



Opportunities for Investment

Capital Markets and Sustainable Forestry

A Report for the John D. and Catherine T. MacArthur Foundation

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How to Use This Report

This report provides a broad overview of the opportunities for investment in the growing sector of sustainable forestry. It is intended for many audiences:

- Investors with little experience in the forest industry.
- Investors with much experience in the forest industry.
- Investors from across the capital spectrum:
 - Philanthropic grantmakers
 - Foundation treasurers and trustees
 - Investment fund managers, other institutional investors and investment advisers
 - Family office managers
 - Individual investors
 - Policy-makers and public agency personnel
 - Development institutions
- Anyone interested in the capital issues and opportunities within sustainable forestry

In this report, we frame the differences in the business models of conventional forestry and sustainable forestry. We cover the sustainable forestry sector “from the forest to the floor,” along its value chain of business enterprises. We consider the varying situation in tropical, temperate and, to some degree, boreal forests. We endeavor to give a global perspective, while grounding the report in specific examples of business opportunities from a variety of countries. Finally, we lay out a strategy for scaling up the sector to a higher level of commercial success, including opportunities for investment from the three main capital pools: private, public and philanthropic.

Therefore, the scope of this report and its potential readership is considerable. However, not everyone will need to read every section, depending on your level of familiarity with forestry and capital markets. While the full report provides the most complete picture, feel free to select from within the report for the information most relevant to your interests.

We strongly recommend to those who cannot invest the time in reading the full report to read the opening **Summary of Findings** and closing **Strategic Investments in Sustainable Forestry**.

For readers with an interest in learning in more detail about the commercial potential of sustainable forestry, we suggest you be sure to read Section III: *Understanding the Sustainable Forestry Business Model* and Section VI: *Sources of Return: The Spectrum of Forest Products*.

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Preface

Expanding Access to Capital Markets for Sustainable Forestry

By Michael Jenkins,
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The John D. and Catherine T. MacArthur Foundation
Executive Director, Forest Trends

The MacArthur Foundation has had a long-standing interest in sustainable forestry as a strategy for halting the loss of forest cover in the tropics, where much of the world's biological diversity is concentrated. Since 1985, we have been actively making grants to support sustainable forestry projects from Peru to Papua New Guinea. It has become apparent from our experience that grant-making can only go so far in reversing the trends of deforestation. Those who have the greatest—and potentially the most positive—influence on the global forest estate are private sector businesses and their investors.

The global forest products industry represents close to 3% of the world's gross economic output, and the forests upon which it depends are particularly important ecosystems for the health of the planet and for human well-being. The size of the industry, its links to the rest of the world economy, and the centrality of its resource base to environmental sustainability make it an industry subject to intense controversy and growing public and regulatory scrutiny.

Dramatic change is underway in the forests products industry. For most of its history, the industry has consisted largely of companies oriented toward the rapid harvesting of standing native forests. Yet this practice clearly cannot last: at current rates of cutting, only a tiny remnant of original native forests will remain intact by the middle of the next century. At the same time, demand for wood products is expected to keep growing, driven by population increase and economic development. This increasing scarcity of natural forests is a concern for both the forest products industry and for the rest of us who depend upon the array of services forests provide. Humid tropical forests alone harbor at least half of the world's terrestrial species, provide plant-derived pharmaceuticals that are worth more than \$40 billion per year, represent a huge carbon sink, and directly support around 400 million people. For some, the forest is their home, a source of culture, knowledge, and livelihood; others receive aesthetic and recreational benefits from forests. For all of us, the forest provides local and global ecosystem services, such as clean water, protection from floods, and climate stability.

The forestry sector offers an unusual opportunity to demonstrate just how strongly commercial interests (the marketplace) and conservation objectives (the public good) can be aligned. The challenges to the industry have led to a wave of experimentation around the globe. Over the past decade, a small but growing number of companies in the forest products sector have emerged as innovators in the movement toward what is being called “sustainable forestry.” Low-impact forestry methods, local community involvement, forest management certification, green buyers' groups, and affirmative government procure-

ment programs have all emerged over the past decade. The concept—that managing forests for multiple uses within the bounds of ecological limits makes solid economic sense in both the short and long term—is gaining momentum. In addition to environmentalists and academics, a growing number of investors, both institutional and individual, are recognizing the merits of this approach.

Yet there remain critical gaps in moving these experiments and this interest from marginal or niche status to large-scale mainstream activity. Clearly, one of the largest and least-addressed obstacles constraining the expansion of the sustainable forestry sector worldwide is the nascent industry’s lack of integration into the capital markets and, consequently, its poor access to mainstream private capital. This is a particularly critical issue given the extent to which private capital flows to developing countries are rapidly outpacing public sector financing such as overseas development assistance (from 1985 to 1995, private capital flows grew from US \$25 billion to \$170 billion). Institutional investors such as pension funds, mutual funds, and insurance companies represent a growing proportion of these flows and are now the largest type of private capital investing in emerging markets.

The impact of the capital markets lies in the influence it has over companies’ investment and management decisions. The capital markets send strong signals through ongoing valuation of companies and through the pricing of new capital companies need, as well as directly through investors’ use of their rights as shareholders and owners.

In an attempt to better understand the linkage between capital markets and the emerging sustainable forestry sector, the MacArthur Foundation undertook a series of linked research projects over the last two years.

The first of these studies was a major survey of investors to gain a clearer picture of the perceived and real obstacles and opportunities for attracting major capital investments into this emerging sector. Donald J. Hoffman, an investor with longtime experience in the forestry sector, was hired as a consultant. A small advisory group from the international forestry industry was formed, representing additional experience and a variety of international perspectives. Over the course of 12 months, more than 100 interviews were conducted with a broad array of appropriate investor types, including family offices representing high net worth individuals; public sector investors; insurance companies that have major timber investments; the reinsurance firms that are increasingly sensitive to climate change effects; pension funds; investment banks; university and philanthropic endowment funds; and energy companies that are exploring carbon sequestration options.

We asked about rates of return, risk, and market capitalization as well as geographic preferences, investment structure preferences, their response to sustainability, and certification.

We traveled to Northern Europe to understand why the investors there seemed so much more interested in green or environment issues. The major findings of this inventory are integrated throughout this report.

The second major element was a survey of the universe of sustainable forestry deals. With the assistance of Abraham Guillen, we undertook research to describe the profile of more than two dozen investment opportunities in Brazil and Bolivia that could suit a diversified forest investment portfolio. The survey compiled general information about each company, including size, structure, products, markets, and return on investment.

The survey results were published as “Strategic Investments in Sustainable Forestry.” The intent of this piece of research was to provide us a clearer view of the opportunities and needs of the emerging businesses around sustainable forestry. While a quick inventory of conventional channels for forestry deals yielded few prospects, “beating the bushes” in these two countries exposed numerous opportunities that investors were not aware of.

This final report is a synthesis, an attempt to marry these two sets of information—investor interest with companies’ needs—while setting the context with a full analysis of this emerging investment sector. It lays out opportunities utilizing different kinds of “catalytic capital” pools and instruments drawing from philanthropic, public, and private sources. It suggests opportunities for financial engineering, matching and bundling investor types with investment opportunities—within existing financial instruments and by creating new financial instruments.

Our findings closely complement work that is underway by other groups, including the report for the United Nations Development Program by Indufor and Ecosécurité, and the recent World Wildlife Fund report, “Investing in Tomorrow’s Forests.” As a group, they all point to the financial opportunities that are alternative to destructive “mining” forest practices that have been widespread.

Prologue

An Investor's Perspective

By John Earhart, Managing Partner
Global Environment Fund

Sustainable forestry is a bit like the weather, everyone is talking about it, but no one is doing much to effect it. This is especially true in nations characterized as “emerging economies” where the percentage of native forests under any type of sustainable forestry management regime is negligible and the rampant destruction of biologically rich native timberlands continues unabated. Although there appears to be a great deal of political interest in supporting the development of the business of sustainable forestry, there is little evidence of progress. To date, very little capital, public or private, has been directed to sustainable forestry activities in developing nations, and, relatively speaking, not a lot in the developed world either. The first studies on the subject, more than ten years ago, found that less than 1% of tropical forests could be classified as sustainably managed. Since then, given the enormity of the problem, the amount of additional capital invested into such opportunities has been relatively insignificant.

On the other hand, timberland as an investment asset class and generator of capital in “developed economies” has been explosive. The price of timberlands in North America, Western Europe and New Zealand is at all time highs. Several forest products companies have chosen this recent bull market in timberlands to monetize company forests, using the proceeds for consolidation. Billions of dollars have been invested in timberland acquisition, plantation development, corporate merger/acquisition and forest management in recent years as the sector becomes recognized as a low risk/high return investment strategy. Mainstream institutional investors now see this asset class as a safe harbor to hedge against inflation and cyclical economies and are allocating large sums of long-term investment capital to acquire timberland assets. All this is being driven by the sense that demand for wood products will continue and the relatively safe supplies of raw material are becoming more and more constrained.

This certainly begs the question as to why this same level of financial euphoria has not been directed at forest lands and timber companies in emerging markets? These nations will witness enormous economic growth during the next fifty years and become major consumers of wood products, adding considerably to worldwide demand. Furthermore, they house more than half of the world's forests, have production costs significantly less than their temperate neighbors and possess the potential for biological growth rates well above those found in the temperate climes of developed nations. Yet these countries have received very little investment into the forestry sector, even from conventional sources unconcerned about “sustainability” per se.

When put in the context of the recent phenomenon of free market development, trade liberalization and the privatization of state-owned assets occurring in many tropical nations, it is surprising that the forest products sector hasn't

participated more in this mobilization of capital. Virtually every multinational energy, water and communication company in the world has looked to the emerging markets as a source of future earnings growth; yet except for a few isolated cases, the forest products industry has not participated in this wholesale transfer of assets. Are the “perceived” risks to the investor too great given the “perceived” rewards? Is there even a basis for analysis?

In those cases where capital has flowed to emerging markets, it has generally gone to replicate the “temperate” model of plantations with fast growing, softwood species for commodity products, rather than the sustainable management of native hardwood stands. (In the temperate northern hemisphere, the primary forests have already been converted and plantations or semi-natural secondary forests dominate commercial wood production, with its own impacts on biodiversity).

This kind of forest investment in emerging economies brings with it a number of environmental implications since the management of natural tropical forests has been promoted as a pro-active strategy for maintaining standing forests, ergo biodiversity, while extracting economic benefits to prevent conversion. Are native forests being deforested to make way for more efficient exotic-tree plantations, with the attendant loss of biodiversity? Does the absence of natural forest management suggest that these forests will eventually be converted to alternate land-use practices such as agriculture, thereby significantly reducing ecosystem biodiversity?

This report attempts to answer the question of why, with the considerable worldwide interest in the forestry sector, there has been so little capital directed to sustainable forestry activities. It describes some of the barriers to capital flow and suggests mechanisms for catalyzing investment in private sustainable forestry endeavors.

In developing this analysis, we have made several assumptions about the global economy and the role of wood products within it:

- World human population will continue to grow, nearly doubling by the year 2050;
- The majority of this population growth will occur in the so-called developing nations, which essentially overlay with the emerging market economies;
- Per capita GDP will also increase during this 50-year period, with particularly strong growth found in these same emerging markets;
- Wood will continue to be the raw material of choice for several societal needs including fuel for cooking and heating, construction material for commodity housing products, value-added items, and paper and packaging materials;

- The combination of total population growth and per capita GDP increases will drive the demand for forest products increasingly higher. This will continue to place enormous pressure on forest resources leading to mismanagement or outright conversion to other land uses unless economically viable silvicultural regimes are implemented;
- Raw material supplies for industrial wood products will come increasingly from developing nations that currently hold a majority of the world's forest resources;
- Public financial support for sustainable forestry activities is small relative to the scale of the issues and will decline over time, so mechanisms will need to be put in place to attract private capital;
- Concerns about the environment, including biodiversity conservation, global warming, and watershed quality, will continue to grow, particularly in temperate nations. This will increase pressure to limit forest exploitation in certain regions of the world. Furthermore, management practices will be scrutinized and consumer demand for environmentally sound wood products will grow rapidly.

Although any one of these assumptions can be challenged, there are overwhelming amounts of data supporting these conclusions. Indeed, many multinational corporations and public sector development assistance agencies have based long-range strategic planning on these circumstances occurring.

Between the years 1960 and 1995 world population more than doubled. It is estimated that from its current base of 5.8 billion, human numbers will grow to 7.1 billion by the year 2010 and could reach 10 billion by 2050. The bulk of that growth will come from nations that are considered to be in a developing economic mode. In absolute terms, this will be a major driver of demand for natural resources such as food, water and fiber, putting both direct and indirect pressure on forested areas in these countries.

During this same 1960-1995 period, world GDP grew in real terms by 350 percent. This included grain production growth of 200%, fuelwood harvesting and use up by 250%, sawtimber manufacturing increasing by 300%, and pulp and paper consumption growing by 300 percent. Per capita GDP has grown at a similar pace and has been particularly strong in emerging markets (350% emerging vs. 85% developed economies). FAO has concluded that a greater number of countries are demonstrating GDP per capita expansion and together with this rapid population growth suggests that:

“The combined impact of economic growth and increasing population size on demand for forest products is likely to be significant, particularly so since per capita consumption of industrial forest products is especially responsive to income change at low levels.”

FAO State of the World's Forest 1997.

In addition to the direct impact this will have on tropical forests, the need to satisfy food demand will also put pressure on standing timber. Again, FAO estimates that an additional 90 million hectares of tropical forests will be converted to agricultural use by 2010 to keep pace with rising demand for food. Like demand for forest products, demand for food will increase by 1.8% per annum during the foreseeable future.

The scenario goes something like this:

- Growing human populations in emerging markets,
- + Increasing economic activity and disposable income,
 - + Declining wood supplies in historically key producing countries—Indonesia, Malaysia, Russia—due to over-cutting and economic uncertainty,
 - + Growing land conversion pressures to supply agricultural demand,
 - + Reduced supply availability due to environmental concerns,
 - + Chain of custody demand and forest practices scrutiny,
-
- = Significant medium term pressure on the world's forests and longer-term supply constraints.

So where will the wood come from? Studies indicate that in the near term, supply will more or less equal demand, but this will give way to significant supply constraints, particularly in the softwood commodity product area, in the year 2020. This will be driven by a shift toward greater consumption of industrial wood products as economic wealth redirects product demand. How will this shift effect forested regions in emerging markets? Currently, although developing nations house more than 60% of the world's forests, their role in industrial wood production is small, representing only 11% of world trade in forest products. Of the seven largest forested nations, five are developing countries, but only one, Indonesia, is an actor on the world stage of timber trade. This should change with time.

As wood supplies grow at a pace of 1.2%-1.7% per annum during the next 30-35 years, the bulk of the increase will come from both hardwood and softwood plantations in the tropics, particularly Latin America and Asia. Whereas today about 15% of the world's wood production is derived from plantation forests, by 2030 the number will be closer to 37% of total. Because of favorable growing conditions and lower production costs, most of these gains will come from tropical nations.

Another area of supply concern will be in the sawtimber product area. In spite of gains made in engineered lumber and other lower cost substitute products, demand for high quality veneers and lumber, along with value-added products such as furniture, doors, flooring, decking, etc., will

continue to grow. With declining inventories and increasing harvest restrictions in North America, and significant forest depletion in Asia, the industry will necessarily move into the last great native hardwood forests of Latin America and Africa. The question is, will these same forests be managed on a long-term sustainable basis or will they go the way of the Asian forests?

What will the mechanisms be to ensure that the remaining forests of the developing world are managed in a sustainable way? Who will make capital investments in restoring native biodiversity and older age forests in the developed world? How is private capital that is both patient with returns and enlightened towards management regimes attracted to the sector? Are these concepts considered mutually exclusive? Is there no capital because there are no good deals, or are there no good deals due to a lack of capital? Are the deals too small or too illiquid to attract significant investment? What about the relative roles and capacities of international and in-country investment groups? Will the investment community be open to the efforts of governments of emerging markets nations to privatize or secure long-term tenure of forest resources, as they have in other sectors such as energy and communications? These are questions that cannot be fully resolved in any report, but will ultimately be answered in the marketplace.

Perhaps what is needed most are sustainable forestry success stories with attractive risk adjusted returns to attract larger pools of investment capital. Creating those much needed successes, ultimately, may require innovative sources of funding to prime the pump, thereby catalyzing the growth of the sustainable forestry sector and attracting a wider range of capital sources.

Section I

Summary of Findings

Forests are being simplified, fragmented and lost around the world at an alarming rate. The liquidation value of forests is high, creating a strong economic incentive for conversion. Further, financial markets reward short-term returns more than long-term ones. There is little in the economic status quo to encourage natural forest stewardship and the protection of biological diversity. Without strengthening and expanding the commercial success of sustainable forestry, it is unlikely the tide will be turned in the momentum of loss of primary forests and degradation of natural forests generally.

Sustainable forestry represents a new way of looking at forests and forest management. Its approach seeks to protect and enhance the forest ecosystem, while profitably deriving goods and services that meet human needs. Sustainable forestry draws on the latest scientific knowledge of forest ecosystem dynamics and management, as well as an understanding of the spectrum of marketable forest products, including but not limited to wood. Sustainable forestry works with the complex—and sometimes chaotic—natural systems of forests rather than seeking to simplify them into a mechanical model. The sustainable forestry sector seeks to replicate the ecology of the forest in its own operations, emphasizing diversity, interconnectedness, feedback, adaptation and continuous improvement. This business model is to the conventional forestry business model what the information economy is to the industrial economy.

As *The Wall Street Journal* columnist Tom Petzinger, Jr., wrote in his book, *The New Pioneers*, “Until recently, businesspeople saw their worlds through the Industrial Age metaphor of the machine and built their organizations accordingly. Now, in irreversibly increasing numbers, they see business as more of a living system.” Ironically, for a sector built on the outputs of natural ecosystems, forestry is only now embarking on its own version of this widespread revolution in management.

The widening application of sustainable forestry holds great promise for the protection and improvement of biological diversity, fish and

wildlife habitat, water supplies, carbon sequestration, recreation and forest-dependent communities around the globe. Combined with conservation of whole forest landscapes—embracing primary forests set aside from timber production, extensively managed secondary forests and more intensively managed plantations in previously deforested areas—sustainable forestry could provide the resolution to the long-standing conflicts between commodity production and resource protection.

Sustainable forestry emphasizes building and maintaining forest assets on the ground. Thereby some near-term income is foregone in favor of long-term capital appreciation. Analyses suggest that the incremental difference in financial returns between the conventional and sustainable forestry business models could be made up by revenue generated through the marketing of value-added wood products, non-timber forest products, recreational opportunities, provision of clean water, long-term storage of atmospheric carbon and the sheer conservation value of forests. As this is still a new approach in a wide commercial context, the data is more qualitative than quantitative.

There are a growing number of initiatives in the private and public sectors to implement sustainable forestry practices and expand the market for sustainable forest products. While the sector as a whole is young, commercial opportunities exist and are increasing all along the forest products value chain. Timely, strategic investment could strongly catalyze the sector's growth.

To be profitable and competitive with conventional forestry operations, expanded and better organized markets are needed for the diverse wood products, non-timber products and ecosystem services derived from sustainably managed forests.

To achieve wide-scale application, sustainable forestry requires successful examples of profitable and effective operations at various scales, in major timber-producing and consuming countries. The sector as a whole will gain momentum as success breeds success.

The combination of these factors can build the overall sector, improve efficiencies and likely yield returns from sustainable forestry comparable to the conventional forest products sector.

To break through “business as usual” in the forest products industry and in the capital markets, catalytic risk capital must be marshaled to prove the commercial viability of innovation in forestry. A concerted effort on the part of interested investors—philanthropic, public and private—to provide appropriate R&D, seed, early stage and expansion capital to sustainable forestry would catalyze its growth to a broader commercial scale. Timely, strategic investing of relatively small amounts of capital has the potential to fuel the growth of young sustainable forestry enterprises, bringing them more quickly than might otherwise occur to the stage at which they are capable of mobilizing larger, conventional capital flows.

Each major source of capital—philanthropic, public and private—has opportunities that are highlighted in this report:

Philanthropies committed to sustainable forestry and conservation need to utilize both the grant-making and investment sides of their institutions. Grant-making, program-related investments and corpus investments can all support appropriate non-profit and for-profit sustainable forestry initiatives and enterprises.

Public agencies and institutions can use direct appropriations, grant-making, low-cost financing, educational training, technology transfer programs, loan guarantees, low-cost insurance underwriting and public policy initiatives to broaden the implementation of sustainable forestry.

Private investors can make debt or equity investments in the R&D, start-up, early stage and expansion of sustainable forestry ventures. Commercial banks can provide targeted lending for sustainable forestry.

Given the social and environmental goals of sustainable forestry, and given the earlier stage nature of many sustainable forestry investments, the sector

currently lends itself to pooling of investment capital in public-private-philanthropic partnerships. Lead investing by philanthropies and public agencies, including international development institutions, is critical to this stage of development of the sustainable forestry sector. Co-investment with private sources will mitigate risk that inhibits conventional capital flows.

Several hybrid sustainable forestry funds have recently been organized. Innovative investment joint ventures can provide companies with a variety of financing mechanisms appropriate to different stages of development and different capital needs (from grants to export insurance to mezzanine finance). They can also provide industry expertise and other technical assistance in addition to capital.

The other big question, of course, is, “If the money is there—are there sustainable forestry businesses in which to invest?” The answer that is clear from this report is *yes*.

We have identified five areas of strategic investment opportunity to leverage the growth of the sustainable forestry sector:

- Forestland acquisition and management, especially of natural forests.
- Advancements in scientific silviculture and harvest systems.
- Improved technology for harvesting and processing.
- Sustainable forestry products R&D and development of market intelligence.
- Market-making for all sustainable forestry goods and services.

Investments in these areas not only benefit that aspect of sustainable forestry, but synergistically build the strength of the sector. Sustainably managed natural forests can provide a greater array of goods and services that fuel other enterprises. Markets developed for value-added processed products feed back opportunities to forest managers.

New markets for ecosystem services can pay for forest conservation efforts. Improvements in utilization of all wood reduce extractive pressures on natural forests while increasing profits to processors.

There are major structural changes in forestland ownership underway, concurrent with the emergence of sustainable forestry. These changes are leading to the disposition of many tens of millions of acres over the next few years. Forestland is moving from being held as an industrial or personal asset to a financial asset. While such huge turnover may threaten vast areas of forest with conversion or more intensive harvest, this historic transition also holds many opportunities for the expansion of sustainable forestry, if committed sustainable forestry capital can be organized to take advantage of these dispositions. Forest investment management organizations (FIMOs)—alternatives to existing *timber* investment management organizations (TIMOs) that represent institutional investors—need to be created to pool capital for the acquisition, conservation and sustainable management of forestland for timber and non-timber revenue sources.

In the crucial area of forestland acquisition, funds (or similar pooled vehicles) are an advantageous method of ownership. By holding interests in a portfolio of diversified forest properties, risk—natural, market and environmental—can be better mitigated. The creation of a variety of sustainable forestry investment funds may in fact be the most efficient way to organize capital flows into the many opportunities within the sector. For investors, funds provide:

- A means to leverage their own investments by co-investing with others (including public, philanthropic and private sources).
- Potentially easier diversification within the overall sector.
- Management by professionals knowledgeable in the field with established intelligence networks, deal flow and due diligence capability.

For sustainable forestry companies, funds can open up access to investors that might otherwise be impossible to reach. Funds can also make fundraising more efficient for companies, and provide access to needed expertise or business networks as well.

By targeting investments to achieve the greatest strategic value in building this new sector, interested investors have the potential to profit while promoting the growth of sustainable forestry. By focusing catalytic investment capital on this sector at this stage in its growth, there is the opportunity for sustainable forestry to achieve the scale and momentum necessary to demonstrate its viability as an alternative to conventional forestry. With spreading commercial success and application on the ground, sustainable forestry offers the best means to both conserve the world’s forests and continue to provide the goods and services that people need for coming generations.

Section II

Introduction

The conventional forest products industry is a major sector of the world economy, representing approximately 3% of global gross domestic product. Broad estimates place the value of world wood consumption in the range of \$400 billion, with industrial (non-fuel) usage comprising about 75% of this. (FAO 1997) Among developed countries with mature forest products industries, such as the U.S. and Scandinavia, investment has been considerable and continues to grow. Timberland as a distinct asset class is now well-recognized as an alternative asset for institutional investors. In general, the established portions of this sector are not experiencing capital shortages.

In developing countries that have a forest products industry, plantations and related manufacturing industries are growing. They are relatively well served by private capital, including banks, as well as by government and international aid sources, as compared to natural forest management. To the degree that plantation enterprises are struggling in emerging economies, it is usually tied to factors such as lack of capital generally as well as lack of transportation or processing infrastructure—factors which affect all industries in those particular regions.

However, for many countries, “forestry” tends to consist of clearing natural forests for fiber plantations, agriculture, dwellings and other development. On-going management of natural forests for timber and other forest products is typically the exception in the developing world. There is poor understanding of the science and economics to make natural forest management sustainable. While natural forests comprise the vast majority of forestland, they are highly threatened and their conservation and management receives little or no investment capital.

Ironically, natural forest capital is being diminished through conversion, fragmentation and simplification, even as conventional forestry is spanning the globe, fueled by growing capital investment. World forest ecosystems are in jeopardy. Ecosystem functions and services, including water provision, carbon sequestration, habitat and biodiversity, have been severely impacted from unsustainable timber

harvesting in many regions and forest loss overall is increasing. Citizens and governments are beginning to require more environmental and social responsiveness from the industry. Scientists, economists and other analysts are questioning the sustainability of timber harvest returns—suggesting the industry is riskier than it appears. In response, a new field of sustainable forestry has emerged that seeks to work with the natural complexity of forest ecosystems to derive and profit from the full range of goods and services forests provide, including not only wood but non-timber forest products, water and carbon sequestration.

Our goal in this report is to provide information for investors, managers of investments and others interested in forestry regarding the investment opportunities that can expand the emerging sustainable forest products industry. In this report, we review the challenges within the capital markets faced by businesses that are seeking to create a forest products economy based on principles of sustainable management. We consider the relative roles of the different kinds of capital that could invest in this area. We investigate capital instruments—existing and new—that can bridge the gap between the capital pools available to the timber industry and those available for sustainable forestry. Finally, we highlight investment foci of strategic importance to the growth of the sustainable forestry sector.

There are several different kinds of capital and many associated capital pools that fuel the global economy. Broadly speaking, there are four kinds, ranked by their relative size and reach, beginning with private sources that are by far the largest:

1. Private Sector Debt
2. Private Sector Equity
3. Public Sector
4. Philanthropic

Each type of capital has its appropriate use, depending on the stage of the business life-cycle of an enterprise or industry. (See Figure 1) As a general principle, capital sources which have a high tolerance for risk, or which may require little or



FIGURE 1

no direct return, are used to research, develop and start up enterprises. These typically include philanthropic and public funds, including grants, below-market equity and debt; as well as private venture investing by individuals and institutions.

Once an enterprise or sector is beyond the early stage of development, the capital sources begin a transition from high risk sources to relatively lower risk ones. As an enterprise or sector reaches a strong growth phase and later phases of maturity, conventional capital sources such as banks compete for the financing opportunity. The opportunity for issuing publicly-traded securities becomes available. In general, higher risk capital requires higher returns, or a “risk premium” of added return over more secure investments. Higher risk, earlier stage capital pools are also smaller in volume compared to lower risk, later stage ones. (See Figure 2) Capital flows most easily to investments that provide the highest risk-adjusted returns. Therefore, innovative, early-stage businesses have the most difficult access to capital.

Sustainable forestry is generally in the early stages of business development, although there are a few notable exceptions. As the sector grows, and its premises are better proven, investments will become weighted toward later stage opportunities. Currently, however, sustainable forestry is encountering economic and cultural hurdles to becoming established and expanding, typical of other innovative segments. The struggle for pioneering industries to break

Basic Capital Types by Relative Volumes



FIGURE 2

through the inertia of business-and-investment-as-usual should not be underestimated, especially in a tradition-laden sector like the timber industry.

This report begins with an examination of the differences between conventional and sustainable forestry and their respective business models. We then look at forestland ownership and investments generally. This is followed by a discussion of sources of capital, and the various investor vehicles that are used. We then survey in some detail the sources of return available from the spectrum of sustainable forest products. The final section identifies strategic areas of investment in sustainable forestry, illustrated with specific existing or emerging opportunities.

Section III Understanding the Sustainable Forestry Business Model

SUSTAINABLE FORESTRY IN CONTEXT

Many volumes have been written in the last decade seeking to define “sustainable forestry.” For the purposes of this paper, we will distill these discussions to schematically illustrate the differences between sustainable forestry and conventional forestry. With that perspective, we will then present the capital challenges and opportunities specific to sustainable forestry.

Any discussion of the forest industry should start first with the forest, the primary producer in the industry value chain: Forests are structurally complex, dynamic ecosystems dominated by large, woody plants and shaped by disturbances of biological process, climate, fire, and human action. Forests produce a wide range of goods and services for people as a result of the interactions among soil, fungi, fauna, vegetation and the elements, including:

- timber, pulp, and fuel wood;
- watershed functions;
- habitat for plants and animals and their associated genetic diversity;
- foods, medicinals and decorative florals;
- recreation and scenic beauty; and
- climate stabilization and carbon sequestration.

Both sustainable forestry and the “renewable” approach to conventional forestry can provide these products to some degree. The difference is in the forest’s capacity to provide the quality and quantity of products through time.

Now, for the first time, global society finds itself faced with a recognition that forests are not a given. Where once they covered an estimated 45% of the planet, forests’ current extent is only 26% and is diminishing daily¹. The World Commission on Forests and Sustainable Development reports

¹ The World Wildlife Fund estimates that two-thirds of the world’s original forest cover is gone. They further estimate that 42 million acres are disappearing annually. On a regional basis, WWF reports the following forest loss: Latin America /Caribbean:41%; Asia/Pacific:88%;Africa/Madagascar: 45%;North America:39%; Europe:62%.

that in the last two decades some 15 million hectares² of forests have been lost annually. (1999) Forests are believed to provide habitat to two-thirds of all species. (FAO 1997) An estimated 90% of listed threatened and endangered species are associated with primary forests. According to a recent report, 10% of the world’s known tree species are in danger of extinction, and 75% of all mammals are threatened by forest decline. (IUCN 1998)

Where the frontier once seemed limitless—and exhausted forest landscapes could be “replaced” by others—today it is clear that forests are a scarce resource. Population growth and increased wood demand from developing nations are both surging. Global demand for softwoods, in particular, is projected to outstrip supply in the next decade (Council of Forest Industries 1997). (See Figures 3

Global Softwoods Harvests Compared with World Population Growth

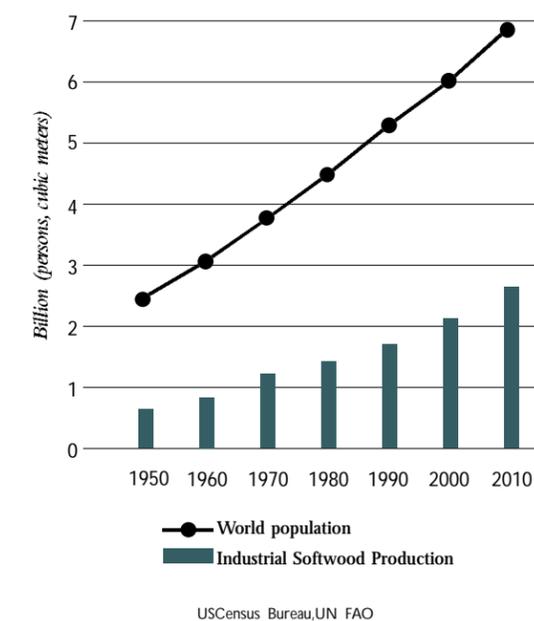


FIGURE 3

² Hectares and acres are used at different times in this report. Hectares are usually used as the standard international or non-U.S. unit of land measure. One hectare equals 2.45 acres.

Global Softwood Supply and Demand 1996-2020

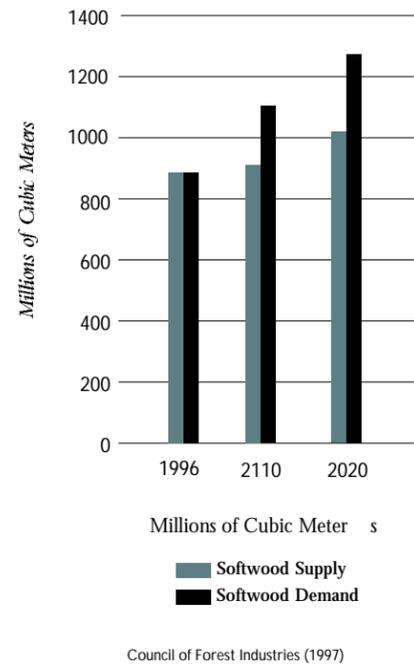


FIGURE 4

and 4) Excess demand will draw on the remaining tropical hardwood forests and expand plantations of fast-growing species. It will drive more efficient utilization of harvested wood and substitution of non-wood sources for pulp and building materials. No one knows just how the supply and demand dynamics will be resolved on the ground. However, the issue of sustaining the world's natural forests is a critical puzzle that will have to be solved in a dynamically interconnected world economy.

³The hardwood-based timber industry can be more oriented to diversity of species and production of value-added products as compared to the softwood timber industry. However, the problems of high-grading (taking only the largest, best trees) and species simplification (from cutting out favored commercial species from the mix) can degrade hardwood-dominated forests as well as softwood. Further, hardwoods are increasingly being utilized for low value pulp.

Within this context, human decision-making becomes the primary determinant for the fate of forest ecosystems. This new condition gives rise to “the urge to manage forest systems as valuable, diverse and vulnerable assets.” (Romm 1998) Forest management itself is therefore in transition, as our understanding of what forests provide expands and informs management goals.

Forestry has gone through several phases in its evolution. With greater social, economic and scientific understanding of the urgency of sustaining forest ecosystems, we believe forestry can respond and evolve further. Conventional forestry has tended to be characterized by either the traditional “cut and move on” philosophy, mining the “free capital” of the forest for human needs; or a more modern “renewable resource” philosophy, in which regeneration of cut-over forests and efficient production of fiber is the primary goal of silviculture. Both approaches emphasize timber or fiber production, with the goal of maximizing near-term harvest yields and current income. In both, forest ecosystem products and services have been typically ignored or considered a constraint on wood harvesting. The unfortunate result of an emphasis on near-term timber harvesting as the driver of management decisions has been increasing forest loss, degradation of ecosystem functions and diminishment of biodiversity worldwide.

The qualities that make forest management “sustainable” are not absolute and exist necessarily along a continuum. Social and biological context can change the emphasis for sustainable forestry in a particular region, landscape or site. Simply put, sustainable forestry seeks to protect and/or increase forest extent and diversity, managing for greater relative ecosystem complexity and functionality as compared to conventional forestry. (See figure 5³)

⁴No comprehensive data exists, but estimates made by the World Wide Fund for Nature and the FAO suggest up to 60% of forests in tropical countries consist of primary and old second growth forests. The World Bank Forest CEOs ad hoc Forum estimate that half the boreal forests in Russia are either mature or “over mature,” ie, old growth.

The Continuum of Forest Management: Comparing Sustainable and Conventional Forestry



FIGURE 5

For example, there is still significant primary forest remaining in the tropical and boreal forests of the world⁴, whereas in the U.S. an estimated 5% of primary forest remains. Tropical and boreal countries are experiencing the pressures of wholesale primary forest loss that characterized the first 150 years of U.S. history. Therefore, consideration of the sustainability of plantations in tropical regions, for instance, looks at whether the plantation is on lands previously deforested and whether it demonstrably relieves extractive pressure from the primary and other natural forests in the region. A global forest conservation strategy ought to fully consider the contribution plantations can make integrated with sustainable natural forest management and protection of primary forests, especially in tropical areas.

In the U.S., and other temperate forests in the northern hemisphere, on the other hand, primary forests are a very minor component of the landscape and sustainability issues focus on the increasing simplification, fragmentation and conversion of secondary forests. Among other things, concern focuses on impacts of forest management on habitat of species dependent on the small and diminishing extent of remaining older, more complex forests. Therefore, foresters are seeking to rebuild complexity into managed secondary forests and even plantations.

In all instances, the sustainability of forests is threatened by encroaching agricultural, residential and commercial development—itsself an outcome of population growth and other demographic factors. In more developed countries, the forests most prone to succumb to such conversion pressure are secondary forests that have been over-harvested and degraded in their productivity, leading to another, non-forest “highest and best” economic use. In emerging economies, primary forests are hardest hit, targeted to clear the way for development. In all instances, biological diversity is lost.

It may be useful to visualize four broad stages of forest management (see Figure 6). Native biodiversity is greatest at the first stage of virgin or primary forest and declines. The strong historic trend is toward forest ecosystem degradation, with the end result being conversion as settled development makes that option more immediately profitable. Sustainable forestry dwells between primary unmanaged forests and conventional forestry. In this stage, management seeks to extract economic value from the forest while maintaining high ecological productivity. As such, sustainable forestry has a greater likelihood of maintaining both the relative economic value and ecological integrity of forestland, preventing further degradation and ultimate forest loss.

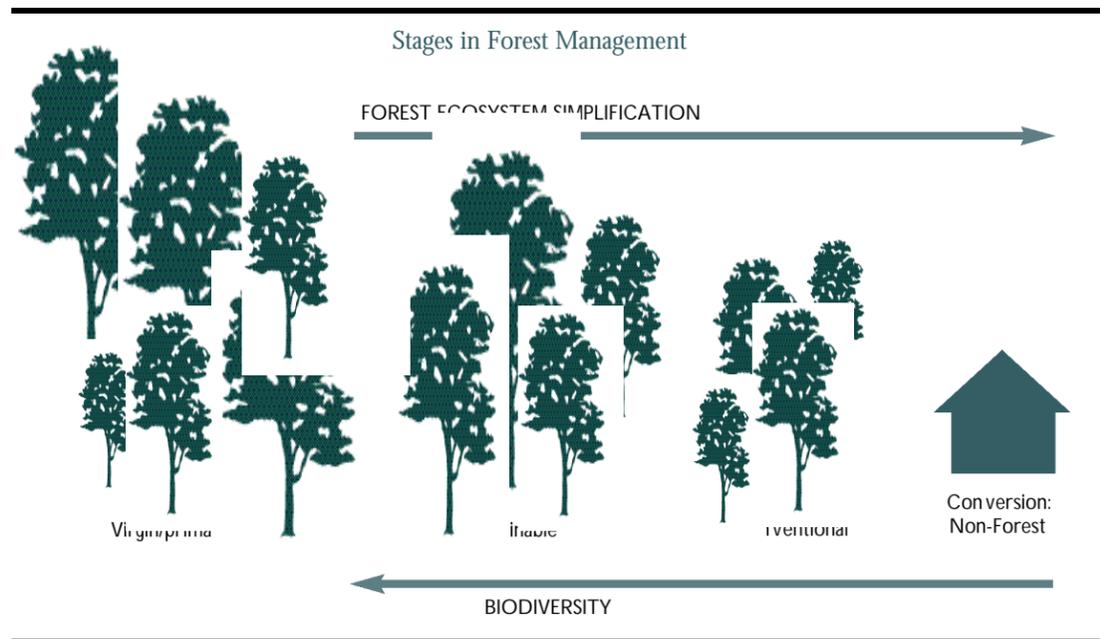


FIGURE 6

COMPARING THE SUSTAINABLE AND CONVENTIONAL FORESTRY BUSINESS MODELS

Capital flows readily to conventional forestry and associated real estate conversion. Capital is less readily available for the conservation and sustainable management of primary and previously harvested natural forests.

Prior to surveying the capital needs of sustainable forestry along the forest products “value chain,” we will briefly compare and contrast generalized conventional and sustainable forestry business models. There are certain characteristics that are common across forestry enterprises:

- The tangibility and relative low risk of forest land as compared to financial assets (such as stocks and bonds).
- The negative correlation of forestland with stocks, bonds and commercial real estate.
- Returns that are generated by the biological growth and increasing unit value of the timber as it grows older.
- Long-term historic real price appreciation for

timber and potential of continued appreciation if supplies continue to tighten.

- Short-term price volatility, inefficiencies in global supply and demand, and other market risks.
- High capital in-puts for land, inventory, plant and equipment.
- The relative illiquidity of the forest resource as compared to many financial assets.
- The long planning horizon due to the biology of the resource.
- The potential for natural catastrophe, including forest fire, pest infestation and disease.

Given this, each of the following business models takes a distinctly different approach.

1. Conventional Forestry Model

The foundation of the forest products industry is the acquisition and harvest of timber from forestland. The conventional goal is efficient maximization of commercial fiber harvest yields and its processing into wood products. In the conventional view, the forest is the trees.

While every venture has its uncertainties, on a relative basis the returns for conventional forestry tend to be well-known and the potential for profits attractive. Forestland is typically acquired at a price that is projected to provide the rate of return desired by the timber enterprise over its investment horizon based on an expected harvest schedule and other property management activities, including disposition⁵. In the case of developing countries, that price may be publicly subsidized as part of a nation’s development efforts⁶. In any case, the internal rate of return (IRR) will ultimately be driven by just how quickly the merchantable timber can be harvested and sold, yielding cash revenues. In the U.S., generally accepted accounting practices recognize returns on the basis of cash distributions to investors, not increases in asset value. The forestland assets are usually carried at cost on balance sheets and are not marked to current market value.⁷ Therefore, given the time-value of money, the earlier stage cash (i.e., first 3-5 years) generated contributes the major portion of investment returns. This situation is further intensified by the fact that much forestland is acquired using a high proportion of debt financing. While this may increase the IRR to the investors, the need to service the debt reinforces the drive to quickly convert trees to cash, with the highest value trees being given preference (i.e., larger, older and highest demand species).

Historically, these accounting facts of life have been among the major drivers of forest ecosystem degradation. “Throughout the world, forest composition and structures are . . . expressions of financial forces rather than ecological or silvicultural judgment.” (Romm 1998)

Within conventional forestry, there are two basic approaches: One cuts a tract and moves its opera-

tions to another forest (perhaps selling the property for development as it moves). The other seeks to re-establish a new generation of trees on the site for on-going harvesting. Within the latter, “renewable” forestry operation, the goal is both to convert the older forest into cash and to create in its place a young, “thrifty,” fast-growing forest of either native or exotic species. The young plantation is usually simplified in its composition of species, as compared to a primary forest of the same type, focusing exclusively on the growth of selected species of high commercial value. The forest stands are managed on a cutting cycle that meets the on-going IRR requirements, assuring a level of supply of fiber or timber that the owner expects can be readily processed and marketed. Softwood silviculture and plantation silviculture of softwoods and hardwoods are typically even-aged in nature, using an agricultural crop model of forestry.

The ultimate “sustained yield” management goal is a predictable flow of fiber from a “fully-regulated” forest of stands in a range of age classes from seedlings through to the economic age of rotation (the point at which the stand is harvested). The rotation age will vary with the species and is based on the point at which stand’s growth rate falls below the IRR objective. The resulting harvest cycle is often well below the potential biological productivity of the species. For instance, in the Douglas-fir region of the U.S. Pacific Northwest, the prevailing economic age of rotation is 40-45 years, when the annual growth rate of the stand begins to decline below the desired IRR target. However, maximum stand productivity is thought to reach its peak—considering the total volume yield or carrying capacity of the site—between 80-120 years old (depending on site class).⁸

⁸ Maximum productivity is usually indicated by the “culmination of mean annual increment,” or the time when the total growth of a stand, divided by its age, peaks. Recent studies by Robert O. Curtis indicate that thinning of older stands can stimulate continued relatively high rates of growth, pushing the time of “culmination” out into the indefinite future. See “Some simulation estimates of mean annual increment of Douglas-fir: Results, limitations, implications for management,” 1994. Research Paper PNW-RP-471. Portland, OR: USDA Forest Service; and “Extended rotations and culmination age of coast Douglas-fir: Old studies speak to current uses,” 1995. Research Paper PNW-RP-485. Portland, OR: USDA Forest Service.

Renewable forestry is increasingly characterized by intensive management to maximize fiber production. Forest managers seek to speed up establishment and growth of the desired species, eliminate undesired “weed” species, make up for losses in soil fertility⁹ and mitigate the higher risk of fire, pests and disease of younger, simplified forests. The market risk of managing particular forest tracts for a narrow band of commercial species is mitigated through owning tracts in various forest regions nationally or globally, to ensure some diversification of species across the ownership and reduce the impacts of sometimes severe market fluctuations within species.¹⁰

Declining inventories of mature timber (especially in developed nations) and increasing demand for wood have compelled the forest products industry to improve utilization of harvested trees, reduce processing waste and compensate for the lower quality fiber of young trees by engineering new wood products. Laminated beams, medium-density fiber-board, oriented-strand board, and similar products combine low-quality wood or fiber and adhesives in the effort to replicate the strength and breadth of application of products processed from now scarce high-quality timber. Scarcity of supply is also leading to the harvest of species previously considered “weeds”, especially for use in engineered fiber products. Engineering fiber products also reduces market risk by allowing many different species to be homogenized into products meeting certain specifications. Forest scientists are producing faster growing species through hybridization, and hope to through genetic engineering, as well.

These developments are the logical outgrowth of the conventional forestry business model that

⁹The agricultural crop model of forestry does not, unfortunately, incorporate concepts of regenerating cover crops or laying fallow to allow soils to recover lost nutrients. Therefore, plantations require increasing application of fertilizers, with associated costs.

¹⁰ For instance, Douglas-fir from the U.S. Pacific Northwest plummeted in value in 1997 when the Asian financial crisis dramatically reduced export demand. This threw shock-waves through the conventional forest industry in the region which had heavily invested in Douglas-fir plantations.

focuses on trees and fiber, not forests. Management for younger plantations requires less capital to be invested in the ground for shorter periods than management for older forests. While younger tree farms still provide some habitat values, store more atmospheric carbon than grasslands, and provide more biodiversity than housing tracts, these services are greatly diminished compared to those provided by complex, older, natural forests. In this model, mitigating the impact of timber harvesting on non-timber forest resources is considered a constraint on operations and, in regions where forest practices are regulated, a cost of doing business. Nonetheless, the cost of certain impacts, such as loss of water quality or fisheries, are usually externalized.

The economic success of this business model provides wide access to capital markets, enabling conventional forest companies to move around the world as wood supply dictates. Such companies are among the favored clients of commercial banks because of the secure, merchantable asset of the standing timber, as well as the underlying real estate. As the land itself appreciates in value with the expansion of development into forest regions, the relative value of conversion to agriculture, other commercial or residential use increases over forest use. In developed countries, the real estate arms of timber companies are important profit centers.

2. Sustainable Forestry Model

While timber harvest currently remains the primary revenue source, the sustainable forestry business model emphasizes total returns and asset appreciation over near-term timber income. The forest is treated as a productive asset to be enhanced rather than depleted, to provide for sustainable long-term revenues rather than short-term return of capital.

Sustainable forestry enterprises are innovative, working with the natural diversity of forest ecosystems to produce a wider range of forest goods and services than conventional forestry. The goal is to maintain market options, hedge risk, build economic and ecological resilience, and enhance overall ecosystem productivity through time. This is consistent with an economic analysis that the

dependence of conventional forestry on single commodities is less adaptive to market conditions and more risky. Sustainable forestry seeks to mitigate the risk of long planning horizons intrinsic to the forest industry by management for product diversity and market flexibility. The image of the forest from this perspective is more that of a super-market of goods than a grain elevator.

The products from sustainable forestry include the wood and fiber products of the conventional timber industry, but also encompass lesser-known tree species and the potential range of forest ecosystem goods and services. Some of these non-timber products have established markets and business structures, such as:

- fee-based hunting, recreation, and eco-tourism;
- edibles, such as mushrooms and berries, or agro-forestry crops such as coffee or cocoa;
- herbs and other botanicals for medicinal purposes; and
- decorative florals, grasses, cones and boughs.

The business potential of other products is only just emerging, though it could be considerable. Global markets that could mobilize significant capital for forest-based carbon sequestration are developing in the wake of the Kyoto Protocol to the U.N. Framework Convention on Climate Change. Water provision from forest watersheds is another valuable service for which regional markets are developing. These varied sources of return from sustainable forestry will be discussed further in Section VI.

The guiding principles of sustainable forestry have been articulated by organizations that have been set up in recent years to provide third-party certification of the sustainability of the forest practices of specific forestry operations. (A copy of the Principles and Criteria utilized by the members of the international Forest Stewardship Council is appended.) Interpretation of the sustainability of a forestry enterprise depends to some degree on its context: the forest ecosystem type; prevailing laws and regulations; tract and landscape conditions and

history; land tenure and other use rights; relationship with surrounding communities; etc. Sustainable forestry can encompass different intensities of management and different management goals across the landscape. The conservation management strategy can include the set-aside of sensitive areas or primary forest from timber harvest, the restoration management of degraded habitats, the intensive management of certain areas and the extensive management of others. In total, a more fully-functional forest ecosystem can be maintained, providing connectivity across habitats, and taking extractive pressure off primary and other forests reserved from timber harvest.

In sustainable forestry, the goal of forest management is to maintain or rebuild timber inventories and overall ecosystem complexity and vitality. The harvest of forest products, including timber, does not remove all merchantable volume at once but uses partial cuts that seek to replicate natural disturbance patterns. The goal is for the forest to readily regenerate without a significant loss of complexity or biodiversity, and with minimal, transitory impacts to other forest resources, such as water quality, soil productivity or habitat quality.

Sustainable silviculture can keep stands growing rapidly for longer periods than many conventionally-managed forests, improving both the quality and dimension of the timber. For instance, many temperate species respond with enhanced growth to a series of thinnings spaced over decades, allowing for the growth of older, larger trees with maintaining a flow of cut timber. Studies have shown Douglas-firs still responding vigorously to thinnings at ages beyond their theoretical culmination of growth. (Curtis 1995) Overall timber yields can increase through time from active sustainable management that cultivates timber assets on the ground, as compared to conventional short rotation operations that don't realize site potential.

Wood harvested from sustainable forestry can be utilized in all the same products as conventional forestry. However, assuming global trends continue, within the next 20 years only sustainable forestry

operations are likely to be providing the high-quality, large dimension saw-timber associated with harvests from primary forests. In addition to commanding price premiums, larger dimension trees with high quality fiber can be converted to a wider variety of wood products, especially value-added ones, than younger trees.

Sustainable forestry operations seek to mitigate the characteristic risks of forestry differently than conventional operations:

- a) Market risks of forest product pricing volatility and shifting market demand are mitigated by managing for a variety of species and a variety of products over longer time horizons, seeking to avoid the need to sell products in down markets that can come with over-specialization.
- b) Vigorous, diversified forests, with the suite of native species and age classes, are more resilient to natural disturbance than younger, simplified forests, providing mitigation for the risks of catastrophic fire, pest outbreaks and disease.
- c) Forests routinely managed for the restoration or maintenance of fuller ecosystem functions and forest values are less likely to encounter regulatory and environmental risk, with associated operational delays and other costs.¹¹

3. Competitive Rates of Return

This discussion focuses exclusively on rates of return from ownership and sustainable management of forestland, not processing, distribution or retail businesses in the industry value chain. Rates of return from the higher levels of the value chain should not vary from returns generated by conventional forest products companies simply because one is based on products derived from sustainable forestry operations and one is not.

¹¹ It has been argued that, perversely, forest landowners who manage their forests to maintain habitat for threatened species are in fact more likely to face regulatory “shut-downs” than those who have already eliminated such habitat. Nonetheless, environmental compliance is generally not a problem for an operation committed to exceeding the thresholds set by regulation.

Overall, sustainable forestry ownership and management—including the range of forest products and ecosystem services—can provide returns competitive with conventional “renewable” forestry over time. The primary differences in the two business models which drive potential differences in return are: relative emphasis on short-term intensive timber harvest; relative degree of diversity of tree species and products managed; time period for recapture of capital invested; exploitation of non-forest development potential of property; and marketing of non-timber forest goods and services.

The risk-adjusted return of a sustainable forestry investment needs to be competitive with other investment opportunities to attract capital. Correspondingly, investors’ return expectations need to be based on a clear understanding of forest asset characteristics, political and environmental risks, historic returns and a thorough analysis of current and projected market conditions. The characteristics of forestland as an investment asset are discussed in more detail in the next section. If a forest operation’s cost of capital (equal to the return requirements of equity investors and the interest rate on any debt) exceeds the historic rate of return, then one must question the sustainability of the operation.

If we assume that 8% is the target real rate of return¹² that investors should expect from this asset based on historic performance, is that in fact sustainable? Our analysis suggests that this return relies substantially on both realizing the merchantable timber value and re-selling the property to capture capital appreciation as soon as possible. Sustainable forestry can accomplish the same return through capturing more of the value of the non-timber forest resources. That is, conservation real estate transactions can to secure some portion

¹² Forestland is unusual among investments in that rates of return are usually quoted at the “real” or inflation-adjusted level. Most investments, such as stocks and bonds, are quoted at the nominal annual rate, without adjustment for inflation. Therefore, if your portfolio of publicly-traded securities returned you 15% in one year, and in that year inflation was 2%, then your “real return” was 13%.

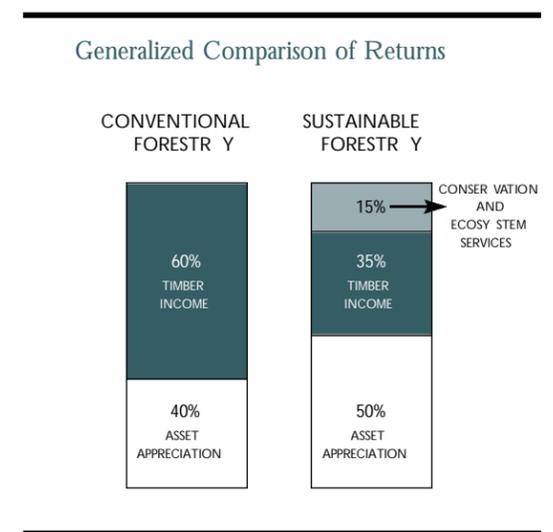


FIGURE 7

development value without converting the forest; and they can monetize habitat values that otherwise have no market. Further, the marketing of ecosystem services and development of other non-timber products will add value as well. The potential for these returns is discussed in Section VI. Sustainable timber income is likely to be comparable or greater over longer time periods for a property managed sustainably as for the same one managed conventionally, since increased standing inventories yield more—and usually more valuable per unit—wood.

A generalized comparison of returns between conventional and sustainable forestry is illustrated below. This is derived from an investment modeling project of the Pacific Forest Trust in which the acquisition of several forest tracts in the Pacific Northwest were analyzed on a pro forma basis (1998). In this schematic analysis, timber income accounts for an estimated 35% of sustainable forestry returns as compared to 60% for conventional forestry. Asset appreciation, on the other hand, accounts for half of the sustainable forestry return, versus 40% for conventional forestry. This is due to higher forest inventory levels and higher valuations for older stands. An estimated 15% of return is derived from non-timber sources. Therefore, for instance, if a conventional forest investment were to provide a 8% real IRR, a sustainable forestry approach to the same property would provide 6.8% from timber-related sources and 1.2% from other sustainable sources.¹³

To enhance returns and achieve the sustainable forestry sector’s full potential, there is need for further market development for certified wood, lesser known species, non-timber products, ecosystem services, and conservation per se. The ability to readily market forest values other than timber or land for development is still relatively limited. These are among the challenges and opportunities inherent in creating a new, ecologically-based industry which will be highlighted in Section VII.

¹³ Actual timber harvest levels, stumpage prices and other market factors can materially affect comparative returns on a particular property.

Section IV

An Overview of Forestland Investment

The acquisition, control and management of forests is fundamental to the forest products industry. Efforts to catalyze development of the sustainable forestry industry on a significant commercial scale must include investment in forestland, either through fee title acquisition, leases, concessions or other rights. In order to evaluate these opportunities, it is important to understand the nature of forestland investments, forestland distribution and ownership, as well as marketplace trends. This section provides a brief global forestland investment overview and analysis as background for the investment strategy detailed in Section VII.

FORESTLAND AS AN ASSET CLASS

Over the last 15 years forestland has been increasingly recognized in the capital markets as a distinct asset class, apart from commercial real estate or integrated forest products companies. There are several key historic characteristics to forestland as an investment¹⁴:

1. Forestland is a tangible, low-risk asset. Forestland value is based not only on market conditions, but is strongly driven by biology. The sheer volume growth in the timber during the ownership period typically accounts for a significant portion of return. Further, unlike commercial real estate, timberland cannot be “overbuilt.” In fact, high quality forestland is only decreasing through development-driven conversion. These qualities are sometimes called the “biological beta.”

The primary risks associated with forestland are natural (fire, pests and disease), market and regulatory. These can be mitigated through careful diversification among commercial tree species, sites, and regions and countries. They can be further mitigated through environmentally-sensitive and ecologically-knowledgeable forest management. Long-term holds not only enhance returns through capturing volume and grade growth, but

¹⁴ This discussion is based on numerous studies of U.S. forestland, including *Timberland Investments*, Zinkhan, et al (1992); and *Timberland: An Industry, Investment and Business Overview*, Rinehart (1991).

they can mitigate short-term market fluctuations through more flexible market timing of harvests.

2. Risk-adjusted returns are strong. Real, inflation-adjusted returns from U.S. forestland investment have ranged from 8-10 percent on average.¹⁵ (Hoffman 1997, Zinkhan 1997) The elements of return are:

a) The *growth rate* of the trees: Young trees can grow at a very fast rate, which gradually decreases with time as they approach biological maturity. The actual growth rate will vary by species and age, ranging from 2-15% annually, with managers typically targeting 3-4 percent through time.

b) *Value growth* as trees mature into higher value classes, such as the incremental growth from pulpwood to sawtimber. Therefore, the unit value as well as the volume is increasing through time.

c) *Real price appreciation* for timber “stumpage”¹⁶ has historically exceeded inflation. Across U.S. species the average long term real price appreciation has been approximately 2% on an annualized basis. (See Figure 8) However, it is important to note that current market conditions, arising from increased global competition among producers and overcapacity in pulp supply, are inhibiting near term price appreciation for most species. Experts are divided as to long-term forecasts.

d) *Active management* can increase timber growth rates and sustainable volumes. Market timing and careful merchandising of timber harvests can capture market opportunities or avoid troughs. Buying forestland in low markets and selling timber in high ones can significantly increase returns.

¹⁵ There can be major fluctuations in forestland return within a decade. The Hancock Timber Resource Group’s realized a 32% return on Pacific Northwest forestland between 1987 and 1996. These were based on buying strongly in that region during the depressed prices of the mid-1980s and selling many properties at the peak in the early 1990s, after the national forest timber supplies were curtailed by litigation over threatened and endangered species. Current projections by Hancock, however, are for returns of 8% in the near term.

¹⁶ The term used for the value of trees “on the stump” in the woods.

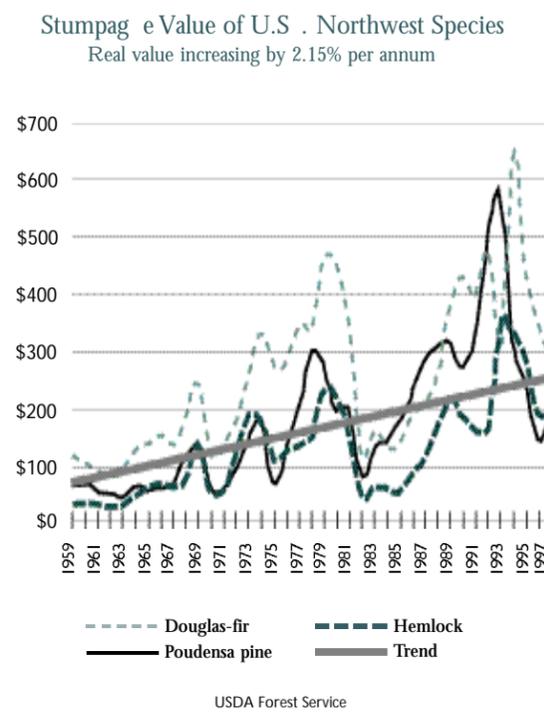


FIGURE 8

3. Taxation is preferred and deferred. In the U.S., most commercial forestland has preferentially low, forest resource-designated property tax rates. On, state and federal taxes are deferred until timber harvest or property sale. Most timber sales can be readily structured to qualify for low long-term capital gains tax rates. Given the capital intensity and potentially long time frames of investment, in many other countries, preferential tax treatment is also a common practice.

4. Forestland can improve investment performance. As a financial asset, forestland is negatively correlated with stocks, bonds and real estate. Studies have shown that forestland returns can be on par with the S&P 500, yet have a lower standard deviation. (See Figures 9 and 10. Please note that Figure 10 compares assets at nominal rates of return.) Analysts have demonstrated that inclusion of forestland in a portfolio can reduce risk and improve returns, enhancing overall portfolio efficiency.

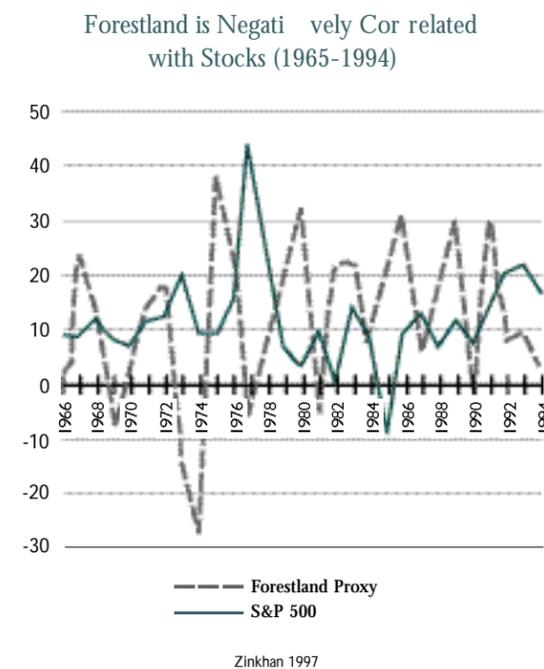


FIGURE 9

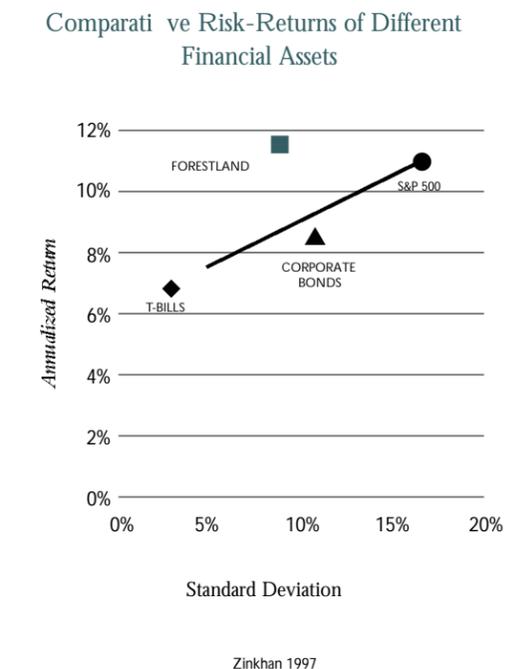


FIGURE 10

GLOBAL FOREST DISTRIBUTION, PRODUCTION AND OWNERSHIP PATTERNS

Of the 3.45 billion hectares (ha) of forestland in the world, 48% consists of temperate or boreal forests and 52% of tropical. (FAO 1994) Just seven countries account for more than 60% of the world's forests: the Russian Federation, Brazil, Canada, United States, China, Indonesia and Zaire. (See Figure 11) The top twenty producing countries of industrial roundwood (which includes all wood products other than fuel wood) account for 85% of world production. The top five command 57% of production. (See Figure 12 and Table 1)

Forestland is still being fragmented, simplified and lost at a significant rate. "Between 1980 and 1995, the extent of the world's forests decreased by some 180 million ha, an area about the size of Indonesia

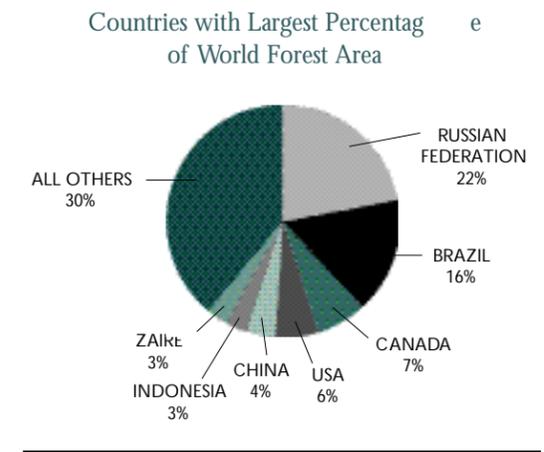


FIGURE 11

Top 21 Producers of Industrial Roundwood

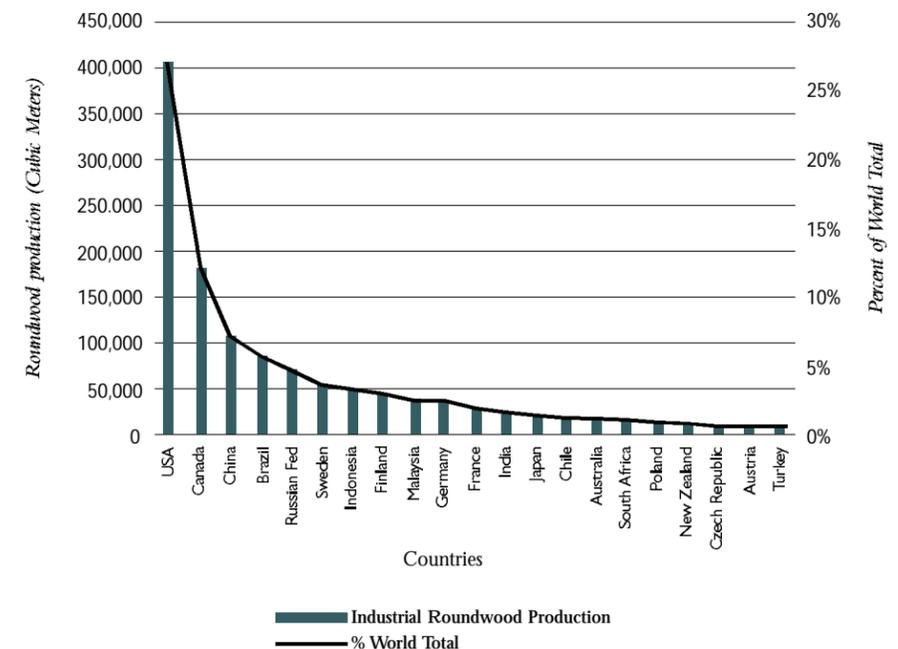


FIGURE 12

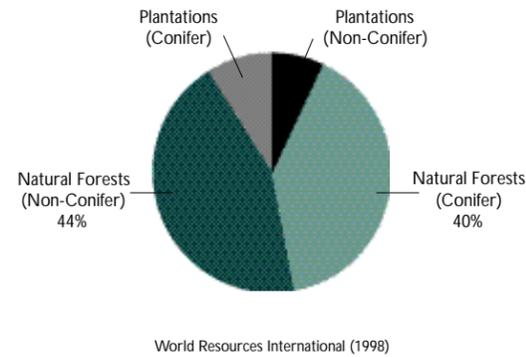
Top 5 Countries: Wood Production and Forest Area

Country	Wood Production	% World Production	% World Forest
USA	406,595 m ³	27	6
Canada	183,113 m ³	12	7
China	109,718 m ³	7	4
Brazil	84,711 m ³	6	16
Russian Fed.	67,000 m ³	5	22

FAO Yearbook—Forest Products 1992-1996 and FAO State of the World's Forests 1997

TABLE 1

Supply of Industrial Roundwood from Natural and Plantation Forests (1995)



World Resources International (1998)

FIGURE 13

Share of Wood Production from Plantations Among Countries with Significant Plantation Estates

Country	% Area	% Wood Production
Argentina	2.2	60
Brazil	1.2	60
Chile	17.1	95
New Zealand	16.1	93
Zambia	0.5	50
Zimbabwe	0.04	50

FAO State of the World's Forests 1997

TABLE 2

or Mexico.” (FAO 1997) Forests are being cleared across the developing world for agriculture and settlement. FAO estimates that only 4% of the natural forest area lost was converted to forest plantations. During this period, while forest expanded in developed countries by 2.7%, more than 9% of the forest area in developing countries was lost. Recent deforestation has been highest in the tropics.

As noted earlier, in the developed world, principally Europe and the United States, an insignificant amount of old growth or primary forest remains. In these countries, private forestland is dominated by naturally regenerated and planted secondary forests. In the developing world, it is roughly estimated that in 1995 natural forestland (including perhaps equal proportions of primary and previously harvested forests) made up 96% of forest area and plantations 4 percent. According to Wood Resources International, approximately 83% of current global wood supply originates from natural or extensively managed (long rotation) forests and 17% comes from short and medium-rotation plantations. (See Figure 13)

Forest plantations are playing an increasing role in wood production globally, in a few countries providing more than half the industrial wood harvest. (See Table 2) While still providing a small contribution to world fiber supplies, according to the FAO, most countries with large acreages in plantation intend to double their 1995 coverage by 2010. Many analysts predict that future fiber supplies—as compared with solid wood—will increasingly rely on fast-growing plantations of an agricultural nature.

More than 80% of forest plantations in the developing world are located in the Asia-Oceania region. These include not only large industrial blocks, but smaller holdings such as community woodlots, farms and agroforestry operations. Typically, plantations utilize non-native species selected for fast growth, commercial yield and simplicity of management. In the tropics, the primary species planted include eucalypts (23% of area), pines (10.5%), acacias (7.7%), teak (5%) and others. In the temperate countries, poplars, pines and Douglas-fir predominate.

FORESTLAND OWNERSHIP AND TRENDS

To better understand the forestland marketplace, in this section we will look at forestland ownership patterns in the U.S. and abroad, as well as some very major changes in forestland ownership that are occurring. In the interest of brevity, we will zero in on the U.S. and three Latin American countries to illustrate the range of conditions, comparing the highly developed U.S. market to some varied emerging economies.¹⁷

Unlike markets for many financial investments, the market for forestland is a dispersed and inefficient, even in the United States. Considered globally, the forestland marketplace is even more fragmented. There is no central exchange, no ready reference for transactions or values. Information about forest properties can be difficult or expensive to come by, especially accurate information on timber inventories and other biophysical characteristics of the property. Property boundaries can be ill-defined. In developing countries, title may be in dispute. Though, as in the U.S., a relatively small number of landowners may control the vast amount of forestland, many local communities and peoples have small holdings or even de facto control of larger properties. Therefore, local and regional knowledge, good business and governmental relationships, keen forestry and financial analytic capacity, and the

ability to act quickly can significantly influence the success of forestland acquisition.

1. Forestland Market in the U.S.

The U.S. forestland market is the largest and most developed in the world. Its major industrial owners are among the world leaders in forest products and are increasingly playing leading roles internationally. U.S. forest ownership and management trends significantly influence global trends. The opportunities to acquire and sustainably manage forestland in the U.S. are greater than elsewhere due to the breadth of the market, high demand for major commercial species, relative political stability, established land tenure, and the robustness of the forest products industry generally. The growing popularity of U.S. forestland investment may also yield greater risk than historically due to high valuations pushed by more investment capital chasing each transaction.

Most forestland is not owned industrially or institutionally. There are close to 10 million owners of the 393 million acres of U.S. private forestland¹⁸. However, 627,000 owners, or 6.3% of all owners, control 68.4% of the land. (See Table 3) Industrial owners and large non-industrial owners (1000 acres-plus) number 27,000, or about a quarter of a percent of all owners, and control 39% of private forestland.

Profile of U.S. Private Forestland Ownership

	1 - 9ac	10 - 99 ac	100 - 499 ac	500 - 999 ac	1000 + ac	Total
Landowners	5,795,000	3,480,000	559,000	41,000	27,000	9,902,000
% Total Owners	58.52%	35.14%	5.65%	0.41%	0.27%	100%
Forest Acres	16,600,000	107,600,000	91,600,000	24,500,000	153,000,000	393,300,000
% Total Acres	4.22%	27.36%	23.29%	6.23%	38.90%	100%

Birch (USDA Forest Service 1994)

TABLE 3

¹⁷ Forestland ownership in most other major developed countries, such as Finland, Norway, Sweden, Australia and New Zealand, is similar to the U.S. in that more than 70% of forestland is privately owned. While market and forest conditions vary among the developed timber economies, they are more akin to the U.S. than not.

¹⁸ The estimate of private commercial timberland, which includes some other forestland and native forestlands used by Thomas Birch in Private Forestland Owners of the United States, 1994. Total forestland extent in the U.S. is approximately 736.7 million acres.

Commercial forestland in the U.S. is overwhelming privately owned, with only 27% in public ownership (mostly in the west). Of the 73% in private hands, 14% is held by the forest industry and 59% by other private owners. (See Figure 14) While representing a minority of ownership, industrial and institutional owners, however, tend to control the most highly productive lands.

Looking at ownership patterns from the perspective of market valuation, however, it is interesting to note that public land valuation is almost 40% of the estimated total U.S. forestland market value of \$1 trillion. (See Figure 15) This is due to the higher stocking levels of timber on public lands and also due to the relatively higher proportion of public land in the Pacific Coast region, where commercial species such as Douglas-fir command higher stumpage than species in the east. Private ownerships have proportionately lower market valuations because of higher levels of timber harvest (therefore lower standing timber inventories on the ground), as well as the dominance of smaller ownerships in the South and Northeast, where values generally have historically been lower due to management for low-cost pulpwood rather than added-value sawlogs.

Forest value in any country is generally based on a number of factors including: (a) biological productivity of the forestland (including soils, climate,

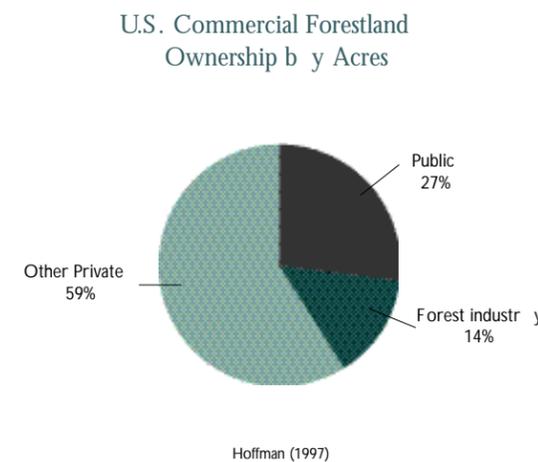


FIGURE 14

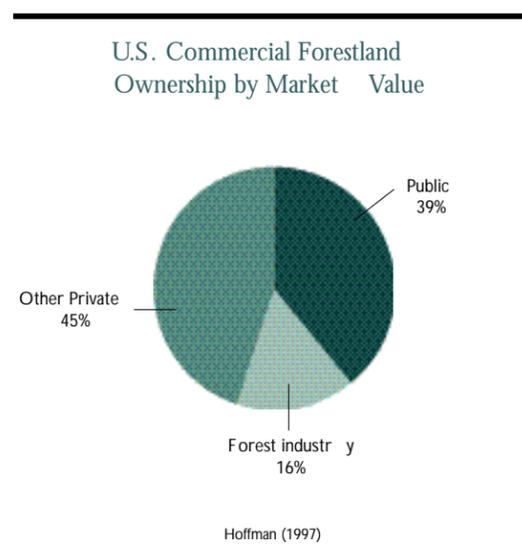


FIGURE 15

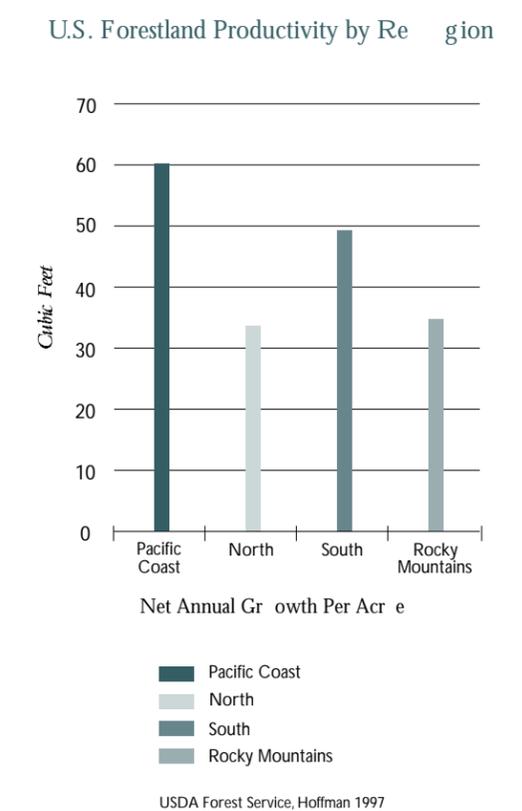


FIGURE 16

Brazil, Bolivia and Mexico. After a look at these countries, we will discuss some of the implications for investment.

A) Who Owns the Forests in Brazil?

The fourth largest current producer of industrial roundwood, Brazil is a major factor in the world forest products industry. Its forests are held in four basic types of tenure:

Public Lands- The government has two basic types of lands, the largest holdings being the national system of conservation areas (NSCA). The areas included on the NSCA are classified into areas of direct and indirect use. In the areas of indirect use such as national parks, partnerships with the private sector are being created to manage tourism—the first experience is being developed at Iguacu National Park in the state of Paraná. In areas of direct use such as national forests, forest management activities for timber or non-timber products are allowed, and the government plans the first concessions for the private sector to be made between 1998-99 (the first being implemented at Tapajós National Forest).

Private Lands- The majority of the forest lands in Brazil are still owned by the private sector. Companies and individuals own most lands, and properties can be immensely large in Brazil—an individual in São Paulo state owns more than 1.2 million hectares (around 2.9 million acres) in the state of Amazonas. Land is cheap in many parts of the Amazon Region (it can be as low as US \$5 per hectare), but land title is still a big problem. Descriptions and locations of the areas are inaccurate and one title can overlap others.

Extractivist Reserves- Although these areas are public and included on the national system of conservation areas, extractivist reserves can be considered a separate category of the government and depend much more on the needs and decisions of local communities. Opportunities in this area for investments include Brazil nuts, medicinal plants, rubber, and vegetable leather. The production of timber on a certifiable basis has been undertaken by partnerships in such areas as the Amazon states of Acre and Rondônia.

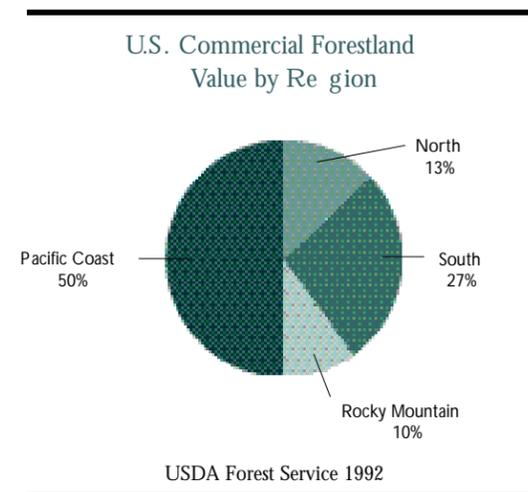


FIGURE 17

native species) as measured in annual growth (see Figure 16); (b) commercial value of dominant tree species; (c) timber inventories or standing volumes per acre; and (d) accessibility of timber and timber markets. Therefore, while the South encompasses 40% of total U.S. forestland (as valued in 1997), it accounts for only 27% of total market value. Conversely, the Pacific Coast region includes only 14% of U.S. forests, while comprising 50% of total value. (See Figure 17)

2. In the Developing World: Three Examples

In the top 20 global producers of industrial wood there are eleven that are considered “emerging economies”: China, Brazil, Russia, Indonesia, Malaysia, India, Chile, South Africa, Poland, the Czech Republic and Turkey (in order of magnitude). Other developing nations, such as Mexico, Bolivia, Argentina, Zambia and Zimbabwe, all have important forest sectors in their economies. The status of forest tenure and level of development of a forest products industry varies considerably around the world. It is beyond the scope of this report to investigate the prospects for sustainable forestry in any detail in these countries. However, as a means of introduction to these relatively small but growing producers, we will describe aspects of forest ownership and production in three countries:

Indigenous Reserves- These comprise more than 90 million hectares, 12% of the total area of the country. Management in these areas has several restrictions, but experiments in joint ventures and partnerships between companies and indigenous communities have begun in the states of Pará and Amazonas (logging and eco-tourism). The success of projects in such areas depends to a large degree on the transparency of the involvement of the indigenous people in the planning and operation of forest management.

The Challenge of Sustaining Brazil's Forests

The Brazilian Amazon contains more than 80% of Brazil's native forests and almost one-third of all tropical forests in the world. The standing volume of commercial trees in the Amazon is estimated to be 60 billion cubic meters, valued at a trillion rial of sawn wood. Amazon timber production nearly quadrupled from 1976 to 1987, accounting then for more than half of Brazil's total. In the state of Para, where 65% of Brazil's logging occurs, the industry generates 22% of economic output. With the depletion of tropical timber stocks in Southeast Asia, the Amazon is expected to become the world's major provider in the coming decades. In World Bank Report No. 15687-BR (1993) the main constraints on implementing sustainable forestry were identified as (a) public policies that create perverse incentives to destroy forests (e.g., native forests must be cleared to receive land title from the National Institute for Colonization and Agrarian Reform); (b) failure to involve local communities in forest management opportunities, often leading to land invasion; (c) weak, over-centralized institutions; and (d) lack of scientific information, databases and technical capabilities for forest management decision-making.

B) Bolivia at a Crossroads

Concessions are granted by the government on its land. All concessions were granted for existing Bolivian industry with previous "good" working records with the government. Prior to the new forestry law passed in July, 1996, there were 20 million hectares allocated to private industry as quasi-concessions, but granted through one-to-five-year contracts. Government fee payments were based on volume officially extracted from the forest.

Under the new law, about 6 million hectares were allocated, and fees are area-based instead of volume-based. This induced private landholders to "return" to the government those forests that they did not consider profitable or those on which they could not afford the taxes. Terms of the new concessions are 40 years, audited every 5 years for compliance; the concessions are let through public bidding. Old concessions were turned into new if they met the government's requirements. The annual concession fee is US\$1 per hectare, plus minor fees for invoice permits. Each forest concessionaire is required to develop a forestry management plan that is soundly implemented in the field; a professional forester is their representative to the Forestry Superintendancy.

The concessions are transferable and marketable from one company to another, which acquires all rights and responsibilities. The government must be informed, and the five-year audit will extend the concession if no major issues arise. In 1998, concessions sold for US \$1-5 per hectare according to type of forest, infrastructure available, size of the concession land, investment in the land and industry, and overall soundness of the company.

Advantages to industry include acquiring long-term rights, and a less corrupt system with clear rules and a serious management agency (the Forest Superintendancy) in exchange for industry's commitment to sustainable forest management. Constraints include the cost of changing over to the new system, and that the system is still not consolidated because of the government's unclear forestry development policies.

Bolivia Invests in Sustainable Forestry

The Bolivia Sustainable Forest Management Project (BOLFOR) is an example of public sector investment in building sustainable forestry. A joint venture between U.S. Agency for International Development and the Bolivian Government, BOLFOR's goal is to reduce the degradation of forest, soil and water resources and protect the biological diversity of Bolivia's forests. The strategy to do so entails building Bolivian public and private sector capacity to develop and implement programs for sustainable forestry. BOLFOR's three program elements include strengthening policies and institutions; developing scientifically-sound natural forest management systems; and supporting the commercialization of sustainably harvested forest products.

BOLFOR's main projects include:

- Providing training and other assistance in the implementation of sustainable forest management practices on 1.4 million ha of forestland, working with concessionaires, private landowners and indigenous communities.
- Establishing four permanent research sites in different forest ecosystems, from semi-arid to humid tropical forests.
- Training those working in forestry on policies, forest management and product development.
- Developing appropriate public policies, including the new Forestry Law and the creation of the new national forestry authority.
- Assisting in product research, development and marketing for certified timber and lesser-known but abundant species.
- Promoting forest certification through the creation of a local FSC-accredited certifier and a national body to regulate certification activities under FSC Principles and Criteria.

C) Mexican Exceptionalism in Community Forest Land Tenure

Mexico represents a unique case in the context of land tenure, tree tenure, and community forest management. In most of the world, the most pressing problem with regards to community forest management is communities getting secure access to government or private forests. In Mexico, an estimated 80% of the country's approximately 50 million hectares of closed forests are essentially owned by communities under two kinds of land tenure. Mexico owes its exceptionalism on this score to the Mexican Revolution, a cataclysmic upheaval of Mexican society which lasted from approximately 1911-1919, and to successive waves of land reform efforts. The 80% of the forests that ended up in community hands is embedded in peculiarly Mexican forms of land tenure called ejidos, which are collectively held but individually farmed land areas, and 'indigenous communities,' which are similar in practice but recognize ancestral land claims of indigenous peoples.

In both forms of land tenure, agricultural lands are individually administered by families, but forest lands are held in common and administered by the entire community. Although legal access to these forests was framed in the Mexican constitution, the Mexican government took the stance for many decades that the communities did not have the ability to manage these forests without state tutelage. Thus, concessions to log the forests were given for 25-30 years to parastatal timber companies, with the communities receiving only a stumpage fee that represented a fraction of the real value of the standing trees. During the concessions period, communities in several states became increasingly disgruntled with the minimal proceeds that they were receiving from the forest and the damage that was being done to the forests. In the early 1980s, when the concessions were ending in several different states at the same time, the Mexican government signaled its intention to renew the concessions for additional lengthy periods. The communities mobilized, with help from supporters in some agencies of the federal government and student activists, and were able to force the

government to reconsider these plans and to allow the communities to begin managing the forests for themselves.

Thus, by the mid-1980s, communities in states such as Oaxaca, Guerrero, Michoacan, and Quintana Roo began the arduous process of learning how to carry out forest inventories, administer logging operations, and operate small forest industries like sawmills and furniture workshops. Despite the difficulties, Mexico has today what is almost certainly the most extensive sector of community-managed forests anywhere. What is most notable is that many of these communities are managing their forests for commercial timber production, not just non-timber forest products, as is most commonly the case.

Today the World Bank estimates that some 5,148 communities (between ejidos and indigenous communities) exploit their forests commercially in Mexico. The vast majority have deep problems in forest management and marketing, but there is a significant minority that have made great strides in developing competitive forest industries and in moving towards sustainable forest management. As many as 400 of these community commercial timber producers are either currently competitive market producers or could be with greater technical assistance and credit.

Mexico shows that community forest management for commercial markets is possible. However, land tenure is an essential ingredient for it to occur, along with years of persistent effort in training, organizing, and securing financing.

D) Analysis of Forest Investments in Emerging Markets

As illustrated by just three Latin American countries, we can see how difficult it is to generalize, within tropical countries or between countries, about land ownership and investment conditions. One simple observation is that forestland in tropical countries has been dominated by public ownership, in contrast to the U.S. Traditionally, public forestland is typically managed by the private sector through long-term concessions granted by the

government. The degree of outright private ownership, and therefore relatively secure investment opportunities, varies considerably across the developing world. Therefore, public policy has had a major bearing on the availability of forestland for investment. The appropriateness of those policies and the government's capacity to implement them can expand or contract supply of forestland.

In addition to the complexity of ownership patterns in many countries, there are other major barriers to major forestry investment in the developing world. These include the risks (perceived and real) of working in nations with ineffective legislation, inefficient bureaucracy and corruption. Other major forestry specific investment issues are:

- Lack of infrastructure and accessibility for profitable harvesting and processing. Low land costs can be more than offset by high operating costs.
- Lack of applied scientific knowledge of natural forest ecosystems and appropriate silviculture (especially in the tropics); and associated environmental risk.
- Inconsistency and unpredictability in supply of native species, especially well-known species with ready markets.

Over the last decade, however, a number of major developments in the political and economic environments of many of these countries have changed the opportunities around forestry investments. Environmental concerns have translated into a growing number of agreements meant to facilitate forest products trade while promoting sustainability. The 1994 International Tropical Timber Agreement is one such example. It established "Objective 2000," a challenge to source all trade in tropical timber from sustainably managed forests by the turn of the century, moving governments closer to appropriate and enforceable forestry policies.

Through governmental and non-governmental initiatives, sustainable forest management in the developing world is growing from a theoretical concept to a set of practical, procedural guidelines. Certification schemes independently verifying forest practices

have proliferated onto the scene and are rapidly gaining acceptance by industry, environmentalists, and governments. Perhaps most important, markets for "green" forest products are rapidly growing, being led by "buyers groups" or groups of retail companies who are demanding that their wood products come from sustainably managed forests. These developments are inducing change in tropical and other developing countries' forest products industries.

Recent economic downturns in Asia and Latin America are driving a process of economic liberalization, devolution of powers and control held by governments, and increased privatization of resources such as forests. This trend towards private ownership and management seen in countries such as Indonesia, Chile, and Guyana is recasting policy and development assumptions. Transnational Asian timber companies had moved aggressively in the last decade to exploit these openings, but their efforts have stalled because of their own financial problems and strong environmental criticism.

What is emerging from this flurry of change is a mosaic of land ownership patterns involving individuals, communities, companies, and governments that reflects the mosaic of forests, from thorny woodlands to rainforests. Those examining the growing opportunities for profitable investing in emerging countries will have to be sensitive to the differing dynamics, investment requirements, and risk/return profiles of different countries. These risks may best be mitigated by offering investors the opportunity to invest in a portfolio that is diverse geographically to spread country risks and diverse in forest type and activity to spread market risks.

3. Trends in U.S. and Transnational Forestland Ownership

Both industrial and non-industrial U.S. forestland ownership have recently entered a time of historic re-structuring and turnover. These changes are already affecting forestland ownership globally, as large transnational forest products companies reorganize. This is being driven by four domestic U.S. and global trends:

A) The aging of U.S. non-industrial landowners:

Much of the U.S. private forest landscape is owned by individuals either directly or indirectly through partnerships and other closely-held entities. The average age of these forestland owners is estimated to be 65 years old. For many of this ownership class, their forestland represents a significant portion of their estate. For perhaps the first time in U.S. history since the settlement of the west, a major disposition of forestland is beginning to occur, either by planned succession, or unplanned as a result of estate tax liability. This disposition is expected to accelerate fragmentation and conversion of private forests. It is also likely to speed the consolidation of the most commercially valuable non-industrial holdings into institutional ownership as families "cash out" through the estate settlement.

B) Industrial owners are seeking increased shareholder value:

Publicly-traded forest product companies are under increasing pressure to improve shareholder returns. These companies have had very poor financial performance in the last decade, barely covering their cost of capital and generating little if any free cash flow. However, timber harvesting itself is quite profitable and stumpage has appreciated, in some cases strongly. Institutional investors in pulp and paper companies especially are seeking shelter from the last decade's pulp market volatility and poor stock performance.

A strategic decision has been made by numerous companies to realize the increased market valuation of their forestland—carried on their balance sheets at cost—by restructuring its ownership. Louisiana-Pacific, Weyerhaeuser, Cavenham, Sappi, Bowater and others have recently divested, or are in the process of divesting, more than 7 million acres of commercial U.S. forestland. Georgia-Pacific spun off its timberland into a "letter security" controlled by GP, in an effort to achieve greater recognition by Wall Street for their timber assets.¹⁹

¹⁹ As we go to press, Georgia Pacific has announced they are considering the auction of their California forestlands.

Other companies are selling their forest assets to financial investors outright, sometimes while retaining supply agreements.

This strategic restructuring has also led to increased international holdings. Many U.S.-based forest products companies that are selling U.S. lands are at the same time expanding abroad, acquiring major tracts in Canada, South America, New Zealand, and Australia.

C) Fiber is currently in over-supply:

Natural forests and plantations in southeast Asia and South America have been hard hit by the “Asian crisis,” as forests are being liquidated at depressed prices for cash in the export market. This financial crisis feeds into the already increasing pulp sources internationally—including recycled pulp—to give pulp and paper companies “fiber security.” These companies are now in a position to buy more competitively from a variety of pulp sources than through direct control of their own land. This creates another impetus to spin off their forests to realize greater asset value, as described above.

D) Financial investors in forestland are increasing:

When the Hancock Natural Resource Group first organized a timber investment fund 15 years ago, total institutional investment in this asset class was estimated to be \$300 million. Today it is approximately \$5 billion²⁰. While still a relatively small portion of the total estimated \$600 billion U.S. forestland market, it is growing strongly, influenced by the trends cited above. In addition to investment funds managed by the major Timber Investment Management Organizations (TIMOs) such as Hancock, Prudential, Wachovia and UBS, new financial entities and forms are emerging such as timber REITs, bringing significant flows of new capital to forestland as a distinct asset, apart from its value within an integrated forest products company. *Forestland is undergoing a fundamental change in the U.S. from treatment as an industrial or personal asset to a financial asset.* This has considerable implications for forestland ownership and management. (See further discussion in Section V.)

²⁰ This is primarily from pension funds. While a sizable figure, this still only represents approximately 1% of total pension assets.

OVER VIEW OF SOURCES OF CAPITAL

As discussed in the beginning of this report, there are different kinds of capital appropriate to different businesses, depending on the kind of business and its stage of development. The primary sources of capital needed to bring sustainable forestry to a higher commercial scale are:

- Private: Seed and Venture Capital
Other Private Equity
Asset-Based Lending
Commercial Banks
- Public: Grants
Development Funds
Loan Guarantees
Trade-related financing
- Philanthropic: Grants
Program-Related Investments
Investments Related-to-Program

1. Philanthropic Capital

Beginning with the smallest, but potentially the most creative pool of funds²¹, philanthropic capital flows from charitable individuals and institutions. Philanthropy’s traditional form of investment by grant-making is being supplemented now by new approaches that include aligning their capital asset investment policies with their programmatic goals, as described below. By utilizing all the forms of investment available to them, philanthropies can leverage their influence to more effectively accomplish their charitable missions.

A) Grant-Making

Through grants, philanthropies “invest” in non-profits to accomplish public benefit goals. Foundation grants have been a major source of

²¹ According to the report “Giving USA” published in May 1999 by the AAFRC Trust for Philanthropy, Americans made charitable gifts totaling \$175 billion in 1998, an increase of 11% over the previous year. Foundation giving rose 23% to \$17 billion. Of this charitable gifting, environment and wildlife organizations received \$5.3 billion. Combined assets of the 142 foundations surveyed by the Council of Philanthropy totaled \$154.4 billion. While considerable, these capital flows are dwarfed by the private equity markets.

capital for sustainable forestry research (both basic and applied); education for the general public, forest communities, landowners, forest managers and resource professionals; demonstration projects for various aspects of sustainable forestry; policy development; and forest conservation projects. Philanthropic investment in these areas has been instrumental both in the conservation of key forests and in expanding the practice of sustainable forestry in the private sector. While relatively small in amount, this “risk” capital, requiring no direct return, generates tremendous indirect return for the public benefit.

Supporting economic community development institutions is also an established charitable activity related to growing sustainable forestry enterprises. Grants to non-profit organizations for business planning assistance, revolving loan funds and mini-grant or micro-loan programs for R&D and start-ups are excellent mechanisms.

B) Investments

There is a trend within the foundation community to utilize their capital to promote charitable purposes through investment in for-profit and hybrid non-profit/for-profit enterprises as well. There are two similar tools being utilized by foundations for this purpose: One is the *Program-Related Investment* and the other is the *Recoverable Grant*. Both are made to enterprises with appropriate charitable purposes at below-market rates of return, requiring an eventual return of capital. These funds typically are allocated from the foundation’s grant budget or annual qualifying distribution (required under U.S. tax code).

Similarly, some foundations are also making *Investments Related to Program* as part of their investment portfolio. These are market-rate investments made with the goal of utilizing some portion of the foundation’s corpus to both generate earnings for charitable distribution and also advance their charitable goals through the specific investment.

By utilizing PRIs, RGs and IRPs, philanthropies can invest in strategic sustainable forestry enterprises, catalyze their growth through early stages and

achieve at least a return of capital, if not a competitive IRR. The returned capital and profits can then flow back into their charitable giving.

2. Public Capital

There are a wide range of public capital sources, both U.S. and international, appropriate to different sustainable forestry investments. The primary venue for public investment is through appropriations of public funds. These funds are usually distributed by direct disbursement of government agencies for, among other activities, acquisition or management of public forestland. The funds may also be distributed as grants—similar to those made by charitable entities—for scientific research, public education, technology transfer and non-profit community development institutions or projects. The latter could include enterprise feasibility studies, other business planning, market development activities, training, and technology transfer. Other public capital instruments include low-cost loans or loan guarantees, which can sometimes be essential to financing inventories, equipment and sales for emerging markets or sectors; and cost-share or other incentive payments for private sector implementation of public benefit projects, such as reforestation or habitat restoration.

In the U.S. there are many federal, state and local natural resource management, conservation and economic development agencies with funding activities that support forestry and could fund sustainable forestry related activities, enterprises and opportunities more widely. These include, for instance, the federal Department of Agriculture Farm Service Agency, USDA Forest Service, Cooperative Extension, Natural Resources Conservation Service, U.S. Fish and Wildlife Service, Rural Development Agency, Resource Conservation and Development Districts and a host of state and local agencies.

Historically, U.S. public investment has been oriented to (a) acquisition of forestland for parks; (b) management of national forests for timber production and other economic uses, while providing recreational opportunities; (c) reforestation of private lands after timber harvest; and (d) private landowner

education and technical assistance to encourage forest management (i.e., timber harvesting). In the last 20 years there has been a gradual and accelerating shift in government priorities from timber management to ecosystem management of forestlands. Accordingly, public funds are increasingly being allocated to habitat restoration and management on both private and public lands; conservation of ecosystem values on public lands; conservation of timber and non-timber resources on private lands; and associated educational outreach. There are great opportunities for U.S. public investment to directly conserve more environmentally significant forestland; to better manage existing public forestlands for their ecosystem values; and to foster the conservation and sustainable management of private forestlands.

There are a range of international public capital sources interested in forestry, with an emphasis on environmental and social issues. About 20 donor countries and 13 multilateral agencies are involved in providing Overseas Development Assistance (ODA) for forestry activities outside the U.S. Public sector financing—both bi- and multilateral, ODA and domestic—can play an important role in investment schemes for sustainable forest management, particularly in removing key structural barriers to investment. ODA flows are generally in the form of debt, grants, or technical assistance. They can be focused more structurally through efforts to create incentive/disincentive regimes, policy reform, institutional development and strategic planning, or focused more operationally on scientific research, public education, and training.

A) Multilateral Development Banks

Multilateral assistance is provided by development banks, UN agencies and specialized organizations, international non-governmental organizations (NGOs), etc. Among the multilateral development banks (MDBs), the World Bank is by far the largest source of funding, and its policies tend to guide other agencies. Of particular importance has been the WB 1992 Forest Policy which rules out any financing of logging in primary tropical forests. Due to local and international conflicts related to

the use of forests, WB and the regional development banks have switched their focus from “pure” forestry towards integrated projects where forestry is part of rural development and environmental conservation. The Global Environment Facility (GEF), recently created by the Bank to address issues of biodiversity, has funded some forestry projects focused on conservation. Related to the Bank is the International Finance Corporation (IFC), which has a small portfolio of sustainable forestry loans with the private sector and an interest in increasing that portfolio. The Interamerican Development Bank (IDB) has created an unusual instrument called the Multilateral Investment Fund (MIF) that has been active in supporting biodiversity and forestry funds.

The World Bank is currently undergoing a review of its Forest Policy and Strategy through a broad-based consultative exercise involving an evaluation of the Bank’s operational activities related to forestry. The revised Policy will be a major signal to both the donor community and the international financial community on which kinds of activities are considered appropriate for financing, and what kind of preconditions should be put in place at country level to mobilize such financing. The contentious issue of using primary natural forest for timber production will be one of the critical elements to be addressed.

B) International Agencies

Technical assistance in forestry is provided by a number of UN agencies such as Food and Agriculture Organization (FAO), International Tropical Timber Organization (ITTO), International Labor Organization (ILO), UN Development Program (UNDP), UN Environment Program (UNEP), UN Education, Scientific and Cultural Organization (UNESCO), UN International Development Organization (UNIDO), World Food Program (WFP), and World Health Organization (WHO). UNDP is the main funding channel of the UN for development and environment through country program allocations. In 1993, UNDP, as a follow-up to UNCED, launched the Forestry Capacity Program

to help countries formulate and implement their national forestry programs (NFPs). In 1998, UNDP launched its Program on Forests (PRO-FOR) to promote sustainable forest management (SFM) and related public and private sector partnerships at the country level, in order to support sustainable livelihoods.

FAO is the principal technical agency involved in forestry and its scope covers practically every aspect related to forestry, including linkages with agriculture. Its normative activities are funded from the regular budget while field projects are financed by donors and the FAO Technical Cooperation Program.

ITTO focuses on the promotion of SFM in tropical forests through interventions in reforestation and forest management, forest industries and economic information and market intelligence. They finance projects through the Special Account to which voluntary contributions are made by donors, sometimes including the private sector. The International Tropical Timber Agreement (ITTA) 1994 made provisions for the establishment of the Bali Partnership Fund. This facility, which is expected to become operational in 1999, should offer an opportunity for improved decision-making on the use of funds which are unearmarked, based on objective criteria rather than relying on donor priorities as has been the case in the past. Practically all the contributions to the ITTO Special Account have been earmarked.

While international public sector financing for sustainable forestry is not likely to increase, these monies from the public sector are well-positioned for the startup phase of forestry enterprises. Additionally, these funds are capable of being applied to risk mitigation strategies and long-term debt vehicles as part of a complementary funding streams strategy with private sector investors. This would have the potential to reduce investment liabilities and risk, facilitate strategic management, reduce project uncertainties, and ensure long-term commitments and involvement from relevant stakeholders.

3. Private Capital

Private capital is by far the greatest pool of investment funds, dwarfing philanthropic and public funds. The sources of private capital are varied, ranging from specialized privately marketed instruments to the vast publicly traded stock and bond markets. The kinds of private capital most relevant to sustainable forestry today are oriented to start-up, early stage and expansion of businesses. In these earlier stages, private capital can be effectively commingled with public and philanthropic sources, leveraging the “hard” dollars and mitigating risk. As businesses develop, the private capital markets take over entirely, passing judgment on each company’s success and profitability.

Venture investing can be done by any private entity, typically high net-worth individuals, companies, or venture funds. Given the higher degree of risk in making earlier-stage private investments, venture investors seek higher returns of 20% and more. Venture investments are made to acquire equity stakes or equity-like subordinated debt in operating businesses, rather than acquire assets such as forestland or equipment. In addition to private funds organized strictly for venture investing, there are also diversified private funds that may combine venture, private equity, public equity and/or other investments. Some portion of their assets may be invested in forestry-related enterprises or securities.

Asset-based lending entities (including leasing companies, factors and commercial banks) are also important to the expansion of sustainable forestry as a sector, as are commercial banks, generally. For certain more mature sustainable forestry operations, there may be the opportunity to access capital through the issuing of publicly-traded securities as well.

²² Partnerships have been the favored form of forestland ownership for individuals, small groups, families, and larger private funds. However, with the advent of Limited Liability Companies, which offer limited liability similar to a corporation but are treated for tax purposes like a partnership, enterprises which would have previously been organized as a limited partnership are increasingly using the LLC form instead.

The forms of forestland equity, including both private and public securities, are discussed below. We will consider the role of private capital more fully as we examine the nature of forestland ownership and evolving ownership structures.

FORMS OF FORESTLAND EQUITY

There are various forms of equity ownership in forestland, whether in fee title or timber rights. These include:

1. Direct sole ownership of a property or group of properties.
2. Direct ownership of a property or group of properties through a partnership (general or limited)²² or similarly closely-held vehicle.
3. Ownership of privately placed partnership units in a limited partnership fund or units in a real estate investment trust (REIT) organized by a timber investment management company (TIMO). These are usually units of \$1 million or more, placed with “qualified” high net-worth investors or institutions.
4. Ownership of a portfolio of properties or property interests through a dedicated account managed by a TIMO (often reserved for entities investing \$25 million or more).
5. Ownership of publicly-traded shares in a forest products company or partnership units in a master limited partnership (MLP) (however, most include processing and distribution facilities and are therefore not “pure” plays in forestland).
6. Ownership of publicly-traded forest REIT units (a new vehicle similar to a forestland MLP but more attractive to certain institutional investors for tax reasons).²³

²³ Timber REITs are not yet fully tested by the marketplace and the IRS. Plum Creek Timber Co., LP, has announced its intention to re-organize its MLP into a REIT. Two new entities, Strategic Timber Trust and Timberland Growth, are planning on taking their recently acquired portfolio of properties public as REITs.

There are two basic kinds of private investors: taxable and non-taxable. An investor’s tax status will impact its choice of forestland equity vehicle. The desire to attract certain kinds of investors also influences a business’s legal organization, ownership structure and management decision-making. Taxable investors include individuals and corporations. Non-taxable investors include non-profit corporations, such as private foundations, public charities, churches and educational institutions.²⁴ Pensions funds and other ERISA entities are also not subject to taxation.

There are three basic legal forms for ownership, each with its own tax treatment, which can impact the rate of return of its forestry investment:

1. Proprietorship (sole owner) or general partnership:

Provides no limitation on liability and a single level of taxation. A large proportion of U.S. forestland is held directly or in some form of general partnership.

2. S corporation, limited partnership, limited liability company (LLC) or REIT:

Provides limitation on liability, usually in return for some limitation on investor control, numbers or other ownership characteristics. Provides for a single level of taxation because these entities are “pass-throughs” and have no tax identity of their own. Most forestland investment funds are organized as pass-throughs. Each of the various pass-through structures has its own requirements and limitations regarding numbers and kinds of owners, management/ownership relationships, etc.

²⁴ Generally speaking, the investment earnings of these non-profits are not subject to tax. However, there are complex regulations they must adhere to in order to maintain tax-exemption. Certain earnings, for instance, from operating businesses not related to their program or from other “active” investments are subject to taxation. Tax-exempt institutions usually organize their forestland ownership through limited partnerships or similar structures, with TIMOs acting as their investment manager, in order to ensure that their ownership is passive, to avoid unrelated business income tax.

3. C corporation:

Provides limitation on liability and a double level of taxation, i.e., the corporation is taxed on its net profits and the investor is taxed on any profits distributed. Most publicly-traded forest products companies are organized as C corporations.

TRENDS IN FORESTLAND INVESTMENT CAPITAL ORGANIZATION AND IMPLICATIONS FOR SUSTAINABLE MANAGEMENT

The desire of investors to avoid double-taxation and the availability of more flexible pass-through vehicles is a major factor in the increase in ownership of forestland by such vehicles and the decrease in ownership by regular corporations. Avoiding two levels of taxation and managing for capital gains can strongly improve the forest investment return. Together with the other historic trends influencing forestland ownership described in Section IV, the result is a dramatic increase in investment in forestland as a financial asset—that is, ownership by institutions such as pension funds or jointly by investment partnerships, MLPs or REITs, rather than by forest products companies. Already new capital is flowing into forestland from institutions seeking to gain the advantages to their portfolio that forestland as an asset class should bring. As both U.S. industrial and non-industrial forestland changes hands over the next decade, and as international investment in forestland increases, a significant portion will find itself in financial ownership through “pass-through” vehicles.

Large-scale financial ownership could influence forest practices positively or negatively. From the positive perspective, financial ownership of forests formerly owned by industrial companies can de-link the forest from the mill. Forestlands owned by wood processors have historically been more prone to overharvest in the effort to supply the mill.

Forestland is a long-term asset that provides periodic income (the frequency of which depends on the extent and nature of forestland owned). Liquidity has typically been obtained by selling the property or harvesting timber to meet liquidity

needs—sometimes at the expense of long-term asset value. Financial ownership with marketable investment units can supply greater liquidity opportunities for investors than some other traditional ownership forms, such as family corporations or smaller private partnerships.

If ownership units are more freely transferable and the forest management is not directed to supplying an associated mill, there is the potential for the forestry practiced to be more consistent in nature, and more sustainable for the long-term.²⁵

The “beneficial” ownership of forestland is becoming more dispersed and “retail” through these new financial products. This puts the control of the resource and its management more strongly in the hands of investment bankers and fund managers, who have great sophistication in finance but not in forestry. Therefore, there is no guarantee that the demands of the capital markets for return from the forest will be any more sustainable than at present. As forestland becomes another asset to market through a variety of financial products and securities, the flows of capital can move strongly in and out of the asset, creating a potential for greater price volatility than historically. While pension fund ownership could provide for long-term, sustainable forest management, fund managers are still driven to accomplish short-term benchmarks. Further, tax-exempt institutions are dependent on their investment managers, who in turn hire forest managers, so that their forest investment is considered passive by the IRS, keeping income from being subjected to unrelated business income tax. This constrains pension fund and other exempt-institutions’ influence on forest management.

The financial market success of publicly-traded MLPs and REITs are driven by their distributions

²⁵ Though increasingly industrial forest owners are selling their forestland to a new entity that then in effect leases the land back to them for management, or creates a supply agreement with them that dictates flows (and sometimes prices) of timber off the land. This arrangement lets the industrial producer monetize their timberland asset while still securing control over the supply.

to unit holders. This puts pressure on forest managers to schedule timber harvests to meet the distribution objectives. With increasing ownership by entities that require income generation over asset appreciation, there could be considerable damage to forest ecosystems as a result. Markets will still be challenged to provide sufficient recognition of the value of standing timber assets versus timber harvest receipts.

Debt financing of forestland has similar implications. The industry norm has been to acquire forestland with a high proportion of debt.²⁶ By utilizing debt, investors can increase their return on investment, having leveraged their actual cash contribution. Debt financing requires relatively high and predictable levels of cash flow to service the obligation. When a forest property is highly leveraged, its owners have an impetus to unsustainable levels of harvest, which can result in a degraded biological and financial asset.

Forests are an asset that pushes the limits of conventional investment horizons. Whether or not forest-based securities turn over in the market frequently, forests themselves are intergenerational assets from a human perspective. Frequent turnover in forest ownership and control tends to have a degrading effect, as each succeeding owner seeks to pay off acquisition debt and derive near-term returns. Therefore, regardless of the ownership form, the longest-term perspective will benefit both the forest ecosystem and the investor.

A private equity investment vehicle for sustainable forestry is likely to be one that minimizes debt or other fixed distribution requirements; emphasizes capital appreciation; has a longer term of life to capture maximum value and mitigate short-term stumpage volatility; and minimizes tax impacts.

²⁶ Pension funds and investment funds with institutional investors can’t utilize acquisition debt for tax reasons.

One of the fundamental differences between the conventional and the sustainable forestry business models is in their sources of return. As discussed in Section III, conventional forestry is about maximizing income from timber harvest—frequently at the expense of overall yields through time. Conventional forestry operations also enhance returns through non-forest development based on “highest and best use” financial calculations. Sustainable forestry is about maximizing total return from management of the forest ecosystem, increasing yields through time. In this context, highest and best use analysis focuses on conservation of the forest. Further, sustainable forestry offers a spectrum of returns that conventional forestry cannot provide comparably. In this section we will review the potential of revenue from established and emerging forest products additional to timber.

TIMBER-RELATED RETURNS

Even in sustainable forestry, timber harvest income is likely to remain the chief revenue source for the foreseeable future. The goal of sustainable timber harvest is both to yield net income and to improve the remaining stand characteristics, enhancing future income potential and non-timber forest values. In the near term, then, forest asset appreciation is emphasized over timber income. Longer term, income from sustainable timber harvest can equal or exceed conventional forestry.

The wood products flowing from sustainably managed forests are often the same as those from conventional sources. However, sustainable forestry generally provides greater diversity of products and species harvested, including sustainable quantities of increasingly rare larger dimension and higher grade sawtimber. This diversity of wood products can feed a similarly diverse constellation of upstream processing and marketing enterprises.

As described in the next section, the ability to realize returns from non-timber forest products, ecosystem services and conservation value is growing as existing markets expand and new ones emerge.

ADDITIONAL SOURCES OF RETURN

There are various sources of return additional to timber that can be derived from sustainable forestry. In fact, well-stocked, older and more complex natural forests can provide these goods and services more readily than simplified, younger forests typical of conventional forestry. This section examines the prospects for:

- Non-Timber Forest Products
- Recreation/Eco-tourism
- Ecosystem Services:
 - Carbon Sequestration
 - Watershed Services
- Conservation Real Estate and Limited Development

Our analysis suggests that a sustainable forestry enterprise can succeed in monetizing non-timber forest values through one or a combination of these approaches, enhancing the competitiveness of sustainable forestry or making up any incremental difference in profitability there may be as compared to conventional forestry. Each revenue source is summarized below, followed by a more detailed description.

Non-Timber Forest Products (NTFPs) have the widest and most established market of all the alternative sources of return. NTFPs cover a wide range of goods, are produced in all cultures, and have been important to economies since time immemorial. The profitability per acre can vary widely, depending on the products. Revenue in some instances can exceed that of timber harvest. Generally speaking, NTFP revenue ought to provide consistent annual income compared to timber harvest, yielding profits that more than offset annual property maintenance. Markets for NTFPs are widespread and often well-established. The scope of application is also quite widespread, given that all forests can provide some kind of NTFP.

Carbon sequestration is the ecosystem service with the greatest potential as an additional source of return derived from the conservation and sustainable management of forests. Revenue is generated

from the sale of “carbon credits” or “tradable carbon offsets” through new market mechanisms being created by the parties to the U.N. Framework Convention on Climate Change. The World Bank estimates that \$5 billion in annual carbon credit transactions could occur during the treaty’s first budget period (2008-2012). The World Resources Institute estimates that carbon sequestration projects in tropical forests alone could generate a similar amount of revenue. Landowners committed to conservation of primary forests, reforestation of degraded areas and management of secondary forests for an older, more complex character could derive significant revenues from the sale of carbon credits. This is an emerging market driven by a still evolving global climate change policy, therefore the prospects are not very immediate except in pioneering efforts. Eventual revenues depend on the additional carbon stored per acre for a tract as compared to a baseline scenario. At prices of \$10-20/ton carbon stored, a sizable market could be developed with a wide scope of application for sustainable forest investments.

Recreation and eco-tourism comprise traditional and new forest-based outdoor fee-for-service activities from which a forest owner could profit. The likelihood of generating returns from recreation/eco-tourism is very site dependent. Access for sufficient numbers of visitors is key. The ability to provide that access profitably, with an appropriate level of amenities, must be assessed on a case-by-case basis. Low amenity investment levels typically generate low per acre returns, but ones that can add incremental profit from an activity compatible with timber operations. Market access is relatively high for recreational use of forests within 1-2 hours of urban areas. Hunting is the most established activity. Hiking, riding and biking are newer, strongly growing recreation markets. Higher amenity investments can generate higher profits, with greater capital risk, and are usually associated with relatively pristine forest reserves. Nature travel to more distant destinations is an important, growing segment of world tourism.

Water shed services are the other ecosystem value with significant near term potential to provide

added revenue to forest landowners. The protection of forested watersheds to preserve high quality water supplies is not new, but its importance is increasing as world population increases while water supplies and quality are diminishing. The increasing costs of building new reservoir systems as well as filtering polluted water make forest protection correspondingly more financially attractive. The scope is limited to those with forests in select municipal watersheds. Management that reduces siltation, maintains more even flows and avoids costly filtration systems for water and hydropower utilities can generate new returns. The revenue source is typically from user fees paid to the utility by its customers. These funds are used to acquire watershed lands outright or conservation easements on them, or similar means to share fee proceeds with watershed landowners.

Conservation real estate is somewhat different than the other forest goods and services described here. Conservation adds value to sustainable forestry operations through the sale or tax-deductible donation of fee title or conservation easement on forestland. Such transactions can secure improved water quality or carbon sequestration. In addition, conservation real estate revenue enables landowners to monetize non-commodity forest resources, such as habitat, that do not have any direct market and can only be valued indirectly through the opportunity cost of alternative management on timber or development values. Finally, revenue or tax savings from a conservation easement can compensate the forest owner for restricting the non-forest development of the property. This allows the sustainable forestry operation to realize some of the so-called “highest and best use” return while committing to maintaining the forest as forest.

Conservation real estate transactions can be appropriate to both primary and secondary forests, helping achieve biodiversity goals on a landscape scale. In the case of primary forests, more forest area can be acquired by governments or non-profit organizations to be reserved from timber production in favor of management for biodiversity, fish and wildlife habitat, watershed or other resources of

significant, broad public benefit. In the case of secondary forests, more forest area can be acquired by private or public entities for sustainable management, while permanently protecting significant non-commodity ecosystem values. There is an immediate market among forest owners for conservation real estate transactions, but financing is quite limited compared to the large potential scope. Funding is almost entirely public, either through direct payments or tax benefits. Additional funding is emerging through mitigation banking, water user fees or through the developing carbon credit market.

1. Returns from Non-Timber Forest Products

Non-timber forest products encompass the suite of plant-derived products and represent considerable global economic value. According to the FAO, at least 150 NTFPs are significant in international trade, with an estimated value of \$11 billion.²⁷ These products include decoratives, edibles, medicinals, building and household materials.

While ancient in origin, the full economic scope and structures of NTFP sector are poorly documented whether one is considering the U.S. Pacific Northwest or Nepal. Generally, NTFP harvesting for wild plants has operated in the gray reaches of the official economy. In many countries, public access to private forestland is a long-established right, allowing for widespread and often unregulated collection for both personal and commercial uses. In recent times, efforts have been made to organize extraction in such a fashion as to bring greater value to the forest landowner as well as the often itinerant low-income harvesters. The needs of harvesters and the goals of forest managers can be in conflict. Development of organized businesses can provide for a mutually beneficial relationship by providing regular cash income to harvesters while incorporating their work within the overall forest management regime.

Within the context of sustainable forestry, NTFPs have great promise. Forest ecosystems can be managed for both timber and non-timber products because NTFPs grow in association with commercial tree species. Some are understory plants; some are the fruit of the fungal mat that enhances timber productivity; some are the seeds, branches and sap of the trees themselves. By managing for overall ecosystem productivity, and not over-harvesting or depleting any one aspect of the system, the ongoing capacity for a diverse range of products can be maintained and enhanced. Businesses that bring added and more regular returns to forest owners and forest communities from NTFPs can provide incentives to these groups to manage more sustainably. They may also contribute to maintaining the cultural knowledge that informs the harvest of NTFPs and is being lost. Sustainable gathering is increasingly possible with advances in the understanding of forest ecosystems; and with the organization of businesses that provide more secure access or tenure to forests, improvements to harvest techniques, value-added processing at or near the forest, and cooperative marketing.

NTFPs make major contributions to economies around the world:

- In Zimbabwe, where forests are a major source of indigenous food, NTFPs contribute 30-40% of forest economic value.
- In India, NTFPs comprise an estimated 30-40% of value from forests, and as much as 70% of export value. (Gupta and Guleria 1982a). Indian NTFPs include fibers, grasses, bamboo, essential oils, gums, lubricants, dyes, medicinals, spices and foods.
- Several studies in Scandinavia have shown that the harvest value of NTFPs contribute in the range of 6-10% of total forest economic production. The net profit value of the forest berry crop in Sweden was estimated to be SKr500 million in 1987; and the mushroom crop SKr550 million. (Saastamoinen 1992, Hultkrantz 1991)

²⁷ As described further below, most NTFPs are produced for local or regional consumption and their value is not reflected in the international trade figures.

ADDITIONAL SOURCES OF RETURN

1. Returns from Non-Timber Forest Products

The medicinal plant sector alone has an estimated value of \$12.5 billion. Growing at an estimated rate of 8-15% annually, major exporting countries include India, Argentina, Brazil, China, Pakistan, Poland and Bulgaria. (Grunwald 1994) The best-selling medicinal herbs in the U.S. all come from forests, including echinacea, goldenseal, valerian, Oregon grape root, ginseng, ginkgo and St. John's wort.

2. Recreation / Eco-tourism

A study in Belize assessed the economic value of medicinal plant harvests for two plots of tropical forest. One case assumed a 30 year harvest cycle with a resulting net present value (NPV) of \$726/ha; the other assumed a 50 year harvest cycle yielding a NPV of \$3,327/ha. These economic values are competitive with those of intensive agriculture or pine plantations, typical alternative uses. (Balick and Mendelsohn 1992) Another study in Peru demonstrated that a 1-ha plot could yield 26 species of marketable value, including 11 kinds of edible fruit, one latex-producing species and 60 species of commercial timber. The potential revenue of the non-wood products significantly exceeded that of timber harvesting or cattle. The value from a sustainable operation, including timber and NTFPs, was estimated to be at least \$6,820/ha, of which 90% was derived from NTFPs. This value dwarfs those if the forest were converted to a timber plantation (\$3,184/ha) or to pasture (\$2,960/ha). (Peters, Gentry and Mendelsohn 1989)

In the U.S. there is a similar wide range of NTFPs that are harvested commercially and non-commercially, with large domestic and export markets. Floral greens, including boughs, cones, grasses, ferns, mosses and ornamental plants, are major U.S. NTFPs. The U.S. floral industry is the world's largest, at \$14.1 billion in 1995. In 1989, the wholesale value of floral greens in the U.S. Pacific Northwest alone was \$128.5 million, providing employment to more than 10,000 people. Twenty-eight percent of this was exported. Wild, edible mushrooms harvested in Washington, Oregon and Idaho were valued at \$40.2 million in 1992. (Schlosser and Blatner 1994)

Though a considerable portion of U.S. NTFP harvest occurs on public forestland, private landowners play an increasing role either as direct producers or by providing long-term leases or permits for harvest on their lands. Lease revenues for NTFP gathering can yield landowners 10% of the value of the harvest, contributing in the range of \$5-15/acre, depending on the site. If the landowner organizes the collection, sorting and primary processing of NTFPs, per acre returns could increase three-fold or more. (Pacific Forest Trust 1997)

Other NTFPs are well-suited to agro-forestry and plantation operations, some of which can be incorporated within or associated with natural forest management ventures. Coffee, rubber, cocoa, hearts-of-palm, brazil nuts and rattan are examples of major cultivated NTFPs.

While data tends to be very regional, and rigorous economic quantification at the primary producer level often unavailable, it is still evident that NTFPs can contribute significantly to the profitability of sustainable forestry operations.

2. Recreation/Eco-tourism

As with the harvest of non-timber forest products, the use of forests for recreation and personal renewal is not new. People have long used forests culturally and commercially for hunting, fishing, hiking, boating, camping and the observation of nature. Sustainably managed and conserved forests provide added recreational opportunities in growing markets, as compared with conventionally managed forests. This is due to these forests' greater and more diverse habitat values, ecological complexity and aesthetic pleasures.

The tremendous growth in human populations over the 20th century, with associated urbanization and loss of forests, has fueled the growth of a specifically "nature-based" tourism in addition to traditional consumptive forest recreation, such as hunting. This is sometimes referred to as eco-tourism, adventure travel or sustainable tourism. The World Trade Organization estimated that 7% of all international travel expenditure was related

to nature-based tourism. (Lindberg 1997) The global economic value of this tourism was estimated by Fillion et al to be at least \$83 billion (1992). Whatever the precise dimensions, nature-based tourism is a very significant sector and is growing strongly. According to the World Resources Institute, while tourism generally has been growing at an annual rate of 4%, nature travel is increasing at between 10-30 percent. (Reingold 1993) Another indicator of the growth in this sector is the 157% increase in bird-watchers in the U.S. between 1983-1994, with 54 million participants. (Gustaitis 1997) In addition to being close to wilderness and wildlife, a premium is placed by eco-tourists on learning and discovery.

Most major destinations for nature-based tourism or recreation are publicly-owned parks or reserves, many of which have developed recreational concessions of one kind or another. These have become a major economic force for communities in their region. As one example, travel to national parks in the U.S. generated direct and indirect economic value of \$14.2 billion, supporting almost 300,000 tourist-related jobs. Canada is high on the list of desired destinations for tourists surveyed in Japan, France and Britain because of its national parks, scenery and wildlife.

Tourism is Costa Rica's leading "export" since it became a major eco-tourism destination, with 781,000 visitors in 1996. Of these, two-thirds visited a natural protected area. (Instituto Costarricense de Turismo 1996) One of the most successful forest tourism projects that has been documented is the Monteverde Cloud Forest Biological Reserve in Costa Rica. Annual net revenues from this project yield \$18/ha/year. (See box on next page.) Prior to Hurricane Mitch's devastation, nature-related tourism was growing at 15% per year in Honduras, with 200,000 tourists total in 1995.²⁸ (Dempsey 1996) The number of trekkers visiting Nepal, another major forest eco-tourism locale, grew 255% in the decade of the 1980s. (Gurung and De

²⁸ Observers note that forested areas of Honduras survived the storm much better than deforested areas.

ADDITIONAL SOURCES OF RETURN

2. Recreation / Eco-tourism

Corsey 1994) In a report for the World Bank, the estimated annual value/ha of ecotourism is estimated to be \$12-25. (Chomitz et al 1998)

On private forestlands in the U.S., hunting is the most well-established fee-based recreation. Landowners provide access on a daily fee or short-term lease basis, typically limiting use to several individuals or an organized group for ease of management. Fees vary from \$2-\$15/acre for a season, with higher fees on forestland in the south where public land is more scarce than the west or north-east. (Loomis and Cooper 1990)

For instance, long-leaf pine forest properties (5,000-15,000 acres in size) in the Red Hills region of southeastern Georgia that have been fire-managed for high quality bird habitat are leased for \$25,000-50,000/week during the 8-12 week hunting season. Anderson-Tully's hunting lease program in Arkansas and Mississippi employs several wildlife biologists and generates over a million dollars in revenue, with lease rates ranging from \$3-6/acre per year, depending on the parcel's habitat quality. Champion International ran a successful fee-based hunting program on its Washington state forestlands. Permits were available for one day (\$13), three days (\$27) and 10 days (\$55). Year-round permits cost \$200 for one person and \$300 for two. The program attracted 10,000-12,000 visitor use days each year.

Leases for horseback riding, hiking, camping and fishing are also established and growing revenue sources. Private forestlands within 1-2 hours of urban areas that provide good road access have the greatest prospects for generating revenue from fee-based recreation. The U.S. Forest Service estimates that 8% of private non industrial forestland is leased on some basis for recreational use. The prospect for the growth of more diverse, non-consumptive recreational uses on private, managed forestland in the U.S. is very good. Demand is increasing for the kinds of outdoor recreation appropriate to these properties, which provide a range of locations from quite remote and pristine to very accessible and well-roaded. According to a U.S. Forest Service study of outdoor recreation and

wilderness, the most popular types of recreation projected for 2040 include walking, hiking, both undeveloped and developed camping, wildlife viewing, bicycling and photography. At the same time, they project shortages of opportunities to satisfy these demands. (Cordell, et al 1990)

There appear to be growing opportunities in forest regions around the world to manage profitably for recreation and eco-tourism as part of a sustainable forestry enterprise. Revenue from forest-based

recreational enterprises can be an incentive for landowners to conserve wilderness and manage natural forests for added complexity and biodiversity. Successful operations have shown it is possible to add 15-20% to the net present value of forest-land investments through recreation.

3. Ecosystem Services

Ecosystem services are recognized as having huge economic value at the macro-level. Costanza et al

A Model of Successful Ecotourism in Costa Rica

The Monteverde Cloud Forest Preserve is a private 10,000 ha preserve owned and managed by the non-profit Tropical Science Center of San Jose, Costa Rica. The TSC and the Monteverde Conservation League assembled the Preserve from donated and purchased properties since 1972. Sitting astride Costa Rica's central Tilaran Mountain Range, Monteverde is in the heart of a biologically rich region. Beginning as a field station for biologists, Monteverde Cloud Forest Preserve has become the leading private preserve visited by foreign tourists in Costa Rica, hosting approximately 30,000 visitors or 6% of all tourist arrivals to the country—many of whom came expressly to visit this preserve. These visitors generated an estimated \$9.75 million in new expenditures. Positive publicity that began with the broadcast of a BBC documentary on Monteverde in 1978 has built the preserve's "draw" among European and North American nature tourists.

From its inception, the Preserve has had the benefit of considerable community support which has helped it maintain its integrity and grow. Through adaptive management approaches, the Preserve has defended itself from encroachments by squatters and logging interests. It has become self-supporting in its primary functions through its variable fee structure that charges foreign tourists a higher rate than nationals and students, and provides free

access to locals. The tourism carried out on a small portion of the property provides sufficient income to fund the maintenance, protection and administration of the whole preserve. Entrance fees provide 45% of revenue and 97% of those fees come from foreign visitors. Revenue also comes from the "Natural History Program" of guided tours; the gift shop, snack bar and lodge. The lodge is the only portion of the operation that runs at a loss, as it provides free housing and food for the many volunteers who help maintain the trails and staff various operations. Overall, including donations that amount to 4% of all revenue, Monteverde has been producing a good surplus, documented as almost 9% in 1993. This provides funds for investment in capital improvements and expansion of educational programs.

Strict guidelines for visitor use have contributed to the ecological sustainability of the operations. In seeking to establish parameters for the "carrying capacity" of the Preserve—and recognizing its original mission as an ecological preserve not a resort—no more than 100 visitors are allowed on Monteverde's 20 km of trails at one time. These policies are reviewed annually, with the management seeking to incorporate the latest scientific understanding into the preserve's operations to prevent environmental deterioration. (Aylward et al 1996)

amounts of carbon. Forests are nonetheless the natural system with the greatest capacity for long-term storage of additional carbon. This can be accomplished through conservation of those threatened by conversion, reforestation of cleared forest areas, and management to restore older age, higher-sequestering forests.

Mechanisms for capturing the value of forest management that increases storage of atmospheric CO₂ are being developed under the U.N. Framework Convention on Climate Change (UNFCCC). Since the signing of the Kyoto Protocol in December 1997, the interest by some countries, carbon producers, forestland owners and trading organizations in promoting a market in carbon credits has been growing. The Protocol specifically recognizes that Annex 1 countries (including OECD countries and those of the former Soviet Union) can receive credit toward their CO₂ emission caps for forest-based activities that increase carbon sinks or decrease emissions. These activities can take place within and among Annex 1 countries. Annex 1 countries can also receive credit for projects undertaken in non-Annex 1 countries through the Clean Development Mechanism. There are still many issues that remain ambiguous and unresolved in this developing system, including just what aspects of forest management will count toward countries' greenhouse gas budgets and reduction goals, how credits will be legally defined and whether they can be traded. Despite these uncertainties, a market is developing and transactions are beginning to take place.

The scope of application to forests is potentially very large. The World Resources Institute estimates that 5-13% of tropical forests could be managed for enhanced carbon stores. (Reid 1998) Temperate forests have enormous capacity for carbon storage as well, especially those in coastal temperate rainforests, which are known to store the greatest carbon tonnage per acre of any forest type. (Turner et al 1995) In places such as the tropics where deforestation is very high, the sale of carbon credits could provide significant revenue. In places such as the U.S. Pacific Northwest where Douglas-fir, ponderosa pine and redwood forests could be grown to

estimated the global contribution of ecosystem services to be \$33 trillion dollars (1997). Primary among forest services are provision of supplies of high quality water for human consumption and hydropower; carbon sequestration for climate stabilization; pollination and biocontrols for agriculture; waste treatment; and flood and storm protection. While ecosystem services may form the foundation of much economic activity, the ability of forest landowners to realize monetary returns from management which provides such services has been very limited. Although poor forest management that degrades the quality of ecosystem services may increase economic and social costs broadly, good forest management that enhances the capacity of the forest in this regard has not generated revenue because there has been little market development.

The basis for emerging markets in ecosystem services is elementary economics: Markets grow when resources or services become scarce and people become willing to pay for things that used to be free and readily available. Carbon sequestration and watershed services are the two major forest ecosystem services for which societies and their governments have acknowledged increasing scarcity. New institutional mechanisms are therefore being developed to finance forest management changes to optimize their provision. The potential for mobilizing capital into sustainable forestry and conservation through the development of these markets is significant.

A) Carbon Sequestration:

Forests can either be a source or a sink for carbon dioxide. In analyzing contributing sources to atmospheric global warming gases, forests were found to be the second largest emissions sector after energy production, yielding 17% of carbon dioxide. (Dixon et al 1994) Emissions are generated by deforestation and the process of timber harvesting, through which considerable CO₂ is lost to the atmosphere by burning and accelerated decay. Tropical deforestation and degradation is estimated to be a net source of 1.6 billion tons of carbon annually. (IPPC 1996) Temperate forests, while a net sink for the time being, are emitting increasing

older ages than the economic age of rotation currently allows, revenue from carbon credits could pay for the incremental cost to the landowner.

The potential size of the market for “certified tradable offsets”²⁹ (CTOs) is impossible to predict, as are the prices. The World Bank estimates that world demand for carbon offsets available through flexible market mechanisms may amount to 500 million tonnes of carbon annually during the first Kyoto budget period (2008-2012). Existing forest-based carbon projects as well as projections by the World Bank suggest a price range of \$5-30/ton of carbon stored, which is considerably less than costs of technology improvements for the energy sector. Given the early stage of the market and limited number of projects, no true market pricing has yet developed. One analysis estimates the carbon credit value of tropical forests to be \$120/ha at \$20/ton of carbon. (Kishor and Costantino 1993) Heal calculates that up to \$800/ha/acre could be generated, making forest carbon storage competitive with ranching and other alternative uses. Analysis by the Pacific Forest Trust suggests that U.S. Pacific Northwest forestland owners could gain \$250-750/acre at the same price per ton. (1998) The actual revenues would be based on the productive capacity of the site, the length of time for the agreement, the baseline against which additional carbon stores are calculated and discounts for risk factors.

Costa Rica currently has the most developed program for marketing CTOs from its forestland, growing out of its forest environmental services program. The country plans to market CTOs from three large ‘umbrella’ projects, two of which utilize forests: the Protected Areas Project (PAP), which creates CTOs through public acquisition of forestland for protection; the Private Forestry Project (PFP), which creates CTOs based on the Forest Environmental Services Program contracts described in the box on this page. Purchasers for the PAP will be receiving a 20 year stream of offsets, paying in advance and receiving 20 coupons

²⁹ AKA “emissions reductions credits” or “carbon credits” among other synonymous terms in the evolving lexicon.

for annual redemption of offsets. Purchasers for the PFP will receive offsets one year at a time. The current offering of Costa Rican CTOs from the PAP is for 11 million tons, selling in tranches. The first CTOs traded at \$10-12/ton. Costa Rica expects to use the sale of CTOs to secure 555,042 ha of protected area through PAP. The PFP could encompass more than 700,000 ha. (Chomitz et al 1998)

Costa Rica Markets Forest Ecosystem Services

In 1996 Costa Rica passed an innovative new forestry law that explicitly recognizes four environmental services (carbon fixation, hydrological services, biodiversity protection and provision of scenic beauty) and allows landowners to be paid for providing these. Under the Forest Environmental Services Program (FESP), the government acts as the broker for the sale of these services derived from participating private landowners and from public forests. Revenue from domestic and international buyers, and from a fuel tax, is paid to the service providers. Funds from these sales are being used by national parks and public lands for acquisition, maintenance and restoration. Private landowners are receiving payment for five year contracts to provide reforestation, sustainable forest management and forest preservation for a period of 20 years. Due to the more enforceable nature of the agreement, conservation easements are an alternative method being used to secure the public benefits being acquired. Prices paid over the five year contract range from \$480/ha for reforestation to \$200/ha for forest protection. The incentive for natural forest management is \$321/ha. In 1997, the first year of funding, 95,500 ha of forestland was enrolled, including 79,000 for forest protection. Demand for the program by landowners has far outstripped the program's funding. (Chomitz et al 1998)

Clearly, the potential scope of application and economic impact of carbon sequestration under a functioning marketplace could be enormous. The social and ecological impact could also be considerable, with the sale of CTOs providing a source of financial return from forest conservation, restoration and sustainable management activities that the market does not currently reward.

B) Watershed Services:

Water is often supplied from forested catchments upland of developed regions. The nature of forest management in these watersheds can positively or negatively impact the supply and quality of water flows, in particular the degree of siltation and the periodicity of flows. Protection of watersheds to improve water supply quantity and quality has long been appreciated by municipalities. New York City and Los Angeles each secured water supplies for their growth early in their histories. Hydroelectric suppliers are also concerned about the timing of water flows and the degree of sedimentation of the water. The fishing industry, environmentalists and others concerned with an interest in fish and wildlife habitat have a keen interest in watershed functioning, especially the impact of timber harvest and development on instream flows.

Water use is rising rapidly, increasing the scarcity of good quality, unpolluted supply. Shiklomanov reports that freshwater drawn from rivers and groundwater has risen 35-fold in 300 years, with a 400% increase in the 50 years after 1940. WRI estimates that in the next 25 years more than 600 million people will be living with insufficient water. This is increasing the market value of water, once thought to be a plentiful and free commodity.

There has been and continues to need to be major public investment in the acquisition and protection of watersheds. In fact, many parks and protected areas around the world were created with the dual purpose of habitat and watersheds. For instance, thirteen of Venezuela's 39 National Parks protect urban water supplies for 60% of the country's urban population. In particular, Guatopo National Park provides 20,000 liters/second of high quality water to Caracas. In Honduras, La Tigra National

Park provides Tegucigalpa with 40% of its drinking water—at about 5% of the cost of the next largest source. Dumoga-Bone National Park in Indonesia was established in part to provide water to a major irrigation project, with financing from the World Bank. (Reid 1998)

The provision of watershed services is a government-sponsored market. The acquisition of watershed lands has generally been paid for out of either general tax revenues, water or electricity fees, or sometimes a surcharge or excise tax.³⁰ For instance, in Brazil's Parana state 2.5% of the revenues generated by an Ecological Value-Added Tax are paid to municipalities to acquire and manage watersheds. In Spokane, Washington, residents pay a surcharge of \$15/year to the city for aquifer protection. Providence, Rhode Island, receives \$1.29 per 100 gallons of water used from a state surcharge and uses 55% of this to buy watershed lands from private owners—expanding the protected acres from 1,500 to 17,000, or 28% of the watershed.

New York City recently initiated a program to upgrade its municipal water quality through improved watershed management at about 20% of the cost of building a filtration facility. (See box on next page) Communities across the U.S. have yielded similar savings. In addition to outright public ownership of watershed land, fees paid by water beneficiaries are being used to pay watershed landowners for land management improvements that protect water quality, including funds for educational and technology transfer programs and acquisition of conservation easements. Such easements often restrict timber harvest in riparian areas or on erosion-prone slopes, or prohibit other uses that accelerate sedimentation or dramatically reduce forest cover.

In places like the western U.S. where water is scarce and water rights are well-established, a new water market is developing where holders are selling or leasing water rights to downstream users. Local governments and upstream forest owners

³⁰ These fees or taxes can also create a disincentive for users to waste water.

New York City's Watershed Protection Program

In the U.S. the Clean Drinking Water Act passed in 1996 provides a strong incentive for water utilities and municipalities to expand watershed protection as an alternative to the installation of costly filtration systems. The cost of compliance by unfiltered water companies is estimated to be \$12.1 billion if a technological approach is used. New York City faced the prospect of having to filter the water from its Catskill watershed at a cost of \$4-6 billion, plus \$300 million in annual operating costs. The city's water rates would have had to double. Instead the city adopted an EPA-approved watershed protection plan with a total cost of \$1.2 billion, half of which is being used for watershed improvements, including \$250-300 million for acquisition of fee title and conservation easements on privately-owned watershed lands. The plan is being financed by a public bond which will be repaid by user rates, with the typical New York water bill rising by only 9 percent. (Budrock 1997, Revkin 1997)

who can sell these to the highest bidder generate new revenues, which can serve as an incentive for them to conserve watershed lands and improve land uses to produce higher quality water.

Public and private electric utilities have a major economic interest in watersheds. Watersheds that are managed for water quality and low sedimentation allow them to avoid costly filtration systems as well, extending the life of their reservoirs. Forested watersheds help regulate flows, reducing peak events and extending run-off time, reducing the threat of spill-over. Energia Global is a private hydropower company with two run-of-river projects in Costa Rica with a combined watershed area of about 5,800 ha. As part of Costa Rica's Forest Ecosystem Services Program, the company

is paying forest landowners in these watersheds \$10/ha annually to maintain and restore forest cover to even-out stream flow. Energia Global's reservoirs are very small, storing only five hours worth of water. When streamflow exceeds the reservoir capacity, the excess water and its generating capacity is lost. Each lost kWh is lost revenue. The power company has analyzed that its investment will be paid off if it succeeds in storing an extra 460,000 cubic meters of water per year than it would otherwise.

Almost three-quarters of Bhutan's 47,000 km² are forested. Given its steep topography and aspect, most of Bhutan is in effect a watershed. Hydroelectricity is one of the country's major exports with 344 mw in power currently developed and a potential of 16,000 mw. Neighboring India is its primary customer, with growing demand. The protection of Bhutan's forest cover is essential to maintaining the stability of its soils and functioning of its power reservoirs. At a selling price of \$.07/kw and a cost to produce of \$.0237, Bhutan has the ability to reinvest in watershed protection and extend the life of its installed power capacity. Managing its forest area sustainably, with care for sedimentation impacts, also helps maintain the country's economically significant ecotourism trade.

The World Resources Institute estimates that a minimum of 13% of the world's land has high economic value as municipal watersheds for our urbanizing populations. Private and public forestland owners have the potential to gain significant new revenue from watershed management in these areas. Payments by water users can be used by public or private utilities to acquire property rights, to restore forest cover and to manage the timber sustainably. The marketing of watershed services can be integrated into and enhance the economic viability of conservation and sustainable forestry projects in appropriate locations.

4. Conservation and Limited Development

The direct sale of land or restrictions on land use for conservation of forest ecosystems can sometimes generate the greatest non-timber revenue for

a private sustainable forestry operation. The potential scope of application of conservation real estate approaches is very wide, given their flexibility in dealing with both primary and secondary forests and a wide variety of site specific situations, within the context of conserving biodiversity and other forest ecosystem values at a landscape scale.

The traditional "buyer" of forest conservation is the public, with funds obtained through direct appropriations, bond issues, tax surcharges (on real estate transactions or sales taxes), tax deductions or credits. There are new financial mechanisms for conservation as well, including carbon sequestration and watershed service provision, as described above. In general, however, forest ecosystem conservation value is arrived at indirectly, because there are no direct markets for biodiversity, habitat or many other ecosystem functions. The indirect value is calculated by determining the opportunity cost of prohibiting or restricting conventional timber operations or development.

Given the increasing rarity of primary forests and their unique and immense social and environmental values, the highest and best use of these forests is arguably conservation acquisition by governments or non-governmental conservation organizations. This is especially compelling where commercial timber exploitation is uneconomic and must be subsidized due to undeveloped or poor transportation and processing infrastructures. The greatest limiting factor in this endeavor is sufficient quantities of public or philanthropic funding. Within countries that have large areas of primary forest remaining, conservation is a necessary part of an overall sustainable development strategy that complements sustainably managed natural forests and reforested plantations.

Secondary forests have conservation value that can also be monetized, benefiting sustainable forestry operations. Conservation of "working forests" assures that they are not converted to non-forest uses. It also supports restoration of forest complexity and older age classes, enhanced provision of ecosystem services, and can guarantee sustainable timber management and contributions to commu-

nity economic stability. In this case, the non-commodity forest values, the opportunity cost of longer rotations and structural retention silviculture, and the foregone development values can be monetized through the sale or tax-deductible donation of a conservation easement on the forest property. Conservation easements are widely used in the U.S., with NGOs alone now holding ones that cover some 1.4 million acres. Britain, Canada, France, Costa Rica, Chile, and other countries have statutory recognition of conservation easements and provide some degree of tax-deductibility for their charitable donation.

Conservation does not necessarily prohibit all non-forest development. In order to achieve major forest conservation goals some portion of a property may best be developed in order to fund the permanent protection of the remainder parcel. For instance, a secondary forest located near a growing population center may generate revenue for conservation of 80-90% of the forest tract through limited development of select portions of the property that are either not forested, or are closest to roads and other development infrastructure, and are not core forest areas. Limited development uses may include agroforestry, agriculture, eco-tourism or appropriate housing, all of which could be compatible neighboring uses to a conserved forest property. A conservation easement is used to consolidate and protect the main forest tract, while providing for sustainable timber harvest, restoration of old growth characteristics, watershed protection or other public benefit goals. In some circumstances, careful limited development of this type can generate revenues that significantly underwrite the complete conservation of the remainder forest parcel.

The financial value of forest conservation is generally established by appraising the opportunity cost of development and timber harvesting that is foregone by sale of the property or the restricted rights acquired through the conservation easement. The price of title acquisition is a straightforward calculation of the fair market value (FMV) for the property. In some instances, this value can be 100% realized by a cash sale. In other instances, some significant percentage of FMV can be realized

through the charitable contribution of the property to the government or NGO charity. The seller may also find it advantageous to make a below-market sale and realize the difference in value as a charitable tax deduction. With such a “bargain sale” the seller can realize an after-tax profit on par with what would be achievable with a FMV sale.

The price of the conservation easement is calculated by appraising the difference in value between the encumbered and unencumbered property. As with the fee title sale, the easement can be acquired either with cash or through a charitable donation, or some combination of the two. Sale of the conservation value of productive secondary forest can return from 20-50% of its fair market value. The property title remains in private hands and the land in some form of economic use.

As exemplified by the CTO sales in Costa Rica or the projects undertaken by the Pacific Forest Trust in the U.S. Pacific Northwest, conservation easements form a legally enforceable contract that binds the land title and is well-suited for long-term provision of forest-based carbon credits by private landowners.

Conservation easements, in particular, offer the opportunity to monetize the non-market ecosystem values of a forest while still providing for the range of revenue generation that sustainable forestry offers. Using conservation transactions to provide a return of capital to investors reduces the return requirements from timber management. Therefore, they are a particularly important tool for private investment capital to utilize in achieving competitive rates of return from sustainable forestry.

Having described the scope and potential of the sustainable forestry sector, we will now present an investment strategy to catalyze the global commercial growth of this sector. In this section we will highlight the initiatives or enterprises that can provide an investor—whether private, public or philanthropic—with the greatest leverage in advancing the economic viability and breadth of scale of sustainable forestry.

Among these strategic investments, different ones will utilize different kinds of “catalytic capital”, drawing from philanthropic, public and private sources. The greatest investment leverage is likely to be achieved by financing innovative forestry enterprises through their early stages, until there has been “proof of concept” sufficient to attract conventional capital.

As discussed in the Introduction, higher risk capital from the three pools is available in relatively small quantities, seeking the highest returns on investment. For a sustainable forestry investor, these returns can be measured in direct financial as well as broader social and economic terms. Lower risk capital will be in larger quantities, with commensurably lower rates of return. The kinds of investments needed in sustainable forestry fall roughly into the categories illustrated in Figure 18, with the bottom of the pyramid representing those with the largest capital requirements, and generally a lower degree of risk.

Forestry Investment Capital Pyramid



FIGURE 18

THE FOREST PRODUCTS VALUE CHAIN

The forest products industry can be illustrated as a “value chain” that flows from the forest resource base through extraction, primary processing, value-added manufacturing, distribution and retail marketing to the end-user. (Jenkins et al 1996) Using the image of the value chain, we can better understand the range and relative position of investment needs and opportunities within the emerging sustainable forestry sector. (See Figure 19) While timber and non-timber forest products follow the value chain based on processing, the marketing of forest ecosystem services, such as carbon sequestration or fee-based recreation, each follow different approaches.

A STRATEGY FOR INVESTMENT

There are two interrelated drivers to the wide-scale commercialization of sustainable forestry:

1. Developing expanded, better organized markets for wood products, non-timber products and ecosystem services from sustainably managed forests.
2. Establishing working models of economically successful sustainable forest management operations at various scales in major timber producing countries.

The first provides the means for properly valuing—and generating financial return from—the breadth of products and services available from forests. The second breaks the barrier of business as usual and demonstrates the viability of sustainable forest management on the ground. Five areas of strategic investment opportunity are encompassed within these two broad categories:

- Forestland acquisition and management
- Scientific silviculture and harvest systems
- Improved technology for harvesting and processing
- Sustainable forestry products R&D and development of market intelligence
- Market-making for all sustainable forestry products

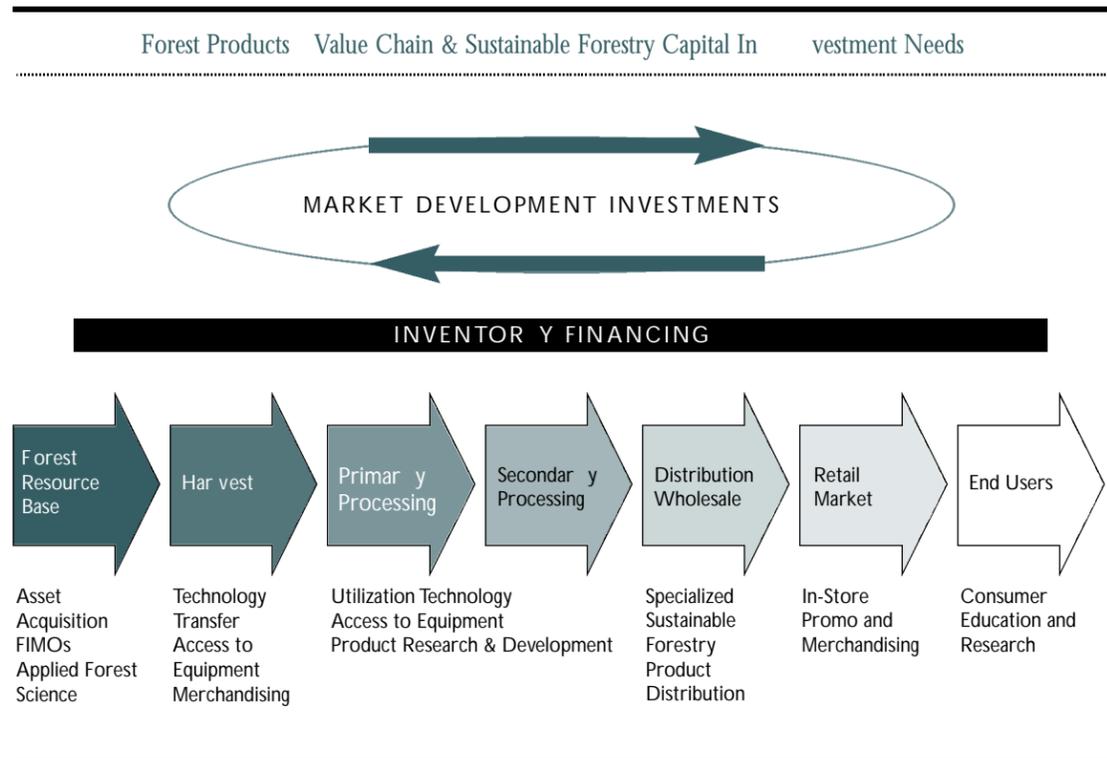


FIGURE 19

They are summarized in Table 4, with reference to the kinds of investment that could be made by the four major capital pools. An investor can use this table to gain a quick overview to the kind of investment (e.g., grant, program-related-investment, venture investment, working capital, etc.) appropriate to the investor-type for each of the five strategic areas.

Each area of strategic investments is described below, including highlights of actual or emerging enterprises to illustrate potential “deal flow”. However, it should be understood that we have not evaluated the operations or finances of any cited company and we are not recommending an investment in any specific enterprise. Any investment requires due diligence on the part of the potential investor. What we wish to convey is the best strategic direction an interested investor could take.

For this section we are drawing not only on the work of the Pacific Forest Trust, but on the experi-

ence of a team of investigators organized by Michael Jenkins of the MacArthur Foundation to test the market for sustainable forestry investment opportunities. Investigators included Donald J. Hoffman of the CREST Company, a forest industry consultant (international and U.S. markets); John Earhart of Global Environment Fund, a manager of “green” investment funds (emerging and U.S. markets); and Abraham Guillen of Smartwood International (Latin American markets). Collectively they called on more than 100 fund managers, investment advisers, TIMOs, banks, foresters, forest product producers and retailers, NGOs and development agency personnel. Field reconnaissance included trips to the United Kingdom, the Netherlands, Switzerland, Bolivia and Brazil. EcoSecurities, Ltd., also prepared a report for the MacArthur Foundation surveying a variety of tropical and sub-tropical forestry investment opportunities.

Strategic Investments in Sustainable Forestry				
INVESTMENT TYPE	INVESTOR: PHILANTHROPY	INVESTOR: PUBLIC SECTOR	INVESTOR: PRIVATE SECTOR-EQUITY	INVESTOR: PRIVATE SECTOR-DEBT
Forestland Acquisition and Management	Business development grants.	Business development grants.	Venture investment in FIMO as fund and forest manager.	Working capital for forestland acquisition process.
Sustainable management and conservation	Conservation acquisition grants. Recoverable grants. Program-related investments (PRIs). Investments related to program (IRPs).	Low-cost, long-term debt financing. Conservation acquisition funding. “Debt-for-nature” swaps.	Direct forestland acquisition. Capital investments in FIMO-organized funds.	
Scientific Silviculture and Harvest Systems:	Grants for research and demonstration projects.	Grants for research and demonstration projects.		
Boreal and tropical forests	Educational outreach.	Educational outreach.		
Improved Technology: Harvesting & Processing	Grants for educational, training and tech-transfer programs. PRIs for equipment financing through development orgs.	Grants for educational, training and tech-transfer programs. Low-cost financing for equipment.	Technology consultants. Equipment manufacturers, distributors.	Leasing and other debt financing for equipment
Sustainable Forestry Products R&D – Including all goods and services	Grants for new product R&D. PRIs to development orgs for grants, loans to small businesses.	Grants for new product R&D. Low-cost loans to small businesses.	Investment in new product development for existing suppliers, processors.	
Market-Making for Sustainable Forest Products All levels	Grants for business development. Grants for forest certification issues. PRIs for working capital for cooperative marketing efforts. IRPs in trading companies, etc. (See Private Equity). Grants for networks of sustainable forestry enterprises. Grants for consumer research.	Low cost inventory and working capital loans. Loan guarantees for working capital. Low-cost insurance underwriting for export and foreign investment. Public policy support of forest ecosystem service markets (eg, carbon offsets). Grants for SF market intelligence network development. Grants for consumer research.	Venture investment in trading companies and wholesale distribution companies; and in management entity for marketing cooperatives; retail outlets. Company investment in product promotion. Venture investing in market intelligence enterprises.	Asset-based lending for inventory and working capital.

TABLE 4

1. Forestland Acquisition and Management

Without serious investment in the acquisition, conservation and sustainable management of forestland, the sustainable forest products sector will not achieve critical mass as the industry flows from the forest source. The more forestland that is conserved as such and sustainably managed, the more forest biodiversity will be protected from further degradation and the more a diversified flow of products can support downstream, value-added enterprises. The direct means to this end is to create new buyers of forestland committed to conservation and sustainable management. The indirect means is to educate existing forest landowners and assist them in implementing conservation and certifiable sustainable forest practices.

Forestland requires considerable capital investment, while historically providing very good risk-adjusted returns as compared to other investment types. Small amounts of seed and early stage capital from philanthropic, public and private sources have the potential to leverage much greater private sector capital to accomplish broad-scale sustainable forestry management on the ground.

A) Philanthropic investment:

In general, the goal of philanthropic investment in sustainable forestland is to expand conservation of forest ecosystems. Therefore, in addition to direct conservation projects, philanthropies seek to leverage the early stage development of innovative forestland acquisition initiatives and businesses that can accomplish public benefit goals in the private sector. Further, investments (vs. grants) made related to these programs goals should be profitable, generating more funds for philanthropy. This can include the following investment activities:

- (1) Making grants for business planning, economic analysis and development of the sector and particular businesses that are consistent with the grantor's charitable mission.
- (2) Making grants for educational outreach to forestland owners to create greater understanding and implementation of conservation and sustainable management practices.

(3) Making grants for the charitable acquisition of forestland title or conservation easements for forests that are either ecological reserves, sustainably managed or some combination.

(a) Recoverable grants or low-cost PRIs can be utilized in cases where the acquired land can be re-sold by the NGO to recover its costs.

(4) Making PRIs or IRPs (depending on the goals and financial analysis of the investment) to invest in the organization of new sustainable forestry investment funds or "FIMOs" (forest investment management organizations, described further below), and directly in significant forestland projects.

B) Public institutional investment:

In general, the goal of public investment in sustainable forestland is to improve the competitiveness of sustainable forestry by improving efficiencies and returns, lowering costs, reducing risks, and improving cash flow for long-term operations. The challenge is to avoid creating perverse incentives or generating unintended consequences such as increased conversion of natural forest to plantation; or logging of primary forest that would be uneconomic without the benefit of the public investment. Public investment mechanisms can include:

(1) Making grants for business planning, economic analysis and development of the sustainable forestry sector and particular businesses.

(2) Providing long-term, low-cost loans for acquisition of forests or concessions. To prevent a subsidy for deforestation or overharvest, third party certification, conservation easements or other measurable and enforceable standards for sustainable forest practices should be a qualification for the credit.

(a) Providing loan guarantees to commercial lenders could also lower risk for them, and the cost of capital for the borrowers, subject to similar conditions as above.

(b) Forest-based asset lending could be expanded to smaller producers, allowing more even cash flow for sustainable management.

(1) Venture investments in FIMOs as managers of forestland funds, acquisitions and sustainable forest operations.

(2) Direct acquisition of forestland and concessions.

(3) Investment in units of FIMO-organized sustainable forestry funds.

(4) Working capital (i.e., debt) for the forestland acquisition process.

Investment opportunities in the acquisition, conservation and sustainable management of forestland are growing both in the U.S. and internationally. Current opportunities have largely evolved out of two sources: FSC certification of existing forestry operations; and expansion of conservation-oriented forestland acquisition techniques to include "working forests." There are now new initiatives to organize capital specifically for the acquisition, conservation and certified sustainable management of forestland.

More than 25 million acres of forestland in 27 countries has been certified as sustainably-managed under FSC criteria, across all major forest producing areas. Investors may find opportunities to expand the reach of these companies, as well as demonstrate to non-certified producers that certification provides investors with confidence in their operations. (See box on next page).

While no TIMOs have yet had any of their managed forests certified³⁴, there are several U.S. operators that have become "conservation buyers" of forests subject to permanent conservation easements that protect ecological resources. These include the Hancock Natural Resource Group, of Boston, MA; Lyme Timber Co. and Wagner Woodlands, both of Lyme, NH; and the Forestland Group, of Chapel Hill, NC.³⁵ Acting

(3) Funding the acquisition of forest conservation easements on productive forestland, to be monitored and enforced by qualified agencies or NGOs.

(4) Instituting or expanding cost-share programs to assist forest landowners and managers in implementing reforestation, conservation or restoration activities.³¹

(5) Establishing tax incentives (either lower rates or credits) for forest landowners committing to conservation and sustainable management of natural forests through conservation easements, certification or both.³²

(6) More widely instituting user fees and similar mechanisms in forested watersheds (as described in Section VI) to generate funds for conservation and sustainable management of upland forests.

(7) Facilitating more "debt-for-nature" swaps to retire costly commercial debt owed by developing countries through acquisition of forests for conservation.³³

C) Private sector equity and debt investment:

In general, the goal of private sector investment in sustainable forestland is to gain control of the primary producing asset while achieving competitive risk-adjusted returns. Secondly, the goal is to expand the "franchise" of sustainable forestry. This can be accomplished by utilizing small amounts of higher risk capital to create organizers of forest investment and management; and to utilize larger amounts of lower risk capital to actually acquire or otherwise invest in the forest asset. This can include:

³¹ Programs of the U.S. Forest Service, Natural Resources Conservation Service and other Department of Agriculture programs are useful references.

³² Similar incentives have been used in various countries, such as Brazil and Malaysia, to promote the establishment of plantations. However, it is also arguable they have also promoted conversions of natural forests.

³³ According to the U.N. Intergovernmental Forum on Forests, more than \$159 million in debt has been retired using this technique.

³⁴ TIMO managers have reported that they believe certification does not add sufficient value in relation to its costs and would otherwise constrain operations and profits. In general, they don't believe that investors will sacrifice any basis points of return to achieve greater stewardship.

³⁵ In these instances, the TIMO has bought the property already subject to the conservation easement and the acquisition price is discounted to reflect the easement restrictions; or the conservation easement has been sold at fair market value.

TIMO or FIMO?

Managers of institutional investment in forestland are usually referred to as TIMOs: Timber Investment Management Organizations. They raise capital through funds comprised of numerous investors or otherwise manage timber investments by very large investors, usually pension-funds.

We propose the strategic need to create FIMOs. A FIMO is a Forest Investment Management Organization. It is based on the sustainable forestry business model and seeks to provide competitive risk-adjusted returns for investors through acquisition, conservation and sustainable management of forests, capitalizing on the suite of goods and services feasible to profitably market from its portfolio of properties. FIMOs can organize capital from a variety of sources, including private, public and philanthropic investors. They can participate in the fast changing forestland marketplace, seeking to create more conservation "outcomes" as properties change hands. They would manage their investments to achieve the financial and ecological "double bottom-line". Creation of FIMOs—dedicated to conservation of all their forests—has the potential to mobilize new and greater sources of capital to sustainable forestry.

as a conservation buyer, a forest investor can reduce its capital investment and increase its return for conservation-oriented forest management. Timber is still harvested, or other economic use maintained, consistent with the terms of the conservation easement. For productive forestland, key forest ecological values must be identified and protected through the conservation easement restrictions. Therefore, the easement can lay the groundwork for sustainable forest management and prevent conversion to non-forest uses.

The establishment of FIMOs could allow for investors to profit from the conservation and

sustainable management of diversified portfolios of forest properties. Supported by business development grants from the MacArthur Foundation, among others, the Pacific Forest Trust is in the process of organizing a for-profit FIMO, Cascadia Forest Stewardship Investments, to build a portfolio of conserved and FSC-certified forestland in the U.S. Pacific Northwest. This would be the first forestland fund to focus exclusively on conservation and sustainable management, bringing to bear all the potential benefits of conservation easements, forest certification and marketing of the full range of timber and non-timber forest goods and services. The Pacific Forest Trust is seeking joint venture partners in the creation of the FIMO, as well as investors in Cascadia's first fund.

In the international marketplace, a survey of potential sustainable forestry investment opportunities by EcoSecurities identified six natural forest management operations (in Brazil, Gabon, and southeast Asia) and one FSC certified plantation (in Brazil). Total area comprised approximately 2 million ha, with an estimated value of \$195 million (at early 1998 currency values). Interestingly, their analysis of expected returns indicated that the natural forest management entities returned generally better than conventional plantations.

Mil Madeireira Itacoatiara Ltda. is a forest management company organized in 1996 with 80,571 ha of highly productive natural forest in the state of Amazonas, Brazil. They are an example of an integrated forestry and manufacturing company that is certified by FSC. Almost 25% of the land is set aside from timber production. In the remainder they are harvesting and milling 32 species of trees, primarily for export to the European market. Management expected the company to return a profit in 1998. The major limiting factors amenable to being addressed by philanthropic, public and private investment include: improved silvicultural systems for regeneration of primary commercial tree species; improved utilization of logs in milling; and better marketing of the lesser known species harvested from the property. This company is owned by Precious Woods, Ltd., a holding company with several related operations, including an inter-

Forest Certification Can Guide Investments

In an expanding world of forestry investment opportunities, an investor seeking out sustainable opportunities among an array of forest investments could utilize third-party certification of sustainable forest practices as a good guidepost in their due diligence. The Forest Stewardship Council is the only independent third-party system that draws on objective criteria relevant to the world's forest regions. An FSC-certified company is likely to be better managed to sustain long-term timber supplies, maintain or enhance forest productivity, and be less subject to regulatory risk—the threat of losing the license to operate due to public environmental concerns. Further, the products of FSC-certified companies are branded for consumers and differentiated in a marketplace that is increasingly characterized by commodities. Investors seeking assurances of the quality of a forest company's claims to sustainability should begin by taking advantage of third party certification efforts.

national trading company described below. Precious Woods is a private company with both individual and institutional investors, including those with environmental investing criteria and those without.

There are many examples of public institutional investment in sustainable forestlands, some of which have been described in Section V. Further funding to meet demand for successful existing programs is sometimes all that is required to expand sustainable forestry. Funds for programs and initiatives described above can be generated by

³⁶The Land and Water Conservation Fund in the U.S. was organized to be funded by approximately a billion dollars in mineral royalties paid each year to the federal government. While Congress has resisted appropriating these funds as the statute requires, with the healthy surplus in the U.S. budget the current Administration is now promoting the full use of these funds for their intended purposes of acquiring lands for conservation.

taxes on forest concessions, other timber yield taxes, and fees on minerals acquired from public lands.³⁶ Established Forest Funds derived from timber receipts, such as those in Latin America and Indonesia, can be redirected to supporting sustainable forestry. Given the scarcity of domestic funding for forestry in many lower GDP developing countries with high forest values, U.N. Intergovernmental Forum on Forests has been discussing the need for an international public fund for sustainable forestry, drawing on the experiences of the Global Environment Facility and other similar international sustainable development initiatives.³⁷

The Forest Legacy Program of the U.S. Department of Agriculture's Forest Service is an example of public investment in conservation of private productive forestlands. In this initiative, federal funds leverage state and private resources to acquire conservation easements on privately owned working forests. The program goals are to protect environmentally significant forests threatened by conversion, while maintaining traditional forest uses, including timber production, recreation, watershed services and wildlife habitat. Either federal, state or non-profit agencies can hold title to the easements. The Costa Rican forestry program described in Section VI is similar, using receipts from carbon credits, water users and other sources, to acquire fee title on some forests and conservation easements on others.

2. Scientific Silviculture and Harvest Systems

Many sustainable natural forest managers are constrained by a lack of scientific ecological and silvicultural knowledge of their forest types. This is especially true for tropical and boreal forests. Natural foresters can cause unintended damage to forests due to the poor state of knowledge. With greater knowledge of forest ecosystem dynamics, better silviculture can be employed to harvest and

³⁷ For many of the public finance concepts discussed in this section we are in debt to the "Information Note on the Need for Financial Resources for Sustainable Forest Management" (June 1998), produced by the Intergovernmental Forum on Forests.

sustainably manage forests without degrading ecosystem functions. This applies not only to timber harvest, but to impacts of harvests of non-timber products. Greater scientific understanding of how managed forests provide ecosystem services such as carbon storage and water quality is also needed.

Philanthropic and public funders could make a great contribution to sustainable forestry by making grants to research institutions, in cooperation with private companies, to fund basic ecological and applied silvicultural research in tropical and boreal forest types under most pressure for conversion to plantations of exotic species or to non-forest uses. Grants could also be made for educational outreach to forest managers, forest communities and forest agency personnel.

3. Harvesting and Processing Enterprises

Harvesting and processing of products from sustainably managed forests embraces a host of investment opportunities.

The harvest of sustainable forest products requires an understanding of how to minimize the impacts to the forest ecosystem from harvest levels, methods and equipment for a variety of forest products, both timber and non-timber.

Primary processing includes lumber, wood panel and veneer producers; pulp and paper producers; and bulk processors of non-timber forest products such as florals or herbs. Secondary processing encompasses value-added wood product manufacturers such as furniture, flooring, millwork and molding producers; craftspeople who utilize fine woods; and value-added manufacturers of foods, beverages, cosmetics, pharmaceuticals, etc. In sustainable forestry, market information needs are more intensive and end-products are more value-added.

Because of the variety of sustainable forestry products, primary and secondary processing needs to be both closer to the resource and closer to the marketplace than in conventional, volume-oriented timber operations to be adaptable and competitive.

The financial success of enterprises is based on secure access to forests through fee ownership,

other established tenure, concessions or contracts. While integrated ownership of forestland and processing operations has been the industry norm, small scale harvesters of wood and special forest products have usually functioned on the edges of the timber industry. Regardless of scale or product, the interface between the forest owners/managers and the harvesters is an intimate one, as harvest activities can profoundly impact the health and productivity of the forest ecosystem. Therefore this is a key strategic area of investment.

Key areas for investment at this stage include:

Technology Transfer— to provide technical and scientific information and training to harvesters on relevant forest ecosystems, harvest techniques, appropriate equipment, etc. For processors, access is needed to better utilization technology to optimize the use of scarce resources, improve efficiencies generally and eliminate waste. Developing countries in particular need the transfer of improved technology from North American and Europe for their emerging industries.

Access to Equipment— to provide harvesters with appropriate equipment at affordable cost through leasing or purchasing opportunities. While there have been great improvements in harvest and processing technology in the U.S. and Europe, many emerging countries are using older, higher impact or less efficient equipment. Lack of adequate equipment can be a significant limiting factor.

Merchandising— to provide the means to sort and grade products, including certified sustainable products and lesser known species, for sale to processors. Better merchandising can target sales and improve profitability to harvesters and landowners.

A) Philanthropic and public institutional investment:

In general, the goal of philanthropic and public institutional investment in sustainable forest product harvesting and processing is to advance ecologically-appropriate harvest technologies; to improve processing efficiencies so as to reduce waste and to utilize lesser known species and lower grade mate-

rial; and to promote economic equity by improving the business structures of small harvesters and producers. Philanthropic investment can be strategically directed toward improving the business prospects of small producers and producers in developing countries. This can include:

(1) Making grants for educational, training and technology transfer programs.

(2) Making PRIs through development organizations to provide low cost financing for better quality equipment and for inventories of multiple species and grades of materials.

B) Private sector investment:

In general, the goal of private sector investment in sustainable forest product harvesting and processing is to increase operating efficiencies and raw material utilization so as to reduce waste, operating costs and collateral forest damage; increase sustainable yields; diversify products; and gain added value closer to the beginning of the value chain. This can include:

(1) Making venture or other equity investments in harvesting and processing companies.

(2) Making venture or equity investments in technology consultants.

(3) Making venture or equity investments in harvesting and processing equipment manufacturers, importers or distributors.

(4) Providing leasing or other debt financing for inventory and equipment needs of private harvesters and processors.

Given the breadth of forest products, there are a considerable number of investment opportunities in harvesting and processing of sustainable forest products. Primary and secondary processing businesses are varied and range from cleaning, sorting and bundling greens for the floral industry to producing lumber from lesser-known tropical species to manufacturing windows from certified wood. A flavor for some opportunities is gained by looking at the following enterprises:

Kikori Pacific, Ltd., a Papua New Guinea processor, is an example of a current early stage investment opportunity. The company received seed funding totaling more than \$500,000 from the MacArthur Foundation and the World Wildlife Fund. Chevron, a major supporter of the WWF's Papua New Guinea program, has invested in the start-up through timber purchases and in-kind logistical support. The company has established itself as a buyer and processor of logs and rough sawn timber harvested and delivered to it by twenty clans or land-groups that control over 250,000 acres through the prevailing "customary" land tenure system. These forests are estimated to hold 2.2 million cubic meters of wood, of which less than 1% will be processed annually. The company manufactures lumber and other value-added wood products for local, domestic and international buyers. Their sawmill employs 40 people. The major foreign market for the company's products is Australia, where Papua New Guinea tropical species are well known. Kikori Pacific has worked closely with the World Wildlife Fund to define and implement sustainable management practices and biodiversity conservation working cooperatively with its land-groups. The company is in the process of being certified under FSC and is already the leading "green" wood producer in the country.

In the Para State of Brazil, there are several companies that have been identified that offer investment opportunities. Each is an existing company that wants to better implement sustainable forest management on their associated forestlands. **Exportadora Peracchi Ltda.** owns 18,000 ha of natural forests, with plans to acquire 12,000 ha more. They produce lumber, flooring and decking at their mill from Jatoba, Spanish Cedar and Curpixa. Their primary export markets are the U.K. and U.S. for higher grade products and the Caribbean for lower grades. They are interested in loans, leases or other investments for three purposes: reforestation with native species; for harvesting and processing equipment; and for implementing sustainable natural forest management plans. **CIKEL** is another Para company interested in investment, primary as loans or similar instruments;

Inventory Financing

Working capital is essential to successful market-making. Lack of asset-based financing, and inventory financing in particular, is a limiting factor at all stages of sustainable forestry enterprise. Sustainable forestry generates a greater variety of products or inventory units than conventional, commodity-oriented forestry. Sorting, grading and market-ready stocking is important from the resource owner and harvester through to wholesale distribution. With sustainable forestry in its early stages in many countries, sales volumes are less predictable, often making inventory turns and cash cycles longer. Producers and marketers face “chicken-and-egg” dilemmas in inventory level decision-making: if the raw material or product is not ready for shipment within an appropriate time-period, sales volumes can never build to higher levels; yet building inventories for new and emerging products can tie-up capital, leaving little available for sales and marketing. While more risky as an investment than inventory financing for established forest products, the added risk can be mitigated in the financing terms.

and technical assistance. CIKEL controls about 120,000 ha of forest and produces lumber, flooring and decking using about 30 tropical hardwood species. They also manufacture 35,000 m3 of plywood annually. Their needs are in improved equipment, assistance in natural forest management, and reforestation.

The Brazilian state of Amazonas is home to one of the largest plywood and veneer manufacturers in the country, Gethal-Amazonas S/A Indústria de Madeira Compensada. Employing an estimated 1300 people, they utilize hardwood species harvested from the company’s operations on 120,000 ha of plantations and additional 150,000 ha of natural forests. They anticipate receiving

FSC-certification soon. Established in 1948, the company books revenues of US \$14 -18 million annually (with sales currently depressed by the impacts of the Asian crisis, given that their major export customers are in Japan and Korea). The company owns considerable assets, but Brazil’s economic difficulties make the capital to properly increase returns on those assets scarce and costly. With 25% of Gethal’s ownership in German hands, they are open to further international investment.

Grupo Roda is a Bolivian vertically integrated forest products holding company with several subsidiaries, including IMR (furniture), CIMAL (plywood, veneer, lumber), VASBER (sawmill), and ESR (transportation, logging). They also own a cement plant, a construction company and other enterprises. Grupo Roda controls a total of 264,475 ha of forest under concession from the government. Its forestry and furniture manufacturing operations are certified by Smartwood under FSC. The parent company is in the process of transferring 86,000 ha in San Miguel to Industria de Muebles Roda (IMR). IMR is the only Latin American manufacturer to sell certified wood products directly to B&Q, one of the largest retail chains in the U.K. IMR also exports certified furniture to Holland and is expanding to other European markets. Grupo Roda management reports that IMR has returns of 20% annually and is currently considering a public offering for IMR. By tapping into the public capital market, they hope to better finance their export expansion and invest in more dry kilns and manufacturing equipment.

A \$2.5 million family business based in Santa Cruz, Bolivia, La Chonta Agroindustrial has a government-granted concession on 190,000 ha of natural tropical forest and operates two sawmills and a door manufacturing facility. Their forestry and manufacturing operations are FSC certified. Exports of exterior doors to the U.S. and Argentina comprise a significant portion of their revenue. Management believes that their forestry yields and product exports can grow significantly if they can obtain financing for better sawmill equipment, dry kilns and reprocessing machinery. They would like to expand into flooring.

4. Sustainable Forestry Products R&D/Market Intelligence

Due to the great diversity of goods and services that are currently derived or are emerging from sustainably managed forests, the challenge of developing and improving on products represents both a barrier and an opportunity for growth. Many lesser known wood species are grown in tropical and boreal forests that could have commercial potential if their industrial characteristics were better understood and promoted.³⁸ New, value-added uses that could generate greater income for forest dwellers, landowners and primary producers could be determined with greater investment in research and development. Uses for low grade materials is just as important, so that forests are not high-graded in harvest, leaving them genetically impoverished and less valuable commercially. Without uses for low grade material, producers of high grade products can still be unprofitable because of the waste and inefficiency.

While investment in sustainable forest product R&D could reduce costs, increase efficiencies and open up new revenue sources for companies, it often falls to the bottom of the list of investment priorities, with preference given to more “hard” capital items. Strategically, we believe small amounts of investment in this arena can provide substantial returns for both the sector and individual enterprises through time. Therefore, we recommend that philanthropic and public sector investors make this a priority in their community economic development granting and in low-cost loan funds for small producers or cooperatives of producers. Private sector cooperative efforts through funding trade associations or other collective R&D mechanisms should be encouraged. Private sector investors should insure that sustainable forestry companies do not overlook their R&D needs.

5. Market-Making for Sustainable Forestry Products

Market-making is a cross-cutting area of strategic importance to the growth of the sustainable forest products sector. It affects businesses all along the

Hearts of palm are a major non-timber forest product that could be managed sustainably as part of a natural tropical forest and gain wider global distribution. King of Palms has been supplying Asian, U.S., European and South American markets for close to 50 years, while half their production is sold in the domestic Brazilian market. They operate several processing plants across the Amazon estuary. Currently, they are seeking a joint venture partner to create a centralized plant. They also want to expand their sustainable management area by 15,000 acres of native palm forest. The Terra Capital Fund (described further below) is considering organizing an investment of \$1.2 million into this opportunity, which they analyze could return 35 percent annually.

Another commercially-important special forest product grown in South American tropical forests is the Brazil nut, of which Bolivia is the major producer. Hermanos Hecker S.A. is a harvester, processor and exporter of Brazil nuts headquartered in La Paz, Bolivia. Their source is the natural Amazonian forest of western Bolivia where they have ownership of 500,00 ha, of which half is under management. In addition to Brazil nuts, they harvest hearts of palm and are exploring other non-timber products. With total sales equaling 10% of the Bolivian Brazil nut market, the company exports a reported \$4.7 million in processed nuts in bulk, ready for retail repacking, selling primarily to the U.K. and the U.S., counting Planters among their customers. Their investment needs are for expanded working and processing equipment to expand their capacity. They currently have relatively costly commercial bank debt (from Citibank) that they would like to convert to lower cost financing.

Over the last few years forest products companies interested in utilizing certified sustainable wood have organized the Certified Forest Products Council, a non-profit trade organization. Through its membership of producers, manufacturers, retailers and others interested in promoting sustainable forest products, the CFPC provides an excellent source of information on companies that may have investment needs. The CFPC produces the *Good Wood Resource Center*, an on-line database of buyers and sellers of certified wood.

³⁸ For instance, Brazil has more than 400 species with potential market value.

value chain. Market-making has both tangible and intangible elements. On one hand it has to do with facilitating commercial transactions and moving merchandise. On the other it has to do with building awareness and demand. Overall, market-making identifies market needs and organizes their fulfillment.

Buyers and sellers in this emerging sector are not always easily identified and matched. There are many inefficiencies that retard the growth of the sector due to discontinuities in supply and demand. Lack of knowledge among buyers of the attributes, utilities and competitiveness of sustainable forest products—such as lesser known tropical species or hardwoods from the U.S. Pacific Northwest—reduces potential returns from sustainable forest management. Non-timber forest products have diverse market-making needs, depending on whether they are foodstuffs, pharmaceuticals, or decorative florals. Brokers, wholesalers, import and export agents, trading companies, producer-owned cooperatives and retailers are all market-makers. Their role in building the sector is crucial to sustaining the flow of sustainable products across the value chain and around the world.

In addition to moving goods, market-making is also a critical need in the development of ecosystem services as a viable revenue source for sustainable forestry operations. Realizing the potential revenue of forest-based carbon credits for sustainable forestry operations requires strategic investment at this time, as the operations of a global carbon market are in formation under the Kyoto Protocol process over the next several years. The policy environment needs to develop to appropriately value and include the role of forests in stabilizing climate. High quality carbon credits from reforestation, enhanced stewardship and conservation of forest tracts need to be secured through conservation easements, long-term contracts or other enforceable mechanisms. Trading mechanisms need to be established, utilized and improved through market-feedback.

Eco-tourism offers great market investment opportunities of a different nature. Many fledgling enterprises are located in rural areas of developing

nations. Their challenge is marketing effectively to foreign tourists in developed nations.

Sustainable forestry is characterized by innovation in a changing global marketplace. Therefore the need for timely market intelligence is great—identifying trends, analyzing changes in market conditions, scouting new product development and recognizing market movers. Access to high quality market intelligence has serious commercial value.

A) Philanthropic investment:

In general, the goal of philanthropic investment in market-making for sustainable forest products is to build capacity among new and existing market-makers at early stages of development in key areas of concern. Philanthropic investment is also important in creating markets for ecosystem services where they are just emerging, as with forest-based carbon credits. In particular, philanthropic investment can include:

- (1) Making grants for the business development of market-makers, especially those serving small producers and low income populations that don't have ready access to markets.
- (2) Making grants to non-profit institutions that promote sustainable forest products and services such as eco-tourism, and wood product certification, helping build awareness and demand for these products.
- (3) Making grants for the development of effective policies and markets for forest ecosystem services, especially forest-based carbon sequestration and water provision.
- (4) Making PRI's and IRPs for the inventory and other working capital needs of market-makers, especially for very innovative areas like carbon trading, for emerging products, or for undercapitalized regions.

B) Public institutional investment:

Public institutional investment can play a role very similar to philanthropies. However, given the greater funding levels and multiple public mechanisms available, public investment can be greater in

marketing services to sustainable forest products producers, including producer marketing co-operatives.

- (3) Asset-based lending and other working capital at market rates for established and growing market-makers.

Investments in marketing occur at different levels of the value-chain, and can begin with forest landowners. Amazonic Sustainable Enterprise S.R.L. is a family-owned, FSC-certified tropical hardwood lumber business in Bolivia. They have fee ownership 30,000 ha of forest. Expanding the market potential for the many lesser-known species growing on their land is central to building their business, as it is for CICOL/APCOB, another Bolivian sustainable forestry company. CICOL/APCOB is a cooperative comprising 28 communities that owns 250,000 ha, of which 50,000 ha is in certified forest management. They produce lumber, including flooring and decking for export, but their sales are limited due to lack of marketing expertise and capital.

Sylvania Certified, LLC, is a U.S.-based company that is investing in these marketing opportunities by buying Bolivian and other South American certified lumber exclusively for export to the U.S. and Europe. They work both as a broker and distributor, providing valuable services to their suppliers in product development, quality control and market access. They believe a credit line of \$1-2 million would expand the market for wood products from lesser-known tropical Bolivian species.

Manufacturers such as MW Florestal do Brasil Comercial e Industria Ltda., based in the Amazonas state, need assistance in securing both more consistent supplies of certified logs and more export market access. They use a variety of native species to produce certified flooring for European markets and are very committed to natural forest management. The company has invested \$1.7 million in state of the art equipment. They are interested in gaining more working capital, equity investment and marketing expertise to build the business.

certain key market-making areas, i.e., low-cost inventory financing and other working capital needs. In particular, public institutional investment can include:

- (1) Providing business planning grants for early stage market-makers and for producers of sustainable forestry goods and services to expand their marketing capabilities.
- (2) Providing low-cost inventory and working capital loans, either directly or indirectly through non-profit community development funds.
- (3) Providing loan guarantees to commercial lenders to lower risk for them and the cost of capital to borrowers.
- (4) Underwriting low-cost insurance for international trade and foreign investment.
- (5) Grants and other support for development of functioning carbon-credit markets, as well as other ecosystem services.

C) Private sector investment:

Private sector investment can focus on either higher-risk venture-type investments in key early and mid-stage market-makers; or on lower-risk, asset-based lending for inventory and working capital. The goal is to build volume, improve efficiencies, lower transaction costs and promote the franchise. Private sector investment can help enterprises become the well-financed, professionally managed players who could gain "early mover" advantages in this growing sector. In particular, private sector investment can include:

- (1) Venture investments in trading companies, wholesalers, import-export entities, eco-tourism operations³⁹ and retailers engaged in the marketing of sustainable forest products.
- (2) Venture investments in consulting and management companies offering management and

³⁹ We are including them here in the discussion because one of their greatest needs is in marketing. However, eco-tourism resorts typically function as a revenue source for the conservation of forest ecosystems.

In addition to established timber and non-timber products, new ones are emerging from sustainable forest management. One of interest is a patented vegetable-based leather substitute called “Treetap,” produced by Cour o Vegetal de Amazonia, S.A. This product uses natural latex extracted from rubber trees in Amazonas and Acre which is used to “paint” cotton, that is then dried and smoked to form a dark brown leather-like sheet. Treetap is being utilized in back-packs, brief cases, women’s bags, shoes, hats and other uses as an alternative to leather. This is one of the few new uses for latex obtained from natural forests, as most rubber trees are now plantation grown. Couro Vegetal works with two other organizations: Toroco (for product development and Brazilian marketing) and Instituto Nawa (an NGO that assists in organizational development, research and international marketing). The company provides employment to 150 indigenous people (out of a population of 7,000) in a 1 million ha area. Development assistance and seed capital has come from Conservation International, Rainforest Action Network, Foundation for Deep Ecology, IMAFLORA, Centro de Pesquisa Indigena and others. Couro Vegetal is a private company owned by three partners and is seeking equity or loans to expand their production and marketing.

In addition to Sylvania Certified, mentioned above, other dealers in sustainable forest products are emerging to meet the demand for market-making. Established in 1992, Ecotimber is a \$3.6 million in revenue San Francisco-based company that is probably the most comprehensive wholesaler dedicated to sustainably harvested wood products. They carry a wide inventory of imported and domestic construction lumber, fine woods, millwork, plywood, flooring, decking and veneer. Their wood comes from mostly FSC certified sources in the U.S., Latin America, Africa and Southeast Asia. They have invested heavily in customer education and support to build client loyalty and market lesser-known species. They also assist retail customers with in-store promotion of certified wood products. To captured added value from lumber they custom mill lumber as well.

Ecotimber’s president, Aaron Maizlish, notes that they have built strong company identification and market share in a commodity-oriented business through their “niche” focus on sustainable wood products. “In an industry starved for marketing ideas and access to end users, we can reach homeowners and pull them in.” When Ecotimber needed investment to expand their inventory to be more consistent in supply of both imported and domestic species, they organized investors from both the philanthropic and private sectors, including the MacArthur Foundation, Ecotrust and the Collins Pine Company. Profiles, Inc., of Westport, CT, is a similar company, incorporating custom millwork, wholesale and retail operations.

Precious Woods (Switzerland), Ltd., is a forest products international trading company dealing exclusively in certified sustainable products that commenced business at the beginning of 1998. It is a subsidiary of Precious Woods, Ltd., which owns another trading company that deals in conventional forest products, as well as MIL, described above, and a forest plantation in Costa Rica that would like to be certified.

In addition, established wood product distributors are expanding their lines to include certified sustainable forest products. For example, FSC-certified Keweena w Land Association sells through Banks Har dwoods (Indiana), Connor-AGA Sons Floor ing (Michigan), Midw est Har dwood Corp. (Minnesota), all dealers in commercial wood that have become FSC-certified as well for portions of their inventory.

Retailers make the market for sustainable forest products to the general public. For the sustainable forestry sector to grow, retailers need to be investing in adequate inventories and promotion of these products. Major retailers like Sainsbur y and B&Q (UK) have made major commitments to certified sustainable wood products. Sainsbury sells \$800 million in lumber and is committed to changing over all of their inventory to certified products by 2000. Specialized “green” retailers are being established as well, such as the Envir onmental Home Center , of Seattle, WA. Established in 1992, their

Shorebank Pacific: The First Environmental Bank

Shorebank Pacific, is a commercial bank and a subsidiary of Shorebank Corporation, which also owns the famed commercial community-development bank, South Shore Bank of Chicago, as well as other similar institutions. Known as the “first environmental bank,” Shorebank Pacific is a collaboration between Ecotrust, a 501(c)(3) dedicated to expanding the “conservation economy” and protecting the North American coastal temperate rainforest region, and Shorebank. With offices in Olympia and Ilwaco, WA, and Portland, OR, the bank and its non-profit business development arm, Shorebank Enterprise Pacific, provide a range of business consulting services and financial instruments, from grants and micro-loans to credit lines and commercial loans.

12,000 square foot showroom and warehouse sells a full array of “environmentally-healthy” alternatives for construction, renovation, furnishing, and decorating the home, including certified wood products. They provide extensive customer educational, including technical support for builders, architects and homeowners.

Non-timber forest products are typically harvested by itinerant and poorly organized people in forest communities. Primary processing and manufacturing often also occurs in forest regions by small or micro-enterprises. Market access, inventory management and general business support are hard to come by for many of these operations. By joining together, these small producers can gain access to many more resources than by themselves.

Rainkist, a project of Shorebank Enterprise Pacific, is a marketing organization based in Olympia, WA, that represents twenty-five small processors and manufacturers of special forest products gathered from the North American

coastal temperate rainforest. Incubated within the non-profit business development program of Shorebank Enterprise, Rainkist is being spun-off as a for-profit affiliate. Rainkist provides business development, market representation and forest stewardship services for its members. They has developed a standard product line for its producers that includes decoratives and gift items such cedar sachets, decorative wreaths, furniture and wall objects utilizing grasses, other understory plants, cones, boughs and other non-timber forest products. Rainkist provides direct retail representation in the Pacific Northwest, and, a wholesale presence in major markets such as Los Angeles, New York and Dallas. In addition to providing micro-loans and other business development assistance, Rainkist has developed guidelines and training for its members to assure sustainable harvesting.

The new world of market-making for carbon credits being created under the auspices of the Kyoto Protocol holds great potential. Establishing a functional forest-based carbon credit market requires three interdependent elements:

- (1) generating an inventory of high quality carbon credits from scientifically credible and politically secure projects;
- (2) building demand among carbon producers and others for these credits; and
- (3) facilitating the commercial sale of credits in a rational, legally credible system.

Underlying these market elements is the development of public policy and regulatory systems that will set the legal framework for the market—and ultimately drive transactions.

Generators of forest-based carbon credits, including governments, forest landowners and forest conservation non-profits often do not understand this complex and evolving market. Identifying purchasers of carbon credits is time-consuming and will require considerable educational effort until a clear regulatory system is in place.⁴⁰ The market is

⁴⁰ Which is unlikely before the beginning of the first compliance period in 2008.

beginning with small numbers of negotiated transactions, at widely varying prices. Nonetheless, these early stage transactions will establish the form and functioning of the market, as well as test and refine the nature of the commodity being traded. As demand grows, transactions will become more efficient and prices more reflective of supply and demand factors, not political or social ones. Active market-makers, including possible carbon investment banks acting as intermediaries, will play a critical role. At this formative stage, philanthropic and public investment can make a major impact on the nature of the evolving market and whether it will indeed result in a new incentive for sustainable forestry.

To facilitate the development of a well-founded international carbon credit market, the World Bank has established a Prototype Carbon Fund. Through this approach, the PCF will review carbon credit projects and select those it believes will meet future regulatory requirements; then it will bundle them together as a portfolio to mitigate risk for the buyers. The managers of the PCF will seek to achieve reasonable costs for credits that are reliable, certifiable and permanent reductions. Bank personnel working on the PCF believe they have the specialized expertise to deal with the many technical issues, including conformity with the protocols, baselines, additionality⁴¹, and other project-specific assessments. The Bank hopes to use the PCF to meet both commercial and development needs. Credits are expected to be purchased with funds contributed by various international development institutions and the private sector.

The Pacific Forest Trust has taken a leading role in promoting the competitive advantages of sustainable forestry in U.S. policy-making, supported by the MacArthur Foundation, the W. Alton Jones Foundation and the Wallace Global Fund. PFT's *Forests Forever Fund* is organizing buyers and sellers of U.S. forest-based carbon credits secured by perpetual conservation easements. PFT is acquiring on

⁴¹ Additionality refers to the requirement that a carbon emissions reduction project demonstrate that the emissions reduction be demonstrably one that would not have occurred anyway.

private, working forestlands. These easements will ensure that forests are not converted to other land uses and that they are managed to grow older and store more carbon than they would otherwise.

The United Nations Conference on Trade and Development has set up the International Emissions Trading Association, a non-profit based in Geneva, to bring together governments and the private sector to establish rules for global trading. As of October 1998, thirty-five international companies, including British Petroleum, Royal Dutch/Shell Group, Texaco, Mobil and General Motors had joined as founding members. Governments will join as associates. Member companies expect to test trading mechanisms among themselves, utilizing private brokerage firms for actual transactions. The U.S.-based Emissions Trading Association is a collection of brokerage firms that trade in environmental commodities, such as clean air credits created under the federal Clean Air Act. Several of their 137 members are entering the carbon credit trading field, including Cantor Fitzgerald's Environmental Brokerage Service and Richard Sandor's Environmental Financial Products, Ltd. In addition to brokerage services, there investment in the creation of a domestic U.S. carbon bank could strongly facilitate positive market and policy development in this key nation. Such a bank could invest its own capital in buying and selling credits to build the market faster than might otherwise occur.

The gathering and dissemination of sustainable forestry market intelligence is an important, catalytic investment opportunity. Providing data, insight and connections among the multi-faceted efforts that comprise this emerging sector can facilitate smarter, faster growth of enterprises. Investing in market intelligence can happen within companies and can be provided to companies and investors by NGOs, industry associations and for-profit purveyors. Reports, conferences, web-sites, newsletters, and other media can be utilized. A new organization called Forest Trends has just been formed among environmental NGOs, forest products companies, development agencies and philanthropies to provide market intelligence services for sustainable

forestry. An outgrowth of Michael Jenkins' work at the MacArthur Foundation and the World Bank, Forest Trends is being launched by him as Executive Director with investments by these institutions and others.

THE POTENTIAL OF SUSTAINABLE FORESTRY FUNDS

Clearly there are many investment opportunities within the sustainable forestry sector as a whole, and within each segment of its value chain, "from the forest to the floor." Given the currently specialized nature of the sector, many investors may find it more efficient to utilize the fund approach to organizing their sustainable forestry investments. Funds offer investors:

- A means to leverage their own investments by co-investing with others (including public, philanthropic and private sources).
- Potentially easier diversification within the overall sector.
- Management by professionals knowledgeable in the field with established intelligence networks, deal flow and due diligence capability.
- On-going monitoring and reporting on investment status.

This adds up to greater risk mitigation than many investors could accomplish on their own. Fund managers or FIMOs charge a fee for their services, calculated usually as a percentage of assets under management. Successful funds add value through their active management and provide competitive net returns after fees.

Pooling capital interested in sustainable forestry investment also makes sense for potentially investable enterprises. Larger, focused pools of money make fund-raising more efficient and provide the potential for identifying investors not only with ready money, but with relevant expertise and technical assistance that could be brought to the table.

Sustainable forestry funds can be organized along a variety of lines, as with any funds. Stratification can

occur geographically or by business category or some combination. Potential foci include:

- **Forestland:** U.S. (regional/national); international (non-U.S. forest countries/emerging countries); global (mix of U.S. and established international, with some emerging economies).
- **Venture capital:** similar geographic organization; could focus on specific value chain elements, e.g., processing, eco-tourism, etc.
- **Mezzanine capital:** for later stage companies.
- **Umbrella funds:** mixing and matching investments as appropriate, within an investor-approved allocation.

Increasingly, ecological or "green" investment funds are being formed in the U.S., Europe and South America. These various funds each have their own objectives, with many focusing more on eco-efficiency and environmental remediation than on sustainable resource management. The largest are funds of publicly-traded securities that have been "screened" for environmental benefits among other social goals. These funds are part of the larger movement toward "socially responsible investing." According to a recent report by the Social Investment Forum, an estimated \$1.2 trillion in capital is professionally invested with social as well as economic objectives. This is up from \$639 billion in 1995 and a scant \$40 billion in 1984. Of these funds, 37% use environmental screens.⁴² (Social Investment Forum 1997)

For such green funds, forest products companies represent less than 1% of investments. Currently such funds provide limited opportunities for growing new and early stage companies in sustainable forestry. However, they could invest in larger, public forestry companies that are practice certified forestry, such as AssiDomän, the largest listed forest products company in Europe, with 3.3 million ha of certified forest.

⁴² See, for instance, the Domini Social Investment Index Fund, a \$900 million publicly-traded mutual fund that is a socially-screened alternative to the S&P 500

There are several recently organized funds that serve as examples of “green” umbrella funds that invest in private or closely-held public companies. Several serve as examples of hybrid public-private funds, leveraging private investors’ capital with debt, equity or technical assistance investments from international development institutions and philanthropies. This structure mitigates risk and enhances returns for private investors, facilitating investments in the emerging “sustainability” sector of an emerging economy. The funds described below focus in on businesses in developing economies that provide environmentally advantageous goods or services. Each includes sustainable forestry as an invest focus:

Terra Capital Fund and Corporación Financiera Ambiental are two funds managed by Environmental Enterprises Assistance Fund of Arlington, VA, or one of its subsidiaries.

Terra Capital is a \$15 million fund organized to invest throughout Latin America in growing businesses “whose activities have a positive impact on biological diversity . . . These market opportunities involve the sustainable or environmentally friendly use of natural resources.” Terra Capital is sponsored jointly by EEAF, Banco AXIAL, S.A., Sustainable Development, Inc., and the International Finance Corporation, the private sector affiliate of the World Bank. Banco AXIAL, an environmentally-focused investment bank, will house the fund’s investment management in Brazil. The economic situation in Brazil in particular is quite challenging, given the current liquidity crunch, as well as the generally undeveloped nature of private capital markets, so AXIAL’s experienced banking team is key to Terra’s ability to find, analyze and develop investment quality deals. Their target sectors include sustainable forestry, agriculture, aquaculture tourism and special forest products. The fund’s investors include private sector entities and multi- and bi-lateral institutions, such as the International Finance Corporation and Multilateral Investment Fund. EEAF is also seeking foundation investors. In addition to its direct investment capital, the World Bank’s Global Environment Facility intends to provide Terra with \$5 million in support

from for costs of biodiversity-related project development, technical assistance, monitoring and evaluation.

Similarly, Corporación Financiera Ambiental (CFA) is a \$10 million fund organized by EEAF and co-sponsored by the MIF of the Inter-American Development Bank. Major additional investors include the government of Switzerland and FINNFUND. CFA invests in smaller, private sector environmental businesses in Central America. Sustainable forestry and nature tourism are among their stated sectoral targets.

The Nature Conservancy, a non-governmental organization, is organizing the Eco-Enterprises Fund, another joint venture with the MIF. Their goal is to provide \$6.5 million in venture capital and \$3.5 million in technical support to environmentally responsible business projects in Latin America and the Caribbean. They intend to invest in sustainable forestry, non-timber forest products, nature tourism and agriculture. The Conservancy serves as fund manager and capital is being raised from both private and philanthropic sources for both the venture and technical assistance portions, with the MIF matching these sources one-for-one.

The Global Environment Fund, headquartered in Washington, DC, is another example. They manage a group of four environmental funds with a total of \$300 million in assets. About 95% of their investments are in emerging markets. The funds focus on water, energy, natural resource management and sustainable agriculture. A variety of sustainable forestry opportunities could satisfy their investment criteria. Two of GEF’s funds are joint ventures with the Overseas Private Investment Corporation wherein OPIC is the lead investor, contributing \$2 for every \$1 of private capital invested. Other investors include foundations, high net worth individuals and strategic business investors with an interest in emerging economies.

As discussed in some detail earlier, the organization of investment funds by FIMOs dedicated to forestland acquisition and management have great potential to expand the commercial breadth of sustainable forestry. Existing TIMOs and similar funds

could expand their focus to sustainable forestry and conservation or new funds could be created.

While sustainable forestry investments can and are being integrated into existing private investment funds, the needs and opportunities of this sector are such that the creation of funds with an exclusive focus on sustainable forestry is warranted. This would gain investors the general advantages of funds enumerated above, while ensuring that the fund management has access to the particular sector know-how and deal flow to be successful—and for it to play a leading role in expanding sustainable forestry.

CONCLUSION

By targeting investments to achieve the greatest strategic value, interested investors have the potential to profit while promoting the growth of sustainable forestry. At this stage, the means to move the whole sector forward is finding and supporting key sustainable forestry enterprises and expanding markets for sustainable forest products—both timber and non-timber. Once there are profitable, proven ventures with visible success both “on the ground” and “on the shelf,” the catalytic capitalist

has achieved its goal and the conventional capital markets will serve the sector as it matures.

Finding good companies, skilled management, clear achievable business plans and attractive investment terms always takes work. Doing this in an emerging sector—and in many emerging economies—is that much more demanding. Therefore, investors should look to people and organizations with expertise in sustainable forestry and investment management for advice in selecting investments. Careful due diligence will be required to best utilize scarce funds.

Nonetheless, based on our survey of the opportunities and issues in the sustainable forestry sector, we believe the conditions are ripe for strategic catalytic investment to be successful in taking the sector to “scale.” We believe the deals are there. While more educational outreach to philanthropies, public agencies and private investors is plainly needed, informed and interested investors are increasing. By moving forward strongly, there is considerable potential for significant tracts of forestland around the world to become sustainably managed—with great gains to protection of biological diversity, critical ecosystem services and forest-dependent communities.

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Constance Best is Managing Director of the Pacific Forest Trust, a regional U.S. non-profit organization she co-founded in 1993. The Pacific Forest Trust comprises nationally known specialists in land conservation, tax law, forestry and sustainable development, and is dedicated to the conservation and sustainable management of private, productive forestland in the Pacific Northwest. Ms. Best and the Pacific Forest Trust advise major private landowners in California, Oregon and Washington. Ms. Best is a private investor and small timberland owner. As principal of Best & Co., she has provided management and marketing services for consumer product companies. Ms. Best co-founded and managed the first natural soda business in America, Soho Natural Sodas, which established the billion dollar “new age” beverage category. (Soho was sold in 1989 to Seagrams). She serves on numerous boards, including the national Land Trust Alliance and Investor’s Circle (an association of socially responsible venture capitalists).

Abraham Guillen is International Marketing Manager for Smartwood, an international FSC sustainable forestry certifier headquartered in Vermont. Prior to joining Smartwood, Mr. Guillen worked for 3 years as the Product and Market Development Coordinator for BOLFOR, a sustainable forest management project in Bolivia. A Honduran native, Mr. Guillen also worked for 4 years as an Associate Regional Forester for USAID in the Environment & Natural Resources Office for Guatemala and Central America. He holds a MBA from Framingham State College in Massachusetts and a Bachelor of Science in Forest Products from the University of Idaho.

Donald J. Hoffman is the Principal of The CREST Company, a management advisory firm he founded in 1989. From 1985 through 1988, Mr. Hoffman was President of The Hudson Group, Inc., a 15 location U.S. wholesale distributor of building materials. Prior to Hudson, he spent 10 years with International Paper Company in a

variety of management positions in marketing, finance, and operations, and was most recently the Manager of Lumber and Plywood operations. Mr. Hoffman is a graduate of Biola University and California State Polytechnic University Graduate School of Business.

Michael Jenkins recently launched Forest Trends, which he serves as Executive Director. Forest Trends is a global organization focused on the conservation and sustainable management of forests, bringing together forest industry, environmental, philanthropic and multilateral agency interests. Prior to organizing Forest Trends, Mr. Jenkins served for ten years as Associate Director for the Global Security and Sustainability Program of the John D. and Catherine T. MacArthur Foundation. During 1998, he held a joint appointment as a Senior Forestry Advisor to the World Bank. At the World Bank and MacArthur Foundation, as well as in his earlier work with the USAID Agroforestry Outreach Program, Appropriate Technology and the Peace Corps, Mr. Jenkins worked internationally in agriculture and forestry projects, with a focus on Latin America and the Caribbean. Mr. Jenkins holds a Masters degree in Forest Science from Yale University.

Laurie A. Wayburn is co-founder and President of the Pacific Forest Trust (described further above). Ms. Wayburn is a leader in developing markets for forest ecosystem services and conservation. Prior to establishing PFT, she served for five years as Executive Director of PRBO, a scientific non-profit research and conservation organization. She worked with the United Nations in environment and economic development for nine years in Africa, Latin America and Europe. A graduate of Harvard University, Ms. Wayburn also serves as President the Anderson Valley Land Trust, and has served on the boards of the Compton Foundation, the 7th American Forest Congress and the Biosphere Reserve of the Central California Coast (UNESCO-MAB).

Appendix

Forest Stewardship Council: Principles and Criteria for Forest Stewardship

INTRODUCTION

It is widely accepted that forest resources and associated lands should be managed to meet the social, economic, ecological, cultural and spiritual needs of present and future generations. Furthermore, growing public awareness of forest destruction and degradation has led consumers to demand that their purchases of wood and other forest products will not contribute to this destruction but rather help to secure forest resources for the future. In response to these demands, certification and self-certification programs of wood products have proliferated in the marketplace.

The Forest Stewardship Council (FSC) is an international body which accredits certification organizations in order to guarantee the authenticity of their claims. In all cases the process of certification will be initiated voluntarily by forest owners and managers who request the services of a certification organization. The goal of FSC is to promote environmentally responsible, socially beneficial and economically viable management of the world's forests, by establishing a worldwide standard of recognized and respected Principles of Forest Stewardship.

The FSC's Principles and Criteria (P&C) apply to all tropical, temperate and boreal forests, as addressed in Principle #9 and the accompanying glossary. Many of these P&C apply also to plantations and partially replanted forests. More detailed standards for these and other vegetation types may be prepared at national and local levels. The P&C are to be incorporated into the evaluation systems and standards of all certification organizations seeking accreditation by FSC. While the P&C are mainly designed for forests managed for the production of wood products, they are also relevant, to varying degrees, to forests managed for non-timber products and other services. The P&C are a complete package to be considered as a whole, and their sequence does not represent an ordering of priority. This document shall be used in conjunction with the FSC's Statutes, Procedures for Accreditation and Guidelines for Certifiers.

FSC and FSC-accredited certification organizations will not insist on perfection in satisfying the

P&C. However, major failures in any individual Principles will normally disqualify a candidate from certification, or will lead to decertification. These decisions will be taken by individual certifiers, and guided by the extent to which each Criterion is satisfied, and by the importance and consequences of failures. Some flexibility will be allowed to cope with local circumstances.

The scale and intensity of forest management operations, the uniqueness of the affected resources, and the relative ecological fragility of the forest will be considered in all certification assessments. Differences and difficulties of interpretation of the P&C will be addressed in national and local forest stewardship standards. These standards are to be developed in each country or region involved, and will be evaluated for purposes of certification, by certifiers and other involved and affected parties on a case by case basis. If necessary, FSC dispute resolution mechanisms may also be called upon during the course of assessment. More information and guidance about the certification and accreditation process is included in the FSC Statutes, Accreditation Procedures, and Guidelines for Certifiers.

The FSC P&C should be used in conjunction with national and international laws and regulations. FSC intends to complement, not supplant, other initiatives that support responsible forest management worldwide.

The FSC will conduct educational activities to increase public awareness of the importance of the following:

- improving forest management;
- incorporating the full costs of management and production into the price of forest products;
- promoting the highest and best use of forest resources;
- reducing damage and waste; and
- avoiding over-consumption and over-harvesting.

FSC will also provide guidance to policy makers on these issues, including improving forest management legislation and policies.

PRINCIPLE #1: COMPLIANCE WITH LAWS AND FSC PRINCIPLES

Forest management shall respect all applicable laws of the country in which they occur, and international treaties and agreements to which the country is a signatory, and comply with all FSC Principles and Criteria.

- 1.1 Forest management shall respect all national and local laws and administrative requirements.
- 1.2 All applicable and legally prescribed fees, royalties, taxes and other charges shall be paid.
- 1.3 In signatory countries, the provisions of all binding international agreements such as CITES, ILO Conventions, ITTA, and Convention on Biological Diversity, shall be respected.
- 1.4 Conflicts between laws, regulations and the FSC Principles and Criteria shall be evaluated for the purposes of certification, on a case by case basis, by the certifiers and the involved or affected parties.
- 1.5 Forest management areas should be protected from illegal harvesting, settlement and other unauthorized activities.
- 1.6 Forest managers shall demonstrate a long-term commitment to adhere to the FSC Principles and Criteria.

PRINCIPLE #2: TENURE AND USE RIGHTS AND RESPONSIBILITIES

Long-term tenure and use rights to the land and forest resources shall be clearly defined, documented and legally established.

- 2.1 Clear evidence of long-term forest use rights to the land (e.g. land title, customary rights, or lease agreements) shall be demonstrated.
- 2.2 Local communities with legal or customary tenure or use rights shall maintain control, to the extent necessary to protect their rights or resources, over forest operations unless they delegate control with free and informed consent to other agencies.

2.3 Appropriate mechanisms shall be employed to resolve disputes over tenure claims and use rights. The circumstances and status of any outstanding disputes will be explicitly considered in the certification evaluation. Disputes of substantial magnitude involving a significant number of interests will normally disqualify an operation from being certified.

PRINCIPLE #3: INDIGENOUS PEOPLES' RIGHTS

The legal and customary rights of indigenous peoples to own, use and manage their lands, territories, and resources shall be recognized and respected.

- 3.1 Indigenous peoples shall control forest management on their lands and territories unless they delegate control with free and informed consent to other agencies.
- 3.2 Forest management shall not threaten or diminish, either directly or indirectly, the resources or tenure rights of indigenous peoples.
- 3.3 Sites of special cultural, ecological, economic or religious significance to indigenous peoples shall be clearly identified in cooperation with such peoples, and recognized and protected by forest managers.
- 3.4 Indigenous peoples shall be compensated for the application of their traditional knowledge regarding the use of forest species or management systems in forest operations. This compensation shall be formally agreed upon with their free and informed consent before forest operations commence.

PRINCIPLE #4: COMMUNITY RELATIONS AND WORKER'S RIGHTS

Forest management operations shall maintain or enhance the long-term social and economic well-being of forest workers and local communities.

- 4.1 The communities within, or adjacent to, the forest management area should be given opportunities for employment, training, and other services.

4.2 Forest management should meet or exceed all applicable laws and/or regulations covering health and safety of employees and their families.

4.3 The rights of workers to organize and voluntarily negotiate with their employers shall be guaranteed as outlined in Conventions 87 and 98 of the International Labour Organisation (ILO).

4.4 Management planning and operations shall incorporate the results of evaluations of social impact. Consultations shall be maintained with people and groups directly affected by management operations.

4.5 Appropriate mechanisms shall be employed for resolving grievances and for providing fair compensation in the case of loss or damage affecting the legal or customary rights, property, resources, or livelihoods of local peoples. Measures shall be taken to avoid such loss or damage.

PRINCIPLE # 5: BENEFITS FROM THE FOREST

Forest management operations shall encourage the efficient use of the forest's multiple products and services to ensure economic viability and a wide range of environmental and social benefits.

- 5.1 Forest management should strive toward economic viability, while taking into account the full environmental, social, and operational costs of production, and ensuring the investments necessary to maintain the ecological productivity of the forest.
- 5.2 Forest management and marketing operations should encourage the optimal use and local processing of the forest's diversity of products.
- 5.3 Forest management should minimize waste associated with harvesting and on-site processing operations and avoid damage to other forest resources.
- 5.4 Forest management should strive to strengthen and diversify the local economy, avoiding dependence on a single forest product.
- 5.5 Forest management operations shall recognize, maintain, and, where appropriate, enhance

the value of forest services and resources such as watersheds and fisheries.

5.6 The rate of harvest of forest products shall not exceed levels which can be permanently sustained.

PRINCIPLE #6: ENVIRONMENTAL IMPACT

Forest management shall conserve biological diversity and its associated values, water resources, soils, and unique and fragile ecosystems and landscapes, and, by so doing, maintain the ecological functions and the integrity of the forest.

- 6.1 Assessment of environmental impacts shall be completed—appropriate to the scale, intensity of forest management and the uniqueness of the affected resources—and adequately integrated into management systems. Assessments shall include landscape level considerations as well as the impacts of on-site processing facilities. Environmental impacts shall be assessed prior to commencement of site-disturbing operations.
- 6.2 Safeguards shall exist which protect rare, threatened and endangered species and their habitats (e.g., nesting and feeding areas). Conservation zones and protection areas shall be established, appropriate to the scale and intensity of forest management and the uniqueness of the affected resources. Inappropriate hunting, fishing, trapping and collecting shall be controlled.
- 6.3 Ecological functions and values shall be maintained intact, enhanced, or restored, including:
 - a) Forest regeneration and succession.
 - b) Genetic, species, and ecosystem diversity.
 - c) Natural cycles that affect the productivity of the forest ecosystem.
- 6.4 Representative samples of existing ecosystems within the landscape shall be protected in their natural state and recorded on maps, appropriate to the scale and intensity of operations and the uniqueness of the affected resources.
- 6.5 Written guidelines shall be prepared and implemented to: control erosion; minimize forest damage during harvesting, road construction, and

all other mechanical disturbances; and protect water resources.

6.6 Management systems shall promote the development and adoption of environmentally friendly non-chemical methods of pest management and strive to avoid the use of chemical pesticides. World Health Organization Type 1A and 1B and chlorinated hydrocarbon pesticides; pesticides that are persistent, toxic or whose derivatives remain biologically active and accumulate in the food chain beyond their intended use; as well as any pesticides banned by international agreement, shall be prohibited. If chemicals are used, proper equipment and training shall be provided to minimize health and environmental risks.

6.7 Chemicals, containers, liquid and solid non-organic wastes including fuel and oil shall be disposed of in an environmentally appropriate manner at off-site locations.

6.8 Use of biological control agents shall be documented, minimized, monitored and strictly controlled in accordance with national laws and internationally accepted scientific protocols. Use of genetically modified organisms shall be prohibited.

6.9 The use of exotic species shall be carefully controlled and actively monitored to avoid adverse ecological impacts.

6.10 Forest conversion to plantations or non-forest land uses shall not occur, except in circumstances where conversion:

- a) entails a very limited portion of the forest management unit; and
- b) does not occur on high conservation value forest areas; and
- c) will enable clear, substantial, additional, secure, long term conservation benefits across the forest management unit.

PRINCIPLE #7: MANAGEMENT PLAN

A management plan—appropriate to the scale and intensity of the operations—shall be written,

implemented, and kept up to date. The long term objectives of management, and the means of achieving them, shall be clearly stated.

7.1 The management plan and supporting documents shall provide:

- a) Management objectives.
- b) Description of the forest resources to be managed, environmental limitations, land use and ownership status, socio-economic conditions, and a profile of adjacent lands.
- c) Description of silvicultural and/or other management system, based on the ecology of the forest in question and information gathered through resource inventories.
- d) Rationale for rate of annual harvest and species selection.
- e) Provisions for monitoring of forest growth and dynamics.
- f) Environmental safeguards based on environmental assessments.
- g) Plans for the identification and protection of rare, threatened and endangered species.
- h) Maps describing the forest resource base including protected areas, planned management activities and land ownership.
- i) Description and justification of harvesting techniques and equipment to be used.

7.2 The management plan shall be periodically revised to incorporate the results of monitoring or new scientific and technical information, as well as to respond to changing environmental, social and economic circumstances.

7.3 Forest workers shall receive adequate training and supervision to ensure proper implementation of the management plan.

7.4 While respecting the confidentiality of information, forest managers shall make publicly available a summary of the primary elements of the management plan, including those listed in Criterion 7.1.

PRINCIPLE #8: MONITORING AND ASSESSMENT

Monitoring shall be conducted — appropriate to the scale and intensity of forest management — to assess the condition of the forest, yields of forest products, chain of custody, management activities and their social and environmental impacts.

8.1 The frequency and intensity of monitoring should be determined by the scale and intensity of forest management operations as well as the relative complexity and fragility of the affected environment. Monitoring procedures should be consistent and replicable over time to allow comparison of results and assessment of change.

8.2 Forest management should include the research and data collection needed to monitor, at a minimum, the following indicators:

- a) Yield of all forest products harvested.
- b) Growth rates, regeneration and condition of the forest.
- c) Composition and observed changes in the flora and fauna.
- d) Environmental and social impacts of harvesting and other operations.
- e) Costs, productivity, and efficiency of forest management.

8.3 Documentation shall be provided by the forest manager to enable monitoring and certifying organizations to trace each forest product from its origin, a process known as the “chain of custody.”

8.4 The results of monitoring shall be incorporated into the implementation and revision of the management plan.

8.5 While respecting the confidentiality of information, forest managers shall make publicly available a summary of the results of monitoring indicators, including those listed in Criterion 8.2.

PRINCIPLE 9 : MAINTENANCE OF HIGH CONSERVATION VALUE FORESTS

Management activities in high conservation value forests shall maintain or enhance the attributes which define such forests. Decisions regarding high conservation value forests shall always be considered in the context of a precautionary approach.

9.1 Assessment to determine the presence of the attributes consistent with High Conservation Value Forests will be completed, appropriate to scale and intensity of forest management.

9.2 The consultative portion of the certification process must place emphasis on the identified conservation attributes, and options for the maintenance thereof.

9.3 The management plan shall include and implement specific measures that ensure the maintenance and/or enhancement of the applicable conservation attributes consistent with the precautionary approach. These measures shall be specifically included in the publicly available management plan summary.

9.4 Annual monitoring shall be conducted to assess the effectiveness of the measures employed to maintain or enhance the applicable conservation attributes.

PRINCIPLE # 10: PLANTATIONS

Plantations shall be planned and managed in accordance with Principles and Criteria 1 - 9, and Principle 10 and its Criteria. While plantations can provide an array of social and economic benefits, and can contribute to satisfying the world’s needs for forest products, they should complement the management of, reduce pressures on, and promote the restoration and conservation of natural forests.

10.1 The management objectives of the plantation, including natural forest conservation and restoration objectives, shall be explicitly stated in the management plan, and clearly demonstrated in the implementation of the plan.

10.2 The design and layout of plantations should promote the protection, restoration and conservation of natural forests, and not increase pressures on natural forests. Wildlife corridors, streamside zones and a mosaic of stands of different ages and rotation periods, shall be used in the layout of the plantation, consistent with the scale of the operation. The scale and layout of plantation blocks shall be consistent with the patterns of forest stands found within the natural landscape.

10.3 Diversity in the composition of plantations is preferred, so as to enhance economic, ecological and social stability. Such diversity may include the size and spatial distribution of management units within the landscape, number and genetic composition of species, age classes and structures.

10.4 The selection of species for planting shall be based on their overall suitability for the site and their appropriateness to the management objectives. In order to enhance the conservation of biological diversity, native species are preferred over exotic species in the establishment of plantations and the restoration of degraded ecosystems. Exotic species, which shall be used only when their performance is greater than that of native species, shall be carefully monitored to detect unusual mortality, disease, or insect outbreaks and adverse ecological impacts.

10.5 A proportion of the overall forest management area, appropriate to the scale of the plantation and to be determined in regional standards, shall be managed so as to restore the site to a natural forest cover.

10.6 Measures shall be taken to maintain or improve soil structure, fertility, and biological activity. The techniques and rate of harvesting, road and trail construction and maintenance, and the choice of species shall not result in long term soil degradation or adverse impacts on water quality, quantity or substantial deviation from stream course drainage patterns.

10.7 Measures shall be taken to prevent and minimize outbreaks of pests, diseases, fire and invasive plant introductions. Integrated pest management shall form an essential part of the management plan, with primary reliance on prevention and biological control methods rather than chemical pesticides and fertilizers. Plantation management should make every effort to move away from chemical pesticides and fertilizers, including their use in nurseries. The use of chemicals is also covered in Criteria 6.6 and 6.7.

10.8 Appropriate to the scale and diversity of the operation, monitoring of plantations shall include regular assessment of potential on-site and off-site ecological and social impacts, (e.g. natural regeneration, effects on water resources and soil fertility, and impacts on local welfare and social well-being), in addition to those elements addressed in principles 8, 6 and 4. No species should be planted on a large scale until local trials and/or experience have shown that they are ecologically well-adapted to the site, are not invasive, and do not have significant negative ecological impacts on other ecosystems. Special attention will be paid to social issues of land acquisition for plantations, especially the protection of local rights of ownership, use or access.

10.9 Plantations established in areas converted from natural forests after November 1994 normally shall not qualify for certification. Certification may be allowed in circumstances where sufficient evidence is submitted to the certification body that the manager/owner is not responsible directly or indirectly of such conversion.

Principles 1-9 were ratified by the FSC Founding Members and Board of Directors in September 1994. Principle 10 was ratified by the FSC Members and Board of Directors in February 1996.

The revision of Principle 9 and the addition of Criteria 6.10 and 10.9 were ratified by the FSC Members and Board of Directors in January 1999.

Words in this document are used as defined in most standard English language dictionaries. The precise meaning and local interpretation of certain phrases (such as local communities) should be decided in the local context by forest managers and certifiers. In this document, the words below are understood as follows:

Biological diversity: The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems. (see Convention on Biological Diversity, 1992)

Biological diversity values: The intrinsic, ecological, genetic, social, economic, scientific, educational, cultural, recreational and aesthetic values of biological diversity and its components. (see Convention on Biological Diversity, 1992)

Biological control agents: Living organisms used to eliminate or regulate the population of other living organisms.

Chain of custody: The channel through which products are distributed from their origin in the forest to their end-use.

Chemicals: The range of fertilizers, insecticides, fungicides, and hormones which are used in forest management.

Criterion (pl. Criteria): A means of judging whether or not a Principle (of forest stewardship) has been fulfilled.

Customary rights: Rights which result from a long series of habitual or customary actions, constantly repeated, which have, by such repetition and by uninterrupted acquiescence, acquired the force of a law within a geographical or sociological unit.

Ecosystem: A community of all plants and animals and their physical environment, functioning together as an interdependent unit.

Endangered species: Any species which is in danger of extinction throughout all or a significant portion of its range.

Exotic species: An introduced species not native or endemic to the area in question.

Forest integrity: The composition, dynamics, functions and structural attributes of a natural forest.

Forest management/manager: The people responsible for the operational management of the forest resource and of the enterprise, as well as the management system and structure, and the planning and field operations.

Genetically modified organisms: Biological organisms which have been induced by various means to consist of genetic structural changes.

Indigenous lands and territories: The total environment of the lands, air, water, sea, sea-ice, flora and fauna, and other resources which indigenous peoples have traditionally owned or otherwise occupied or used. (Draft Declaration of the Rights of Indigenous Peoples: Part VI)

Indigenous peoples: "The existing descendants of the peoples who inhabited the present territory of a country wholly or partially at the time when persons of a different culture or ethnic origin arrived there from other parts of the world, overcame them and, by conquest, settlement, or other means reduced them to a non-dominant or colonial situation; who today live more in conformity with their particular social, economic and cultural customs and traditions than with the institutions of the country of which they now form a part, under State structure which incorporates mainly the national, social and cultural characteristics of other segments of the population which are predominant." (Working definition adopted by the UN Working Group on Indigenous Peoples).

High Conservation Value Forests: High Conservation Value Forests are those that possess one or more of the following attributes:

- a) forest areas containing globally, regionally or nationally significant:
- concentrations of biodiversity values (e.g. endemism, endangered species, refugia); and/or
 - large landscape level forests, contained within, or containing the management unit, where

viable populations of most if not all naturally occurring species exist in natural patterns of distribution and abundance

2) forest areas that are in or contain rare, threatened or endangered ecosystems

3) forest areas that provide basic services of nature in critical situations (e.g. watershed protection, erosion control)

4) forest areas fundamental to meeting basic needs of local communities (e.g. subsistence, health) and/or critical to local communities' traditional cultural identity (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities).

Landscape : A geographical mosaic composed of interacting ecosystems resulting from the influence of geological, topographical, soil, climatic, biotic and human interactions in a given area.

Local laws: Includes all legal norms given by organisms of government whose jurisdiction is less than the national level, such as departmental, municipal and customary norms.

Long term: The time-scale of the forest owner or manager as manifested by the objectives of the management plan, the rate of harvesting, and the commitment to maintain permanent forest cover. The length of time involved will vary according to the context and ecological conditions, and will be a function of how long it takes a given ecosystem to recover its natural structure and composition following harvesting or disturbance, or to produce mature or primary conditions.

Native species: A species that occurs naturally in the region; endemic to the area.

Natural cycles: Nutrient and mineral cycling as a result of interactions between soils, water, plants, and animals in forest environments that affect the ecological productivity of a given site.

Natural Forest: Forest areas where many of the principal characteristics and key elements of native ecosystems such as complexity, structure and diversity are present, as defined by FSC approved national and regional standards of forest management.

Nontimber forest products: All forest products except timber, including other materials obtained from trees such as resins and leaves, as well as any other plant and animal products.

Other forest types: Forest areas that do not fit the criteria for plantation or natural forests and which are defined more specifically by FSC-approved national and regional standards of forest stewardship.

Plantation: Forest areas lacking most of the principal characteristics and key elements of native ecosystems as defined by FSC-approved national and regional standards of forest stewardship, which result from the human activities of either planting, sowing or intensive silvicultural treatments.

Principle: An essential rule or element; in FSC's case, of forest stewardship.

Silviculture: The art of producing and tending a forest by manipulating its establishment, composition and growth to best fulfill the objectives of the owner. This may, or may not, include timber production.

Succession: Progressive changes in species composition and forest community structure caused by natural processes (nonhuman) over time.

Tenure: Socially defined agreements held by individuals or groups, recognized by legal statutes or customary practice, regarding the "bundle of rights and duties" of ownership, holding, access and/or usage of a particular land unit or the associated resources there within (such as individual trees, plant species, water, minerals, etc).

Threatened species: Any species which is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Use rights: Rights for the use of forest resources that can be defined by local custom, mutual agreements, or prescribed by other entities holding access rights. These rights may restrict the use of particular resources to specific levels of consumption or particular harvesting techniques.