this is an area that would benefit from broader information dissemination. While exotic tree species receive much attention, the analysis shows that many native species are not only well adapted ecologically but can generate high profits. Their economic effects could be higher if they received even a fraction of the research attention that exotic species do (e.g., in the area of selection of better germplasm and management).

2. Many tree-based investments (fertilizer tree systems, parkland systems, exclosure-based systems) are critically important for providing environmental services and restoring landscapes.

Trees are very important plants, with many species and much intraspecific genetic diversity among them. Trees host a number of animals, including pollinators that are essential for crop production. In systems, they can be important niches or corridors for other types of animals. They have deep rooting systems that help keep soil in place and improve water infiltration and soil structure. They provide a lift (through their roots) to recycle nutrients and water from deep soils. Their cover intercepts rainfall and can provide microclimates to reduce soil temperature and evaporation. They drop organic matter from leaves and roots that spurs greater biological activity in soils.

However, some highly productive trees—eucalyptus, for one—consume a great deal of water. Planting a large number of such trees in sensitive hydrological areas has been found to have negative effects on water flow, even though private profits are high. Some trees compete with crops and other understorey plants for sunlight, water, and soil nutrients—all integrated systems involve trade-offs.

3. Some tree-based investments, such as the parkland systems, provide win-win outcomes in terms of profits and ecological services.

Parkland systems predominate in the savanna and Sahel biomes for good reason: They provide nutritional and economic benefits as well as ecological benefits, which in turn benefit farming system components (cultivated crops and livestock). Similarly, innovations such as nitrogen-fixing shrubs boost yields as well as improving soil health and providing some additional fuelwood benefits. Another tree system—fodder shrubs—boosts milk production and income; the shrubs can also serve as good soil conservation barriers and fix nitrogen. Boundary plantings of timber trees are used worldwide as sources of income and wood, and as windbreaks and boundary markers.

Not all tree species or systems qualify as win-wins, of course. In some cases, diversifying tree crop systems with shade trees can reduce profits, especially if tree crop values are high. This is not to suggest that such systems should be dismissed uniformly; rather, that their location and scale need to be taken into consideration from both ecological and economic perspectives. In addition, in terms of broader planning, they should be viewed as components of a broader system of resource management and enterprise development that is designed to deliver long-term private and social benefits.

4. Some other tree-based investments (e.g., integrating high-value trees into tree crop systems) could be improved upon to deliver more profits and ecological benefits.

The term "green deserts" has been coined to denote monocropped systems such as oil palm and eucalyptus; it implies that very few other plant or animal species are found in such systems. This may be an exaggeration, but there is definitely scope for enhancing monocropped systems through diversification to benefit biodiversity and increase profits. Multispecies agroforests are traditional systems in many humid areas of the world. In Africa, the Chagga home-garden system of the Mt. Kilimanjaro region of Tanzania and the "wild forest" coffee agroforestry systems in southwest Ethiopia are the best known examples, but this chapter has described many more. Farmers appreciate the diversity offered by these agroforests not only for the range of nutritional and economic resources, which sustain the food security of their households, but also for the role of diversified production as a buffer against the market shocks and price fluctuations common to almost all agricultural and forestry products. The integration of trees and crops in agroforestry systems also mitigates the effects of climate change, such as unpredictability of seasonal rainfall and increasing frequency of extreme weather events (such as drought and flood), which affect annual crops much more than they affect perennial tree crops.

The major impediment to greater expansion of integrated agroforestry systems is that research has overwhelmingly bred "improved" crop varieties for high external inputs and management practices under moncropped systems or full sun; this has changed the balance of economic and ecological trade-offs.

5. Large-scale restoration almost always requires a combination of investments in tree and nontree technologies; for example, vegetation regeneration, soil conservation, and planning for woodland/riparian management.

Tree-based technologies are just one component that contributes to long-term economic and ecological benefits in landscapes. Other technologies are as important or more so, depending on the circumstances. There are many different land uses, and each requires its own kind of sustainable

management practices. Improved pastures and grasses are key to rejuvenating rangeland, while contour management with vegetation such as grasses and shrubs is important in managing hillsides. Exclosure practices are critical in rehabilitating highly degraded lands, while existing woodlands and forests require rules for sustainable use. Water sources require protection and regulated use. This chapter has attempted to describe a number of landscape management tools or components, with an emphasis on tree-based technologies. Chapter 2 gives examples of areas where these technologies have been successfully combined to create landscape-level effects and provides insights on where future successes could occur.

6. Emerging markets in rewarding environmental services and stewardship offer new opportunities for financing tree-based technologies and land restoration practices.

The types of technologies and management practices described in this paper are those that stand to gain the most from environmental service payment schemes. Such payments are not likely to be significant compared with the private benefits received from investments; however, because tree-based and land restoration technologies do not give a quick return on investment, the payments can be an important factor in providing early rewards for investment.

This analysis demonstrates that although global and African demand prospects for many tree-based products are favorable and financing opportunities are expanding, multiple challenges remain in translating prospects into private investment opportunities in Africa. Chapter 3 examines the constraints in achieving landscape-level economic and ecological rejuvenation, and methods for overcoming these constraints.

NOTES

1 This chapter is not meant to be a comprehensive evaluation of all the technologies across different regions, partly because of the large number of such technologies and also because of the limitations on information, which is a common problem for tree products.

2 Based on household surveys in 10 African countries: Burundi, Ethiopia, Ghana, Guinea, Kenya, Malawi, Mozambique, Rwanda, Tanzania, and Uganda.

3 http://www.3f-africa.com/sheanuts.html

4 http://www.teaboard.or.ke/statistics/exports.html

2 WHERE DO PRIVATE MARKET INCENTIVES CONVERGE WITH LANDSCAPE RESTORATION GOALS?

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2.1 INTRODUCTION

Forests and woodlands in Sub-Saharan Africa provide a vast range of foods, animal fodder, fuel, building materials, and medicines for the largely rural population, while protecting watersheds, harboring a rich diversity of native fauna and flora, and storing huge reservoirs of carbon in their soils and vegetation. Population growth, land clearing for agriculture, human settlements, and infrastructure development have reduced forest and woodland cover, depleting soil nutrients and degrading soil structure, overexploiting water resources, and shrinking natural habitat. Although historical data are poor, the best guess at an aggregate value for the percentage of original broadleaf forest remaining in 1980 was 36 percent (Sayer, Harcourt, and Collins 1992); since then, forest cover (including woodland) in Africa has declined from 699 Mha in 1990 to 635 Mha in 2005 (FAO 2006). In West Africa alone, 30 Mha of forest were lost in the last century; only 13 percent of original forest remains (Leach and Fairhead 2000). Negative consequences have resulted not only for nature but also for economic growth and development—limiting agricultural productivity growth, reducing industrial access to raw materials, and reducing resilience to natural and economic shocks (Scherr and Yadav 1999).

African entrepreneurs, farmers, civil society, and governments have often responded dynamically to this challenge, and the continent is dotted with landscapes where production of tree and other forest products on farms and in managed woodlands and forests has grown dramatically to meet market and subsistence needs; where sustainable agricultural practice and revegetation of landscapes have restored soils and watershed; and where key conservation areas are being protected. (See Introduction for discussion of 'landscapes'.) However, such landscape restoration is not happening at the scale required by societal needs in Africa. In part, this is due to a lack of strategic cooperation and coordination among private sector investors and land managers (who are focused on realizing profitable opportunities and meeting their own needs) and public and civil society actors (who are focused on restoring forest cover and ecosystem services). To realize the potential for synergies among the different actors requires a "landscape approach" that addresses the full range of critical functions for provision (for food, fiber, energy, and so on) and healthy ecosystems (Scherr and McNeely 2007). The institutional challenge is to incentivize private investment and finance that also contributes to landscape restoration, and to engage public sector and civil society in complementary action where private investment is unlikely to take place.

To achieve multiple objectives at scale requires institutional mechanisms to resolve trade-offs and realize synergies among actors across agricultural, forest, and conservation land uses—and the associated value chains—at various levels. Some coordination at landscape scale is often needed to scale up successful investments at the farm, community, or enterprise level; to support large-scale private investors in incorporating key conservation objectives; and to address ecological and socioeconomic links across the landscape.

Although the need for such coordination is widely recognized, not enough has been done in Africa to explicitly engage the private sector in landscape restoration efforts. A basic tension underlies the relationship: Private capital and business flow to activities that generate short- and medium-term financial returns. The challenge is to find a point of convergence among the biophysical potential for landscape restoration, private sector investment opportunity (to mobilize financial resources and market developments), and societal demand for multiple benefits, so that the investment in multistakeholder planning and partnerships makes practical sense.

Potential clearly exists for profitable private investment in many sustainable agriculture, agroforestry, tree crop, and forest and woodland products in Africa (See Chapters 1 and 3 in this volume]).This chapter looks spatially at where and how such private investment is likely to flow; the contribution this could make to achieving landscape restoration at scale; and the implications for private and public investment agendas. It examines factors that contribute to convergence or divergence of private and public objectives in landscape restoration.

The chapter begins with an overview of diverse types of large-scale landscape restoration in Africa and the variable role of the private sector, farmers, government, and civil society in supporting and undertaking investment. It provides a context in terms of the scale and scope of land degradation, the biophysical potential for landscape restoration, and the importance of ecosystem services in production landscapes. The chapter goes on to describe spatial factors that affect market demand and supply for farm trees and forest cover in Africa, as well as factors related to social organization and institutions that affect investment potential. The final section summarizes the challenges and opportunities of negotiating, planning, and coordinating landscape-scale restoration with investors, land and forest managers, and other stakeholders.

2.2 INVESTMENT IN LARGE-SCALE LANDSCAPE RESTORATION IN AFRICA

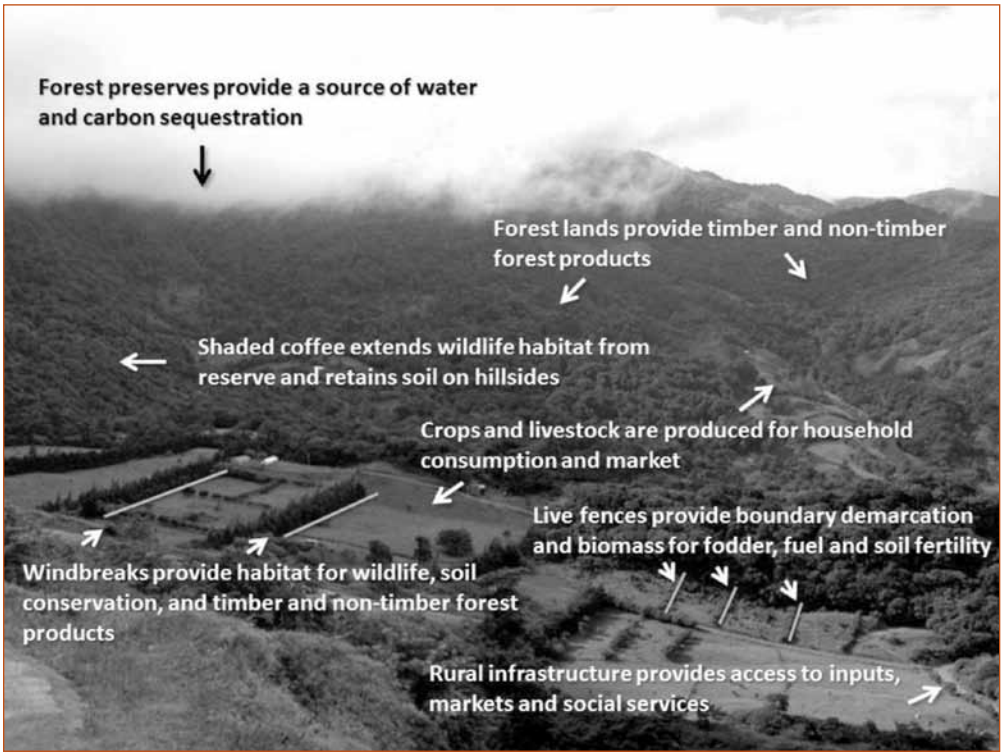
Degradation of land and forest resources in Africa has reduced real wealth and assets, consumption, and income-earning potential for local land managers, the public sector, and private businesses. Thus, the conservation and restoration of tree and forest cover and soil health present real opportunities for economic gain. Figure 2.1 illustrates how the different actors can invest in different spatial areas of a landscape—for example, croplands, riparian areas, and protected areas—and how together they shape the overall watershed, wildlife habitat, and human environment. There is typically little coordination among their efforts, but the overall impact for landscape restoration can be significant.

Public and Civic Initiatives

Throughout Africa, organized initiatives are under way to facilitate landscape restoration and management. Public agencies and environmental NGOs are catalyzing stakeholder forums to plan

and coordinate investment in major watershed programs that encompass diverse economic and social actors from the upper catchment to the lower wetlands, and in biological corridors through major crop- and livestock-producing regions.

FIGURE 2.1. SPATIAL DISTRIBUTION OF LANDSCAPE INVESTMENTS



Source: EcoAgriculture Partners

Scoping for this report identified dozens of landscape-scale restoration initiatives in Africa. Examples include the Lake Victoria Ecosystem Management Project (LAVEMP), supported by the World Bank; landscapewide sustainable land management projects supported in several countries by the Global Environment Facility (GEF) through the New Partnership for Africa's Development (NEPAD)/ TerrAfrica; initiatives to engage farmers in wildlife and habitat conservation, such as African Wildlife Foundation's Heartlands conservation programs and International Union for Conservation of Nature (IUCN)-supported Landscapes and Livelihoods; many large-scale integrated watershed management, rehabilitation, and rainwater harvesting initiatives; transboundary wildlife conservation programs; and dozens of initiatives that involve payment for ecosystem services in agricultural landscapes, particularly for biodiversity conservation and carbon sequestration. International agencies such as the International Fund for Agricultural Development (IFAD), the World Food Programme (WFP), and the World Bank are structuring more of their investments in a landscape framework. African leaders have recommended a more complete inventory and assessment (Ayensu et al. 2010).

Some countries are going even further—incorporating landscape restoration strategies as a central part of national development policy. In February 2011, Rwanda announced a program of border-to-border landscape restoration. Ethiopia's new agricultural investment program encompasses numerous large landscape restoration initiatives. The Fadama program in Nigeria involves investment of over a billion

dollars. Climate finance is supporting investment in sustainable land management. REDD-plus fast-start funds are supporting investments to reduce deforestation, while many African countries are in the process of designing Nationally Appropriate Mitigation Action (NAMA) and National Adaptation Programme of Action (NAPA) projects that will use sustainable land management (SLM) to promote climate-friendly, climate-resilient agriculture and land use at scale.

Private Sector Initiatives

The role of private sector investment in these initiatives and the potential of private finance to fund the restoration process have not been systematically evaluated. But the contribution is significant and growing. In response to market incentives and subsistence requirements, millions of farmer and community-based organizations are undertaking independent investment efforts: reforesting hillsides, planting trees on farms, and improving soil management. Their aggregate efforts are achieving land cover effects at scale. Private agribusiness investors and companies along agricultural and forest supply chains are pursuing opportunities to profit from tree- and forest-based enterprises. Some are finding ways to access large areas of land; others are engaging large numbers of smallholder farmers or forest communities. Integrated agribusiness development corridors being promoted through public-private partnerships in breadbasket regions are incorporating elements to "green" land management. Private developers are pursuing climate change mitigation projects.

While Africa-wide data on tree crop and forest investment are sparse, the International Finance Corporation (IFC) loan portfolio illustrates interest from private business. IFC's annual tree-based agricultural investments increased from about $300 million in the early 2000s to $2 billion in 2009 and 2010. Examples include the Salala Rubber Company in Liberia; Ghana Oil Palm Development Company (a palm oil plantation in Ghana); Karsten (a tree fruit processing company in South Africa); Kongoni River Farms (a horticulture and flower production and export company in Kenya); and coffee farmer cooperatives in Ethiopia. Since 2004, IFC has invested about $1.13 billion in the forestry sector, including energy-saving initiatives (for example, substituting waste biomass from sawmills for the use of fuel oil in Tanzania); reforestation/afforestation in Uganda and Mozambique; and forest product manufacturing companies in Ghana, South Africa, and Mozambique. Billions of dollars in foreign direct investment in agriculture and forestry are entering Africa; although most investment is landscape-degrading, the potential exists to include practices that support landscape restoration.

Linking Public and Private Sector Investment

The six boxes in this chapter present examples of landscape-scale action in response to diverse drivers, encompassing diverse investment activities. Government-led restoration efforts in the Kagera River Basin in Tanzania (box 2.1) are engaging all sectors in a multifaceted strategy. In the Ethiopian highlands (box 2.3) and the southern savannas of Niger (box 2.6), large-scale landscape restoration was led by farmers and community organizations, with modest support from governments and NGOs, and limited nonfarm private investment. Private companies and investors played an important supporting role in smallholder agricultural landscapes in southern Zambia (box 2.2), and a leading role in restoring smallholder agroforestry landscapes in Embu, Kenya (box 2.4), and tea landscapes in Kericho (box 2.5).

BOX 2.1. KAGERA RIVER BASIN: TRANSBOUNDARY AGRO-ECOSYSTEM MANAGEMENT

The 60,000 km^2 Kagera River Basin is shared by 17 million people in Uganda, Tanzania, Rwanda, and Burundi. The basin faces increasing pressures from population growth, agricultural intensification, and unsustainable management practices, and over 7 percent of the land is degraded to the point that it is categorized as nonreclaimable. Land uses in the basin are diverse, including extensive and intensive livestock systems, cropping systems, and mixed farming systems: agroforestry, crop-livestock, crop-fish, and systems dominated by commodities such as bananas, coffee, and tea.

The goals of the recently launched Transboundary Agro-Ecosystem Management Programme (TAMP) are to restore degraded lands for improved productivity and food security, improved livelihoods, carbon sequestration, and agro-biodiversity conservation. Although the program is led by government agencies, private sector investment is central to the strategy. Restoration is to be achieved through a variety of agro-ecosystem management approaches, such as conservation agriculture, agroforestry, and integrated plant and nutrient management. Payment for ecosystem services approaches are being explored for watershed and biodiversity conservation and carbon sequestration. Capacity building and community-based natural resource management play a large role. TAMP aims to have 100,000 hectares under sustainable management, resulting in 10 percent increase in crop and livestock products for trained farmers, and a 20 percent increase in carbon stores on 30,500 hectares. More than 120,000 community members have participated in TAMP activities.

The transboundary activities are funded by the Global Environment Facility (GEF), with support from FAO and the four governments. Government agencies are also major partners: Rwanda Ministry of Agriculture and Animal Resources; Uganda Ministry of Agriculture, Animal Industry and Fisheries; Tanzania Division of the Environment; and Burundi Ministry of Agriculture and Livestock. The activities were initially developed by the United Nations Environment Programme (UNEP) and are executed through TerrAfrica. The initiative relies on existing regional policy (e.g., East African Community, Lake Victoria Basin Commission, NEPAD). NGOs and researchers provide technical support. Private companies support input and product supply chains, credit, and finance.

Source: FAO 2011.

2.3 BIOPHYSICAL CONSIDERATIONS FOR INVESTMENT IN LANDSCAPE RESTORATION

Appropriate biophysical conditions are a first screen for the suitability of specific rural landscapes for investment in restoration. Public sector actors may seek to steer investment to areas with high potential for public benefits (e.g., restoration of ecosystem services, export earnings, or domestic energy production interests), while private actors will generally seek investment sites that present lucrative opportunities with acceptable levels of risk. These diverse objectives generally mean that different public and private actors typically have biophysical investment criteria that are overlapping but not identical. This section first briefly reviews the scale and consequences of landscape degradation in Africa, as well as opportunities and benefits associated with landscape restoration.

It then outlines a set of criteria, evaluation processes, and data sources to identify landscapes with suitable biophysical conditions for investment in landscape restoration.

Farming and Land Use Systems

Geographic variation across Africa and diverse historical patterns of production and trade have led to a rich variety of land use and farming systems. Systems based on commercial tree crops are found in the lowlands of western Africa (including with rice) and the highlands of eastern Africa; pastoral and agropastoral systems in the drylands; and forest-based systems in central Africa. Systems based on grains and root crops dominate elsewhere. The area of Africa covered by farming systems predominantly based on trees and other perennials is relatively significant: 11 percent is covered by forest-based systems, in which producers rely on forestry/tree products interspersed with annual crop production. Another 3 percent is in tree crop systems (e.g., cocoa and oil palm); 1 percent is in mixed rice-tree systems; and another 1 percent is in highland perennials (e.g., coffee and tea) (Dixon and Gullivar 2001). In each type of farming system, landscape degradation takes a somewhat different form, as do priorities and mechanisms for restoration.

Scale and Consequences of Land and Forest Degradation

Although it is now somewhat out of date, the United Nations Food and Agriculture Organization's (FAO's) 2000 Global Assessment of Soil Degradation (GLASOD) provided one of the most comprehensive assessments of global land degradation. Overall, 4.2 percent of Africa has strongly or extremely degraded soils—the highest percentage of any continent and twice the world average of 2.1 percent. Pockets of strong or extreme soil degradation are clustered so that certain landscapes have a high degree of degradation across a high percentage of mapping units. These severely and very severely degraded landscapes comprise about 6 million km^2 of Sub-Saharan Africa (about one-fourth of the region's land), of which 2 million km^2 have been degraded as the result of agricultural activities. These areas are concentrated at the southern margin of the Sahara Desert (stretching from the Atlantic Ocean to the Red Sea), South Africa, Madagascar, around Lake Victoria, and in pockets in coastal West Africa. The primary causes of degradation are deforestation, overgrazing (particularly in dryland regions), and overexploitation of vegetation for domestic use, including biomass energy. In Sub-Saharan Africa, land degradation is closely correlated with population density (FAO 2000).

A recent geospatial analysis of tree cover in productive areas (Zomer et al. 2009) compares current levels of tree cover with potential tree cover, defined on the basis of geographic region, climate, and population density. This analysis suggests that several regions in Africa are below their potential in terms of tree cover (and corresponding livelihood benefits and ecosystem services) and could be priority regions for investment in restoration. These areas are in the West African coastal lowlands, pockets in northern and southern Nigeria, the eastern coast of Madagascar, north central Ethiopia, a band south of the Sahara, the area from central Tanzania to the Kenya/Uganda border and into southern Sudan, and the northern part of South Africa. Of course, these generalized patterns are mediated at the landscape level by biophysical, socioeconomic, market, and policy factors.

Recently, Vlek and colleagues (2011) used a time series of satellite imagery (1982–2003) to assess changes in net primary productivity (NPP) in Africa. NPP integrates multiple causal factors (e.g., soil fertility, water availability, degradation from human activity) and has multiple implications for human well-being (e.g., availability of biomass as crops, livestock fodder, or forest resources, as well as levels of ecosystem functions such as water purification and carbon sequestration). Although the changes

at first seemed modest, when adjusted for rising atmospheric CO_2 levels and nitrogen deposition, NPP analysis found that human activity has negatively affected productivity on 5.91 million km^2 (about one fourth) of Sub-Saharan Africa, divided nearly equally among arid, semi-arid, sub-humid, and humid zones. Land degradation is most prevalent in agricultural areas (1 million km^2, or 31 percent of all agricultural lands); woodland/shrubland (1.6 million km^2, or 28 percent of such lands); and grassland (0.95 million km^2, or 17 percent of such lands). It is less prevalent in forest/crop mosaics (0.25 million km^2, or 31 percent of such lands); forest/savanna (0.28 million km^2, or 41 percent of such lands); and dense forest (0.47 million km^2, or 12 percent of such lands). The most degraded areas are the southern margin of the Sahara Desert and a patchwork of degraded lands throughout West Africa; scattered pockets in all the East African nations; much of Madagascar; and a distinct band along the west coast of southern Africa, including coastal areas of Namibia.

Landscape Restoration for Ecosystem Services

Ecosystem services are the functions and benefits humans receive from natural and managed ecosystems. A major rationale for landscape restoration in Africa is to restore and enhance these ecosystem services, which are critical for smallholder rural livelihoods as well as for the sustainability and profitability of a wide range of business sectors, from agriculture to beverage bottling to tourism. The Millennium Ecosystem Assessment defined four categories of ecosystem services (MEA 2005):

- Provisioning services, including wild and domesticated foods, pharmaceuticals, biomass fuels, and water for drinking, irrigation, and hydropower.
- Regulating services, including crop pollination, natural pest and disease control, water purification, and carbon sequestration.
- Supporting services, including nutrient cycling and basic biological primary production.
- Cultural services, including landscape beauty and recreational opportunities.

Each of these provides both economic and noneconomic benefits to private business, private land and resource managers (e.g., farmers), and society as a whole. For instance, restoring vegetative cover on farmlands, rangeland, and forest captures rainfall more effectively and slows the flow of water across the surface of the land, enabling it to infiltrate the soil into aquifers while reducing erosion of productive topsoil. Such actions regulate the flow of water for human and productive use, recharge groundwater reserves, and improve water quality. In a resource-constrained world, reliable flows of ecosystem services are increasingly critical to the business models of a wide range of industries and sectors. Ecosystem services such as water supply and purification, production of wood fuel, crop pollination, and landscape beauty are the basis for inputs, raw materials, and conducive environmental conditions that many industries need to ensure reliable production processes, control costs, manage risk, and pursue profitability. In many cases, the contribution of ecosystem services to businesses' bottom lines (in terms of enhanced revenue, reduced costs, or lower risk) is substantial. For example, wild pollinators are estimated to contribute $190 billion per year to agricultural output, while overall sustainability-related business opportunities may be worth $2–$6 trillion worldwide by 2050 (TEEB 2010).

Recent work to quantify the monetary value of ecosystem services is helping business leaders incorporate these services in their business models and planning. According to a 2009 survey, 45 percent of CEOs in Africa are either "extremely" or "somewhat" concerned about biodiversity loss and its effects on growth prospects (the global average was 27 percent). Biodiversity and ecosystem

BOX 2.2. SOUTHERN PROVINCE, ZAMBIA: SMALLHOLDER CONSERVATION AGRICULTURE

The Southern Province is a semi-arid plateau zone that receives 750–900 mm of annual rainfall. Agricultural systems are mixed crop-livestock, with maize, groundnut, and cotton dominant. The Tonga (the main ethnic group in the area) farm 1–5 hectares per family, but the plateau also houses commercial farming operations. Large expanses of the region have been subjected to serious soil erosion, nutrient depletion, watershed deterioration, and loss of biodiversity as a result of unsustainable farming practices and overexploitation of natural vegetation. To address these challenges, the government of Zambia promoted the widespread adoption of conservation agriculture (CA).

CA approaches foster natural ecological processes to increase agricultural yields and sustainability. In Zambia, CA involves six basic conservation farming technologies: (1) retaining crop residues, (2) concentrating tillage and fertilizer application in a permanent grid of planting basins or a series of planting rows, (3) completing land preparation in the dry season, (4) weeding aggressively to reduce plant competition, (5) intercropping, and (6) rotating nitrogen-fixing legumes on up to 30 percent of the cultivated area (CFU 2010). Many farmers also incorporate nitrogen-fixing trees. In Zambia, 30 percent of smallholders have adopted elements of CA. The estimated area restored is 300,000 hectares, with more than 160,000 participating households; adoption has been especially widespread in the customary land areas under customary tenure of Monze and Choma in the Southern Province (see photos below).

Conservation Farming in Zambia

The socioeconomic and environmental benefits have been well documented. Yields on farms using CA practices doubled in maize plots and were 60 percent higher for cotton compared with yields under conventional plowing systems (Haggblade and Tembo 2003). A 2010 FAO budget analysis in Zambia found that returns under CA are significantly higher than under conventional systems: $104/ha under CA and $19/ha under conventional tillage. A switch to CA has allowed women and children to carry out lighter and more diversified tasks (Baudron et al. 2007). In terms of ecosystem services, CA has improved soil structure, water retention, and biological activity, and has reduced greenhouse gas emissions, as residue is not burned.

The scaling up of CA since the mid-1990s has been achieved by a coalition of stakeholders from government, donors, and the private sector. The Zambian Conservation Farming Unit (CFU) led the effort,

(continued)

with strong policy and extension support from the Ministry of Agriculture and international donors (e.g., Norway). The World Agroforestry Centre, the African Conservation Tillage Network, and FAO were actively involved. From civil society, NGOs such as the Catholic Archdiocese of Monze, Development Aid from People to People, CARE, and Africare have participated in promotion efforts. Other stakeholders include the Zambia National Farmers Union (ZNFU), the Golden Valley Agricultural Research Trust (a public-private partnership created by the government and ZNFU), the Cooperative League of the USA, and World Vision. The Dunavant Cotton Company—one of the largest cotton companies in Zambia—has worked closely with the CFU, especially in farmer training, to support the widespread spontaneous adoption of CA by Zambian cotton farmers (Haggblade and Tembo 2003).

Source: Carbon Trading in Conservation Agriculture and Green Knowledge Institute.

services are also being pursued as a source of business opportunities by a wide spectrum of business interests, from small entrepreneurs to large banks and institutional investors. In a survey of more than 1,500 business executives, 59 percent of respondents saw biodiversity as more of a business opportunity than a risk (TEEB 2010).

Farm and Landscape Strategies for Restoration

The degradation and restoration of tree cover in countries over time, under continuing land use pressure, is illustrated in Figure 1: Forest and Land Use Transition Curve reproduced in this volume's introduction. Landscape restoration generally aims to achieve a mosaic of natural forest habitat, planted forest cover, farmlands, and grazing areas that are managed synergistically to increase household and business income while maintaining and enhancing the natural resource base to provide a range of critical ecosystem services. Tree crops and production forestry can play an important role, particularly if these plantings include a diversity of tree species and planting types, such as intercrops, boundary plantings, mixed species plantations, and multistrata systems. Tree planting can also support nearby agricultural practices; for instance, by providing nitrogenous fertilizer, fodder, or biomass for mulch on nearby cropfields.

Beyond commercial tree crops, a rich menu of SLM practices is available for farms, rangeland, forests, and wetlands in all parts of Africa, such as agro-ecological cropping approaches, including organic materials application, cover crops, and intercropping; conservation agriculture (FAO 2010, Milder, Majanen and Scherr 2011); agroforestry and evergreen agriculture (Garrity et al.2010); and soil and water conservation techniques, including terracing, planting pits, soil bunds, live fences, intensive rotational grazing, and fallow strips (Liniger et al. 2011).

Several barriers inhibit the broader and more effective use of combinations of farm-level sustainable management strategies to achieve landscape restoration goals. Despite the plethora of reports and case studies on SLM practices, context-appropriate information on promising practices is not always readily available to prospective investors, local businesses, rural consultants, NGO staff, farmers, and land managers. In other cases, the critical gap is investment capital needed to finance up-front land management transitions that would be profitable in the long term, with co-benefits for environmental protection and poverty alleviation. Even when the return on investment of such transitions is quite favorable, access to capital often proves to be an absolute barrier, especially for rural households

BOX 2.3. ETHIOPIA LANDSCAPE-SCALE SUSTAINABLE LAND MANAGEMENT PROJECT

The Ethiopian highlands have suffered some of the highest levels of land and soil degradation in Africa, with unsustainable farming practices and overexploitation of soil and vegetation resources. Large investments in sustainable land and water management, led by government agencies and NGOs, have led to major restoration achievements in areas such as the Oromia region. Through the Strategic Investment Program, a national institutionalized sustainable land management platform has been developed, and a watershed project is being implemented. Activities are funded by GEF/World Bank/TerrAfrica and co-financed by GIZ (formerly GTZ), Norway, IFAD, UNDP, WFP, and others. The watershed project shows early success, and communities are implementing biophysical conservation measures, erosion management, and water harvesting practices.

Farmer Experiment in Ethiopian Watershed. Photo: GIZ

Source: Government of Ethiopia Watershed Project financed by the World Bank.

and small businesses that are poorly served by either conventional credit markets or microfinance institutions. Developing new mechanisms to finance profitable and low-risk investments in improved management practices is one of the challenges for large-scale landscape restoration; it will require a strategic combination of public, private, and philanthropic sources.

Areas with Restoration Opportunities

A recent global assessment identified about 2 billion hectares that may be ripe for forest landscape restoration (Global Partnership on Forest Landscape Restoration 2011)). These opportunities are most extensive in Africa, with an estimated 115 million hectares having potential for widescale forest restoration (in low-population-density areas where natural forest regeneration could occur over large areas) and 600 million hectares having potential for restoration in forest-agriculture mosaics. These lands include extensive areas in West Africa (from Guinea east to Nigeria), the Sahelian band in Chad and Sudan, coastal East Africa, virtually all of Madagascar, and scattered areas in Central Africa. In addition, major parts of Ethiopia, Malawi, and the lands around Lake Victoria have ample opportunities for "protective restoration"—reforestation integrated within rainfed cropping systems. Although the study is global in extent, its authors explain how the methodology can be adapted for

country-level analyses to identify zones with high restoration potential at the national and subnational level, so that appropriate investments and policies can be designed to support such restoration.

This analysis focuses on areas in which deforestation and degradation have already taken place and, therefore, where the biological and economic output of landscapes may be well below their potential. Investors can reap benefits by restoring the productive potential of such landscapes, with positive feedback in food production, ecosystem health, and profitability. Identifying a complementary set of investment opportunities—area where degradation is actively in process but where investment could reverse the process and halt its negative feedback loops—would be an important focus for subsequent spatial analysis.

Identifying priority areas for landscape restoration will generally require overlaying and analyzing multiple sets of biophysical, socioeconomic, infrastructure, and market data in light of the specific objectives and intended beneficiaries of any prospective restoration investment. Developing such a map for all of Africa is neither feasible nor appropriate, given that restoration objectives will differ widely depending on the investment location, proponents, and intended beneficiaries. However, a rich array of spatially explicit data is available to help prospective investors, government officials, and others target investments for maximum public and private benefit. The following types of biophysical datasets are likely to be helpful for targeting investments in landscape restoration (see annex I):

- Data on the physical potential of rural landscapes, including soil type and capacity; climate and rainfall averages, variability, and trends; and water infiltration, net evapotranspiration, or water yield.
- Data on existing land and landscape management practices, including soil and land use maps, maps of cropping or livestock systems, and maps of forest or tree cover density.
- Maps that project future biophysical conditions, particularly with respect to the anticipated effects of climate change on temperature, water availability, and yield potential.
- Maps on the relative condition of land units and their ability to be productive from both a biological and an economic standpoint. Land degradation maps, for instance, may be helpful for identifying areas that are underperforming and may therefore be good candidates for landscape restoration.
- Composite maps based on custom integrative analyses that combine several of the above sets of factors to answer specific questions, such as where carbon can be most cost-effectively sequestered in vegetation and soils, where biodiversity is threatened by agricultural intensification, and where upstream watersheds are most vulnerable to degradation that threatens urban water supplies.

2.4 POTENTIAL MARKET DRIVERS FOR LANDSCAPE RESTORATION

Private investment in forest and agricultural production and marketing can be a driver of landscape restoration, but only if it is planned thoughtfully with respect to the landscape context, with appropriate stakeholders involved, and knowledge of spatial features of production and markets. Agricultural investments are typically targeted to the development of individual products chosen solely on the basis of growing conditions in a particular agro-ecosystem (water, climate, topography, biodiversity, soil type); institutional conditions (e.g., land tenure, extension systems, government stability), and market infrastructure (e.g., transport, communications, processing facilities). Less

thought is generally given to the landscape implications of production processes or the systematic development of supply chains for ecologically compatible products. Taking a spatial or ecological approach to market development planning can create long-term win-win-win opportunities for business profits, rural livelihoods, and ecological restoration.

This section highlights key spatial considerations and opportunities for investors and planners of these production processes and supply chains to help shape and link to markets that can drive restoration efforts; it also introduces strategies for the public sector to encourage private investment to integrate ecological factors into its decisions.

Spatial Considerations for Market Development in Rural Landscapes

Market development follows spatial patterns related to ecological conditions of production, the distribution of market infrastructure, and the economic incentives of industry clusters. Private investors and public land managers need to consider these factors in developing viable long-term strategies for landscape restoration.

Ecological characteristics of production systems

Areas of significant agricultural and production forestry potential in Africa often correspond to those of highest ecological significance: the biodiversity hotspots and critical watersheds. Specific forest/agriculture products vary in their resource and spatial needs, in the extent of environmental degradation and pollution driven by their production, and in their compatibility with and contribution to biodiversity and ecosystem services. For example, while the cut flower industry in Naivasha, Kenya, requires very little growing space per unit of production, the industry is implicated in significant ecological damage to Lake Naivasha through high water use and agrochemical runoff (Walton 2010). In contrast, shaded cocoa fields can support a high number of wild plant and animal species.

These ecological trade-offs can be mitigated, and synergies captured, by carefully selecting products, growing sites, and production practices. Synergies between production and conservation at the landscape scale can be realized by explicitly designing investments to achieve integrated outcomes. Special attention is needed to identify market opportunities for products from ecologically critical niches in the landscape (e.g., wetlands) or other flows of finance to cover costs of sustainable management. In some cases, investing in degraded lands can be more profitable than in other areas, because the lower initial cost of purchasing or leasing degraded lands more than offsets the cost of ecological restoration.

Effects of market infrastructure

The spatial pattern of transport and related market infrastructure is a critical determinant of market-driven opportunities for landscape restoration. For 40 percent of Africa, transportation systems are insufficient for bulky products to be moved beyond local markets (Roberts, Shyam, and Cordula 2006). This means that restoration of landscapes in these regions must rely on economic incentives provided by subsistence-use values and local markets for tree/forest/wetland products or sustainably produced crops (as in the case of southern Niger) or external investment resources from national governments, international donors, or payments for ecosystem services.

Meanwhile, national and international agricultural and forest production and processing investments are concentrated around cities and existing transport infrastructure. Urbanization, the rise of the

supermarket in Africa, and growing international demand are leading buyers to prefer suppliers who can provide large, regular quantities of products of consistent quality, and to concentrate sources of supply to lower transport and transaction costs (Weatherspoon and Reardon 2003). As land values rise in these areas, economic pressure increases to convert natural areas to production, industry, or human settlements and their associated infrastructure, and to divert water and other resources to these economically important hubs.

Some types of capital-intensive agro-industrial investments drawing on relatively low-value but bulky raw materials—such as pulp mills and sugar mills—are associated with strong geographic concentration of land use, as economics strongly favor procurement within a limited radius around the plant. The need for high-cost refrigeration and incentives to shorten supply chains means that intensive dairy production tends to concentrate very near urban demand centers all over Africa.

Investment in transport and market infrastructure in Africa is accelerating and often has real benefits for rural communities. This infrastructure can be a curse or a blessing from an ecological perspective. On one hand, transportation access can make previously inaccessible forest lands, woodlands, and wetlands available for land clearing and agricultural development, as in the Congo Basin (Wilkie et al. 2000). However, the opposite effect is also possible. A reduction in transportation or other marketing costs may create incentives to transition away from systems in which degradation is being driven by continuous production of annual staple crops on small plots with little input or investment, to higher value, more ecologically friendly conservation farming practices and to perennial products that can be shipped to market. Producers may also decide to improve the quality and management of products that previously could not meet the standards of international markets. This could drive investment and improved management that may have ecological co-benefits. However, roads and production facilities servicing resource-intensive or polluting tree and agricultural products need to steer clear of the most ecologically sensitive areas.

Investment clusters

Further spatial concentration of agricultural and forest market activity is fostered by the development of "clusters" that thrive on the concentration of knowledge in a particular subsector. The presence of complementary economic activity creates externalities that enhance incentives and reduce barriers for new business creation, the clustering of trained workers, managerial expertise in a particular product, and ancillary services. International studies find that industries located in regions with strong clusters (i.e., a large presence of related industries) experience higher growth in new business formation, start-up employment, expansion of existing firms, and start-up firm survival (Delgado, Porter, and Stern 2010). Agricultural industry clusters have been documented in Africa (Juma 2010), and intentional creation of clusters has been promoted by donors and facilitated by government support.

Opportunities for Market Growth that Restores Landscapes

To achieve desired ecosystem functions across a large landscape may require modifying land management in many different niches: in cropfields, pastures, wetlands, riparian areas, forested areas, and protective strips around infrastructure. Market demand for products from each of these niches needs to incentivize land use and management choices that produce ecosystem services (Oberthur et al. 2009). If not, other policies—such as government land management, regulation, and subsidies—will be required.

Developing agricultural and forest product supply chains in ways that benefit landscape restoration may, in some cases, require short-term trade-offs between ecological and economic goals. However, a spatial lens can often identify market opportunities in different niches of the landscape that will produce immediate business or livelihood gains. The following sections describe four profitable market opportunities: (1) creating synergies by replacing farming/forest systems that degrade resources with commercial products whose production systems generate ecosystem co-benefits; (2) managing the spatial interface between land uses; (3) eco-certification and eco-standards that shift enhanced ecosystem services from existing production systems; and (4) payments to farmers and land managers for ecosystem services.

Synergies between production and restoration

The greatest opportunity, in terms of scale, occurs when market incentives stimulate the transition of land management from crops whose conventional production practices are associated with degradation to crops, grasses, or trees that can be profitably produced with much less intensive soil cultivation, lower application of agrochemicals, or less supplemental water. Land management can also provide much better protection of soils from erosion, more compatible habitat conditions for wildlife, and natural vegetative barriers to water flow without sacrificing profit. The introduction of conservation farming and other agro-ecological techniques (Milder, Majanen and Scherr 2011) and the introduction of tree crops, agroforestry intercrops, or forest plots into farming systems can often achieve these benefits while at the same time reducing cash costs for inputs. Microdosing with inorganic fertilization can help jump-start restoration of cropped areas economically and with a relatively small environmental impact. Commercial tree crop production systems can benefit landscape restoration if they avoid or are efficient in their use of agrochemical input, use good erosion control and water and soil management, and incorporate native perennial vegetation in and around plantations (Clay 2004). Transition to more intensively managed rotational livestock grazing practices from conventional extensive grazing can greatly improve profitability while enhancing soil structure and fertility, storing more carbon, improving water-holding capacity, and providing wildlife habitat (Buck et al. 2007, Leakey 2007, Neely and Hatfield 2007). Good examples of this transition can be found in Zambia, Niger, and Embu District in Kenya (see box 2.4).

Managing the spatial interface of land uses

The economic and ecological interface between trees/forests and crops in associated land uses can be predominantly competitive or synergistic, depending on species growth characteristics. The science of agroforestry and of landscape ecology and management can help pinpoint where such interactions are likely to be positive and can help in designing integrated land uses systems that limit negative interactions at the interface and optimize positive ones to produce net positive economic returns among trees, forests, and other land uses (Scherr and McNeely 2008. The relationships must be considered at multiple scales. At the field/farm scale, agricultural crops and livestock can be integrated with trees in agroforestry systems or segregated in fields of crops or trees/forests. Intercropping, a commonly used agroforestry practice, can supply markets for secondary products, thus providing an incentive for smallholder farmers to invest in trees and forests. Faidherbia albida, for example, is a multipurpose tree widely distributed in semi-arid Africa, notably in agroforestry parklands, and commonly intercropped with sorghum and millet crops with beneficial effects on crop growth and grain yields (Kho et al. 2008, Suresh and Rao 1999). In higher rainfall areas as well as semi-arid regions, the adaptable Grevillea robusta is successfully intercropped with maize, cowpeas, and other crops, including coffee (Ong et al. 2000). At the community scale, other uses—such as

nonfarmed areas in infrastructure, fields surrounding schools or industry, and community parks—provide niches where trees and forest fragments can be grown. At larger landscape scales, the interfaces commonly produce a mosaic of patches and corridors that include an array of land uses and features.

BOX 2.4. EMBU, KENYA: AGROFORESTRY AND GROWING MARKETS FOR TREE PRODUCTS

The growth in local and national urban markets for tree products has been the driver of landscape restoration in Embu District in the central Kenyan highlands. A long-settled farming region, Embu District was substantially deforested by the mid-20th century, with land use dominated by annual crops and a tradition of farm agroforestry practice. Market conditions changed sharply with the development of commercial coffee, expanding markets in the nearby capital of Nairobi, and local population growth. Demand for tree products grew quickly, especially for building poles, farm-grown tree fodder for the burgeoning smallholder dairy industry, tree fruits for local consumption, and other products. Improved agroforestry species and technologies were introduced in the 1990s and 2000s that increased the productivity of trees that grew compatibly with crops. As higher value trees were grown, Embu began to import lower value products such as fuelwood from places like Mbeere. Over the past 25 years, the landscape has been transformed to a high level of tree density, although little natural forest cover. This change has been associated with significant increases in crop productivity and whole farm income.

Public agencies, NGOs, and national and international research centers have contributed to the improved agroforestry systems in Embu. But most of the investment has been undertaken by farmers and private companies involved in developing the supply chains and inputs for on-farm tree growing and marketing. Important examples were tea and coffee factories, and the Kenya Cooperative Creameries (KCC) and other milk producers.

Densely Planted Tree Cover in Smallholder Farmlands in the Central Highlands of Kenya

Source: EcoAgriculture Partners.

Although harvest of products from protected areas may be restricted, the landscapes surrounding these areas can be highly conducive to sustainable agriculture and forest investment. Managers of protected areas aim to develop livelihood alternatives for populations near these areas to reduce pressure on native forest. In areas near human settlements where modern systems of energy infrastructure are not well developed, urban and peri-urban forestry can play a critical role in energy supply and livelihood security. Interactions with other settlement areas may not be so positive, particularly in growth regions where land is rapidly being cleared for agriculture, either because of new commercial opportunities in the sector or because alternative livelihood sources are not developing.

Eco-certification and eco-standards

Private producers, businesses, and investors respond positively when the market itself rewards them for products grown in an ecologically compatible way. Market demand for eco-certified agricultural products is growing rapidly, particularly in Europe and North America. Globally, these markets totalled approximately $56 billion in 2010 and are estimated to reach $261 billion by 2020 (EcoAgriculture Partners 2010). Forest products certified by the Forest Stewardship Council (FSC) totalled $30 billion globally in 2010 and are projected to reach $228 billion 2020 (Ecosystem Marketplace forthcoming).

These trends have the potential to drive transitions to more ecologically friendly practices among producers in Africa who have access to international markets. In 2009, Africa had 1.0 Mha of certified organic agricultural land and 16.4 Mha of other areas (wild collection, beekeeping, aquaculture, forests and pastures) engaged in organic production (FiBL and IFOAM 2011). FSC works in 12 countries in Africa, with a total of 7.6 Mha certified (FSC 2011). Projections are for significant growth in a variety of products, including tea, coffee, cocoa, and palm oil (Forest Trends and Ecosystem Marketplace 2008, Unilever 2010). The focus of these certification systems has been on ecological and social benefits at the farm level. Another area of rapid growth is the establishment by multinational food companies of internal eco-standards and climate standards for their suppliers. As illustrated in the Kericho case (box 2. 5), there is scope for eco-certification and eco-standards to drive landscape-scale restoration, and certifiers are beginning to experiment with ways to measure the effects of these schemes at landscape scale (EcoAgriculture Partners forthcoming).

Payment for ecosystem services

Payment for environmental services (PES) is another new business opportunity for African land managers, companies, and investors. PES sidesteps the need for physical market infrastructure, but it requires the capacity to measure and monitor an ecosystem service created from a land management intervention and to manage the transactions among buyers, sellers, and other actors in the value chain. PES is represented in the Kagera landscape in Tanzania (box 1). So far, the most significant developments for PES systems in Africa have been for terrestrial carbon sequestration and emission reduction, and watershed protection.

Huge potential exists in Africa for terrestrial carbon mitigation. A large portion of the mitigation would be from avoided deforestation. In addition, carbon sequestration potential is estimated at 265 million tons of CO_2-equivalent, with about a quarter coming from improved crop management, a quarter from improved grazing land management, a quarter from organic soil restoration, 12 percent from degraded land restoration, and 14 percent from other sources (Pender 2009).

Land-based carbon projects—primarily in forests up until now—can sell carbon emission offset credits to a wide range of buyers throughout the world, because these credits are fungible. As far as

BOX 2.5. WESTERN KENYA TEA LANDSCAPES: ECO-CERTIFICATION AND FOREST RESTORATION

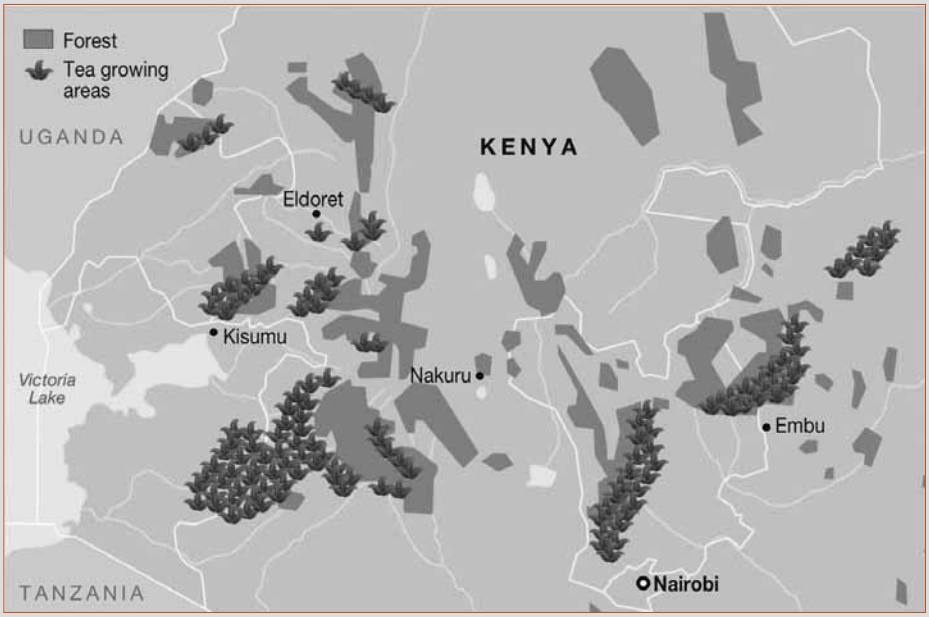
Kenya is the world's third largest producer of tea (TCC 2010) and the number one exporter of black tea. Tea plantations cover hundreds of thousands of hectares and employ about 3 million people (FAOSTAT), with concentrations in the highland areas of western and central Kenya (see figure below); about 60 percent of tea is grown by small farmers. Conventional tea production has posed significant threats to ecosystem services in Kenya because of conversion of forest lands to tea and the associated biodiversity loss, soil erosion on steep slopes, water pollution from agrochemicals, and overexploitation of woodfuel for tea drying. An initiative in Kericho, in western Kenya, aims to restore ecosystem functions of large tea landscapes; it is led by private sector companies with some support from civil society.

The tea landscape of Kericho includes smallholder agroforestry, production of commercial tree products, forest patches with native species, riparian vegetation, and wetlands. Of the land leased to Unilever, 11 percent is natural forest cover (Unilever Tea Kenya 2005). Kericho's tea plantations are close to the Mau forest complex, an important area for biodiversity, and Unilever has supported some activities there (seedling donations, support to Friends of the Mau Watershed). Smallholder farmers are participating in activities on over 13,000 hectares. Unilever has been working in Kericho since 1999; as the world's largest purchaser of black tea (buying around 12 percent of the world's supply annually), the company—and the standards it chooses to adopt for its tea production—can have significant effects on ecosystems and local economies.

Recently, Unilever brought in the Rainforest Alliance (RA) to promote sustainable tea production. RA helps tea farms and processing facilities achieve a set of social and environmental benchmarks necessary to receive RA certification. This certification, in turn, can increase the marketability and profitability of tea for farmers and processors alike. Of Unilever's tea purchases, 25 percent came from sustainable sources in 2011. The company is committed to achieving 100 percent certification of its major tea brands by 2015 (Unilever 2010). Certification requires sustainable production practices in tea fields, sustainable fuel sources, protection/extension of natural areas, and riparian forest protection and planting.

Growing trees in tea plantations in Kericho, Kenya

(continued)



Forest and Tea-Growing Areas in Western Kenya

Source: UNEP/GRID-Arendal 2009.

Large areas of eco-certified tea plantations would contribute significantly to achieving goals of landscape, watershed, and ecosystem conservation; many practices also reduce greenhouse gas emissions and sequester carbon, thus mitigating climate change. Public sector agencies are undertaking programs of protected area management and watershed protection within and adjacent to these landscapes. According to the Kericho District Plan (National Coordination Agency for Population and Development 2005), environmental goals include reducing the use of wood and fuel, and increasing afforestation. Activities will include the establishment of tree nurseries, education on how to save energy, and mobilizing communities to plant trees. The activities will be led by public sector agencies such as the Ministry of Agriculture and local authorities. Restoration activities are supported by the Kenya Forest Bill, which requires riparian forest to 50 meters from the edge of rivers and recognizes the importance of community participation in natural resource management. Private tea grower and public efforts are not yet well coordinated, but opportunities for synergy seem significant.

Source: Rainforest Alliance.

the atmosphere is concerned, the emission of a carbon atom reduced from a power plant in China is equivalent to one sequestered by a tree in Uganda. Land use carbon offsets have not yet been accepted in regulated greenhouse gas offset markets, but the voluntary market is growing, as is the market for agricultural carbon offsets (Shames and Scherr 2010). The challenge for land-based carbon projects in Africa is that to provide the scale of offset credits required to meet the demands of international buyers, sequestration must be done on a fairly large scale. The minimum estimated

size of an agricultural carbon project (to cover monitoring and other transaction costs) is estimated to be about 200,000 hectares, which would sequester roughly 50,000 tons of CO_2 per year (Forest Trends 2010). This need for aggregation is prompting new interest in landscape approaches that can encompass diverse land uses at scale. These projects are institutionally complex and require the engagement of stakeholders across sectors throughout the landscape (Shames and Scherr 2010). Diverse business models are developing that can be linked to agricultural product supply chains, agricultural and watershed development programs, and microfinance operations.

Payments for watershed services are also expanding in Africa, although there are currently only a handful of functioning projects (Ferraro 2009). From a market perspective, the primary difference between water and carbon is that watershed service buyers are locally based. The downstream buyers must see a direct benefit from changed land management practices upstream. The buyers tend to be municipalities or beverage bottling plants.

Payments to farmers for biodiversity are less developed in Africa, as they face financial barriers, political instability, and disagreements about how the payments should be structured (Madsen, Carroll, and Moore Brands 2010). Currently, most buyers are governments, NGOs, and philanthropic funds. But private financial flows could potentially dwarf these over the long term, in particular through biodiversity offsets in which commercial agriculture, infrastructure, urbanization, and industrial investments offset unavoidable damage to biodiversity by paying farmers, forest communities, or other land managers to protect or restore wild fauna and flora habitat and populations. As with carbon, these schemes usually require landscape-scale, multistakeholder negotiation processes to succeed.

2.5 OTHER FACTORS THAT AFFECT OPPORTUNITIES FOR LANDSCAPE RESTORATION

In addition to biophysical and market factors, other important spatial factors influence motivations and feasibility for private and public investment in landscape restoration. This section focuses on patterns of land and resource tenure, spatial patterns of international investment and land acquisition, quality of governance, and zones of conflict. An extended analysis would also take into account the spatial variations in population density, water availability, poverty, income and income growth, and agricultural productivity potential.

Land and Forest Tenure

Successful landscape restoration requires respect for pre-existing conventions of land and resource ownership; sensitivity to issues of access and equity as investments change the economic value of land, tree, and forest resources; and awareness of the risks that uncertain or contentious tenure regimes may pose to investors. Planning for successful restoration interventions will benefit from examining spatial patterns of tenure systems, including land under titling; secure private ownership without titling; community (common property) title, including customary security rights; national government ownership; and disputed ownership.

While these distinctions provide a useful starting point, they do not in themselves reveal the degree of risk to investors that stems from insecure or disputed property rights. The unusually mixed evidence for the tenure-investment relationship makes Africa stand out from the rest of the world.

Fenske (2011) points out that while the link between land tenure and agricultural investment is strong, 20 years of empirical studies have failed to show its robustness in Africa. His analysis of land tenure and agricultural investment in West Africa found a significant link between tenure and investment for fallow and tree planting but a less robust relationship between tenure and labor use, chemical fertilizer, and other inputs. The importance of use in securing land rights in the region explains the strong link between tenure and fallow investment: Land left fallow may be lost. Because tree planting commonly enhances rights, the activity may sometimes be more prevalent on insecurely held lands, while elsewhere there are strong social norms against making such land claims. In general, greater rights can bolster incentives to plant trees.

In parts of Africa, the forestry sector has developed independently of land tenure policies for agriculture and pastoralism. The omission of community forestry principles is an obstacle to effective management of land. These laws give rights to local communities for forest use and management. Ownership transfer from the state to an interested community extends land and tree tenure on the basis of customary rights and aims to motivate people living near forests to protect and ensure sustainable management as a permanent source of income and livelihood, thereby dramatically reducing the risk of tenure insecurity. While most African countries have decentralized their forest governance systems within the past two decades, policy reform in the forest sector has taken many different forms—from partial devolution of management responsibility to more profound devolution of ownership to communities—and the distribution of benefits has varied (German, Karsenty, and Tiani 2009). Table 2.1 provides a snapshot of forest land ownership in 18 African countries, demonstrating that while the area in public and private community use and ownership increased between 2002 and 2008 in most countries, it remains a small proportion relative to forest land administered by government entities.

Nevertheless, government acknowledgment of customary rights, involving local institutions in decentralization processes, and involving local people in management improve protection of investment in forest management and development while fostering a more equitable distribution of benefits (Barrow et al. 2009). The value of securing private rights is illustrated in the Niger example in box 6. A spatial analysis of which countries have forest reform laws, overlaid with other dimensions of tenure security, would provide a useful tool for predicting where forest tenure would be conducive to stable and rewarding investment.

TABLE 2.1. CHANGES IN FOREST TENURE IN AFRICA, 2002–2008

COUNTRY	PUBLIC				PRIVATE			
(by descending area of forest cover as identified by FAO 2006a) Areas in millions of hectares (Mha)	Government-administered		Reserved for communities and indigenous groups		Owned by communities and indigenous groups		Owned by individuals and firms	
	2002	2008	2002	2008	2002	2008	2002	2008
Angola	59.73	59.10	0	0	0	0	0	0
Burkina Faso	6.69	6.35	0.23	0.39	0	0		0.05
Cameroon	22.80	20.11	0	1.14	0	0	0	0
CAR	22.90	22.76	0	0	0	0	0	0
Chad	12.32	11.22	0	0.70	0	0	0	0
Congo	22.06	22.01	0	0.46	0	0	0	0

COUNTRY	PUBLIC				PRIVATE			
(by descending area of forest cover as identified by FAO 2006a) Areas in millions of hectares (Mha)	Government-administered		Reserved for communities and indigenous groups		Owned by communities and indigenous groups		Owned by individuals and firms	
	2002	2008	2002	2008	2002	2008	2002	2008
Côte d'Ivoire	10.33	10.31	0	0	0	0	0	0.12
DRC	109.20	133.61	0	0	0	0	0	0
Gabon	21.00	21.76	0	0	0	0	0	0
Gambia		0.41		0.02	0.02	0.03	0	0
Mali		15.90		0.71		0		0
Niger	4.74	4.13	0.63	0.87	0	0	0	0.01
Nigeria	13.14	11.09	0	0	0	0	0	0
Senegal		12.77		0.99		0		0.06
Sudan	40.60	64.68	0.80	2.82	0	0	0	0.05
Suriname	14.70	14.70	0.51	0.51	0	0	0.03	0.03
Tanzania	38.50	31.79	0.40	1.58	0	2.05	0	0.06
Zambia	44.68	42.44	0	0.10	0	0	0	0
TOTAL	481.35	505.14	2.46	9.57	.02	2.08	.03	16.24

Source: Adapted from Sunderlin, Hatcher, and Liddle 2008.

BOX 2.6. SOUTHERN SAVANNAS, NIGER: FARMER-MANAGED NATURAL REGENERATION AND SOIL AND WATER CONSERVATION

The southern savannas of Niger were long considered to be a hot spot of dryland degradation. Farmer-managed natural regeneration (FMNR) and soil and water conservation have led to what has been called a "regreening" in Niger (WRI 2008). FMNR involves simple, low-cost techniques for native tree and shrub management to produce continuous harvests of trees for fuel, building materials, food, medicine, and fodder. In Niger, farmers incorporated the approach into agricultural landscapes; it is estimated that 5 million hectares and 4.5 million people are affected. Restoration has been especially strong in the Maradi and Zinder regions: FMNR has been adopted almost universally by farmers in Zinder, and even Maradi's smallest district has 4 million regenerated trees.

Benefits to ecosystems and people have been significant: 200 million trees are protected and managed, amounting to a 10- to 20-fold increase over 30 years (1975–2005). The associated reduced erosion, increased soil fertility, and better water availability have supported higher yields; for example, sorghum yields have improved by 20–85 percent and millet yields by 15–50 percent in participating areas. With improved yields, people eat better and have more food security in drought years, and families and communities have been able to diversify their livelihoods. Not only are fuelwood and fodder more readily available, but households are able to sell surplus products in the local market. For example, regeneration on a 1 ha field can earn the farmer an additional $140 per year from selling firewood, which is half the

(continued)

average annual income of a farming household. In Zinder, each baobab tree can bring in $20 a year from the sale of its edible leaves. Large-scale revegetation with native trees has benefited watershed functions and wild biodiversity.

The most important catalyst for restoration was the regulatory revision under the Niger Rural Code. The previous code disincentivized sustainable management of trees because they were federally owned. Local action catalyzed by an NGO modified the application of the law; this modification spread and eventually resulted in a new rural code that transferred tree ownership to farmers. Signed in 1993 and fully implemented in 2004, it provided the needed confidence for farmers to invest in tree management without fear of breaking the law. The past two decades have been a period of innovation in FMNR, supported by international donors and NGOs. The World Bank, IFAD, and the U.S., French, German, and Dutch governments have provided assistance in research and dissemination. NGOs (e.g., CARE and Serving In Mission) have played the role of intermediaries and promoters in the field. Farmers have shown that FMNR can be implemented at little cost and can yield significant benefits. Landscape restoration benefited from cooperation among government agencies, NGOs, and donors. With most trees regenerated, there was little need for tree nursery stock, and little role for markets.

International Investment and Land Acquisition

Rising prices for commodities of all types, especially food and bioenergy, has stimulated both external and internal investment in African agriculture and agricultural land. International private investment in agriculture, trees, and forestry over the past decade has been most attracted to areas with significant underutilized cropland that has potential for improved productivity through intensification of land management; for example, in Sudan, the DRC, Angola, Zambia, Mozambique, the Central African Republic, and Tanzania (Roxburgh et al. 2010).

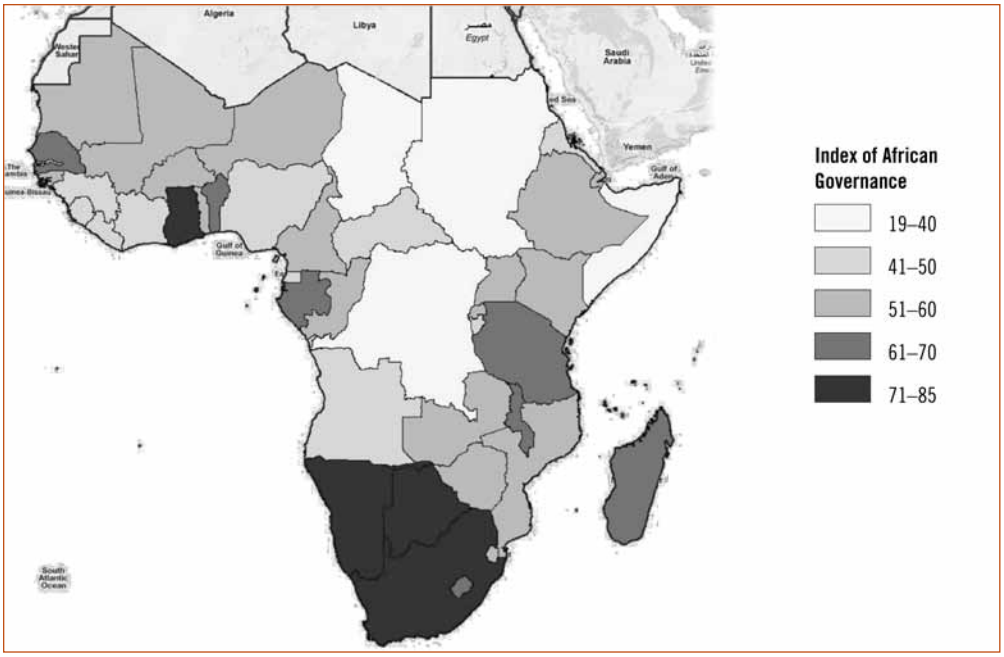
A rapidly growing form of investment has been through direct land acquisition (often referred to by critics as "land grabs"), which occur in the majority of Africa countries, on tens of millions of hectares. While the practice offers potential for raising the value of rural resources by guaranteeing market outlets, employment, investment in infrastructure, and increases in agricultural productivity, some question whether it is more than an extended outlet for industrialized food and biofuel production systems with, in many instances, minimal consideration paid to fairness and equity issues for the populations and environment where the acquisitions are occurring. A study by the International Institute for Environment and Development (IIED) on behalf of IFAD and FAO (Cotula et al. 2009) suggests that acquisitions in Africa—if they are not made properly—are increasing the risk that poor people will be evicted or lose access to land, water, and other resources. The process often involves speculators who acquire land at extremely low rates, hold it for a period, and then sell it off at a higher rate. The study revealed that investor interest is focused on countries with weak land governance and that investors often fail to follow through with their plans, in some cases after inflicting serious damage on the local resource base. Land acquisition directed at "underused" lands, such as protected areas and communal rangelands, can undermine ecosystem services in landscapes by devegetating ecologically sensitive areas or undermining fallow systems essential to sustainable agriculture.

To avoid participating in this scenario and being associated with it, scrupulous investors can follow good governance practices that make their transactions transparent to all concerned stakeholders (Blas 2010). Multistakeholder landscape planning and management processes can provide the forum needed to add transparency and legitimacy to land investment processes. Regionally, a need exists for recognized investment standards to prevent competition among countries for international investment from leading to greatly weakened protections for rural landholders and resource users.

Governance

The quality of local and national governance is an important factor motivating and enabling farm, community, and private sector investment; investment requires a reliable, enabling policy environment; responsible regulation with little corruption; and reliable mechanisms to resolve conflicts with other stakeholders. Good governance also enables effective public investment in agriculture, forestry, and natural resource management. Governance quality varies considerably among countries, as illustrated in figure 2.2.

FIGURE 2.2. INDEX OF AFRICAN GOVERNANCE (SAFETY AND SECURITY, PARTICIPATION AND HUMAN RIGHTS, SUSTAINABLE ECONOMIC OPPORTUNITY, AND HUMAN DEVELOPMENT)



Source: Rotberg and Gisselquist 2009.

Zones of Conflict

Armed conflict and war that renders significant land areas dangerous or unoccupied puts a significant damper on investment in agriculture, agroforestry, and forest economic activity. FAO (2005) lists 11 countries in Africa that have experienced armed conflict in forested areas during the preceding 20 years, and many these conflicts persist. In characterizing these regions, the study highlights their remoteness and inaccessibility, the high value of timber and other natural resources that insurgents can exploit or tax, the marginalized indigenous and tribal groups with low earning power who often live there, and their poor integration into national political processes and governance systems—a

combination of conditions likely to contribute to conflict and war. The report identifies African countries where forests have enabled war by providing refuge, funds, and food for combatants. Tracking such regions will steer investors away from high-risk environments.

It is worth noting that areas abandoned because of armed conflict may be good places for forest regeneration and tree growth because of the limited human pressures to clear land for agriculture or to harvest trees and tree products. Thus, while conflict and war create a high-risk investment environment, if the pattern of inactivity has been stable and is likely to persist, forest products could be resourced from these areas.

Postconflict situations commonly pose acute dangers for natural resources but, depending on the integrity of efforts to mend the governance systems that stimulated or enabled the conflict to occur, investment in agriculture and forest rehabilitation can be an engine for economic recovery. In addition, thoughtfully designed development activity can foster cooperation among formerly warring parties. It might be feasible in such contexts to infuse landscape investment with the often substantial public resources targeted for peace making.

2.6 NEGOTIATING, PLANNING, AND COORDINATING LANDSCAPE-SCALE RESTORATION

Investments in rural landscapes in Africa by landholders, private businesses, public agencies, and civil society are independently organized and governed, and that independence is a source of economic and social dynamism. But restoring ecologically degraded landscapes at the scale necessary to support long-term sustainable development requires some level of multistakeholder collaborative engagement to negotiate trade-offs and conflicts, and to identify and realize synergies. Multistakeholder landscape forums might be spearheaded or facilitated in some cases by government entities; elsewhere, by civil society or private companies. But all groups must be part of strategic discussions about public investment decisions and standards. This section describes the institutional and governance challenges of finding convergence between private sector investment and landscape restoration, and some of the mechanisms that are emerging to address these challenges.

Institutional Mechanisms for Collaborative Planning and Management of Complex Landscapes

Lessons for multisector collaborative planning and management of complex landscapes can be drawn from international experience (Buck et al. 2006, Landscape Measures Resource Center 2011, Milder et al. 2011). For such structured processes for planning, decision making, and action to be effective, a shared understanding is required among stakeholders of a landscape's physical features and socioeconomic characteristics, and the opportunities and constraints for investment. The diverse actors in the landscape need to understand how different configurations and locations for land use and management practices will affect the ecological functioning of the landscape and the livelihoods of different stakeholder groups. The forum should facilitate systematic negotiation over how land is to be used in the landscape as a whole and determine when agreement is needed (and when it is not) among rights-holders, government ministry development plans, and private business investments. Sectoral policies and programs need to be harmonized through coordinated planning or integrated implementation. If action requires collaboration among sectors, efficient modalities

need to be developed. Progress in landscape action and effects need to be tracked and assessed by the key actors, so that lessons learned can be reflected in evolving action plans. This process can benefit businesses and investors, as it establishes clarity about what sorts of investments and practices will be acceptable where, establishes policies and land use plans, and thus allows investors to proceed with confidence.

Diverse institutional mechanisms have been used in Africa for area-based planning across agriculture-forestry-environment-rural development sectors. These mechanisms range from national platforms for sustainable land management to roundtables for sustainable commodity production to watershed management and district development committees. Agricultural carbon programs and new initiatives for climate adaptation, resilience, and mitigation planning—such as those of NAMA, NAPA, and REDD+—are providing motivation for cross-sector planning and policy alignment.

Landscape forums can be influential in scaling up successful investments in landscape restoration by drawing in a broader set of businesses and land managers. They can promote new ideas and models, provide vision and leadership, engage external catalysts, and provide incentives and accountability. The groups can jointly find the "space" for such successes to grow, not only physically in the landscape but also through fiscal policy and finance, supportive policy, institutional capacity, political leadership, cultural adaptation, partnerships, and learning and innovation systems (Linn et al. 2010).

Engagement of Private Sector Investors and Businesses in Landscape Restoration Planning

While the broad process for multistakeholder landscape forums is fairly clear, and elements of the approach are widely practiced in one form or another, implementation is challenging. In particular, it is common for private companies and investors to resist active participation in such forums. Firms are reluctant to share proprietary information, and senior executives with decision-making authority cannot financially afford to participate in time-consuming collaborative processes. Farmer and community organization representatives also face challenges in effective participation, because of the costs of time away from work and the power and knowledge imbalances that limit their ability to represent and negotiate interests effectively. Thus, public sector and civil society often dominate such forums, weakening their effectiveness.

However, institutional mechanisms to address these challenges are emerging. Private businesses have come to recognize the benefits of precompetitive collaboration among actors across the supply chain. In a number of places in Africa, such efforts have helped develop dynamic market hubs, through provision of basic market infrastructure, streamlined regulatory frameworks, and complementary public sector investments that can create financial value and growth opportunities, enhancing the overall business environment. Meanwhile, modern firms are beginning to explore and write new rules about information sharing that can energize these processes. Companies whose activities have a large "footprint" on local ecosystems are consulting more widely before making decisions on siting and procurement. Some are playing a visible public role in promoting public-private partnerships for sustainable development, participating in multistakeholder visioning processes, and offering their expertise and collaboration in addressing challenges of landscape conservation and restoration, particularly around watershed management. The six cases described in this report illustrate the diverse roles that have been played by private actors—both land managers and companies—and by institutional mechanisms for collaboration.

In various parts of Africa, public-private partnerships are developing agro-industrial growth corridors through multistakeholder forums. These forums could involve ecosystem management agencies, NGOs, and rural community organizations to help private businesses develop their own green strategies and complement their investments in the landscape. An example is the Southern Agricultural Growth Corridor of Tanzania (SAGCOT), a public-private partnership designed to increase agricultural productivity and market infrastructure that is in the early stages of implementation. SAGCOT is exploring how it might benefit from landscapewide analysis and planning to enhance the sustainability of its investments and benefit farming communities outside the investment clusters near high-potential agricultural land (SAGCOT 2010a and b).

Strategic investment by the public sector in rural landscapes can guide and support private investment decisions to be more sensitive to spatial/ecological considerations. Governments can continue to improve markets in traditional ways; they can provide transportation infrastructure, solidify property rights, develop trade policy, fund research, provide financial services, enforce contracts, resolve disputes, provide information to potential investors, and act as a fair referee and regulator of markets. To enhance landscape restoration, they can also include ecological considerations in infrastructure investment plans, grant property rights that incentivize production/restoration synergies and support producer groups that are interested in entering eco-certified or PES markets. Public actors can work toward establishing an investment environment that offers regulatory certainty or exempts responsible investors from burdensome regulatory oversight; ensures transparent and secure rights to land and resources; and offers transparent conflict mitigation processes with other stakeholders. They can generate more concrete information on the costs and benefits, from a business perspective, of ecosystem services and of mosaic approaches to land management.

Scaling Up Private Investment for Landscape Restoration

African markets are showing encouraging trends for investments in ecologically sustainable agricultural, agroforestry, and forest production, and in the attention paid by land managers and companies to good ecosystem management. But a big gap remains between the 400 million hectares of potential for landscape restoration and the scale of ongoing landscape investment. Business and political leaders need to champion the goal of having private investments advance both profit and public-good landscape restoration objectives; they need to design public investments and policies that will help realize the goals of green growth that will generate better short-term and long-term benefits. Policies and programs should favor "good investors."

However, biophysical, market, and social conditions vary across the continent. In some landscapes, private sector investment can be a major driver of landscape restoration; while in other landscapes, their contribution will likely be minimal and other actors must take the lead. It would be useful to scope priority landscapes in each country, to systematically evaluate the factors described above. More effort is also needed to develop spatially explicit investment screens; evaluate areas of convergence between private and public incentives; and devise effective tools for business, community and multisector collaborative planning.

3 OPPORTUNITIES AND CONSTRAINTS FOR INVESTING IN FORESTS AND TREES IN LANDSCAPES

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3.1 INTRODUCTION

Economic development in rural parts of the developing world is constrained by many factors, not least of which is the failure to encourage the emergence of a vibrant small and medium-sized enterprise (SME) sector. Activity in the forestry sector in any given landscape is dominated at the top end by very large businesses engaged in extraction of resources or using economies of scale to manage large estates, and at the other end by a vast morass of informal enterprises attempting to eke out a livelihood in unpromising conditions. The SME sector is often informal, poorly organized, and unsupported, and yet Africa in particular is a continent bursting with entrepreneurial spirit. This problem is known as the "missing middle," and it goes some way to explain why land use in Africa is so inefficient.

Many people remain in poverty, yet these same people live in proximity to potential wealth. It has been estimated that an 1.5 billion hectares of lost or degraded forest lands worldwide offer opportunities for restoration as forests, woodlots, or agroforestry (GPFLR 2011). In most cases local people who have some form of formal or informal property rights manage this land. This chapter discusses how scaling up and ensuring effective local control of forest and agroforestry enterprises holds the key to achieving landscape restoration and realizing investment opportunities at the scale required to mitigate climate change and boost food production.[2] Not only will this approach help fill in the missing middle found in so many less developed economies, it will ensure that land management is equitable and sustainable.

Investment in this sector need not be a niche activity or a low-return sector confined to NGOs and donors. Under the right conditions, investment in forest and agroforestry enterprises can yield attractive returns. In addition, this investment opportunity can satisfy social, environmental, and economic objectives in the following ways:

- Restoring forest landscapes and intensifying agriculture to meet the need for 70 percent more food by 2050, and trebling biomass energy by 2050 in ways that are socially and politically acceptable.
- Protecting ecosystem services at the local level and for global goods by mitigating and adapting to climate change.
- Creating viable local economies and off-farm employment, thus improving livelihood prospects for hundreds of millions of people.

This chapter considers the opportunities for investing in forests and trees in landscapes with a focus on how including local people in the ownership and management of SMEs is not only the right thing to do, it is the most likely precondition for satisfying sustainable investment criteria.[3] These enterprises are in an economic sector that encompasses natural forests, plantations, woodlots, agroforestry, shade crops, and the wide range of nontimber forest products and ecosystem services that landscapes with trees can provide. They could be stand-alone enterprises or one of the various types of outgrower schemes or joint ventures that produce many estate crops.

The chapter presents a typology of different types of investors and discusses how they can interact to improve the conditions for investment in locally owned enterprises engaged in the management or restoration of forests and landscapes. It discusses the main constraints to such investments and proposes an improved approach to preparing for, negotiating, and implementing successful partnerships, with specific roles and responsibilities for each stakeholder.

3.2 UNLOCKING INVESTMENT POTENTIAL

Directing Investment into Trees and Landscape Restoration

Landscapes are complex systems ecologically, economically, and socially. Within these systems, governments—which control almost three quarters of forests (White and Martin 2002)—often see them as strategic assets yet allow them to diminish. Although there has been some devolution of control over (often degraded) forests to local communities (White, Khare, and Molnar 2007), poorly managed government control has resulted in large areas of marginal land with overlapping legal title, confusing regulations, and unpromising conditions for investment. Growing populations and global economic development are increasing the pressure on land, leading some to conclude that the only solution must be large-scale investments in plantations or food estates, which has led to the so-called "land grabs." There is a growing debate about the costs and benefits of this trend. For instance, the World Bank (2009) noted that "while some small-scale agricultural enterprises (e.g., for labor-intensive crops) can raise value added on small production units, most modern agricultural enterprises must pursue scale economies to justify increased investment and a higher cost structure." But a more recent World Bank report has documented deficiencies with the large-scale approach, finding that "many investments…failed to live up to expectations and, instead of generating sustainable benefits, contributed to asset loss and left local people worse off than they would have been without the investment" (Deininger and Byerlee 2011).

It appears that a top-down approach to forest management has failed in most places to deliver either good forest management or a decent living for local people; applying a similar approach to broader landscape management is unlikely to be successful. Increasing yields for fiber, food, or fuel is a narrow objective that fails to account for the long-term ecological balance of the land (e.g., carbon, watersheds, and soil quality); the social realities; and the importance of stimulating off-farm employment to bring about structural changes in the economy. Poor people are not hungry because of a shortage of food but because they are denied access to the resources that would enable them to earn a decent livelihood so they could purchase food (Sen 1981). The solution is an alternative investment route—one that is based on a broader understanding of complex forests and landscapes, and does not involve large-scale estates or land grabs.

BOX 3.1. REDD BENEFITS TO LOCAL COMMUNITIES

Wildlife Works has been in business for 14 years; it pioneered a new business model that brings innovative market-based solutions to communities and wildlife conservation in the developing world. The company established a new entity, Wildlife Works Carbon LLC, to help local landowners monetize their forest and biodiversity assets.

The company's flagship REDD project in Rukinga, Kenya, protects over 500,000 acres of forest and brings benefits from direct carbon financing to Kenyan communities while securing a corridor between the Tsavo National Parks. Wildlife Works is actively developing a portfolio of additional REDD projects in Africa with the aims of protecting 5 million hectares of native forest, capturing 25M tonnes of CO_2 annually, creating thousands of sustainable jobs for rural Africans, and securing enduring markets for their products.

Recently the company announced an agreement with BNP Paribas Corporate and Investment Banking and its commodity derivatives business in which BNP Paribas will provide up to $50 million in finance to combat deforestation and climate change. The bank's carbon finance business and Wildlife Works will develop a portfolio of large-scale REDD carbon projects in Africa. BNP Paribas will have the option to purchase avoided emission credits created from the portfolio, with the right to purchase 1.25 million tonnes of credits over the next five years.

The project meets Climate Community and Biodiversity Alliance standards and is designed to bring substantial benefits to local communities while protecting forests and biodiversity.

Sources: http://www.wildlifeworks.com; http://www.ecosystemmarketplace.com/pages/dynamic/article.page.php?page_id=7717&section=news_articles&eod=1

Granting greater control to those who appreciate the multiple services provided by trees and forest landscapes is a way to satisfy multiple objectives for investment in trees and landscape restoration, and increases the chances of reaching an outcome with acceptable trade-offs among those services. Investors who are interested in economic, social, and environmental sustainability might wish to pursue an investment strategy built around strengthening local control. The case for local control of various forest and tree-based enterprises across the landscape can be viewed in terms of economic, social, and environmental impact.

Economic impact

In developing and developed countries, SMEs—such as those found across different landscapes—can be the engine of economic development. For example, Mayers (2006a) estimates that in many countries, 80–90 percent of forestry enterprises are SMEs, comprising over 50 percent of all forest sector employment and over $130 billion a year of gross value added globally. Unlike the vertically integrated industrial model of forest resource management that has been the dominant paradigm for so many years, small-scale industry has specific microeconomic characteristics that generate a multiplier effect in rural economies—wealth is accrued locally, resource rights are secured as enterprises develop, social capital is enhanced, and local environmental accountability is strengthened (Macqueen 2008). This translates into entrepreneurial skills, higher incomes, higher local consumption, and improved terms of trade. The Livelihoods and Forestry Programme funded

by the UK Department for International Development (DFID) in Nepal (LFP 2009) reports that the multiplier effect is approximately 10:1, but some studies calculate it to be as high as 20:1 (GEF 2009).

Social impact

Economic development that involves the active participation of local people has obvious social benefits. Specializing in small enterprises (e.g., timber processing) allows households to make a smooth transition from subsistence living to the market economy. Time gained through buying food in the market instead of hunting or gathering can be spent participating in local institutions. Surplus income is often invested in health and education, improving the welfare of the next generation through better nutrition and broader horizons for fulfilment. Communities with a mosaic of locally owned businesses tend to have more self-confidence, political influence, and autonomy.

Environmental impact

It is a common generalization that forest-dwelling people are naturally disposed to be careful stewards of the environment and that when they do collude in the degradation of forests, they do so for understandable economic reasons (the "poverty causes deforestation" argument). Conversely, when forest-dwelling people receive financial benefits from the forest, they have a strong incentive to keep the forest standing (Carter, Felber, and Schmidt 2007). This may not be entirely accurate for all people in all places (just as negative generalizations about large corporations may overlook positive examples), but widespread evidence from around the world demonstrates that private property holders, including those with communally held property rights, can and do protect public goods if the appropriate incentive structure is in place. In fact, rural communities own or administrate under license at least one quarter of forests in developing countries, and they invest $2.6 billion in conservation, exceeding state funding and all forms of international conservation expenditures combined (Scherr, White, and Kaimowitz 2004).

Macro Versus Micro Investments

It is easy to understand why investors and governments often perceive greater value in macro investments that involve few transaction costs, as long as areas of land can be found that are empty or underutilized. But perceptions that such areas exist are highly questionable in most contexts. For instance, in South Africa, large plantations have always been the preferred option for timber companies. But first land shortages and then land reform have forced companies to negotiate with multiple smallholdings through outsourcing agreements. It remains to be seen whether the reduction in scale efficiency brought about by the new approach will have a significant effect on profitability and to what extent the benefits of improving the social and economic conditions of smallholders outweigh any such costs.

What is clear from recent research is that investments in SMEs have some advantages from a sustainable investment perspective.[4] Research suggests that industrial-scale commercial forestry has, at best, avoided exacerbating poverty, but evidence is scarce that it has actually reduced poverty (Mayers 2006b). Small and medium-sized forest enterprises offer better prospects for rural development, especially when they are organized in groups or associations that have strong social and environmental aims (Macqueen 2007a).

SMEs operate in various kinds of value chains (e.g., woodfuel and charcoal, industrial roundwood, primary or secondary processed products, nontimber forest products, and service delivery) and occupy a range of upstream to downstream positions within those chains. Many SMEs are restricted to upstream positions in agricultural crops, timber, or nontimber forest product production and harvesting. In some countries (notably South Africa, but also countries such as Brazil and Indonesia), major agricultural and forest industries operate well-established outsourcing schemes that involve such SMEs (Desmond and Race 2002). In more exceptional circumstances, well-organized SMEs have taken on downstream processing and retailing activities. For example, in Mexico, the communities of Ixtlan de Juarez, Santiago Textitlan, and Pueblos Mancomunados in Oaxaca state all have forest harvesting activities, sawmills, and furniture factories; at the end of 2007, they jointly opened a furniture shop in the city of Oaxaca. In addition, the communities are investing in ecotourism projects to add value to their forest activities (Suarez and Trujillo 2008).

In general, the more advanced downstream processing activities tend to emerge only once SMEs achieve some form of collective organization and scale. Many umbrella membership organizations cover different forest industry subsectors, but the more useful forms of collective organization involve producer groups or associations that actually do business together. For example, in Papua New Guinea, 29 community producer group members supply timber to seven coastal central marketing unit members, with certification and marketing services provided by the jointly owned umbrella body FORCERT (Forest Management and Product Certification Service). Each member is an independent company, but the joint producer group structure helps them achieve scale efficiencies, add value to the raw materials, and increase their collective bargaining power (Dam 2006).

Investor and Investment Types

Investments in forests and trees in landscapes can be made in a variety of ways and by a variety of actors. They can be "soft" or "hard" investments, depending on the expectations for return on investment. For instance, investments made by donors and NGOs to improve governance or secure forest rights through tenure reform can be considered soft investments, as their expected outcomes are not measured in cash terms. On the other hand, investments in creating new forest resources, managing landscapes or forests, and building production and processing facilities and other infrastructure are hard investments, as the anticipated outcome is a tangible return on the original investment. In many cases, soft investment is required to pave the way for more commercial investment to follow.

For the purposes of this chapter, investors can be divided into three types—value investors, social investors, and conservation investors—defined by their goals, preconceptions, and expected return on investment. The three types are broadly defined as follows.

Value investors

These investors are seeking a real return on capital, and they do not expect to lose the value of their investment over the medium to long term. Some may be more aggressive in pursuing this objective than others—for instance, requiring a superior rate of return—while others will be satisfied with a better-than-cash return. On the continuum of value investors, the more aggressive seek strong economic returns while the less aggressive may seek social and broader environmental returns. A combination of these hard investments across a landscape is necessary owing to the nature of investment in forests and trees, and the trade-offs required for sustainable landscapes.

Social investors

These investors are investing as a means to an end, pursuing goals that are separate from the requirement to earn a return on their money. As soft investors, they may expect no real return or may accept risks that are not usually justified by the rates of return on offer. Typically they are promoting development in some way or acting as a pioneer investor in the hope of attracting mainstream capital. Social investors are attempting to change the circumstances of poor people through their investments, and they understand that markets often fail to deliver outcomes that are either efficient or equitable. Social investors often fall into the soft investment category, but they are increasingly seen as part of a commercial bank's social venture fund portfolio.

Conservation investors

These investors are using their capital to protect or restore a specific landscape, habitat, or species. Like social investors, they are less interested in earning a real return on their capital. They may view environmental degradation as an example of the market's failure to set appropriate prices on ecosystem services, and thus they use their capital to correct this distortion. However, in some sectors they may believe that the market has no place in the natural world. They are usually regarded as soft investors but may be less interested in paving the way for hard investment.

Examples of these types of investors and the investment models they are likely to deploy are presented in annex II.

A wide potential universe of value investors exists: equity funds, timberland investment management organizations (TIMOs), real estate investment trusts (REITs, see box 8), carbon funds, pension funds,

BOX 3.2. REAL ESTATE INVESTMENT TRUSTS

In many cases, the state grants timber concessions but does not have the capacity or inclination to oversee them properly to ensure long-term forest quality. The state thus loses both ongoing revenue and long-term asset value. Using real estate investment trusts (REITs) as an investment model could ensure sustainable forest management (SFM) and improve the terms for local rights-holders.

As the International Family Forest Alliance puts it: "SFM needs a long-term commitment, and such a commitment needs tenure rights." Investors see this as a long-term investment that needs long-term asset quality, which in turn requires that all stakeholders have a stake in that quality and requires separations among investor, regulator, and manager. The solution could be an improved concession model in which the local rights-holders agree to encapsulate their rights in an existing legal instrument (such as a timber production concession), without forgoing their preexisting claim.

The concession is then held by the REIT, which in turn appoints the community as manager, probably in partnership with an experienced timberland manager who co-invests in the project. The REIT has a long-term financial interest in the asset quality while the community has its existing interest; the co-manager must use professional SFM methods to avoid cessation of the contract. All parties can agree on terms for extraction rates (probably based on an existing certification model). The state regulator becomes effectively redundant, as disputes would be handled through a civil legal process. Such a model could form part of a subnational or project-level REDD or clean development mechanism (CDM) project.

sovereign wealth funds, and so on. Many of them are becoming adept at reconciling sustainable investment goals with attractive returns. Investors are beginning to understand the reinforcing loop between local livelihoods and long-term forest asset quality, which is important for climate-smart investments that hold their value over the longer term.

The openness and fluidity of international capital markets can be a crucible for innovation, which may lead to the emergence of models that resolve some of the issues facing sustainable forest management.

The range of potential investments at the landscape level is vast, with variations in forest type (e.g., natural forest, planted forest); type of asset (e.g., wood, nontimber forest products, ecosystem services, intellectual property, capital); and the local rights platform (e.g., security of tenure, subnational variations in legal regime). Consideration should also be given to the investment mechanism and the value proposition for both investor and rights-holder.

Investment opportunities exist throughout the supply chain of products that come from landscapes under different management practices, such as sustainable forest management and restoration (including reforestation/afforestation of degraded lands), agribusiness tree crops, outgrower schemes, and plantations.

People-Planet-Profit

Many investors recognize that achieving resilient returns over the long term will only be possible if their assets deliver a balance of social, ecological, and economic benefits.

Understanding how to deliver these benefits through investment in trees and landscape restoration is essential in the context of climate change mitigation projects, rising food prices, and social unrest. Numerous REDD strategies and readiness plans have identified the problems that must be resolved at the forest-agriculture interface to avoid deforestation, but the various climate change funding organizations show little sign of knowing how to marshal soft and hard investments to make that happen. Similarly, a report submitted by the special rapporteur on the right to food to the UN Human Rights Council recognizes that continuing to invest in industrial agriculture is unlikely to address the challenge of global food security. Advanced in its place is a paradigm of "agro-ecology," in which investment in biodiverse and biomass-rich agroforest production systems is the key to food security in an ever more variable climate.

But how can soft and hard investment bring that about? If multilateral institutional funding can be channelled correctly, it could provide the soft investment that paves the way for attractive hard investments in forests and trees in landscapes. More than 100 civil society organizations and indigenous people's groups from 38 countries have called for such an alternative approach (Accra Caucus 2010), arguing that soft investment should be channelled not to augment the economic value of standing forests (versus the ever-increasing demand for, and therefore value of, agricultural alternatives) but instead toward securing the often fragile commercial rights to land and resources that are held by local rights-holders, building their business organizations and their capacity to attract investments that respect the multiple benefits landscapes provide at the local, national, and international levels.

Rights-holder groups and hard investors agree that a climate-smart approach to investment would find ways to unlock the economic value of the landscape and the talents of the people who live there, forming genuine businesses that contribute to development and human welfare. This approach acknowledges the role that trade and enterprise play in development, diminishing the drivers of deforestation and enhancing the returns to rising productivity and innovation.

3.3 CONSTRAINTS TO INVESTMENT

Competing Goals of Investors and Rights-Holders

Different actors (notably investors and forest rights-holders) have quite different cultural and professional outlooks that involve divergent ways of using key linguistic terms. Different understanding by rights-holder groups and investors of the meaning of common words and unfamiliarity with each other's professional or cultural language can hinder understanding and challenge joint progress. For example, the word "investment" is understood by investors primarily as a financial term involving capital transactions. To forest rights-holders, the word means something much broader: the active allocation of resources (including rights, organization, and capacity, as well as capital) to enhance forestry assets not only in the present but also for the future (Elson 2010). Such differences in language are rooted in different perspectives about the objectives of investing in forested landscapes.

For the two groups, the ultimate goals of investing in trees and landscapes might be summarized as follows:

> *For the investor:* Acceptable returns on capital (economic, environmental, or social returns, depending on the type of investor) invested in viable entities, often over relatively short time frames with acceptably low transaction costs, where stability, liquidity, and measurable risk are preconditions.
>
> *For the rights-holder:* Strengthening of local control (autonomy) over land, resources, and enterprises so that holistic social, environmental, and economic aspirations can be furthered on the rights-holders' terms.

The fact that rights-holders often perceive their autonomy as immutable and their rights as inalienable introduces some challenges from the perspective of investors, who consider a partial relinquishment of both as critical to contract-based investments.

Tenure and Use Rights

Lack of clarity about land ownership is the prime concern of investors (McKinsey 2008). Investors with experience in timberlands may expect a form of unqualified land ownership, such as fee-simple or freehold. This form is less common in emerging markets, so the Global Environment Fund (2009) suggests that "investors must be comfortable negotiating long-term leases or concessions." However, the danger in this approach is that the ownership of much forest around the world, especially in the tropics, is contested. Exactly the same problem applies to agricultural land (Cotula et al. 2009).

And beyond the tenure on offer from the local government, investors may find a tangled nest of issues, with competing claims to both the land and the standing assets from local rights-holders.

Investors may be neither willing nor equipped to deal with these issues. Even in the event that local rights-holders do have recognizable legal rights (such as smallholders), it may not be clear how these rights can be monetized or securitized if they are not assignable, and it is most unlikely that indigenous people and communities can officially grant natural forest leases to investors.

Effectiveness in establishing clear tenure and commercial use rights depends to a large extent on the quality of governance (Mayers 2011). Unfortunately, weak governance is often found in both formal statutory land administrations and in informal and customary tenure arrangements. It flourishes because the law is often complex, inconsistent, or obsolete; people who work in land agencies lack motivation and are poorly paid; decision-making processes are not transparent; and civil society is weak.

Poor governance of tenure and commercial use rights discourages social stability, investment, widespread economic growth, and sustainable use of the environment.

Social Organization into Viable Business Entities

Investment cannot easily proceed without viable business entities in which to invest. One of the key constraints facing investment in trees and landscape restoration is that much of the commercial activity involves informal, unregistered enterprises. Informality (not necessarily illegality) is pervasive in most developing country forested landscapes (Kosak 2007).

The high transaction costs associated with engaging with multiple actors spread across landscapes has often led to a focus on collective action. The rationale is that overcoming social structural difficulties—creating the trust and organizational structures necessary for collective action—can help reduce transaction costs and thus foster investment. To date, many of these efforts have been directed at the level of the firm (the first tier of social organization). For example, considerable emphasis has been placed on formalizing share-based or stakeholder-based associations and cooperatives (Macqueen et al. 2006), and on developing new partnerships and debt-, grant-, and equity-based relationships with private sector investors of different types (Elson 2010).

In dealing with community forest enterprises, social organization is often a secondary consideration after economic and environmental goals (deMarsh 2011). Yet, at the enterprise level, such organization is required to define and staff appropriate business roles and to undertake basic business registration, management, and recordkeeping to manage income and costs effectively (and to inspire investor confidence, should expansion be desired). At the regional or national level, social organization is crucial to link forest enterprises to each other (in business groups or federations); to markets; to financial and business service providers; and to policy makers and decision makers (Macqueen 2007b). The absence of viable business entities can be a major constraint.

One barrier to developing viable business entities is isolation. Multiple country studies show that SMEs and their associations are often isolated in four ways:

- Isolation from each other, where mutual support could help develop scale efficiencies and bargaining power.
- Isolation from consumers and markets, whose inputs could help with product development and sales.

- Isolation from financial and business development service providers, whose services could strengthen business and technological capacity.
- Isolation from policy makers, whose decisions could improve their operating environment.

Business Capacity

Competitive business skills among forest rights-holders are essential to break into or create new markets, ensure profitability, and attract investment for managing the forest resource sustainably. They are rarely ubiquitous across forest landscapes in developing countries. Indeed, ad hoc alliances such as Forest Connect[5] have been established to facilitate support for small forest enterprises precisely because business capacity development is so unsupported in forest and tree enterprises across landscapes (e.g., Macqueen 2008).

Experience suggests that entrepreneurial forest rights-holders need help in a number of areas (Macqueen et al. 2009):

- Markets and marketing—finding out what customers want and developing promotional materials to convince customers to buy their product or services.
- Competition—assessing competitive advantages, such as providing the same value as their competitors but at lower cost, offering more value at the same cost, or diversifying into new products or markets.
- Value chains—assessing what part of a value chain they can realistically occupy and what business form is likely to best serve their interests.
- Business roles—allocating business tasks to the right people: business managers; supply, production, and marketing coordinators; and accountants.
- Recordkeeping—doing the basic accounting involved in balance sheets, profit and loss accounts, and cash flow analyses.

A key area that requires support is helping forest rights-holder groups prepare or negotiate adequate investment proposals. Preparing the proposal involves developing the initial concept or business idea, conducting an impact study, formalizing an organizational and institutional structure, preparing a feasibility study, getting agreement internally, and writing the concept note or business proposal; negotiating the deal with an investor involves disclosing objectives, matching the investor to the concept, designing the deal with debt/equity financing, revenue sharing, time scale, involvement of third parties, conducting due diligence to identify gaps, making improvements, renegotiating, and signing a 'heads-of-terms agreement,' a non-binding document outlining the main issues relevant to a tentative partnership agreement (Elson 2011).

Market Constraints

Policies and rules

Not all markets are free. For different reasons, governments might restrict investment options related to forest landscapes. For example, in Mozambique only Mozambican nationals can take advantage of the annual simple license arrangement to exploit timber, although both national and international investors can pursue longer term concessions. In other countries, such as Ghana, strict requirements for legality linked to the Voluntary Partnership Agreement (VPA) with the EU Forest Law Enforcement, Governance, and Trade (FLEGT) action plan specifies which timber species may be harvested and

BOX 3.3. OVERCOME REGULATORY BARRIERS TO REALIZE INVESTMENT POTENTIAL

To date, the development of the baobab sector has been relatively fast and shows strong potential for further growth, especially given the significant resource base in Africa. The sector is currently being fueled primarily through the sale of baobab powder, with the production and sale of baobab oil viewed largely as a by-product. Following the approval gained by PhytoTrade Africa on behalf of its members for the sale of baobab powder in the EU under its Novel Foods regulation, the next step is to bring baobab powder to the attention of the buying public as a new ingredient, emphasizing its many beneficial qualities and its role in improving livelihoods and sustaining biodiversity.

Further investment is needed in the overall sector; as long as the resources of the enterprises in the sector remain modest, donor support will continue to be needed. Regulatory barriers remain in much of the world, although PhytoTrade has been successful in gaining entry for baobab powder to the United States (under the Generally Regarded as Safe regulations) and Canada. Other major markets still need to be addressed; for example, the Far East and South America. And each market will require a campaign to publicize baobab and its benefits, as well as an effort to build a strong and lasting distribution network in key markets. As the sector continues to grow, other countries that have a lot of baobab should be encouraged to enter the market.

At the enterprise level, early emphasis on domestic and regional markets is an important key to establishing a viable business while the export markets are developing. Opportunities clearly exist for investment in baobab processing. Production of around 150 tonnes of baobab powder annually, for example, would involve around 1,000 people. This would entail an investment of between $150,000–$200,000 for factory, machinery, investment in harvesting groups, training, certification, and transport of raw materials to the factory, but excluding working capital investment.

Source: Adapted from personal correspondence with PhytoTrade.

exported, and how. Alternatively, many governments restrict investments in particular landscape contexts for environmental reasons; for example, agriculture on sloping lands because of watershed and erosion concerns or plantations on peatlands in Indonesia because of carbon emission fears. National forest policies and regulations, notably those on the cutting of indigenous trees, also provide adverse incentives and limitations for investment in such species in landscapes (Ruf 2011). (See box 3.3.)

Market inefficiency

Even where markets are relatively unconstrained by policies and rules, they may operate inefficiently because of a number of factors. Poor market information systems can constrain the ability to meet demand with supply. For many agriculture and forest products, lack of market information is compounded by inadequate grading or product quality control. For example, in Honduras, when Greenwood[6] was attempting to supply Taylor guitars with mahogany guitar necks, a major effort went into building capacity for quality control before the first orders were delivered. Attempts to invest in community forestry timber operations have frequently collapsed because of an inability to meet quality expectations on time (Kwisthout undated).

Competition

Where informality is rife, companies that choose to invest in sustainable management or certification may face unfair competition from those that operate unsustainably or informally. In some cases, such competition may even be legal. For example, in Brazil, the large volume of legally felled timber arising from resettlement projects during the 1990s depressed the value of timber to the extent that certified operations found it difficult to compete in the domestic market. Investment in biomass energy in many countries is hampered by the widespread availability of charcoal and fuelwood from unsustainable harvesting that involves no management costs.

Seasonality

Especially for nontimber forest products, seasonality of supply may mean a glut during the harvesting period that depresses prices. Possible solutions are to identify alternative markets or find ways of storing products to sell them in the off-season.

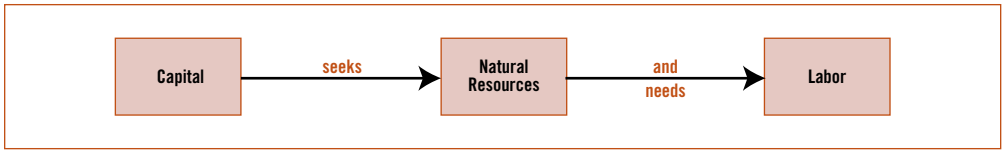
3.4 IMPROVING INVESTMENT STREAMS INTO FOREST LANDSCAPES

The first step toward overcoming the challenge of mobilizing investment in trees and landscape restoration is to recognize that investment is attracted by a value proposition, not merely an empty landscape. Forests and landscapes are inhabited by people who have some rights over the land, of varying degrees of formality. Investors are increasingly aware of the need to apply some form of free, prior, and informed consent (FPIC) process to acknowledge their respect for these preexisting rights, although the practicalities of how these rights are respected has received less attention (Colchester et al. 2011). The output of such a deal is usually some form of compensation for lost revenue rather than a shared enterprise. This trend may be even more likely in REDD deals, where communities are paid to avoid deforestation.

However, respect for local rights needs to arise from something other than mere proximity to natural resources. The danger in advocating principles that rely on emphasizing the inherent worth of rights-holders (such as indigenous people) is that they risk overlooking the real value of the deal, which is vested in the business plan rather than just the resources. A focus on resources and rights, while important, diminishes the importance of labor, skills, markets, capital, and institutions.

Investment in forestry and agribusiness usually follows a pattern of capital seeking natural resources, for which some labor is required, which may be migrant labor (figure 3.1).

FIGURE 3.1. THE RESOURCE-LED SYSTEM

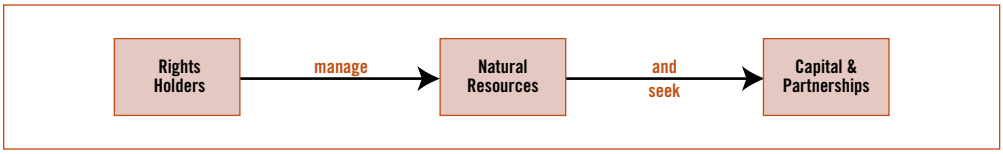


In this rendering, undeveloped land is "empty" and has no value, and any informal customary rights over the land are subordinate to the wider national interest. Indeed, such rights are premodern, inscrutable, and an impediment to development. There is also an assumption—shared by corporations and conservation NGOs alike—that because forests are often sparsely populated, the

land must be unclaimed wilderness. The view of an extensive, virtually limitless expanse of land, unfettered by formal boundaries and seemingly devoid of people, informs this approach to land use and natural resource extraction.

In contrast to the resource-led approach, a rights-based system places rights at the heart of the process, as rights-holders seek investors and partnerships to manage the sustainable use of the natural resource assets they command (figure 3.2). This approach recognizes the autonomy of the local people and their rights to determine the destiny of their land and participate in the income from its effective management.

FIGURE 3.2. RIGHTS-BASED SYSTEM



A genuine business partnership between investors and local rights-holders is both a manifestation of the rights-based approach and the means by which it can be sustained. Unless investment is forthcoming, economic development stagnates, and local or national governments might propose the default resource-led system as the solution to releasing value from forests and landscapes.

Road Map to Implementing a Deal

Building an investment partnership with rural enterprises, in either forests or agribusiness, is in some ways no different from mainstream investment. The process of discovery, relationship building, negotiation, and implementation will be familiar to investors and bankers from any sector. However, as previous sections of this chapter have noted, investing in trees and landscape restoration includes specific challenges. At each stage, local counterparts will need advice, mentoring, and capacity building, which can be supplied by an intermediary or soft investor. The process may not be strictly linear, but it is an iterative one, which at certain points may require intervention. For instance, a feasibility study should test the business concept and the community's capacity to deliver it before the investor is involved. Gaps identified at this stage need to be addressed, either by improving the value proposition or by upgrading capacity and organizational strength. Later, the investor will follow a due diligence process, which might identify additional gaps that require attention. At this point, roles can be assigned to third parties such as NGOs and soft investors, and budgets allocated.

A successful deal includes a number of ingredients, such as those described in the following sections.

Preparation Phase

Creating a representative organizational entity that can make the deal

Identifying an appropriate body with clear decision-making power is widely perceived as a difficult proposition, especially while respecting the need for wide participation. However, the answer lies in the process: Only the community itself can define the composition and structure of the entity, usually with help from a third party funded by soft investment. When the investor comes on the scene, this body should be fully formed and able to present itself as a coherent entity that the investor can recognize. It is not reasonable or desirable to expect the investor to be making judgments about inclusion, gender, and the opaque politics of disparate communities that may be culturally and

BOX 3.4. DEVELOPING VIABLE LOCAL BUSINESS ENTITIES IN MOZAMBIQUE

As part of the Forest Connect alliance, the Centro Terra Viva (CTV) has been working with communities to develop investible entities in bamboo and integrated coconut fiber use. For both product lines, CTV helped communities constitute and legally register commercial associations. The organization identified experts to provide training on the integral useof bamboo and coconut fiber, from plantation management and harvesting to product processing, design, and commercialization. To scale up commercial activities, CTV negotiated with a soft donor— the government of Mozambique's small enterprise authority—to establish a demonstration center on bamboo. CTV also financed farmer association exchange visits and participation in trade fairs, where producers could gain experience in product design and marketing. As the formality of farmer associations has increased, it has been possible to explore options for investment and retail with local companies.

So far, the interventions have led to formalized producer groups that offer more diverse products on the market (e.g., vases, tables), which are sold at higher prices and increase family income.

spatially specific. The preparation phase requires a process that satisfies community norms and general principles of community development (e.g., from the FPIC guidelines); investors must be satisfied that such a process was followed, although they are unlikely to care about the details.

The proposed organization must be a formal legal entity that can trade and enter into commercial relationships, although it may not have to be set up in advance—the costs can be considerable and may require the investor's financial and legal clout to execute. In most countries, it is unlikely that a community group or cooperative would satisfy these criteria. The ownership of the new entity will need to be discussed, as well as the terms under which shareholders can withdraw their investment. For instance, a separate limited company may have shares owned by a cooperative or directly by community members; these are two different kinds of relationship between the company and local people.

The word "representation" needs to be defined. Local rights-holders might have representation as investors (either as direct shareholders or via their membership of a cooperative), but this does not confer the right to influence the day-to-day running of the business. Although the cooperative might encourage democracy, the business itself might not be particularly democratic. A regular small business would have a leader, who would be identified as the entrepreneur. This person provides comfort to the investor by demonstrating permanence (unlike other staff, the entrepreneur is tied to the business and will not/cannot leave) and commitment (the leader will work as hard as possible to ensure success). However, a community-owned business might not have someone in this role, so the constitution needs to make clear who is in charge, who is accountable, and how can he or she can be replaced. It is possible to have an entrepreneurial culture without having just one leader, but the organization has to be designed that way from the start.

At this point, the issue of sequencing between soft and hard investment is most clearly seen. Preparing the community (soft investment) means helping them articulate what they wish to achieve, how they are going to organize themselves into an investible business entity that can speak on their behalf, who will have veto power, who will be included, and so on. Ideally, all these

issues should be dealt with before the investor is on the scene. Once the hard investor arrives, the community needs to confirm that an appropriate process was followed and that this entity can make enforceable deals. Otherwise, the investor faces a future risk of disagreement over the terms of the deal and "submarine" claims (emerging after an intentional delay) regarding land and resources. The agreement could include a statement to the effect that the investor has evidence that the constitution and ownership of the company is a proper reflection of the will of the broader community, but it is hard to see how this could be ascertained by an investor in practice.

It thus makes sense to widen the definition of this principle to include participation in designing the enterprise, and to create articles of association that define rules and procedures that balance the rights of shareholders with the need for company officers to make effective business decisions that are in the long-term interests of the company and all its shareholders, such as replacing a nonperforming executive. Such a structure should be careful not to discriminate between different classes of shareholders if that means diminishing the autonomy of the local rights-holders (e.g., voting and nonvoting shares, preferred stock).

Understanding rights and obligations, and committing to local control

Where there is no clear legal tenure, it can be said that the land is not "locally controlled" and thus investment in local forest or landscape enterprises is not possible. It could be argued that tenure is the fundamental necessary condition for investment. Yet rights-holders often believe that involvement with an investor might lead to clarification of tenure; indeed, this outcome could be more important to them than direct financial rewards. How would this happen in practice? Perhaps an investor has more influence with the national or local government? Not all such deals end happily. The palm oil estates in Indonesia endow each of the outgrowers with a 2-hectare plot of land, but in many cases this arrangement has proved to be less valuable than the previous arrangement of communal access to a very large area of forest. So formal tenure may be a retrograde step from the status quo.

As part of the process of securing long-term tenure security, rights-holders may need to be prepared to work with the government to encapsulate their rights into an existing legal framework (for instance, a concession or lease) that permits fair use of the resource, even if this does not in the short-term advance their ultimate goal of freehold tenure (Elson 2010). Some compromise might be required by local rights-holders to allow investment to proceed, with the stated long-term goal of obtaining more permanent formal tenure in the future. The consensus among rights-holder groups is that recognizing and securing land tenure and user rights is a precondition for sustainable forest and land management. Rights are thus a precondition for rural development, as tenure is an asset and releases the value locked up in land and forests. However, governments often need to be convinced that there is no loss to the state by transferring state forest land to local people—this misconception stands in the way of tenure reform in many countries.

Clarity of tenure is of interest to all parties in the deal, but their interests vary in subtle ways.

Rights-holders might have various ideas about how tenure maps onto their usually quite sophisticated understanding of multiple overlapping layers of state-defined and customary practice ownership, management, and use rights. Tenure can be tied to issues of self-determination or intracommunity politics, and can often have a complicated legacy.

For *investors*, tenure is generally understood as a legal right that creates an asset that can be assigned; for instance, as an asset on the balance sheet or as collateral for a loan. The investor needs to identify how rights to land and standing timber are held by the company.

Governments, in most cases, understand tenure as a strategic tool to confer the benefits of land use on different interest groups while retaining the freehold and receiving rent in return.

These interests are not necessarily incompatible, but they do need clarification. There is some tension: rights claimed by communities might be ignored by the government, and local recognition of rights might not be sufficiently robust for investors. Conversely, leases granted by the government without local consent are not consistent with FPIC principles and thus do not constitute sustainable investment (and carry significant risks for the investor). All three parties need to be in a position to negotiate these rights.

Securing tenure rights requires a variety of governance tactics premised on a number of legal ingredients, the sum of which provide the necessary security for a forest or landscape enterprise (RRI 2009):

- Duration—sufficient to provide an incentive for communities to invest in the forest and in businesses that might sustainably use it.
- Assurance—clearly prescribed, avoiding any ambiguity or distinction between subsistence and commercial use or between land and forest rights; guaranteeing returns from any investment.
- Robustness—easily defensible in a court of law and so widely prescribed and disseminated that they permeate the day-to-day practice of forest officers, transport police, customs, and the judiciary.
- Exclusivity—no overlap between the commercial forest rights of communities and those of external investors or government agencies.

Simplicity—free of excessive bureaucratic steps, lengthy documents, costly registration procedures in distant offices, and so on.

Investing in capacity building

Improved capacity should be an expected outcome of investments; people generally learn by doing, and increased capacity enhances opportunities for future investment. However, some degree of capacity is required in the earlier stages to complete the basic tasks:

- Organize the rights-holders into a coherent entity with professional business roles.
- Secure the necessary formal commercial access rights and operating permits.
- Identify the business opportunity/value proposition.
- Understand the nature of the deal and any proposed relinquishment of control.
- Negotiate the best outcome in response to all parties' agendas.
- Start up the business on a solid footing.

Capacity building is relevant for all parties. Investors can learn more about certain landscapes and local conditions. Governments can learn more about what works in promoting enterprise. NGOs can refine their community development skills. Capacity building is an integral part of the process, with each step calling for different skills and intervention from third parties.

The guiding principle is to respect inherent skills while acknowledging the potential for improvement. All parties should commit to bringing optimism, enthusiasm, and a willingness to learn. Investors must acknowledge that investment will be required in capacity building and that new enterprises have the right to make mistakes, as long as they learn from them quickly.

Building a Partnership

Trust and transparency: foundations of a successful partnership

Transparency can relate to the process of negotiating a deal and to the way the business is managed, managers appointed, salaries agreed upon, and benefits distributed. Many community enterprises fail because a lack of transparency leads to a loss of trust between the leaders and the members. Investors are likely to be used to a high degree of transparency, as they are accustomed to published accounting and auditing. Banks expect some scrutiny of the deals they sign.

Transparency should permeate every stage of the process, and all parties should try to ensure that information can be readily accessed and understood (transparency is worthless if the information can be understood only by insiders). While transparency deals with access to information, capacity building enables people to understand the information and act on it appropriately, and thus reduces the possibility of exploitation. The principle of transparency is one of open and honest sharing of information at all times. The practical steps involve training, translation, and use of appropriate communication tools.

However, transparency is just one element of the process of trust building. In modern investment relationships, the process of trust is embodied in institutions and signified by the strength of social capital. For instance, the sanctions for misconduct by directors ar severe in many jurisdictions, usually ensuring some adherence to fiduciary responsibilities. These sanctions are buttressed by systems that monitor performance, such as independent auditing of accounts. Assets lodged as security for a loan can be relied upon to be available for alienationin the event of default. In forest investment, with its long time frames and remote locations, trust plays an important role in satisfying investors that future returns will be realized. However, local institutions may be weak or nonexistent, and judicial systems dysfunctional. Therefore, some outsourcing of trust may be necessary; for instance, by encouraging certification schemes such as that of the Forest Stewardship Council (FSC), by setting up auditing systems, and by long-term involvement of intermediaries.

Compatible visions and common goals

In conventional investing, it is not always essential that the investor and investee share a common vision, but it is important that the investee convey a singular vision that is consistent with the investor's own worldview and sufficiently motivating to suggest to the investor that this company will achieve its business goals. Objectives indicate the direction of travel, while vision generates motivation and tenacity.

BOX 3.5. PARTNERSHIP THAT SUPPORTS THE PEOPLE-PLANET-PROFIT CONCEPT

In 2002 the Novella Partnership was founded to support a program of scaling up the production of *Allanblackia* oil in Ghana, Tanzania, and Nigeria, and—at the same time—reducing poverty and promoting sustainable enterprise and biodiversity conservation in Africa. The vision of this partnership is to build a sustainable (environmental, economic, and social) supply chain that will contribute to the development of *Allanblackia* businesses in Africa.

Novella is an international public-private partnership with a wide range of actors. Unilever is the largest investor; it buys the harvest in preprocessed crude oil for refining in Rotterdam and has received a food clearance for *Allanblackia* oil in spreads from the European Food Safety Authority, which is the entry ticket into the food market. Having such a key market player as Unilever in the partnership is critical to encourage increased supply of *Allanblackia* seeds.

The World Agroforestry Centre is leading the scientific work on the domestication of *Allanblackia* to boost harvest levels into commercial viability. The National Forestry Research Institutes in Ghana and Tanzania are supporting this work by coordinating field activities and linking to other government departments. Technoserve provides business advice and access to both markets and capital to business people in developing countries. The International Union for Conservation of Nature (IUCN) works to facilitate the integration of forest landscape restoration principles in the different models for increased production of *Allanblackia*; IUCN also supports the development of a market differentiation system for *Allanblackia* oil in collaboration with the Union for Ethical Biotrade.

Novel International is the African partnership member; it consists of the companies that are developing the supply chain in the three main countries of focus: Ghana, Tanzania, and Nigeria. In 2008 Unilever took a step back from the management of the national-level supply chain, handing it over to three local companies in Africa: Novel Ghana, Novel Tanzania, and Novel Nigeria. The reasoning behind this decision was to strengthen decision making, ownership, and implementation at the national level and support the vision of *Allanblackia* as a product from Africa for the benefit of Africans. Unilever would rather facilitate the development of the supply chain than own it, which increases the potential for a sustainable supply chain as other buyers enter the market.

However, investment in trees and landscape restoration requires a closer partnership than conventional passive investment, so some overlap of vision and goals is appropriate and desirable. The process calls for parties to reveal their visions, then agree on goals that are consistent with the visions. For instance, the local enterprise's goals may be to develop a plantation and harvest trees for sustainable profits, while restoring the local ecosystem and maintaining social cohesion. The vision is a healthy and prosperous community living in a rich natural environment. Meanwhile, the investor's goals are to make a positive return on capital while using that capital to promote environmental goals without social conflict. The common ground is to:

- Make a profit and maintain a growing balance sheet,
- Enhance the forest landscape, and
- Build social capital.

Certain issues should be explored further to reveal potential differences in values and vision; for example:

- Does an enhanced forest landscape require a diverse forest (so monoculture crops are not appropriate)?
- What is the endgame of afforestation in terms of utility and amenity value (will the future forest provide more than just timber)?
- Do the requirements for financial discipline that underpin profitability preclude early dividends to a social fund?

This is a process of mutual learning and is the first step in determining whether the partnership is viable and sustainable. It does not mean that either side needs to compromise its values but rather that goals need to be clarified to avoid misunderstanding.

Value investors may be after more than just a return. They may also want to see some effect in terms of a more secure natural resource and more capable business partners, either as a deliberate intervention or as part of what they would expect to see emerge from a free enterprise model. For instance, some investors want to see a better business environment and an increase in the pool of local professionals, which builds a middle class and reinforces democracy. This may not be quite what the local people want, as it implies unequal distribution of rewards—skilled labor is more highly valued and returns to land rent are diminished. But that is the world as it is, so for practical purposes the framework stands: Investors are not looking first and foremost to induce broad social change, but they do expect to see improvements in local capacity to do business and enter into productive market relations, which may in turn cause some local change.

Some major social, environmental, and economic transformation is likely to be the eventual outcome of the deal (e.g., moving from a subsistence to a market economy). Indeed, if a locally controlled enterprise is successful, it is hard to see how it could not be transformative in some way. How do rights-holders prepare for this transformation and take measures to ameliorate the disordered effects of progress, such as inequality, maladaptation, and loss of cultural homogeneity (Cowen and Shenton 1996)?

The power imbalance between investors and local people means that the investor's objectives often shape the conservation and commercial activities of communities. The more powerful partners should be responsible and avoid imposing their values and goals on local rights-holders. But it seems inevitable that some values are going to be transmitted in the process of developing a successful business, and this may not be a wholly undesirable outcome. Perhaps what is needed is a means by which the values can be revealed and discussed openly, acknowledging that goals may change and that it is more important that visions are compatible than identical.

Negotiation

The negotiation phase is only possible if the previous phases have achieved certain outcomes, such as clear tenure rights, social license to operate, a draft business plan, a local organization with legitimate representation and legal standing, awareness of capacities and needs, communication and transparency mechanisms, and capacity to negotiate.

Negotiation starts by asking the right questions of the other party. Implicitly, the rights-holders asks the investor "How can we help you achieve return on capital?" while the investor asks the rights-holders "How can we help you overcome barriers to our mutual advantage, such as tenure and market access?" This process recognizes that sometimes groups want more from an investment relationship than just access to cash. For instance, they may be looking for security of tenure or some form of empowerment. The investor may share these objectives; for example, tenure is likely to strengthen the business case and the balance sheet. Shared objectives do not mean that all the parties have identical goals but that enough overlap exists on substantive issues to ensure that all parties are committed to the activities and outputs that will determine the success and longevity of the venture.

Good negotiation involves the following elements:

- All parties are committed to straight and fair dealing.
- Information and data are shared (transparency).
- All involved parties are identified.
- All parties have the right to say "no."
- The deal on the table can be compared with alternative deals (e.g., its benefits are expressed as financial returns or money equivalents rather than as intangible or hard-to-measure benefits).
- Risks are aligned with rewards.

A good negotiation process should reveal what each party has to offer and what it expects out of the deal. However, it may be difficult for rights-holders to reject "easy money" such as the following:

- REDD funds that are finding a home but come with little oversight.
- Subsidies from local government in the form of cash or equipment.
- NGOs experimenting with private sector projects to please donors but with no real understanding of long-term private sector development.

Perhaps rights-holders need to be examining the proposed deals to test them for potential to be transformative. Deals that perpetuate the status quo (such as REDD cash transfers conditional on not exploiting the forest) should be rejected in favor of genuine investment. The principle behind this may be that the deal aims to build something with sustainable value.

Working Together

An arbitration process mediated by a third party

Partnerships are built on trust, openness, and the perceived fairness of how each party's contributions are rewarded. However, issues can arise that require resolution, and this may involve third parties. A predefined negotiation process can identify the arbitration and conflict resolution mechanisms most appropriate to the context. Such a mechanism is a standard clause in mainstream investment, but where there are disparities of power, resources, and access to information, a more innovative approach may be required.

In any business, if the shareholders are equally divided (for instance, if the investor and the entrepreneurs each hold 50 percent of the equity), exercising a straight vote may not resolve

anything. For this reason it is sometimes appropriate for a third party to hold a "golden share" that does not have much face value or right to dividends but can be used to cast a vote. It can also be used to ensure that the business stays loyal to its founding principles. In some cases, NGOs and other soft investors can fulfill this role for investors and rights-holders.

If arbitration cannot resolve differences, legal recourse may be the only option. This would be the case if a bank or other creditor intended to recover assets. In many countries, the legal system is not in a suitable condition or sufficiently independent to rule in a satisfactory manner. It may be necessary to agree that disputes will be settled by an alternative jurisdiction (e.g., Singapore, United States, United Kingdom), with costs borne by the creditor.

The contract can improve resilience and lower risk by introducing trusted third parties in the following areas:

- Escrow accounts for capital drawdown and revenue collection.
- Arbitration services and foreign jurisdictions.
- Crop verification and asset protection.
- Performance certification (e.g., FSC).
- Financial auditing by professional accountants.
- Insurance to cover political, economic, or physical risks.

Fiduciary responsibility to the enterprise

To protect the interests of all parties, the business must be considered a discrete legal entity and the embodiment of the rights and obligations of all parties. The company's interests cannot be made subordinate to any one group of stakeholders, and the benefits should be distributed according to the agreed-on formula. Benefit sharing is often a cause of disputes in forestry and landscape deals (especially in cases of power imbalance and nontransparency); it is not sufficient for parties to agree to a vague principle of "fair distribution of benefits" that does not specify the terms and conditions of how and when the business will pay dividends.

The benefit being shared is not always cash—it could be anything valued by the either party. To evaluate whether benefit sharing is fair, all benefits probably need a cash proxy value of some sort. Sometimes the project is designed to generate revenue to cover the cost of infrastructure and local services. For instance, the Rukinga plan in Kenya calls for: "Government involvement to ensure funds used for infrastructure and health" (Barrow, Lopez, and Walubengo 2010). But this can result in a form of supertax that displaces state expenditure and may not necessarily generate additional benefits. It often seems that NGOs and governments conspire to persuade community enterprises to spend their profits (and more) on local services that should be provided by the state. Investors may fear that this practice will have the perverse effect of penalizing success to the detriment of all parties (except, of course, the local government).

Timely and equitable benefit sharing is important for sustainability, and perceptions of inequality will lead to disputes requiring arbitration, especially if projects are either way below or way above profit targets. The costs of failure should not fall unduly on the local people; on the other hand, equity investors should be allowed to participate in unusually high profits without having renegotiated terms thrust upon them in the name of fairness.

Equitable benefit sharing requires transparency (an open book policy and disclosure of related transactions and directors' other interests), particularly if transfer pricing is occurring between related businesses and joint ventures. In some cases, investors may be relaxed about receiving no dividends from a business if they are benefiting from cheap raw materials, but this could be to the disadvantage of co-investors.

The principle should be that all parties understand what they are putting into the deal and what they can expect to take out in any given set of circumstances. Such a deal can specify what to do with profits that exceed expectations, including allowing cash to be kept in the business if a dividend distribution is considered imprudent.

A successful deal requires all parties to consider the business as a separate entity that stands apart from its directors and shareholders, and is almost another party in negotiations. In some jurisdictions, a company is in fact a legal person. The fallback position in negotiating benefit sharing is that any act that compromises the sustainability of the business cannot be permitted, even if all parties agree to it. This is where a "golden share" can be useful: to ensure that such a set of circumstances is unlikely to arise.

Improving Investment Conditions

Governments

It is common to call for "good governance" to improve the investment climate in forestry and landscapes. Good governance creates the circumstances for good institutions, which in turn improve the enabling environment for business. Achieving this state is primarily a government responsibility, but it is a process of change that unfolds over time and involves many different actors. The Extractive Industries Transparency Initiative (EITI)[7] is an example of how foreign investors have acknowledged they have a part to play in supporting efforts to improve governance and not undermine institutions. (e.g., EITI Principle No. 9: "We are committed to encouraging high standards of transparency and accountability in public life, government operations and in business").

Good governance, institutional quality, democracy, accountability, and transparency all contribute to an improved enabling environment for business. For instance, good quality social institutions and legal frameworks start with rights as something to be protected and nurtured. The better the institutions, the lower the transaction costs, the more attractive for investors. Commercially oriented parties in the context of decent institutions will make better deals than if governments are left alone with investors to strike deals out of the public eye, as many of the so-called "land grab" deals have demonstrated (von Braun and Meinzen-Dick 2009).

Many of the preconditions for successful investment in trees and landscape restoration, such as clear tenure and property rights, flow from an improved institutional context. It is perhaps fanciful to expect governments to reform tenure in isolation, without considering broader institutional issues such as the role of forests as a strategic asset in the political economy of the country.

It is probably undesirable for governments to allow their enthusiasm for community-led reforestation schemes to lead them to "supervise" deals between investors and communities. This is likely to lead to inflexible negotiation positions or interference in the objectives and modalities of the deal. It is unlikely that good market-based deals would emerge from such a process. Among the successful processes are Guatemala's National Forest Finance Strategy and Mozambique's approach

to increasing the capacity of communities to negotiate deals with the private sector. That approach seems better than supervision: Empower the rights-holders, be on hand with backup if needed, but let the deals happen (and then monitor so lessons can be learned).

In some respects, the government is a soft investor; it is creating the institutional conditions for investment as well as committing funds to tenure reform and spatial planning, which can be significant items of expenditure. For instance, donors have helped Papua Province in Indonesia formulate a provincial spatial plan for the next 20 years, covering 30 million hectares of forest, with special attention to "putting people back in the plan." Donors that provide sectoral support directly to government budgets may need to ensure that resources are focused on improving the institutions rather than attempting to intervene in local forestry.

In summary, institutional conditions can be made more suitable for investment by improving the enabling environment for business as measured by the World Bank Doing Business Survey (World Bank/IFC 2010):

- Clear tenure and usage rights for defined periods, reflecting customary local rights.
- Enforceable contracts and terms of payment.
- Foreign direct investment rules that allow foreign investors to own equity stakes in local companies and that do not place forestry on the negative list.
- Level playing field (e.g., forest governance excludes illegal logging, state-owned enterprises do not have monopolies or control licensing).
- Many players, open markets, and competition.
- Fiscal rules that encourage investment in SFM.
- Systems for monitoring corruption (e.g., "publish what you pay" schemes).

Intermediaries and brokers

In most, if not all, cases where outside investment in rural enterprises has been successful, an intermediary of some sort has been involved. This may be an NGO, a local businessperson, a church group, or a company that specializes in sourcing specific products. These intermediaries can help overcome problems related to isolation and can help shepherd small enterprises through the difficult early stages of establishment, incubating them until they are fit to take on formal credit or equity investment.

However, intermediaries may not always be competent to supply these services, or they may run out of funds. Some intermediaries are themselves soft investors but may be pursuing a goal that is at odds with what the local community wants to achieve; for instance, purely social or conservation objectives. Clusters and associations can help rights-holders vet appropriate intermediaries. Soft investors, particularly donors interested in stimulating rural enterprises, should ensure that service providers (e.g., business development service providers) have secure funding to enable them to extend services to SMEs over the medium term.

Investors

A constructive partnership between hard and soft types of investment in trees and landscape restoration is essential because of the inherent mismatch between the scale of potential investment

BOX 3.6. FARM AFRICA AS AN INTERMEDIARY IN THE DEVELOPMENT OF WILD COFFEE EXPORTS FROM ETHIOPIA

Coffee has its origins in the mountains of Ethiopia, but local rights-holders have not captured the full value of this product, which helps maintain a substantial belt of rainforest in the Bale Mountain region. As part of the Forest Connect alliance to support small forest enterprises, an intermediary (Farm Africa) set out to improve coffee quality and thereby increase prices; establish a functional value chain among community producers, emergent forest cooperatives, the newly privatized Oromia Forest and Wildlife Enterprise (OFWE), and international markets; and develop a speciality brand, Balewild.

The intervention consisted of several overlapping activities. Farm Africa organized capacity building for coffee farmers (training in quality improvements and providing coffee technology support). It brokered a business partnership between the newly established forest cooperatives and OFWE and encouraged OFWE to pay a premium price for coffee (conditional on quality improvements). Finally, it made the link between OFWE and an Italian coffee importer, Sandalj Trading Spa.

The effect two years into the program has been increased revenue generation for both forest cooperatives and OFWE, which has translated into real livelihood improvements for coffee farmers. In addition, coffee farmers have become aware of the value of coffee quality improvement. Both business partners have come to appreciate the mutual value in a strong business partnership with links to overseas markets. Farm Africa is working (within a carefully planned exit strategy) to strengthen the capacity of OFWE to identify overseas markets and the ability of local forest cooperatives to federate and strengthen their supply base to OFWE.

(and the professionalism required to secure it) and the scale and capacity at which SMEs operate. Hard investors look for investible value propositions and are unlikely to shoulder the transaction costs of developing investment preparedness among actors in forested landscapes, so it is incumbent on soft investors to step in.

Soft investors need to precede hard investors to ensure that the preparatory work is done that will enhance the likelihood of a successful negotiation and implementation. Soft investors can provide financial support for the following activities:

- Any necessary process of mapping, campaigning for, delimiting, or registering commercial forest rights.
- The facilitated organization of business entities, as well as associations and federations among entities.
- The creation of institutional hubs that facilitate market system development and small enterprise support.

Soft investors should also be prepared to hold the golden share and arbitrate between investor and rights-holders (and perhaps also government).

Hard investors, on the other hand, should:

- Be prepared to negotiate some terms directly with government (e.g., tenure) but with a mandate agreed on with rights-holders;
- Be prepared to act as a business mentor; and
- Ensure that all materials and communications are understandable to the all stakeholders (e.g., through training, translation, and dissemination).

Investors are usually already convinced by the role of SMEs in the economy at large and pragmatic about the risks of investing in that sector. Scale is less of a problem if the obstacles to aggregating projects can be overcome and investors can use portfolio approaches to mitigate risks. The investment proposition is that value can be released by enabling communities to obtain command over their forest resources, manage themselves as a viable enterprise, and establish links farther down the value chain. These issues can be addressed in the following ways:

- There may be opportunities to make strategic and complementary investments across the value chain to overcome bottlenecks and fill gaps. Broader market presence means the ability to form vertical links (e.g., access to specialist markets).
- Capacity building and training costs can be factored into initial investment without significantly reducing the IRR—perhaps by less than 1 percent. Agencies that provide organizational development (e.g., business development service providers) may themselves be investment opportunities.
- Certain investors can apply their experience in venture capital to the forest sector, enabling innovative or fragile businesses to be incubated until they reach viability and scale.
- More equitable and productive company/community partnerships can have strategic value to the investor that goes beyond the usual corporate social responsibility goals. This will require codes of practice and performance agreements to apportion responsibilities and benefits fairly among all parties.

Rights-holders

Institutional quality does not begin and end with national governments. Local organizations also need to consider how they can improve in order to enhance the conditions for investment. Well-governed local institutions (community groups, tribes, clans, etc.) are more likely to be amenable to capacity building and also to honor the terms of the deal.

Rights-holders should take the following actions:

- Undertake the necessary steps to map out, campaign for, delimit, and register commercial rights.
- Establish a legally competent entity that is empowered by the community to enter into a contract.
- Push for training in business and basic bookkeeping, and bring experience of natural resource use into the learning process.
- Ensure that local institutions (e.g., customary law) are legible to outsiders where relevant.

Most important, rights-holders must acknowledge that economic development will bring about transformation in their circumstances, which may be largely desirable but may also be accompanied by some social upheaval. They need to make plans to ameliorate any negative effects of this process.

NOTES

1 Chris Buss: senior program officer, Forest Conservation Programme, International Union for Conservation of Nature (IUCN), Gland, Switzerland. Dominic Elson: independent consultant, Trevaylor Consulting. Duncan Macqueen: leader, Forest Team, Natural Resources Group, International Institute for Environment and Development (IIED), Edinburgh, Scotland. Carole Saint-Laurent: senior adviser, Forest Policy and Partnerships, Forest Conservation Programme, International Union for Conservation of Nature (IUCN), Gland, Switzerland.

2 "Local control" means formally or informally, owned, managed, or used by forest-dependent people such as smallholders, local communities, and indigenous people, as opposed to managed by large companies or the state.

3 Through the Growing Forest Partnerships initiative, in conjunction with the Forests Dialogue, investors in the forestry sector, forest rights-holders, and other stakeholders have been working together to explore the opportunities and constraints for improving investment into local controlled forests and determining how investment can be directed to realize the opportunities provided for substantial economic, environmental, and social returns. A series of field dialogues have taken place in Kenya, Panama, Nepal, and Macedonia, along with interactive dialogues specifically targeted at obtaining investors' input into the dialogue stream.

4 Sustainable investing—also known as socially and environmentally responsible investing—considers the three dimensions of social, environmental, and economic returns, sometimes abbreviated as "people, planet, profit."

5 http://forestconnect.ning.com

6 http://www.greenwoodglobal.org

7 http://www.eiti.org

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ANNEX I. SOURCES OF SPATIAL AND GEOGRAPHIC DATA FOR TARGETING LANDSCAPE RESTORATION NEEDS, OPPORTUNITIES, AND PRIORITIES IN AFRICA

ORGANIZATION	SPATIAL/GEOGRAPHIC DATA SOURCE	LINK	TYPES OF SPATIAL DATA AVAILABLE
European Commission	Soil Maps of Africa	http://eusoils.jrc.ec.europa.eu/esdb_archive/EuDASM/Africa/index.htm	Metadata and soil maps of Africa (e.g., soil management, soil profiles, vegetation)
FAO	Global Assessment of Soil Degradation (GLASOD)	http://www.fao.org/nr/land/information-resources/glasod/en/	Soil degradation assessments by country; extent of each severity class of soil degradation and associated population numbers
FAO	GeoNetwork	http://www.fao.org/geonetwork/srv/en/main.home	Interactive maps, GIS datasets and satellite imagery on, for example, land cover and land use
FAO	Land Degradation Assessment in Drylands (LADA) Virtual Centre	http://www.fao.org/ag/agl/agll/drylands/index.htm	Interactive maps, metadata, and databases on global and national land use, national land degradation maps, global land degradation assessments in drylands maps
GRID-Arendal	Maps and Graphics Library	http://maps.grida.no/	Collects and catalogues all graphic products prepared for publications and Web sites from the past 15 years in a wide range of themes related to environment and sustainable development
ISRIC	Global Assessment of Land Degradation (GLADA)	http://www.isric.org/projects/land-degradation-assessment-drylands-glada	World map and downloadable database of human-induced soil degradation: type, extent, degree, rate, and main causes
TerrAfrica	Sustainable Land Management Knowledge Base	http://knowledgebase.terrafrica.org/	Information resources related to SLM in Africa, including text documents, multimedia documents, maps, statistics, Web sites
UNEP	Africa Atlas of our Changing Environment	http://www.unep.org/dewa/africa/AfricaAtlas/	Report with more than 300 satellite images, 300 ground photographs, and 150 maps, along with graphs and charts

ORGANIZATION	SPATIAL/GEOGRAPHIC DATA SOURCE	LINK	TYPES OF SPATIAL DATA AVAILABLE
UNEP	GEO Data Portal	http://geodata.grid.unep.ch/	Maps, graphs, data tables on national, subregional, regional, and global levels for more than 500 variables, including agricultural production, land use, vegetation and land cover, fertilizer and pesticide consumption
WRI	EarthTrends	http://earthtrends.wri.org/	Searchable databases, maps, country profiles, data tables on environmental, social, and economic trends in, for example, agriculture and food, forests, drylands, and grasslands
WRI	Drylands, People, and Ecosystem Goods and Services: A Web-based Geospatial Analysis	http://www.wri.org/publication/drylands-people-and-ecosystem-goods-and-services	Report on Web-based analysis on drylands from the perspective of human livelihoods and dryland ecosystem goods and services (e.g., forage and livestock, food production); includes maps using combinations of remotely sensed data and computer-based data management systems
WRI	Global Map of Forest Restoration Opportunities	http://www.wri.org/map/global-map-forest-landscape-restoration-opportunities	Map a starting point for a global assessment of restoration potential; prepared for the Global Partnership on Forest Landscape Restoration
WRI	Watersheds of the World Atlas	http://multimedia.wri.org/watersheds_2003/index.html	Analysis of the state of the world's river basins, including the environmental goods and services they provide; maps and PDF profiles with data and indicators (e.g., land cover and use, biodiversity) for 154 of the world's largest basins

ANNEX II. INVESTOR TYPES

IDEAL TYPE	MODEL	EXAMPLE
Value investors	Debt, bonds, and securities	■ Banks (domestic and international) ■ Pension funds ■ Sovereign wealth funds
	Equity in commercial enterprises	■ Foundations and endowment funds ■ Equity funds (retail or private) ■ Socially responsible investors ■ Venture Capital for Sustainability (VC4S) ■ Sovereign wealth funds ■ High net worth individuals ■ Local entrepreneurs ■ Returning émigrés
	Co-investment	■ Multilateral investment institutions (e.g., International Finance Corporation, Global Environment Facility)
	Carbon REDD+	■ Multilateral financial institutions (e.g., World Bank Forest Carbon Partnership Facility) ■ Carbon offset funds and brokers ■ Socially responsible investors ■ High net worth individuals ■ Hedge funds
	Direct ownership of forests	■ Real estate investment trusts ■ Timber investment management organizations ■ Carbon offset funds and brokers ■ High net worth individuals
	Insurance and derivatives	■ Hedge funds ■ Specialist insurers (e.g., GuarantCo, ForestRe) ■ Multilateral financial institutions (e.g., World Bank Multilateral Investment Guarantee Agency)
Social investors	Soft loans, microcredit	■ NGOs, bilateral and multilateral donors ■ Philanthropists
	Grants	■ NGOs, bilateral and multilateral donors ■ Philanthropists
	Equity in commercial enterprises	■ Foundations and endowment funds ■ Socially responsible investors ■ High net worth individuals ■ NGOs, bilateral and multilateral donors
	Carbon REDD+	■ Multilateral financial institutions (e.g., World Bank Forest Investment Programme) ■ Socially responsible investors ■ High net worth individuals
Conservation investors	Grants	■ Conservation NGOs, bilateral and multilateral donors
	Equity in commercial enterprises	■ Foundations and endowment funds ■ Socially responsible investors ■ NGOs, bilateral and multilateral donors ■ Philanthropists
	Conservation trust funds	■ Foundations and endowment funds
	Carbon REDD+	■ Socially responsible investors ■ NGOs, bilateral and multilateral donors ■ Philanthropists

ANNEX III. INVESTMENT FORUM: MOBILIZING PRIVATE INVESTMENT IN TREES AND LANDSCAPE RESTORATION IN AFRICA—SUMMARY OF FORUM PROCEEDINGS

Introduction

Historically, both public and private sector investments in the forest sector in Sub-Saharan Africa have fallen short of their potential for generating income, mobilizing rural economic development, reducing poverty, increasing food security, and protecting and restoring the environment. This is in spite of the fact that Africa has possibly the greatest potential for investment in this sector.

The primary objective of the Investment Forum held at the World Agroforestry Centre in Nairobi, Kenya, May 25–27, 2011, was to explore the potential for private sector investment in tree-based production, marketing, and processing opportunities for bringing about landscape restoration in key African countries. These investments would help countries achieve the "triple wins" of increasing rural incomes, making yields more resilient in the face of climate extremes, and making agriculture a solution to the climate change problem rather than part of the problem. The forum was an outcome of the Hague Conference on Agriculture, Food Security, and Climate Change and an important milestone leading up to the United Nations Framework Convention on Climate Change (UNFCCC) talks in Durban in December 2011. It was the result of a close collaboration between the World Bank, PROFOR, the World Agroforestry Centre, IUCN, EcoAgriculture Partners and TerrAfrica.

The forum brought together about 100 participants: representatives of private sector financial institutions, forest and agribusiness companies, local communities, national forest associations, high-level national government policy leaders, research institutions, and development partners. Participants worked to identify immediate investment opportunities, the main constraints to investment, and policy and institutional reforms needed to overcome those constraints.

The forum was structured around four sessions—three based on the background papers published in this volume and a session on private sector perspectives. These sessions were preceded by a welcome address from Dr. Dennis Garrity, then director general of the World Agroforestry Centre; opening remarks by Dr. Romano Kiome, permanent secretary, Ministry of Agriculture, Kenya; and a keynote speech by Stanislas Kamanzi, minister of environment and natural resources, Republic of Rwanda. The forum ended with working group sessions focusing on questions determined by the participants and a final session summarizing some of the forum's key messages.

The following brief summary of forum proceedings focuses on the plenary discussions catalyzed by the three main panels and the session in which private sector perspectives were discussed.

Session 1: Tree-Based Technologies for Landscape Restoration and for Improving Livelihoods in Africa

Session 1 focused on the findings presented in the background paper on tree-based technologies for landscape restoration, which was summarized by one of the authors, Oluyede Ajadi from the World Agroforestry Centre (ICRAF). The panel discussion was moderated by Jan Heino (Ministry of Agriculture and Forests, Finland and IUFRO), and the panel included Bo Lager (Vi Agroforestry), Nuhu Hatibu (Kilimo Trust), and Simon Mwangi (Del Monte).

BO LAGER pointed out that farmers were ready to take on many tree-based technologies. The trick is to organize small farmers to take advantage of opportunities at different points along the value chain and to provide access to information and to capital to invest in these technologies. Although farmers need to wait to reap the returns on many products (and therefore food/poverty needs can deter this type of investment), carbon markets may provide an opportunity to advance some of the returns and to bridge the time gap in some cases.

NUHU HATIBU questioned whether we really have the necessary technologies for landscape restoration at scale; for example, for multiplying clonal varieties or identifying high-quality germplasm for indigenous trees. Processing technologies would also be key for supporting farmer investment at any scale.

Hatibu pointed out the huge opportunity in African markets, which the Common Market for Eastern and Southern Africa (COMESA) will greatly facilitate. Incomes are growing and so is the demand for products that come from agroforestry: electricity poles, fruit, and energy. There are plenty of good small producers of furniture who could compete against low-quality imports from Asia if producers along the value chain and domestic markets were better integrated. One important component of a successful business model would be rural-based processing and technology transfer. Smallholders can self-organize if they know about the opportunities, see value in doing so, and can benefit from the savings they generate.

SIMON MWANGI commented that the wide range of technologies available for landscape restoration, and their market potential, is not well understood by the private sector, particularly at the level of the small farmer. In agribusiness, opportunities exist for taking advantage of labor capacity and the recycling of materials, and growing trees for timber for the businesses' own use. Outgrower schemes for fruits could also work, because the manufacturing already takes place locally.

Panelists and participants also discussed the policy context that can make investments more or less attractive. If charcoal use is legal but charcoal production illegal, it's hard to know where to invest in the fuelwood sector. Similarly, hardwood may be imported because of local logging bans. Public procurement policies in developed countries have sometimes helped develop local production by restricting supplies to local sources—this is something African countries could also consider.

Session 2: Scaling Up Landscape Investment Approaches in Africa: Where Do Private Market Incentives Converge with Landscape Restoration Goals?

Session 2 focused on the findings presented in the background paper on scaling up investments in landscape restoration, which was summarized for the forum by one of the authors, Sara Scherr of EcoAgriculture Partners. The panel discussion was moderated by Peter Dewees of the World Bank Program on Forests (PROFOR). The panel included Frank Msafiri (National NGOs Coordinating Committee on Desertification in Kenya); Lars Laestadius (World Resources Institute); Mafa Chipeta (formerly with United Nations Economic Conference for Africa/FAO, now working on food security in Malawi); and Godwin Kowero (African Forests Forum).

MAFA CHIPETA considered the question from the angle of opportunity costs and return on investment. Are some places so degraded that investment may not be worth it? Scarce resources may be better used elsewhere. Average agricultural productivity in Africa is still so low; increasing productivity could

reduce pressures on forests for agricultural expansion and reduce the degradation of additional land. We need to think about returns on investment because the supply of finance is not endless. Africa is not a preferred investment destination, and forestry will compete with whole range of other investments. Chipeta argued that people will make indirect investments in landscape restoration while targeting a product they can sell directly. For example investors will invest in trees as windbreak to protect their tea plantation. They may benefit later from the trees as a source of energy and income, but their objective was related to protecting their investment in tea production rather than in forestry.

Rather than relying solely on private incentives, private sector resources could be tapped through legislation/taxation to fund public programs (consider, for example, water taxes that could create a fund for watershed management). Laws such as these can create opportunities for investment. If we insist on direct investment, however, there needs to be a clear financial return: trees landscaped into agricultural plantations (coffee, tea), fruit trees, and timber to replace block forests that are fast disappearing. In the late 1980s, there were fuel production nurseries. Is there a way to revive interest in growing fuel for African cities? We should enforce charcoal regulations to create a formal market for the single biggest product coming out of African forests.

FRANK MSAFIRI suggested looking for investment opportunities in drylands. Kenya is 80 percent arid and semi-arid lands. The medium to high potential areas (where it rains the most) are saturated with trees already, and farm sizes are minuscule there. Land is more available and affordable in dry areas. Msafiri also suggested that communities may be able to generate income from nursery activities to supply government programs—rather than investing in degraded areas themselves—and that encouraging regeneration is a better choice than tree planting in water-deficient areas. Plants introduced to restore areas of Kenya in the past were poorly suited for supporting livestock. We don't need restoration but natural regeneration programs in which communities are involved and that are supported by investments in marketing infrastructure. Managing livestock movements may be a better investment than restoring land.

GODWIN KOWERO highlighted the political roots of the current situation. Until 2000, agricultural policies in Sub-Saharan Africa were not supportive of agricultural investment at the level of the farm. There was too much emphasis on crops for foreign exchange and not enough support for farmers to become investors. Global institutions have failed to really reach farmers. Perhaps there has been too much investment on the soft side (workshops, processes, etc.) and not enough hard investment. Likewise, solutions to land degradation require secure land tenure to attract investment. Finally, we need to invest in water harvesting technology and spread knowledge of what to plant in dry areas if we expect investors to take up the challenge of farming and growing trees in arid areas.

That said, governments and individuals have begun to understand the connections among tree cover, healthy watersheds, and water for crops. Many African communities are aware and willing to preserve the environment by increasing tree cover.

LARS LAESTADIUS said that the extent of the need for landscape restoration and climate change measures is starting to create scale in and of itself. There are more than 400 million hectares in Africa that could be restored. (NB: A later estimate increased that number to 715 million hectares.) Climate change is also creating mounting pressures on politicians to be seen as doing something sizable on the mitigation side. On the adaptation side, nature-based solutions to restore coastal

areas and watersheds and to anticipate change will be increasingly important. Trees grow slowly, but climate change is slow as well. The question for markets and private investors: How do you meet those needs and make money? Working on a profitable scale is important there.

Even without aiming to make money through restoration measures, it would seem important for businesses to assess how much their line of business, suppliers, and customers are exposed to degradation. Mondi conducted this sort of assessment in South Africa. If you measure it, you can manage it.

From the audience, **DAVID BOYER (AGA KHAN DEVELOPMENT NETWORK)** disagreed with the point about the scarcity of investment interest in Africa. He said that plenty of investment firms are looking for forests, agriculture, and clean energy projects, but they can't find quality projects and trusted partners. Beware of "toxic carbon assets," he added. Most carbon projects never deliver the carbon emission reductions they promise.

ANDREW WARDELL (CIFOR) reminded panelists to consider what's happening at the global level. For example, Indonesia's moratorium on investment in palm oil in peatland means palm oil investments could eventually shift to Liberia and other West African countries. Movements of capital happen at a global scale.

ROSEMARY FUMPA MAKAMO (COMMUNITY ENTERPRISES PROMOTION NETWORK) noted that the lag between tree planting and investment returns has not been a deterrent elsewhere. People do invest in forest for the long term. Scandinavians do it even though their pine-growing time frames are much longer than those under tropical conditions.

JAN VANDENABEELE (BETTER GLOBE FORESTRY) said that soil degradation is a minor factor in the investment decision process and not a real deterrent. If the soil is not completely washed up, an investor will be more interested in the size and price of the land. Good high-potential land should be used to grow crops for food security. Why grow pines when you can grow potatoes? In Europe, plantations were traditionally located on degraded land.

Session 3: Opportunities and Constraints for Investing in Forests and Trees in Landscapes

The third session focused on the findings presented in the background paper on identifying constraints and opportunities for investing in landscape restoration, which was summarized by Dominic Elson. The panel discussion was moderated by Stewart Maginnis (International Union for the Conservation of Nature), and the panel included Wellington Baiden (managing director, Portal Limited); Matthews Manda (Ministry of Agriculture, Malawi); Andre Aquino (Forest Carbon Partnership Facility/World Bank); and Cornelia Roettger (Business Alliance Against Chronic Hunger, Kenya)

Elson's presentation touched off a discussion on the respective roles of soft and hard investors: Institutions and NGOs can help with the preparatory work, and private sector investors can bring the cash and attention to financial returns. "Soft" does not mean unfocused but rather that these actors expect different outcomes than typical investors. Soft investment can be equity support; it is not just capacity building and grant activities. Soft help is expensive and unglamorous but often paramount.

CORNELIA ROETTGER said it was key for hard and soft investors to align their goals so that sustainable business growth can take place across an entire landscape. When implementation capacity and resources are combined in public-private partnerships and investments are well-coordinated, you can leverage large amounts of money and raise efficiency tremendously. Initiatives such as the Southern Africa Growth Corridor of Tanzania (SAGCOT) demonstrate these opportunities.

WELLINGTON BAIDEN reflected on his company's experience, which evolved over 10 years to embrace many attributes of a soft investor. Although the business focuses on timber concessions and processing, it has had to address community tenure issues, with their inherent long-term risk. Discussions with the community led to rethinking the business model to include mixed species and community needs for food and income. Wellington also mentioned a land ownership program in Ghana that is helping investors know what land belongs to whom, reducing boundary conflicts. The Forest Investment Program is also working to demonstrate models that can be scaled up by private investors. That said, knowledge and access to soft funding sources needs to be improved.

MATTHEWS MANDA explained that the "triple bottom line" is driving the national agenda and that government has policies in place to exploit forests for the benefit of livelihoods. Private investors can create employment and increase the GDP without harming the environment. The government can help provide an enabling environment, working with partners and investing in infrastructure. Grouping producers in cooperatives can help clear scale hurdles and increase access to markets.

ANDRE AQUINO agreed that the transaction costs in carbon projects are very high and that aggregation was key to reduce those costs while engaging small landholders in the process of reducing carbon emissions from the land use sector.

Session 4: Private Sector Perspectives

Session 4 provided an opportunity for several private sector company representatives to share their perspectives on the scope and potential for investing in landscape restoration. The panel discussion was moderated by Dominic Elson (Trevaylor Consulting), and the panel included Olav Bjella (Green Resources); Stuart Clenaghan (Eco System Services); Arthur Stevens (PhytoTrade Africa); and Alphan Njeru (Price Waterhouse Kenya)

Elson asked panelists to briefly summarize the nature of their company's investments, then address two questions: What do they do about government regulations? How do they work with local communities?

OLAV BJELLA provided an overview of Green Resources' work planting trees for income for both shareholders and smallholder farmers. The company planted 10 million trees recently in Uganda, Tanzania, Mozambique, and Sudan. Since 1996, private investors and investment funds backing Green Resources have invested $100 million. Two thirds of its plantation areas are certified by the Forest Stewardship Council (FSC).

Typically, planning starts at the landscape level with the involvement of the community. Green Resources negotiates and agrees with the community. It pays a land-lease fee to the government and devotes funds to community projects. In 2010, the company shared 10 percent of its carbon funds with community farmers (about $80,000).

The company does not deal with forestry institutions very much once it has secured access to land. It works with existing policies. Olav said they are considering using more outgrower schemes. They need a supply of high-quality wood but don't need to own the whole supply.

STUART CLENAGHAN has invested since 2004 in sustainable forestry and forest conservation (to securitize the ecosystem services from a forest in Guyana), after working for private investment banks. He owns Green Globe Forestry, which holds 110,000 hectares of forest under FSC-certified management in Peru.

Clenaghan's criteria for investment include finding a partner who can satisfy his need for reliable reports and having security of land tenure. Meeting world standards (such as FSC certification) is advantageous because it reduces the cost of capital. He does not believe in carbon markets yet because they are not well developed, the prices fluctuate, and they have high transaction costs.

Although Clenaghan is a long-term investor, he needs a short-term cash flow. That is the reason tree investment is lagging, in his opinion. However, if you're able to mix current cash flow investments with longer ones, you can put together an attractive package.

As a businessman, he takes a pragmatic approach to the policy environment; he is more interested in the certainty of the environment than what it is.

Although the company area in Peru is sparsely populated (mostly along the river), each community has rights to concessions of about 5000 hectares. The company has helped them obtain a bank account, tax number, and forest survey so they can log legally. The company also does the wood cutting and pays them market price for the wood they take.

ARTHUR STEVENS works for a business service provider whose aim is to bring sustainable profits and to commercialize products in an environmentally sustainable way. For example, PhytoTrade engages with organic and fair trade certifiers to establish standards on baobob and marula products.

PhytoTrade initially finds soft funds (grants) to finance early investments in processing technology, market development, and so on. Finding such funds is not easy Stevens said. Although they would like to be funded by business, the returns are not there yet, so they need their own financing.

He described the regulatory environment as opaque and confusing: Some rules are enforced, some are not, and some are unknown to most people. IUCN has published a report on natural resource regulations across southern Africa and has identified key constraint areas and how to address them.

PhytoTrade tries to ensure that value added is created at the lowest possible level along the value chain, and promotes co-investment schemes that bring together external and community investors.

Closing Session

Peter Dewees (World Bank and PROFOR) summarized some of the key themes that emerged from the forum and focused on policies that would be conducive to mobilizing investments in trees and landscape restoration.

He noted the increasing global trend toward devolving rights over forests and trees from the state to communities and individuals, and said that this has been critically important for increasing

the incentive to invest at the local level. He cited research on collective action supported by IFRI (International Forestry Resources and Institutions) that shows that devolution increases the quality of forest and tree management. However, devolution is not a panacea for the problem of investment, and it requires an appropriate institutional, legal, and regulatory framework to work. Conflicting rights over access and use need to be mediated and resolved, and overlapping rights may be problematic.

Dewees also noted the increasing trend toward supporting payments for environmental services, although their immediate short-term potential is limited because of uncertainties in environmental service markets. For example, carbon markets have suffered because of price volatility and because they are thin; they have not yet been the source of investment that was envisaged. There are great expectations that the future will favor these types of investments.

Another area for policy action is markets for tree and forest products. These can be enhanced by policy measures that remove restrictive legislation, by regulatory simplification, and by measures that shift informal markets into the formal economy. Government and private investment are needed to help strengthen local producers and forest enterprises, to support sustainable production systems for the development of future markets, and for business development services.

Policies and sustained action to improve forest governance will also be important for sending the message to potential investors that agroforestry and landscape restoration measures are viable in the long run and that markets will increasingly be allowed to operate in a free and transparent manner.

Dewees noted that large-scale land acquisition in Africa is a reality and could be extremely important for improving food security. Policy can support a process that leads to better social, economic, and environmental outcomes. He cited the cooperative work among FAO, IFAD, the World Bank, and the United Nations Conference on Trade and Development (UNCTAD) to develop principles for responsible agricultural investment that could help inform policy.

He closed by arguing that to improve the policy framework for trees and landscape restoration, public agricultural and forest institutions need to be revitalized—to shed their old roles as regulatory institutions and develop new service delivery criteria and standards underpinned by relationships of accountability among service providers, policy makers, and frontline professionals, with the aim of improving the delivery of services at the farm level.

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HISTORICALLY, BOTH PUBLIC AND PRIVATE SECTOR INVESTMENTS IN LANDSCAPE RESTORATION MEASURES SUCH AS REFORESTATION AND AGROFORESTRY IN SUB-SAHARAN AFRICA HAVE FALLEN SHORT OF THEIR POTENTIAL FOR GENERATING INCOME, MOBILIZING RURAL ECONOMIC DEVELOPMENT, REDUCING POVERTY, INCREASING FOOD SECURITY, AND PROTECTING AND RESTORING THE ENVIRONMENT.

THIS OVERVIEW DRAWS ON THREE BACKGROUND PAPERS PREPARED FOR THE INVESTMENT FORUM ON MOBILIZING PRIVATE INVESTMENT IN TREES AND LANDSCAPE RESTORATION IN AFRICA, WHICH WAS HELD IN NAIROBI, KENYA IN MAY 2011. IT INCLUDES EXAMPLES OF TREE-BASED TECHNOLOGIES THAT ARE LIKELY TO GENERATE PRIVATE INVESTMENT INTEREST, DESCRIPTIONS OF PARTNERSHIPS AND PLACES WHERE TREE PLANTING HAS BEEN SUCCESSFUL, AND A LOOK AT THE CONSTRAINTS AND OPPORTUNITIES THAT ARE DRIVING PRIVATE-SECTOR INVESTMENT.

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