DEVELOPING COMMERCIAL MARKETS FOR ENVIRONMENTAL SERVICES OF FORESTS

Katoomba Workshop II

Proceedings and Summary of Key Issues

Vancouver and Parksville, British Columbia, Canada

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Developing Commercial Markets for Environmental Services of Forests: Katoomba II

1. The Workshop: Background and Introduction

Conventional strategies to conserve the environmental services of forests—such as voluntary codes, legislative designation of protected areas, or regulation of land use and management—are often inefficient, difficult to enforce or difficult to fund sustainably. Global interest in markets for environmental services from forests is driven by growing recognition that markets, in general, do not recognize or reward forest owners for the host of environmental services generated by forests that are beneficial to society, including carbon storage, watershed protection and biodiversity conservation. If some of the value of these social benefits could be returned to forest owners, there would be a double benefit: additional incentives for forest stewardship and conservation, and new sources of income for forest landholders.

Although there are many initiatives across the world to develop new markets and economic instruments to buy and sell forest services, these initiatives are dispersed and often isolated within particular disciplines, sectors or countries. The valuable lessons generated from these initiatives are not readily accessible to the growing number of stakeholders around the world interested in this topic. Recognizing the potential benefits of markets for forest services—to communities, for companies and for forests—Forest Trends is sponsoring an international working group to spur development of markets and market-based instruments for forest ecosystem services. This working group is called the "Katoomba Group", after the name of the site of its first meeting in Katoomba, Australia in April 2000, hosted by State Forests of New South Wales and the Sydney Futures Exchange. The Katoomba Group is envisioned as a "skunkworks", such as that organized after World War II in the U.S., to draw in scientific expertise for rapid development of the jet engine**.** The purpose of the Katoomba Group is to build our collective understanding of how these instruments are constructed and the conditions in which they can work, to facilitate strategic partnership, and to provide technical support to pilot projects of broad relevance. The group includes experts from forestry, finance, environmental research and policy, government officials and other private and non-profit sectors from all regions of the world.

The second meeting of the Katoomba Group was held in Parksville, British Columbia, Canada, October 5-6, 2000, hosted by the University of British Columbia. Of the 52 participants, 19 had participated in the first meeting; many of the new members were from Canada and Latin America. The meeting was held in tandem with a one-day public conference entitled "Developing Commercial Markets for Environmental Services of Forests" held at the Hyatt Hotel in Vancouver. This conference was designed to inform the broader Canadian public of the fundamental changes underway in the forestry sector and the promise of markets for environmental services. Over 160 were in attendance, from industry, local foresters, environmental groups and governments.

The specific objectives of the Katoomba II meeting were to:

1) Advance conceptual understanding of markets for environmental services, and the range of economic and market-based instruments currently being used or designed;
2) Pilot test an interactive game on environmental markets for forests being developed by several Katoomba Group members;

3) Introduce participants to challenges for environmental market development in the forests of British Columbia, and provide useful feedback for Katoomba Group members involved in innovative market development for environmental services;
4) Exchange information among Katoomba Group members involved in innovative market development for environmental services, and seek opportunities for mutual support;
5) Make practical contributions to efforts in British Columbia to establish new markets and support services for environmental services from forests.

Notably, 19 of the participants were actively involved in designing, organizing or management new markets or economic instruments for environmental services. Another 15 were researchers involved in conceptual development or evaluation of markets for environmental services. Eleven participants were involved in financing environmental markets or financial payments. Two were from environmental groups engaged in monitoring environmental services from forests, and another two were professional journalists engaged in public dissemination of information about environmental policy and action.

This proceedings was prepared to serve as a record of the meeting, to update the rest of the Katoomba Group not present at the meeting, and to highlight key issues raised for further discussion and follow-up. The report briefly summarizes these key issues, the Iisaak Forest Resources project of British Columbia that was highlighted, the Environmental Markets simulation game that was tested by the participants, and plans for the future agreed by the Katoomba Group.

Greater detail on the workshop discussions may be found in Annex A, while Annex B summarizes suggestions made by participants for further development of the Environmental Markets game discussed at the workshop. Annex C provides a complete list of Katoomba II meeting participants. Annexes D and E present the agenda of the formal program at the Vancouver conference, and synopses of speakers' presentations. Annex F provides synopses of speakers' presentations at the Parksville workshop. Overheads from nearly all of the presentations have been posted on the Forest Trends web-site: www.forest-trends.org

2. Summary: Analysis of Key Issues Discussed

Who's Buying Environmental Services from Forests?

While there is considerable interest from forest owners and conservationists in selling the environmental services from forests, a big question mark remains about the actual size of potential demand (buyers) of these services. The Katoomba group addressed this question in both the conference and the workshop, and concluded that demand is greater than most people had realized, and is growing rapidly. Various groups of current and potential buyers were described, including private "green" companies, "green" investment firms, stockholders, public agencies concerned both with enhancing environmental quality and also reducing the threat and costs of environmental damage and disasters, private conservation organizations, philanthropists, and the general public.

Market-based instruments

There has been a proliferation of initiatives around the globe to develop market-based instruments to promote environmental services from forests. Over 20 specific examples from

diverse countries were described and discussed at the meeting. They represented three main categories of instruments:

a) direct financial payments to forest holders providing environmental services;
b) true markets for environmental services, with multiple buyers and sellers negotiating within a government cap; and
c) indirect payments, through a price premium or cost subsidy, for products produced in ways that conserve or enhance environmental services.

Design issues in developing markets for environmental services

These different market-based instruments raise a host of issues for effective design and implementation. Key issues were laid out in a draft Conceptual Framework paper:

a) In what markets do forest services deliver benefits?
b) What are the rights and responsibilities of suppliers and beneficiaries?
c) Can the service be defined in a way that it can be measured and monitored?
d) What regulatory and legal environment exists or is needed for market development?
e) Are there willing buyers and sellers, and what mechanisms and investments need to be put in place to enable them to pay?
f) What support services are required to enable the market?
g) Is there a trend in the quality or scarcity of the service, and what happens if it fails?

Authors of a second paper applied these questions specifically to markets for watershed services from forests. They conclude that developing such markets widely will require more hydrological research, education, lower-cost monitoring methods, exchange of lessons learned, subsidies to cover early transaction costs, and clarification of rights and responsibilities.

The Parksville meeting addressed some key conceptual challenges for the development of markets for environmental services from forests. Diverse views were expressed about the evolutionary process by which environmental service markets develop. Specific obstacles to the development of "green" businesses around environmental services were identified, as well as strategies that have been used successfully to overcome them. Problems of estimating or setting the financial value of environmental services were raised, and participants considered the extent to which multiple environmental services could really be "bundled" in the same project or market areas. A number of equity issues were raised in defining initial market rules and ensuring that market implementation does not harm the poor. The assignment of property rights over forest resources providing environmental services was seen as central to the development of markets, but problematic in many social settings and requiring new strategies to resolve. The need for spatially explicit planning to set the rules for many types of environmental service markets was emphasized, and specific challenges for doing so were highlighted. Various strategies for designing credible forest carbon projects aimed at "avoided deforestation" under the Clean Development Mechanism were discussed.

Institutions to support environmental services

All well-functioning markets rely on a strong institutional foundation, and these are even more important in establishing and maintaining markets for environmental services, such as those from forests. The Katoomba group members shared their practical experience in developing a number of important institutional innovations to provide essential support functions. Examples included: new legislative frameworks, property rights, planning tools, methods and services for monitoring and verification of environmental services, technical research on environmental service values, business advisory services for "green companies" and local entrepreneurs,

insurance services to cover and reduce the risks of environmental service contracts, independent advisory groups to establish environmental guidelines, and training and education services.

3. Iisaak Forest Resources, British Columbia: A Case Study

Iisaak (pronounced *E-soc*) Forest Resources (IFR) is a forest services company owned by indigenous (First Nations) peoples of Clayoquot Sound (pronounced *Clak-wit*) and the BC Coastal Group of Weyerhaeuser. The *strategic intent* of the company is to develop a viable economic model for conservation and management of coastal old growth forests that are not formally protected but nevertheless contain important conservation and cultural values. The Katoomba Group took advantage of its meeting in British Columbia, Canada, to learn more about Iisaak. The case study was presented by Linda Coady of Weyerhaeuser Corporation, Larry Baird of First Nations of Clayoquot Sound, Duncan Dow of Dow and Company, and Eric Schroff, General Manager of IFR.

History

The genesis of Iisaak is the intense social conflict over industrial harvesting in old growth forests in Clayoquot Sound. This conflict developed over many years, but climaxed in 1993 when opposition led to widespread civil disobedience. In that year, logging basically ceased, and also the government announced that no new lands would be designated as protected areas. Interim agreements in 1994-5 led to organization of a Scientific Panel to evaluate the rain forest ecosystem and identify uses consistent with conservation. In 1998, MacMillan-Blaudel, Ltd. closed its division, and initiatives were taken to develop a new joint venture partnering with the First Nations of the region.

A new forest services company was envisioned, built on aboriginal values and respect for a wide range of forest values. “Iisaak” is means respect, and “Hishuk-ish ts’awalk” (pronounced *He-shook-ish-sa-walk*)—the philosophy of IFR--means recognition of the limits of what is extracted and the interconnectedness of all things.

Development of the joint venture involved a 2-year process and formation of a Joint Secretariat with shared resources, like lawyers trusted by both groups. Iisaak is also supported to two stakeholder agreements critical to long-term stability. In spring 1999, a Memorandum of Understanding was signed with five major environmental NGO’s, to promote the resolution of their historic land use conflict in a way which respects First Nations’ traditional ownership of their territories, enhanced local sustainable economic development opportunities, and provides stability for local communities. A second MOU was signed with the community of displaced workers of the Clayoquot South Community that recognizes the need to generate economic and social benefits for local communities. In 1999, Weyerhaeuser acquired MacMillan-Bloedel, Ltd., including the IFR joint venture. In 2000, the UNESCO Biosphere Program named the region a World Heritage Site.

Current Status

IFR is owned by the five Central Region First Nations (CRFN) of Clayoquot Sound (51%, 3 directors) and the Coastal Group of Weyerhaeuser (49%, 2 directors). The principal corporate asset is Tree Farm License 57, an area-based timber harvesting and forestry tenure with the government of British Columbia covering 87,000 hectares in Clayoquot Sound. Iisaak began timber-harvesting operations in the summer of 2000, with a harvest of approximately 12,000 m3.

Iisaak has developed an approach called conservation-based forestry. This involves implementing Clayoquot Sound Scientific Panel recommendations for sustainable forestry (composed of scientists and indigenous elders), maintaining a continuous reserve network, emphasizing non-timber opportunities in precious cultural sites, applying variable retention harvesting systems in developed watersheds, certifying forest operations with the Forest Stewardship Council, and establishing an intensive monitoring system to adapt management practices.

Iisaak will have three business segments. The timber-commercial segment will produce sawlogs for specialty products featuring premiums based on a unique Clayoquot brand. Non-timber businesses will be based on harvest of secondary forest botanical products, and recreation or ecotourism. The third component, known as the Green Investment Strategy, will be to develop and market conservation values such as carbon and biodiversity, as a source of financing for the high-conservation values of this temperate rainforest. This requires design of a unique partnership between public, private and aboriginal parties with aligned interests. Iisaak is in the process of developing a significant green investment transaction to yield approximately $C 30 million.

Challenges

Key challenges must be overcome before IFR can be considered a success. The government needs to move "outside the policy envelope" to provide the necessary support for development of a business model for timber and non-timber values in coastal forests of high conservation value. An example of this is the current stumpage appraisal system (and associated government royalties), that is inconsistent with IFR's harvesting system. A pilot project is underway to see whether such structural obstacles can be overcome. Full support from the Weyerhaeuser Company will not likely be forthcoming until profits are secure, and even then greater efforts are needed to help the company move to include new paradigms of forest industry. By the same token, full local support will require demonstration that the various legal, financial and fiscal instruments provide real local benefits. Finally, the value of a credit for conservation, environmental services or mitigation in Clayoquot is largely uncertain, for both carbon and biodiversity.

4. The Environmental Trading Game: The Katoomba Group makes Deals to Conserve a Forest Landscape

The pilot version of an interactive game on environmental services trading, developed by Carl Binning, David Brand, Ian Powell, Adam Davis, Tim Mealey and Chetan Agarwal, was played and evaluated by the Katoomba Group. Most participants enjoyed the game greatly, and felt that it provided considerable insight into the issues involved in making environment service markets operate effectively and to the benefit of various stakeholders. The group evaluated the game in its current form, and made a number of specific suggestions for improvement, in terms of content and process (see Annex B).

Structure of the game

The participants were divided into five landholder teams with similar land and capital resources, but somewhat different decision-making profiles (two agri-business corporations, a high-tech family farm, a traditional family farm and smallholder farmers organized into a cooperative); and three environmental service buyers (biodiversity credits, water quality, and carbon emission offsets). The objective of the landholders was to maximize their financial assets by the end of the 20-year period of the game. The objective of the buyers was to obtain the

highest level of environmental services at the least cost, within their budget constraint**.** The game was played in four rounds, each representing a 5-year commitment by landholders to a particular land use configuration. Information about environmental service markets emerged gradually throughout the game, influencing seller and buyer behavior. A team of three gamekeepers varied global commodity prices for each five-year period to reflect market fluctuations. They also calculated the impact of landowner land use decisions and other deals on each landowner bottom line at the end of each round, and provided the information to the landowners. The gamekeepers also increased budgetary allocations for buyers between rounds to reflect increasing resources available for environmental services.

Lessons learned about environmental service markets

Playing the game surfaced a number of issues related to decision-making, institutions, and price formation.

Decision-making

a) The long time periods that were required for land allocations to carbon emission offsets produced interesting distortions in decision-making.
b) Some landowners invested in conservation plantings to meet local environmental needs (e.g., to prevent salinization). Whether long-term environmental quality and value of land assets was included as explicit or implicit criteria for "winning the game" made a major difference in land use decisions.
c) Early innovators were at a disadvantage, since buyers were often willing to pay only incremental amounts for already-established conservation plantings, but would pay the full cost of establishing new plantings. Some "guaranteed action for early trading" may be needed to facilitate investment in forest carbon activities.
d) Buyers of environmental services found that if they waited too long to establish contracts, most of the land was already in long-term commitments.
e) Landholder decisions were influenced by the knowledge that there was a likelihood of markets for environmental services developing in the future.
f) Despite the value of environmental services, agricultural income dominated the benefits.
g) For decision makers there was a critical difference between risk and uncertainty.
h) The learning curve associated with the game was rapidly achieved by the groups.
i) The timing of benefits from the environmental services had a big impact on landholder income and decisions.
j) Forestry and conservation can serve as diversification strategy for portfolios. Markets for environmental services did indeed promote significant changes in forests and conservation plantings in the landscape.

Institutions

k) A legal system is needed to enforce contracts (e.g., some groups clear-cut despite agreements to maintain forest plantings in perpetuity; some buyers reneged on contracts with sellers.)
l) As experienced by the biodiversity buyers in the game, if the total budget for buying services is too small, it will have little influence on decisions. It is just a "sweetener".
m) Monopsony buyers presented a serious problem for landowners; it made sense to develop a landowner cartel.

Price formation

n) Poor information to buyers and sellers led to significant inefficiencies; highlighting a need for transparent exchanges and a central marketplace.

o) It is critical to know the environmental value of different land uses.
p) Coordination between buyers of different environmental services was complicated by the different units each used to purchase services ($/ton of carbon vs. $/hectare).
q) Environmental service buyers prefer to pay for maintenance of existing vegetation, rather than new plantings (because this is cheaper).
r) As the supply of plantings providing environmental services increased, there is a likelihood of the price falling.
s) In the absence of defined guidelines on trading, players developed a diversity of trading periods and the "service product" traded. These included annual payments for a particular land use, fixed time period sale of credits, and sales in perpetuity. Some sellers were able to sell different services from the same land—e.g., biodiversity and water.

Further development

The most important work needed on the game is to clarify the lessons to be conveyed, and/or the issues to be explored. It was recommended that the group consider building a "library" with a variety of mechanisms for adapting the tool to different situations, challenges or desired outcomes. Several participants suggested that game developers take a look at Harvard and MIT library of negotiating games, as well as the Cornell University Economic Experiment Lab. The game might eventually evolve into a product like SimCity, an educational multi-player game, and/or a realistic planning model. The game should be automated to the extent possible, so that eventually, it could be downloaded from the web, or even played on the web by players across the world. Several Katoomba Group members volunteered to help work on improving the game, including: Carl Binning, David Brand, David Bray, Gretchen Daily, Paul Ferraro, Jim Brumm, David Kaimowitz, Patricia Moles, Jaime Sanz, Sara Scherr, and Andy White. A second version should be ready by the next Katoomba meeting

5. Goals and Plans of the Katoomba Group

Leadership role of the Katoomba Group

Ron Sims closed his presentation on the experience of King County, USA with a call for more people to come forward to take leadership in establishing the innovations needed to protect our environment in ways that enhance economic development and quality of life. He shared a story from his childhood, in which his father sat with him by a lakeshore, and encouraged him to be one of the people who don't just move with the waves of the lake, but help to "re-arrange the shore". Eugene Linden, in summarizing the conference lessons, also highlighted the need for "champions" to move forward the development of markets for environmental services from forests. Iisaak Forest Resources quotes David Brand in asserting that the challenges "….can only be addressed by individuals and groups determined to meet them and capable of *meshing together policies, action and financing at both the local and global level* in order to achieve a shared goal." The Katoomba Group is seeking to play such a role, providing substantive and moral support to innovators creating and managing environmental service markets.

Proposed products from the Katoomba Group

By the next Katoomba meeting, the following products will be produced:
a) Katoomba II Proceedings, by the end of October 2000.
b) Complete Conceptual Framework paper by end of October.
c) Complete paper on markets for water services from forests.

d) Draft paper on instruments used for biodiversity markets, with cases, by March 2001.
e) Make progress on improving the Environmental Markets Simulation Game.
f) Enhance utility of Forest Trends website for Katoomba group.
g) Add Katoomba member materials to Forest Trends web-site, and make appropriate hyper-links.
h) Translation of Katoomba Group (and Forest Trends) materials to Japanese.

March 2001 meeting

Brazil was designated as the next venue for the Katoomba Group meeting to be held around the week of March 15, 2001. A specific city will be finalized in the next couple of months. The meeting will take place around Rio de Janeiro or Sao Paulo, for easy access to ports of entry. Co-sponsors might include the Ministry of the Environment, the Ecological Economics Society, the State of Rio, and A2R. Participants representing the "demand" side will be included, to ensure that the national and global agendas are discussed. NGO's involved in the Atlantic Forest zone, and IPA should be involved. Various Amazonian projects should be invited, as well as representatives of the Acre government. Representatives from surrounding countries (Colombia, Chile, Bolivia) should be invited, as well as private sector forestry and forest energy projects (thus linking "green" and "gray" issues). A source of information might be new websites for "green" businesses.

Members suggested possible discussion topics:

a) Prepare a case study of a particular watershed in the Atlantic Forest of Brazil, with particular interest in water and biodiversity services.
b) Examples of developing countries funding their own "green development", such as new national associations of certified wood buyers.
c) Ways to overcome constraints related to property rights.
d) Follow-up on results of COP-6 on forest carbon emissions trading and implications.
e) Review the experience of the U.S. Conservation Reserve Program, which, at $1.8 bln, is the largest market for environmental services in the world (www.usda.gov).
f) Review bioeconomic model of the Atlantic Forest of Bahia (World Bank, U.C. Santa Barbara).
g) Bring in more people from the "demand" side, to discuss market development.
h) Focus on concrete advances in environmental service markets for which the Katoomba Group will aim.

Also, the Katoomba Group will seek participants from Africa for the Brazil meeting. Brazilians noted that there is an Ecological Economics Society meeting scheduled for March or May 2001, to which the Katoomba Group results might contribute. A suggestion was made to translate Katoomba Group outputs into Japanese.

Annex A. Summary and Analysis of Key Issues Discussed

While the meeting agenda was not organized thematically, several major themes repeatedly emerged from the presentations and discussions. Some of these may deserve focused attention by the Katoomba Group in future activities.

Who's Buying Environmental Services from Forests?

While there is considerable interest from forest owners and conservationists in selling the environmental services from forests, a big question mark remains about the actual size of potential demand (buyers) of these services. The Katoomba group addressed this question in both the conference and the workshop, and concluded that demand is greater than most people had realized, and is growing rapidly. Various groups of potential buyers were considered, including private "green" companies, "green" investment firms, stockholders, public agencies, conservation organizations, philanthropists, and the general public.

Commercial companies seeking environmental service benefits. Increasingly, individual commercial companies are seeking to provide or protect environmental services from forests as part of their core business strategy. The forest product industry is facing major new environmental drivers from both the supply and demand side, increased environmental regulation, and environmental influences on fiber supply. While these offer major challenges, they also provide environmentally-driven business opportunities (e.g., certified sustainable forest management through SFI, FSC, ISO-14001, and CSA), chlorine-free papers, eco-efficient wood products, carbon sequestration and recycled content (Pierre Trevet). Many companies are beginning to invest and trade in forest carbon emission, for a variety of reasons: risk management, learning, to show leadership, structured products, gain influence, protect environment, provide a competitive advantage, and for profit (David Brand).

Several examples were discussed at the Katoomba meeting. The **Saskatchewan Power Corporation** is purchasing forest carbon offsets through the Greenhouse Gas Emission Reduction Trading Pilot (GERT), a multi-stakeholder partnership based in British Columbia (Warren Bell). **The Collins-Pine Company**, of Portland Oregon, was the first major timber company to be FSC-certified; now all its production is certified, and it is seeking to establish a pilot project for sale of environmental services (Jaime Sanz). **IKEA**, Sweden-based international furniture company, has committed to source its products from certified wood (Gudmund Vollbrecht). **Many Australian forestry companies** now consider wildlife conservation part of their core business strategy, to reduce risks and maintain company image (Jim Shields). **Iisaak Forest Resources**, a joint venture company between Weyerhaeuser and the five First Nations of Clayoquot Sound started in 1999, is seeking a new strategy to revive forestry in British Columbia, based on old-growth forest conservation (and associated environmental service payments) and certified forest products.

Investment companies. Specialized investment and venture capital firms have begun to develop in response to the financial opportunities in "green" investments. Several such were represented at the meetings:

- New trading companies for forest carbon offsets include **Universal Carbon Exchange** (Stuart Beil) and the **Hancock Natural Resources Group** (David Brand.)
- **Innovest Strategic Value Advisors** , the New York based financial advisory firm specialized in environmental rating advises asset managers on selecting sustainable forest product companies to maximize their portfolio returns (Pierre Trevet).

- **Henderson Investors Singapore Limited's** socially and environmentally responsible investment fund has grown from L1.5 to L80 mln; their guidelines are now becoming policy for the whole group (Kirsteen Morrison).
- **Global Environment Funds** (John Earhart) and **Natural Strategies** are both California-based investment funds that invest in environment-friendly enterprises, including sustainable forestry (Adam Davis).
- **Natural Capital Fund** is an Oregon-based fund that specializes in environmental conservation investments seeks to spur the creation of the necessary institutional capacity for the development of the conservation economy. Funds will be invested primarily in the initiatives Ecotrust and its partners have forged to create capacity for economic development, understanding, policy reform and conservation (Bettina von Hagen).
- **Climate Partners** pools funds from individuals and organizations to finance greenhouse gas offset projects, through a partnership with the government of Canada and the British Columbia Automobile Association (Gary Bull).
- **A2R's Terra Capital** fund, a partnership between Axial RR of Brazil and GMO-RR of Boston, provides equity and venture capital investments in small and medium companies in Latin America, to increase biodiversity; investments include organic agricultural, sustainable forestry, non-timber forest products, ecotourism and bioprospecting (Patricia Moles).
- **Mitsubishi International Corporation**, the Tokyo-based trading group (not the car company), is seeking investments in FSC-certified timber and carbon offset investments through collaboration with the Prototype Carbon Fund of the World Bank (Jim Brumm).
- Chinese investors are proposing to develop an **Environmental Fund** for southern China provinces (Changjin Sun).

Stockholders. Public individual and institutional investors are showing increased interest in investing in these environment-friendly companies and mutual funds that bundle various such companies. David Berge of Underdog Ventures, presented the prospects for financial interest by investors in environmental services from forests. Socially responsible investment funds (SRI) have grown in the United States from a value of only $40 bln in 1984 to $2.16 trillion today. Growth 1997-99 was twice as fast as in all funds. Around 79% of SRI funds include some negative screen for environmental issues, and a growing number include affirmative screens for positive environmental contributions. Community investment vehicles are $5.4 bln, including 500 organizations in the U.S., and are potential buyers for environmental services. While only 5-10% of buyers in SRI's are "hard core greens", many others are attracted by a good "green" product that earns a competitive return It is advantageous to develop a "brand" that says your company is pro-environment (e.g., through forest certification). The most likely investors in SRI's are the "Cultural Creatives", who account for 25-30% of the population. They are relatively affluent, 60% women, 42-years old on average, highly educated, and don't trust many organizations or corporations.

In the last few years, SRI overall had twice the financial performance, in every major asset class, so that they are becoming attractive to a wider range of investors (David Berge). Pierre Trevet at Innovest found that active environmental management by forest product companies, including proactiveness, risk management systems, stakeholder communications, eco-efficiency programs and technological innovation, were associated with superior overall management, the number one determinant of stock price. **Innovest** found that North-American forest product companies with a higher than average environmental rating outperformed bottom half rated companies by over 3000 basis points (30%) on the stock market over the last year. **Innovest** predicts that screening for environmental performance will soon become a fiduciary responsibility of investment managers and advisors seeking to maximize return for investors.

Public agencies seeking water and amenity services. The scope for markets around water-related ecosystem services is potentially huge. One estimate is that about 13 percent of the world's land area is needed to protect water supplies for the global population. Sustainable watershed management practices on these lands can save large investments in new water supply and treatment facilities. Hydroelectric power also requires watershed management, on about 2 percent of the world's land area. Conventional water system investment by public agencies is no longer feasible in many cases (as watersheds are heavily populated or farmed) nor affordable (as public budgets decline). For example, by investing $1 bln in land protection and conservation practices, New York City hopes to avoid $4-6 billion on filtration and treatment plants (Nels Johnson and Daniele Perrot-Maitre).

Urban centers may seek to ensure a wide range of environmental services from surrounding forests, as illustrated in King County, Washington, State USA (an area with 1.7 mln people in 38 cities, including Seattle). High quality of life in this area is associated with ample green space, forests, clean water, fisheries, etc., and this quality has contributed significantly to economic growth and investment. The commercial forestry sector also has a long tradition in the region. Thus, the county government received wide public support in 1994 for the Good Management Act requiring a 20-year strategy that would protect forest cover and biodiversity and ensure no net loss of timber, under conditions of rapid population and economic growth. Instruments used include tradable development rights, credits to cities that recover wild species, use of urban-generated biosolids for soil enrichment for commercial forestry, support for commercial forestry plantings in selected sites, a forest legacy fund for forests considered critical to wildlife and wetlands, and environmental education. As more urban areas seek ways to improve quality of life, and conserve water quality and biodiversity, there may arise widespread demand for regional market-based instruments for forest conservation (Ron Sims).

To promote environmental services in Brazil—in particular for water quality improvement--five states have begun to allocate 25% of the proceeds of the value-added tax to municipalities that invest in conservation. Municipios in Minas Gerais, for example, 1995-98 received US$25 mln; in the most active municipios conservation became the "principal industry." The total area protected increased 48%, by 551,591 hectares. Eight other states are considering implementing a similar program.

Public agencies seeking to control environmental damage and disaster. The financial costs of natural disasters—floods, droughts, even depletion of critical agricultural pollinators--have quadrupled since the 1980s. The cost is over $25 bln/year in the developing countries alone, a huge sum, given that total development assistance is only $40 bln. The cost of alien species invasions has cost the U.S. economy an estimated $136 bln/year, and is predicted to increase 50%--a level 5 times higher than the estimated cost for meeting U.S. Kyoto commitments. In the Murray-Darling Basin of New South Wales, Australia, it is predicted that within 20 years there will be no potable water meeting WHO standards in many areas due to dryland salinity (David Brand). Massive forest burning in various parts of the world, but particularly in tropical rainforests, has created not only high levels of carbon emissions to the atmosphere, but also significant health threats and related costs. In 1998 in the Amazon, for example, 30-40,000 km2 burned—four times the official estimate of forest-clearing through logging (Dan Nepstad). Large-scale flooding in Central America has damaged basic infrastructure and destroyed cropland (Chris Barham).

Public sector agencies (and insurers) are thus seeking cost-effective and pro-active strategies for environmental damage and disaster management. In many cases, the proper management of forest resources can contribute significantly to disaster avoidance or mitigation,

and these environmental services have significant financial value to the agencies. A major World Bank project is developing an investment program to reduce watershed-related risks in Mexico (Chris Barham). State Forests of New South Wales, and its partners, are developing a number of market-based instruments to address financing constraints for salinity control in the Murray-Darling Basin (David Brand).

Conservation organizations. Conservation groups have for some time purchased forested land outright for its biodiversity and watershed values, as well as encouraging political designation of land for protected areas. A recent study by Conservation International claimed that most such parks do work. However, parks have major limitations, such as the difficulty of establishing them, perceived costs of lost economic development, and the lack of continuous conservation funding (Dick Rice). Thus conservation organizations have begun to seek other instruments that can provide funding for —and thus promote--environmental services on lands outside the legally protected areas.[1]

Conservation International is testing a new concept, the "conservation concession", on 200,000 acres in Guyana, The conservation concession is modeled after a traditional commercial forest concession, the key distinction being that the forest is maintained in its pristine state rather than exploited for its resources. Under such an agreement, the organization pays an annual fee over the duration of the concession to ensure that the land remains undeveloped and to compensate the resource owner, in this case the government, for foregone revenue. A fixed price is paid for a long time period, with the contract stipulating that the land remains undeveloped (Dick Rice). Forest conservation easements, along the lines of wetlands conservation easements in agricultural lands, are being developed to develop wildlife corridors or watershed protection in farmed or populated regions (Bettina von Hagen, Sara Scherr). The Center for Innovative Conservation Finance, at The Nature Conservancy, is consulting widely with Wall Street investors to develop innovative financial instruments (Ricardo Bayon).

Philanthropists. David Berge noted that the number of philanthropic donors—both individuals and public foundations--has increased greatly in the past decade, particularly in the United States. Many have environmental interests that could be mobilized as a source of investment capital. Some of the public foundations, in particular, do understand the complexities that often characterize environmental markets, and are willing to work with partners to develop solutions, if they see the effort as viable and of good value.

General public. The general public is still largely unaware of the potentials of market-based instruments to promote environmental services from forests. However, there have recently been some major contributions to public awareness, including several articles by Katoomba member journalists Eugene Linden and Katherine Ellsfield Several international NGO's are actively involved in raising public awareness, as are the institutions of many of the Katoomba group members.

Market-Based Instruments

In the past few years, there has been a proliferation of initiatives around the globe to develop market-based instruments to promote environmental services from forests. Over 20 specific examples were presented and discussed (to varying degrees) at the meeting. Details on these instruments may be found in the presentation synopses in Annexes C and D and the Forest Trends web-site. These fell into three main types:

[1] The journal *Environmental Finance* presents a variety of instruments being developed.

1. direct financial payments to forest holders providing environmental services;
2. true markets for environmental services, with multiple buyers and sellers negotiating within a government cap; and
3. indirect payments, through a price premium or cost subsidy, for products produced in ways that conserve or enhance environmental services Well-established instruments being used outside forestlands include the U.S. Conservation Reserve program, which pays for conservation easements in farmlands, and the U.S. sulfur-dioxide trading systems for pollution control.

Direct financial payments to forest holders for providing environmental services:

a) Conservation concessions on 200,000 hectares in Guyana (Dick Rice)
b) Ecological value-added tax in Brazil pays municipalities for conservation (Peter May)
c) Payments and subsidized biosolid fertilizers to forest owners in Washington State to maintain peri-urban forests (Ron Sims)
d) Exchange traded B2B products or over-the-counter trades for carbon emission offsets (Stuart Beil)
e) Payments to private forest owners for environmental services in Costa Rica, from forest conservation or forest establishment (Luis Gamez).
f) Payments for watershed services under design in El Salvador (Stefano Pagiola).
g) Payments for water services from the Catskills mountains by New York City (Nels Johnson).
h) Payments for water services from forested watershed under development in Ecuador (Stefano Pagiola, Nels Johnson)
i) Proposal to use CDM payments in Brazil to fund sustainable forestry investment (Dan Nepstad).
j) Proposal to use tolls or other payments from roads being built in the Amazon for payments to landholders to neutralize environmental damage to forests (Dan Nepstad).

Markets for environmental services from forests:

k) Market being developed to meet salinity reduction targets in New South Wales, Australia (David Brand, Ian Sanderman)
l) Biodiversity credit trading in New South Wales, Australia (Jim Shields)
m) Tradable development rights to develop salmon-safe land bank in Oregon, USA (Bettina von Hagen)
n) Tradeable development rights for habitat protection in Paraná, Brazil (Ken Chomitz)
o) Tradeable development rights for biodiversity and water protection in King County, Washington (Ron Sims)
p) Spot and derivative markets for forest carbon trading in Australia (Stuart Beil)

Indirect payments for environmental services

q) A2R venture equity fund for investment in sustainable forestry companies in Brazil (Patricia Moles)
r) Iisaak joint venture between the Central Region First nations of Clayoquot Sound and the Coastal Group of Weyerhaeuser Corporation, in British Columbia, Canada, for sale of certified timber (Linda Coady, Larry Baird)
s) Collins-Pine, Inc. sustainable certified commercial forestry company.
t) FNO subsidized bank credit for environmentally sustainable forestry and agroforestry activities in the Brazilian Amazon (Carlos Young).
u) Some Australian producers are investing in biodiversity credits in their production areas, to enabling biodiversity-friendly product "branding" (e.g., rice producers), or to sustain local environment quality (e.g., cotton-growers) (David Brand)

v) British Petroleum is investing in forest carbon emission offsets in order to sell part of its product as "clean and green fuel".

Design Issues in Developing Markets for Environmental Services

These different market-based instruments raise a host of issues for effective design and implementation. These were addressed in two conceptual papers, several presentations and much of the group discussion.

Conceptual framework. Key issues, applying generally to markets for environmental services, were laid out in the draft Conceptual Framework paper being developed by Ian Powell and Andy White:

a) In what markets do forest services deliver benefits?
b) What are the rights and responsibilities of suppliers and beneficiaries?
c) Can the service be defined in a way that it can be measured and monitored?
d) What regulatory and legal environment exists or is needed for market development?
e) Are there willing buyers and sellers, and what mechanisms and investments need to be put in place to enable them to pay?
f) What support services are required to enable the market?
g) Is there a trend in the quality or scarcity of the service, and what happens if it fails?

Key challenges for developing such markets include:

a) Identifying the basis of payment and assessing the property and equity implications;
b) Responding to the diversity of contexts and challenges;
c) Expanding the forester's perspective to consider demand issues;
d) Identifying the scope for impact and the conditions for success.

During discussion about the paper, it was suggested that the paper include:

a) Further discussion of property rights;
b) Further discussion of where/when to use "polluter pays" principle, or payments of environmental services;
c) Impact of markets on previous voluntary conservation efforts;
d) Further discussion on planning processes during the development of new markets for environmental services.
e) A good diagram or two describing the key issues.
f) Case examples.

There was some discussion of the target audience for the paper, and it was concluded that we focus not on the general audience, but on other people we would like to engage actively in addressing the questions—"Katoomba +". The paper can then be used as a source document for others in the Katoomba group to develop articles or other communication tools tailored to their diverse networks.

Market-based instruments and watershed management. This paper by Nels Johnson and Daniele Perrot-Maitre raised a number of key issues for the development of market-based instruments for watershed management:

a) What water-related ecosystem services are provided?
b) Can these water services be measured and monitored?
c) What are the rights and responsibilities of land owners for water resource management?
d) Who supplies and who receives the ecosystem service?

e) What is the economic value of the ecosystem service?
f) Are beneficiaries willing and able to pay for the ecosystem service? Are suppliers willing and able to provide it?
g) What transaction costs are involved?

They conclude that development of markets for watershed services from forests will require more hydrological research, education, monitoring methods, exchange of lessons learned, subsidies for early transaction costs, and clarification of rights and responsibilities.

Process of market development. Several models of the process of market development were presented:

a) The Powell and White paper, building on David Brand's diagram presented in Katoomba, identified three phases of development: emergent (awareness of potential and identification of potential actors), defining structure (goods and services defined; transactional structure and enabling regulation take shape), and live (trading rules are established and/or contracts agreed; supporting legislation and monitoring services).

b) Stuart Beil described two stages in market development for forest carbon emissions: stage I, where there are informal "gray" markets, with over-the-counter transactions, forward spot trading, and speculative markets. Stage II markets are formal, with both physical and derivatives trading, much traded on exchanges, as well as over-the-counter; markets are structured, with standardized contracts.

c) Carlos Eduardo Young suggested that we review the existing literature on market development (e.g., B. Sanders), which is quite relevant. First property rights need to be assigned; then trading develops as there are surpluses to sell; third is achieving standardization of resources and contracts (e.g., grading); and fourth is the development of secondary markets to help with price discovery. Others suggested that we should examine ways in which environmental service markets might be different.

d) Stefano Pagiola noted that the development of water markets in El Salvador required three key institutional functions: 1) to handle funds (collecting from beneficiaries of the water supply and distributing to water producers); 2) an agency interacting with farmers to set up contracts, etc.; 3) a technical institution to specify eligible activities, how much should be paid, and monitor contracts.

Overcoming obstacles to business development. Patricia Moles succinctly summarized some of the key obstacles to developing and investing in sustainable forestry enterprises, especially in transforming locally-run companies into national or international market players:

a) Unreliable accounts (whether audited or not);
b) Current survival through tax evasion or avoidance;
c) Requirement for patience and hand-holding by investors;
d) Investment needs monitoring, but doesn't like partners;
e) Investment needs field-knowledgeable technicians and certifiers;
f) Because of a lack of market liquidity, exit is difficult;
g) Due to small project scale, the fixed costs of prospecting and structure investments are high.

She suggests that a business approach to overcoming these obstacles includes:
a) Pick the winners;

b) Align interests with partners, supplying communities, buyers and other stakeholders
c) Always look carefully at markets;
d) Investors should be "hands on";
e) Develop management capacity;
f) Rely on certification;
g) Set up strategic partnerships with local government, communities, NGO's
h) Do not lose focus on the need for developing a profitable company.

Establishing the value of environmental services. Environmental service contracts must define the level of environmental services to be provided, or define a level of payment per unit of environmental service provided. This is more difficult than is the case with conventional commodities. Nels Johnson noted that in most payments for water services, the price is set not by any analysis of its economic value, but in response to budget or political crises. Better mechanisms are needed for price discovery. Linda Coady noted the high level of uncertainty related to what global investors will really be willing to pay for biodiversity services. Jim Shields and David Brand suggested that valuation of biodiversity investments might be more like that for art portfolio. Perhaps a tradeable index value might be used.

In order to provide standard units for market trading, Iisaak Forest Resources has developed the concept of Conservation Credit Units for its forest resources (Eric Schroff), and State Forests of new South Wales is developing standard Biodiversity Credits (David Brand).

Integrating multiple environmental services. David Brand proposes that we re-conceive the nature of forests in the economy. As the value of environmental services increases, relative to forest products, it is appropriate to consider forest investment as a type of "infrastructure" investment. As in the case of hospitals, cash flow would be derived from a mix of products (e.g., timber, biodiversity services, water services). Environmental service markets should promote the spread of forest plantations across landscapes. Natasha Landell-Mills agreed generally with this, but noted the risk of "free-riding" (as was demonstrated in the Game). Ken Chomitz noted in his example of biodiversity credits in Brazil that sites of highest biodiversity value were not necessarily the sites with highest value for watershed protection or carbon emission offsets.

Equity issues. Important equity issues arise in designing markets for environmental services. In developing all systems for marketing environmental services, the most difficult issue is to agree on the initial distribution of rights, as these decisions result in wealth creation and have distributive impacts. Ken Chomitz noted that payments for environmental services seem most desirable where service providers are relatively poor (as is assumed to be the case with smallholders on hillsides in parts of Central America). But in many cases landholders with strategic resources will be wealthy, and with a history of inefficient production and environmental, and a "polluter pays" approach might be more equitable. For example, in the Amazon, 1% of landowners own 50% of the land, while smallholders with fewer than 20 hectares own only 1.5% of the land.

Linda Coady and Sara Scherr noted the importance and difficulties of reconciling global environmental goals with local values and priorities. Goal setting (e.g., designation of areas to be protected) is often done at the international or national level, without local consultation. Linda Coady and Larry Baird noted that one of the lessons of the Iisaak Forest Products experience was that developing investment equity partnerships with non-traditional partners (in this case, a multinational company and indigenous groups) requires a planning approach based on building a trust relationship.

Sara Scherr noted that explicit attention needs to be paid during the design process of environmental service markets, to involve poor people as market participants, and to ensure that market rules and arrangements do not harm their interests. Some guidelines for enhancing local livelihood benefits in forest carbon projects have been developed as part of a Forest Trends project.[2] Several participants noted the need to "bundle" small projects together to gain economies of scale in marketing, insurance, etc.

Property rights. To buy and sell environmental services from a particular parcel of land requires that there be clear property rights over both the land and the environmental services it provides. David Kaimowitz pointed out that there are currently large tracts of forestland all over the globe where property rights are either unclear or disputed, and that investors or service buyers are unlikely to become involved. Others agreed, but emphasized that an important challenge for the Katoomba Group is to conceive of innovative ways of addressing constraints related to property rights in areas where it is unlikely they will be regularized for some time to come. For example, Linda Coady and Larry Baird noted the interim agreement in British Columbia which has allowed the Iisaak Forest Resources investment to move ahead despite on-going land treaty negotiations. Several participants noted the need to examine unconventional strategies for assigning rights, including multiple claimants, and the assignment of rights to groups.

Nels Johnson and Sara Scherr noted that water rights are especially complex, with overlapping and inconsistent sets of rights established by different legislation. It was noted that the development of markets for water may be a stimulus to regularize water rights.

Spatial planning issues. Environmental service markets and economic instruments must be designed to conserve spatially explicit configurations of land use (e.g., strategic habitat, critical watersheds, landscapes to promote ecotourism). Zoning decisions must be made, including definition of what types of resources are sufficiently substitutable that they can be traded. Ecosystem planning is an approach being used to design of a variety of environmental service markets. It is being used to design spatially-targeted environmental investment funds in China (Changjin Sun), in King County, Washington (Ron Sims), and by Iisaak Forest Resources (Linda Coady and Larry Baird). Sara Scherr suggested that ecosystem planning for market purposes might best be done at a meso-scale—large enough to provide a wide market area, but small enough that the various stakeholders will be familiar with the resource base and can negotiate meaningfully about trade-offs.

Ken Chomitz described the challenges of designing tradeable development rights for biodiversity in the Amazon. For example, how does one incorporate areas that are not yet claimed? How should one define biomes within which trade takes place? Nels Johnson noted the difficulties in judging how different portions of a watershed should be zoned, for trading purposes.

Designing CDM forest carbon projects for forest protection. Considerable debate continues about the feasibility and desirability of using CDM projects for forest protection. Ken Chomitz discussed several approaches to overcome some of the perceived problems and limitations. These included the 'rent-a-sink' concept introduced at Lyons to address the permanence issue, project designs that "neutralize" leakage, and use of spatial models to establish regional baselines. David Brand suggested that, to address permanence issues, CDM project payments could be converted

[2] J.Smith and S.J. Scherr. Forthcoming. Capturing the value of forest carbon for local livelihoods. CIFOR, University of Maryland, and Forest Trends: Bogor, Indonesia.

into bonds that pay an annuity to landholders, thus functioning more explicitly as an annual payment for environmental services.

Institutions to Support Environmental Payments

All well-functioning markets rely on a strong institutional foundation in law, contract enforcement, agreed standards, etc. Institutional factors are even more important in establishing and maintaining markets for environmental services, such as those from forests. The Katoomba group meeting highlighted a number of important innovations emerging to provide essential support functions, including legislative frameworks, property rights, planning tools, monitoring and verification of environmental services, technical research on environmental service values, business advisory services, insurance services, independent environmental advisory groups, and training and education.

Legislative frameworks. Ian Powell and Andy White emphasized the centrality of government regulation in the design of most environmental markets. Dan Nepstad noted how the evolution of environmental values in provincial planning and policy in Acre, Brazil has facilitated more effective policy in protecting the Amazon. Recent legislative actions include new caps placed on deforestation; revitalization of NTFP markets; greater control of logging and strengthening the state forest service. Gretchen Daily emphasized the importance of the legal framework in the practical functioning of markets and their equity implications. Linda Coady emphasized the need for governments, both federal and provincial, to go beyond current policy frameworks in order to develop viable economic models for the type of business strategy envisioned by Iisaak Forest Resources.

Planning tools. Several participants and their colleagues are working on the development of landscape planning tools that can be used for practical policy design. Gary Bull described a spatial landscape planning tool (Forest Simulation Optimization System) being developed by the University of British Columbia, with specific applications to forest carbon. They are also working on a decision support system integrating forests and landscapes at various spatial scales. The tools are being applied in the Squamish Forest District of Vancouver. GERT has also developed a tool for individuals and companies to use in assessing their own carbon emissions and considering alternatives to reduce or offset them.

Ken Chomitz and colleagues at the University of California, Santa Barbara are working on a bioeconomic model of the Atlantic forest of Bahia, Brazil, as an input into design of economic instruments for conservation. Sara Scherr noted watershed models being developed in the Philippines, Indonesia and Thailand by the International Center for Research in Agroforestry that will be able to assess environmental services in relation to different land uses in different parts of the landscape.

Monitoring and verification of environmental services. To make markets feasible on a large scale requires standard definitions for the "units" of environmental services, establishment of "baselines" where sellers are being paid only for new services (as in the case of carbon emissions trading), and low-cost methods to measure them. Independent certification is required so that both buyer and seller will trust that terms of the contract have been met. Indeed, formal certification (for example, according to Forest Stewardship Council criteria) was deemed by many participants to be a key feature for effective functioning of most environmental service markets. Ken Chomitz emphasized that transparent information systems, in general, are essential.

Several Katoomba Group members are working to develop these standards and services. Dick Rice described the set of monitoring and performance metrics being developed for the Conservation International conservation concession in Guyana. Lars Laestadius and Galina Stetskaya described the role and developing capacity of Global Forest Watch as a provider of quality information on ecological forest conditions as well as forest industry compliance with relevant laws and regulations. The mapping is based on satellite images supported by on-the-ground information provided by local university and NGO partners. All data products are peer reviewed by scientific and stakeholder communities. Monitoring is on-going in Canada, Russia, Indonesia, Venezuela, Chile, Cameroon, Gabon, and will soon be in the Baltic countries, Romania, USA and the Amazon Basin. However, as Lars Laestadius pointed out, creating new and higher standards is fine, but he also raised the issue of ensuring that existing standards are complied too. He posed the question of how can one enforce commitments on not sourcing from high conservation value forests without having maps of them?

Ken Chomitz demonstrated some new approaches to developing baselines for forest carbon emissions, using spatial models. Gary Bull and colleagues and the University of British Columbia are developing a carbon accounting framework, as well as a carbon monitoring and verification system.

Technical research on environmental service values of diverse land types and uses. Establishing the value of environmental services from particular landscape configurations is greatly complicated by the poor quality of technical information in program sites. This is a concern both for pricing environmental services (for transfer payments, such as water services or the premium to be paid for certified forest products) or defining lands to be subject to environmental service trading (for tradeable development rights for biodiversity or forest carbon trading). Nels Johnson, Stefano Pagiola, Ken Chomitz, Gretchen Daily and David Kaimowitz identified this as a key constraint for the development of markets related to water regulation, siltation, biodiversity/habitat, and pollination services. (The Game also illustrated the difficulties facing market players when criteria for valuing environmental services changed after conservation plantings had already been established.)

Nels noted that hydrological monitoring has actually declined precipitously in most developing countries over the past decade. Lower-cost strategies to obtain regionally validated assessments are urgently needed. Gretchen Daily noted that a new study of the hydrology of the upper reaches of the Yangtze River has just been released by the Chinese Academy of Sciences, and is being summarized in an article in Ecological Applications. Several participants referred to recent papers by Bruce Aylward and colleagues of the Arenal watershed in Costa Rica.

Institutional and policy research. Similarly there is a serious lack of carefully documented and evaluated information about the effectiveness, efficiency and sustainability of various institutional mechanisms involved in environmental service markets. Pierre Trevet described 'EcoValue'21, a research tool developed by Innovest for evaluating environmental performance of companies, which includes over 60 variables from 20 different data sources. Natasha Landell-Mills described research recently begun by the International Institute for Environment and Development to study various models for communities to become involved in sustainable forest product and service markets, and to understand how these processes evolved and what types of institutional arrangements are needed. DFID has commissioned IIED to undertake action research for cases in India, Indonesia and South Africa, to see how markets develop for watershed protection.

Warren Bell noted that British-Columbia-based GERT is preparing "lessons learned" from each carbon project, as an input to establishing national policies. Sara Scherr noted that the Center for International Forestry Research is undertaking studies of pilot forest carbon projects to derive lessons from their experience. She is also working with the International Center for Research in Agroforestry on a number of case studies of community-based natural resource management in the uplands, related to markets for sustainably grown forest products and environmental services.

Business advisory services. Given the relative lack of experience in establishing and management businesses focused on sustainable forest management and/or environmental services from forests, many enterprises are critically lacking in key skills or strategic planning requirements. This is particularly the case for small and medium-scale forest enterprises facing a necessary transition from family-based informal activities to more sophisticated businesses that can compete in increasingly competitive markets. Several Katoomba Group members described on-going business advisory services that are addressing this need. Aurelio Ramos described the new program on "Sustainable Bio-Commerce" that has been set up by the Humboldt Institute in Colombia, to support small and medium size businesses to become more environmentally sustainable or establish new environment-oriented businesses. Clients received courses from nine specialized "incubators", and they are helped to develop good business plans. An information system has also been put in place, and market research is being done to evaluate the potential of various sustainable forestry markets. Patricia Moles described the intensive business support services provided by A2R Ltd. for those forest companies in Brazil receiving equity capital from them. She notes a key factor is their unusual multi-disciplinary team that is willing to travel regularly to remote sites.

Insurance services. Insurance services can play a valuable role in forest environmental service markets and enterprises, as they do in other businesses. Phil Cottle, of Partner Re-Insurance of Switzerland, explained that forestry environmental projects operate in immature, opaque and fragmented markets, often unfamiliar to investor funds and with a perceived high risk profile and sustainability requirements that reduce returns in the short term; this explains the paucity of joint venture funds. Insurance can reduce the risks of project failure, increase the viability of projects, and improve their market profile. Insurance acts as a 'certificator" of durability and low risk, adding liquidity to the market. Insurance services include assessing risk, modeling risk, developing risk scenarios, comprehensive project overview (including management capacity), and bundling risks into a single policy. Key risks considered are political, management, climatic, socioeconomic and financial. Phil noted that the criteria for certification of "sustainable forest management" parallel those for insurance, which may make insurance coverage easier and lower risk. His company, already a global leader in agricultural and forestry insurance, recently began to move into ensuring environmental service providers. Insurance companies are likely to become more interested in forestry, because of its role in mitigating long-term climate change and the consequent effect on insurers' exposure to catastrophe.

Independent Environmental Advisory Boards. Assurance of environmental quality, conservation and sustainability of resources involved in environmental service management and markets requires independent environmental planning input trusted by both buyers and sellers. Several Katoomba members are working with such Boards. Terra Capital has a Biodiversity Advisory Board, drawing experts from multiple countries, institutions and expertise to determine guidelines, evaluate project bio-consultant reports, and approve or reject projects on biodiversity criteria. Iisaak Forest Resources works with a Scientific Panel, composed of internationally recognized scientists and aboriginal Elders, that provides recommendations on land use and management, identifies ecosystem sensitivity and desirable spots for logging.

Training and education. Over the long term, a key determinant of the success of environmental service markets for forests will be the management capacity of local businessmen and forest managers. Several groups have set up non-profit foundations to strengthen the pool of potential partners. A foundation set up by A2R focuses particularly on executive training. IKEA is considering a foundation to train executives for the companies sourcing their furniture in the sustainable forestry business.

Annex B. Suggestions for Environmental Service Market Game

Suggestions for process

a) The teams need more time for making decisions, and more time between rounds.
b) A dedicated game manager is needed to keep up with the analyses and activities.
c) Better forms are needed, such as spreadsheets and use of computer diskettes.
d) All group members need copies of the planning data, and perhaps the spreadsheets to run their own 'what-if' scenarios and each team should have a computer.
e) For educational purposes, it would be useful if players could practice being both buyers and sellers of environmental services.
f) Special forms are needed to formalize all deals made.
g) Consider informing landowners of the decisions taken by others in the previous round.

Suggestions for content

a) More baseline information is needed.
b) The time value of money needs to be incorporated in some way.
c) A wider range of options for land use need to be considered; possibly have some land initially in forest; provide options with different productivity and costs.
d) In the future, it might be desirable to include a landscape model in the game.
e) In determining "who wins" at the end of the game, criteria should include not only financial assets, but also the value of land assets or site environmental quality. Otherwise, players are likely to choose unsustainable land uses.
f) Consider longer time horizon for game, also for sustainability issues.
g) There should be some way to consider the value of local environmental services to landholders themselves in the game, not only the value of those services to outsiders.
h) It might be useful to include banking and insurance functions in the game.
i) It would be interesting to allow land buying and selling and leasing.
j) It would be educational to include more specific profiles for different landholder groups that reflect actual constraints and opportunities (e.g., smallholder typically lack access to capital market; corporate holders may require higher levels of return to stay in the game).
k) The cost of reconversion of conservation plantings needs to be specified.
l) Consider adding a "certified sustainable" producer group.
m) Consider the possibility of buying forward.
n) Include agroforestry practices (mixtures of cropland and forestry or conservation plantings) that would have different production and costs.
o) Incorporate different property rights rules in the game.
p) Consider incorporating the role of technology in the role-playing (.e.g., "agro" participants have cell phones, spreadsheets, etc., while poor farmers don't)
q) Consider including consequences or opportunity costs for buyers – e.g. the cost of emission reduction for carbon buyers, or the cost of filtering water for water boards.
r) It might be useful to increase the motivation of the buyers to do business, by introducing consequences. For example, carbon buyers would have a marginal abatement cost curve (of reducing emissions) which would be their opportunity cost if they are not able to get sufficient carbon credits. Similarly, the water buyers would experience a decline in water quality and need to make large capital expenditures in water filtration plants.
s) Consider evaluating 'additionality' at the landscape scale, i.e., the extent to which markets were paying for things people would have done anyway, or if they really led to increases in the supply of environmental services.

Annex C. Agenda and Synopses of Presentations: Forest Trends/University of British Columbia Conference on "Developing Commercial Markets for Environmental Services of Forests"

Hyatt Hotel, Vancouver, Canada, October 4, 2000.

Michael Jenkins, Forest Trends. *Welcome and Introduction*.
Global forest trends are creating new tensions and new opportunities in forest production, conservation and industry. British Columbia is at "ground zero" for some of the greatest pressures for change—with the stress that involves, but also the greatest forestry innovations. Thus it is an ideal venue for this conference, which should help to place the British Columbia experience within the evolving global markets for environmental services from forests.

David Berge, Underdog Ventures. President. *Attracting Private Capital to the New Forest Economy – A Social Investment Perspective.*
The market for sustainable forestry investment is growing very rapidly, and poised to grow faster still. It is part of a larger trend of socially-and environmentally-responsible investing that encompasses mutual funds (now worth over US$2 trillion), with selective stock-picking and activist shareholders; community investment vehicles ($5.4 billion in around 500 organizations in the U.S.); and private philanthropy. Furthermore, in every major asset class, socially responsible investment has been found to have double the financial performance. These investors should be seen as major potential customers for sustainable forestry companies.

David Brand, Hancock Timber Resources Group. *Emerging Markets for Forest Services and implications for Rural Development, Forest Industry and Government.*

The transition from a commodity-based to a service-based economy is underway in forestry as well as other sectors. Some timber prices are declining, while the value of forests for environmental services increase in relation to disaster prevention and mitigation, protecting biodiversity, and promoting ecosystem health. Payments for environmental services, such as carbon or transpiration, can make forest investments much more attractive financially. Eventually we will conceive of forestry investments as a type of "environmental infrastructure" similar to hospitals, which derive their cash flow from a mix of products.

Stuart Beil, Universal Carbon Exchange (UBX). *The Commercial Market for Carbon Credits.*
The Kyoto Protocol of the Climate Change Convention provides a number of "flexibility mechanisms", including forest protection and establishment, which allow countries to meet their targets for emission reductions at lower cost. This could potentially be a large source of financing for forestry investments. A forest carbon market already exists through the investments by private and public companies. For example, the Tokyo Electric Power Company has agreed to provide investment funds to New South Wales State Forests to establish and manage Kyoto-compliant forests. Companies are trading for a variety of reasons, including risk management, learning, leadership, developing structured products, achieving a better environment, competitive advantage and profit. The first stage in carbon market evolution is an informal "gray" market, with over-the-counter trades, forward spot trading, derivatives on forwards. These carry more risks and are more speculative. The second stage is a more formal market with physical and spot trading, derivatives on physical trades, and trading both over-the-counter and in exchanges. Risks will decline and markets become more structured.

Richard Rice, Conservation International. *A Direct Approach to Marketing the Environmental Services of Tropical Forests.*

A survey by Conservation International of 93 protected areas in 23 tropical countries found that protected areas do work: 83% were unaffected by agricultural clearing. However, parks are difficult to establish and maintain due to the perceived cost of foregoing economic development and the lack of consistent funding. A new instrument, the "conservation concession" is being developed to compensate local resource owners for conserving their forests, just as a logging company might range from 20-40 years, depending on regulations in the host country. The conservation concession is especially suitable for land with relatively low opportunity costs. It enables park creation to be handled as business transactions and monitored through carefully designed performance metrics. The first such concession has been established on 200,000 acres in Guyana, in order to evaluate the model.

Lars Laestadius, World Resources Institute. *Using Global Perspectives to Enhance Sustainability at the Local Level.*
Global Forest Watch (GFW) is an international initiative for independent monitoring of the ecological condition of forests, and the compliance of forest utilization with relevant laws and regulations. GFW's mandate is limited to producing high quality information and making it widely accessible over Internet, and does not include policy prescriptions or advocacy. The mapping is based on a combination of satellite images and on-the-ground information provided by scientific and stakeholder communities at levels from local to international, as relevant to the scale of mapping. Global Watch has seven country chapters now, with another three under development, and an international secretariat at the World Resources Institute. For Global Forest Watch Canada, the principal interest is in mapping intact forests within the region where human development is more likely to result in forest degradation.

Ken Chomitz, World Bank Group. *An Emerging Tradeable Development Rights System in Brazil.*

The key to developing effective market instruments for forest conservation is in the design details. Three examples were presented:

1. A basic decision is whether to use an environmental services or a "polluter pays" approach to conservation. Coasian theory suggests their environmental outcome might be similar, but benefit distribution and transaction costs may differ significantly. This is a concern in the Amazon, for example, where highly inequitable land distribution means that much of the payment for environmental services would go to the wealthy.
2. Another key design question is the potential for bundling various environmental services. Can we support services that are difficult to finance, such as biodiversity, from those with more easily developed markets, such as water quality? However, much more ecological information is needed to determine if these services are provided in the same locations, with the same interventions and same beneficiaries.
3. In Brazil, there are some interesting innovations at the state and national level in implementing tradable development rights (TDRs) for habitat protection. These systems raise critical questions about the definition of trading zones—who can buy, who can sell, and what types of land are substitutable. Social decisions are being taken about the desired shape of the environment at regional and local scales.

Patricia Moles, A2R. *Markets and Market-based Instruments and Incentives for Biodiversity Conservation: Innovation in Brazil and the Potential for Investors.*

A2R is an example of a new generation of Environmental Funds. Its focus is on private equity/venture capital investment in small and medium companies in Latin America. A2R invests to turn companies green or to help green companies grow. Their key programs are in organic agriculture, sustainable forestry, non-timber forest products, ecotourism, aquaculture and bioprospecting, and new initiatives are coming on clean technology and energy efficiency. A 14-person multidisciplinary team runs the fund; they are based in Sao Paolo but have frequent site travel for hands-on management support. The Terra Capital fund has an associated Biodiversity Advisory Board to help evaluate investments. To turn forest conservation into a major financial asset in Latin America will require complementary actions by private investors and public policy. For example as the organization of buyers' groups leads to increased interest in certification, pressures will increase for policy change to support this, such as tax exemptions for certified timber operations.

Peter May, Pronatura. *Markets and Market-based Instruments and Incentives for Biodiversity Conservation: Innovation in Brazil and The Ecological Value-Added Tax.*

The "ecological value-added tax" (ICMS) in Brazil is based on the principle of "Protector Receives." 25% of the tax collected is reallocated to local governments. An ecological criterion was adopted in 1992 by Paraná state, and is now operating in five states, with the ecological share of total ICMS ranging from 0.5 to 5%. This compensates local governments for conservation action, according to the proportion of total protected area in the municipality, the level of protection and the quality of protection (the quality criterion has only been adopted so far in Paraná). As a result, protected areas increased by almost half—an additional half million hectares in Minas Gerais, and over 1.1 million ha. in Paraná (over 140% increase); many private landowners have committed forestlands to permanent easements. The system is being considered in seven other states. Challenges include the small portion of additional funds spent on the environment, opposition by industrialized municipalities, and poor quality of protection in many sites.

Ron Sims, King County, Washington State. *Innovative Policies and Incentives for Biodiversity Conservation.* Keynote Address.

King County, Washington State, USA encompasses 38 cities with 1.7 million people. Environmental services are strongly valued by the population, for aesthetic reasons, for local water services, and to protect long-important forest products and fisheries industries, and also as a major factor in attracting business to the area. The 1994 Good Management Act requires the county to develop strategy over 20 years, which would concentrate 95% of growth in the urban areas that account for a third of the land area. A variety of innovative strategies have been used to achieve this goal, including: tradeable development rights on lands valued for forests and fisheries, direct payments to landowners to maintain forest land long-term, recycling of urban biosolids in forests, promotion of forest plantations, purchase of forests considered critical to wildlife and wetlands. King County is seeking to be a model of urban growth with active forestry.

Pierre Trevet, Innovest. *Maximizing Environmental and Financial Performance.*

Over 60 studies show a positive correlation between environmental and financial performance, largely because companies that can handle the management complexities and uncertainties related to environmental quality typically can handle other business complexities and uncertainties well.

Recent trends increase the premium for "eco-efficiency", including tightened regulation, changing demographics of investors, increased competition, increased institutional investor awareness, consumer pressure and demands for greater transparency. Innovest, and international investment advisory firm, has developed a set of "eco-efficiency" metrics that can be used to evaluate the environmental performance of companies. The "EcoValue'21" model uses over 60 variables from 20 data sources, that consider historical contingent liabilities, operating risk exposure, eco-efficiency and sustainability risk, managerial risk efficiency, and strategic profit opportunities. In every sector rated by Innovest, companies with above average EcoValue'21 ratings outperformed below average companies by 300 to 2500 basis points (3 to 25 percentage points) per year in the stock market. In the forest product industry, sustainable forest practices were found to be a major driver of financial outperformance.

Gary Bull, University of British Columbia. *Developing a Carbon Accounting System in Canada.*

A variety of initiatives are underway in British Columbia, in partnership with the University of British Columbia, to support forest carbon trading. A systematic 13-step carbon accounting framework has been developed for analysis of individual companies. A spatial landscape planning tool, the Forest Simulation Optimization System, has been developed that links timber supply to carbon, and can also evaluate habitat quality and variations in product grades. The data-intensive tool allows for detailed planning use, and is being tested now in British Columbia sites. A third project is using remote-sensing radar technology for carbon monitoring and verification. The technology has been tested 1992-1999 in southern Vancouver Island. Climate Partners, Inc. is a British-Columbia based business to inform and educate the public about carbon opportunities, provide tools to calculate emissions, offer opportunities to purchase offsets, and identify and support greenhouse gas offset projects. It manages the ClimateCare Trust, a non-profit fund to pool funds from individuals and organizations to finance greenhouse gas offset projects.

Warren Bell, British Columbia Ministry of Environment, Lands and Parks. *Greenhouse Gas Emission Trading in Canada.*

Canada's Baseline Protection commits governments to use emitters' reconstructed baselines that include verifiable reductions since 1990. A greenhouse gas emission reduction trading pilot (GERT) was launched in 1998 by British Columbia Environment, and now has partners across Canada including the federal, provincial government, and local governments, six industry associations, and environmental groups. It is currently reviewing projects related to small hydro, fuel switching wind power, forest sequestration, landfill gas, and solar energy.

Larry Baird, Central Region Chiefs, Nuu-Chah-Nulth Tribal Council and **Linda Coady, Weyerhaeuser, BC Coastal Group.** *A New Economic Model for Conservation-Based Forestry in Temperate Old Growth Forests – Release of White Paper by Iisaak Forest Resources Clayoquot Sound British Columbia.*

Iisaak Forest Resources is a joint venture company between the First Nations of Clayoquot Sound of British Columbia and the Weyerhaeuser Company. Environmental and other conflicts in the 1980s had led to a dramatic decline in logging in what had previously been a major timber producer. The region, with its large remaining old growth forests, was recently designated as a UNESCO Biosphere Reserve. The new company, recognizing the ecological and social interconnectedness of the various elements of this forest, places limits on forest product extraction that are consistent with biodiversity conservation and cultural values. Forest conservation is the primary management objective, with timber and non-timber forest product

extraction a secondary objective. The initiative has required re-configuring and bundling existing rights held by various public and private entities, to derive new, tangible values from environmental services. Iisaak is currently developing a method to sell "conservation credit units" for biodiversity and possibly carbon, and packaging a new investment vehicle to raise capital for conservation forestry.

Eugene Linden, Time Magazine. *Synthesis of the Day*.

The presentations made at the conference indicate a very significant change in attitudes about the value of forests and about the important of the environmental services from forests. The stakes have changed as the financial losses caused by forest loss have become clear. There is a need for more "champions" who will move this agenda forward in the private, public and NGO sectors. It is time to move beyond "pilot" projects.

Annex D. Synopses of Presentations at Katoomba Group Workshop, Parksville, British Columbia, October 5-6, 2000

Phil Cottle, Partner Reinsurance Company Ltd. *Making the Link: Sustainable Forest Management and Forestry Finance.* The company provides an investment catalyst for environmental forestry projects by securing investors' and banks' funds, reducing risk of failure, increasing viability of lower internal rate of return projects, raising project market profile and quality, security of environmental products and services and therefore raising liquidity. SFM, certification and insurance can together deliver significant economic benefits given the current nature of the forestry sector, and can be a catalyst for long term sustainable rural development as under CDM goals.

Ken Chomitz, The World Bank. ***Market-Based Instruments for Forest Conservation.***
The presentation dealt with issues in the design and implementation of two types of market-based instruments: 1. There was a more detailed discussion of the challenges in implementing a tradable development rights system in Amazonia. Appropriate design of the system could yield a desirable result: encouragement of agriculture in existing, degraded areas and incentives for buffer zones between the agricultural regions and conservation areas. However, assignment of rights poses challenges in areas where land tenure is poorly defined. 2. There was a discussion of new approaches to solving three of the challenges in marketing carbon offsets from forest protection: baseline definition, leakage measurement, and permanence. The issues of leakage, permanence and baseline information were addressed in terms of the measurement challenges each of these presented. Using case study of tradable development rights (TDRs) in Amazonia, the presenter sought to illustrate how to deal with these critical issues. The presentation concluded by pointing out that all of these issues are relevant to assessment and implementation of a broad range of market-based instruments.

Nels Johnson, World Resources Institute. *Overview of Market-based Instruments for Watershed Management: Lessons from Case Studies.*
The potential for truly open and competitive markets to develop around the provision of watershed services is probably rather limited due to poorly defined ownership responsibilities and rights, and governments will often remain an important role in protecting water-related ecosystem services. Still, a variety of economic tools, including market-based instruments, are being used to help restore, maintain, and enhance water-related ecosystem services on forestlands. Based on the case studies reviewed, we found to be these the most common: public payment schemes, trading schemes, and self-organized private deals. In order to assess market-based instruments, the following questions need to be asked: what water-related ecosystem services are provided? Can these water services be measured and monitored? What are the rights and responsibilities of land owners for water resource management? Who supplies and who receives the ecosystem service? What is the economic value of the ecosystem service? Are beneficiaries willing and able to pay for the ecosystem service? Are suppliers willing and able to provide it? And what transaction costs are involved?

Dan Nepstad, Woodshole Research Center. *Market-Based Instruments for Reducing Fire in the Brazilian Amazon.*
Escaped fires self-perpetuate by burning agricultural systems discouraging landholders from making those fire-sensitive investments in their land that would allow them to move beyond their dependence upon fire as a management tool. Ranchers set fires, land value is almost negative and there is little incentive to protect pastures from burning accidentally in low value production systems. Accidental losses occur due to neighbors who may not have knowledge or resources to

control fires and perpetuates these types of land use; short-term clearing (cattle ranching, slash and burn agriculture and not very good capital supply). The long-term reduction of Amazon fire, and its substantial costs to society, is most likely to emerge though investments and policy change that stimulate permanent agricultural and forestry production systems within existing frontiers while slowing the rate of frontier expansion. The governor of Acre, Jorge Viana has made a series of policy changes to counteract further deforestation by placing a cap of 15% of deforestation on land properties. He is revitalizing the non-timber forest product economies (rubber subsidy and processing, brazil nut marketing and processing, forest infrastructure –no paving- but corridors for cars to go through) and clamping down on loggers through command and control policies and promoting agricultural intensification. Scarcity drives management. Can economic instruments do the same? The answer is no, unless there are effective institutions.

Carlos Eduardo Young, Universidade Federal do Rio de Janeiro.
FNO-*Proambiente is a* proposal for a special credit line to fund rural sustainable activities focusing on the enrichment of natural regeneration areas, degraded areas, agroforestry, forestry-ranching systems, CFM for multiple uses, and fireless agriculture. Three types of payments are suggested: a) an ecological tax which under the current fiscally strapped conditions is not possible to increase the rate, b) using the "polluter pays principle" in oil and mining royalties, roads, and waterways payrolls, and c) global benefits will need global funding through external compensation resources.

Linda Coady, Larry Baird, Eric Schroff and Duncan Dow, Iisaak Forest Resources. *Forest Services, Public Land and Aboriginal Title in Clayoquot Sound, BC -- Iisaak Forest Resources and BC Green Economy Initiative—Policy Obstacles and Opportunities.*

The presentation described the process of developing the Iisaak Forest Resources, covering the different actors involved, the vision of the First Nations regarding the interconnectedness of all things, and the importance of aversion to change in the process. Several features make this experience unique, such as the history of conflict among various stakeholders, the lack of legal precedence on First Nations treaties with Canadian government in British Columbia; their placing forest conservation as the primary management objective; the heavy component of relationship-building in their business strategy; and the unclear property rights regarding non-timber forest products (esp. biodiversity, carbon). Iisaak is in the process of developing a significant green investment transaction to yield $C 30 million, and hopes that social investors will be able to evaluate terms of the offering within the next 12-18 months.
http://www.iisaak.com/contact.html

Short presentations on current work and areas of research

Gretchen Daily, professor of biological sciences at Stanford University is currently writing a book with Katherine Ellison on success stories on ecological protection, and is also conducting ecological research on pollinator services.
http://www.stanford.edu/group/CCB/Staff/gretchen.htm

Chris Barham from the World Bank currently works on natural disaster management, and specifically with the Mexican government to develop financial mechanisms for investment in environmental disaster mitigation.
http://www.worldbank.org/html/fpd/dmf/publications.htm#abstract1

Kirsteen Morrison, from Henderson Investors Singapore works with social and environmentally responsible investment funds with a focus on Asia growing from L1.5 to L80 mln; their guidelines are now becoming policy for the whole group.
http://www.henderson.co.uk/index.htm

Luis Gamez, from the Ministry of Environment and Energy (MINAE), Costa Rica works on programs for payments to private forest owners for environmental services in Costa Rica, from forest conservation or forest establishment.
http://www.minae.go.cr/

Ricardo Bayon, consultant for The Nature Conservancy, is helping set up the Center for Innovative Environmental Finance. The center will develop innovative financial mechanisms in partnership with Wall Street and other investors to support environmental services and habitat protection.

Aurelio Ramos, from the "Sustainable Biotrade" department at *Instituto Alexander von Humboldt,* Colombia. Its objective is to implement mechanisms which generate investment and trade of biodiversity products and services to aid entrepreneurs and all types of productive organizations develop green markets.
http://www.humboldt.org.co/biocomercio

David Brand, Director of Carbon Programs at Hancock Natural Resource Group. "The new program is designed to provide investors with opportunities in the emerging 'green economy' for forests. These investment products will appeal as a hedge to investors in traditional industry sectors as well as meeting the criteria of ethical investment funds. They also can provide part of a risk management strategy for corporations with greenhouse gas emissions".
http://www.shareholder.com/hancock/news/20000619-17187.htm

Ian Sanderman, General Manager for hardwood plantations in the state forests of New South Wales, and its partners are developing a number of market-based instruments to address financing constraints for salinity control in the Murray-Darling Basin. This program began in August of 2000.
http://www.forest.nsw.gov.au/Frames/f_aboutsf.htm

Jim Shields , Wildlife Manager for Native Forests Division of State Forests of New South Wales, Australia, is exploring possibilities for Biodiversity credit trading in association with the salinity project. Rice growers are the main clients who will work to establish migratory path for parrots.
http://www.forest.nsw.gov.au/

Stefano Pagiola from the Environment Department at the World Bank works in El Salvador developing projects with payments for environmental services similar to the model in Costa Rica. Project development in Ecuador also starting. There are 3 main components for payment mechanisms: a body to handle the money, an agency interacting with farmers (contracts, etc.), and a technical institution to determine how to value in economic terms the environmental benefits.

Sara Scherr, Professor of Agriculture and Resource Economics at the University of Maryland is working on community forestry opportunities for CDM and carbon forestry along with Forest Trends and CIFOR. She is also undertaking research on strategies to promote wild biodiversity in agricultural regions, and is working with Forest Trends on a paper describing opportunities for

forest communities to enhance livelihoods through linking with new markets for sustainably grown forest products and environmental services .

Natasha Landell-Mills, IIED is working on environmental services and markets, looking at individual experiences to develop and analytical framework to see how these processes evolve, what type of institutional arrangements are needed, etc. DfID has commissioned IIED to work on action learning on cases in India, Indonesia, South Africa to see how markets develop for watershed protection.
http://www.iied.org/landuse/index.html

Jaime Sanz, Strategic Analyst from Collins Pine wants to establish a pilot project on carbon on a designated area. Collins Pine has been increasing its amount of certified wood over the years to the point that all of their output is presently certified.
http://www.collinswood.com/index.html

Jim Brumm, Executive VP & General Counsel at Mitsubishi Corp. is currently involved in trading activities and works on the forest products operation worth 6 billion. The company is also looking for opportunities with FSC and a pulp mill in Alberta, and the Prototype Carbon Fund at the World Bank through an emissions study.
http://www.micusa.com/docs/whatare.html

Bettina von Hagen, Managing Director of Natural Capital Fund described how they are currently promoting a salmon safe bank, based on wetlands' bank model.
http://www.ecotrust.org/salmon_strategy.html

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