



Forest-Backed Bonds Proof of Concept Study

FINAL DRAFT - CIRCULATED TO STEERING GROUP

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Prepared by Forum for the Future and EnviroMarket Ltd
for IFC and DfID

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About the programme

The research programme was established in mid-2006 by the International Finance Corporation (IFC) with backing from the UK Department for International Development (DfID) and sets out to test the technical feasibility and likely development impact of eco-securitisation by examining its potential role in the financing and/or re-financing of sustainable forestry in the developing world.

The Programme is divided into three stages. This first stage, a Proof of Concept Study, examines the technical feasibility of the idea. Based on its conclusions, subsequent phases are expected to explore concept development and identify and promote measures that would act as market catalysts.

Partners and Sponsors

The concept was originally promoted by Mark Campanale, then Head of SRI Business Development at Henderson Global Investors in London. In early 2005, a proposal to undertake a proof of concept study was developed in collaboration with EnviroMarket and Green & Gold. The initiative quickly attracted the attention of the International Finance Corporation (IFC) and the UK Department for International Development (DfID) and in mid-2006 the two parties agreed to fund a programme of research aimed at exploring the technical feasibility and developmental merit of the concept.

The Proof of Concept stage, which commenced in August 2006, is managed by UK-based sustainable development charity Forum for the Future and undertaken by EnviroMarket Ltd.

The R&D Programme is guided by an independent Steering Group, made up of Jon Williams (HSBC), Matthias Rhein (DfID), Juan Jose Dada (IFC) and Mark Campanale.

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Executive Summary

This project looks at how conventional structured finance methods applied to natural tropical forest might give forest managers greater ability to access long-term finance. Improved finance has been identified as one of the 'missing' elements necessary to unlock the wider uptake of tropical Sustainable Forest Management (SFM).

We propose and test 'EcoSecuritisation', an innovative approach to the financing of natural forests that enables the development of long term asset value rather than short-term timber yield, through the issue of long duration Forest-backed bonds. The proposed mechanism utilises portfolio diversification; recent developments in forestry insurance and risk mitigation techniques; and the emergence of markets for ecosystem services in order to attract a diverse range of capital market investors.

The issue of forest-backed bonds in the proposed format will enable the creation of a long-term capital pool accessible to SFM operators and investors. Although governments remain the dominant owners of tropical natural forests, community and indigenous groups are playing an increasingly important role, and an increasingly diverse range of groups now carries out the management and harvesting of tropical natural forests. Significant financing gaps exist throughout the strata of tropical SFM, and viewing the sector as a whole is expected to deliver real benefits in terms of overall uptake. Important questions remain regarding how capital unlocked by EcoSecuritisation should be accessed by the different entities that could benefit from it.

The principles of EcoSecuritisation can be extended 'up' to government and 'down' to small and medium sized forest enterprises via alternative structures. Sovereign bonds issued against state income from SFM, and securitisation of small scale loans for SFM are both possibilities.

Natural Forest Assets

Over 30% of the world's land area – about 40 million km² – is covered in forest. 96% of this is classified as natural forest. In addition to providing an economic and cultural backdrop for the lives of 700million of the world's poorest people, this vast global estate delivers an array of essential local and global environmental services, including water storage and filtration, soil stabilisation and carbon sequestration.

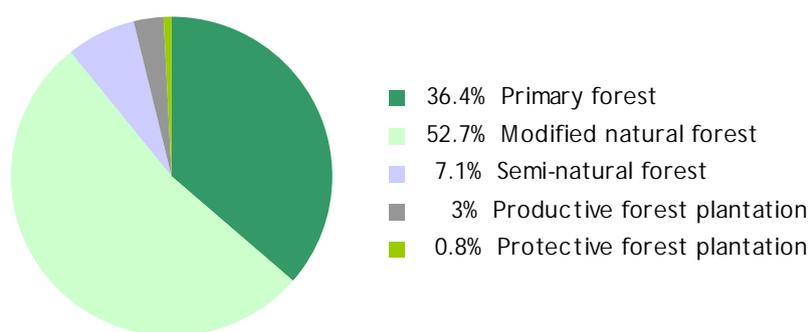


Figure 1: The composition of the world's forests. Source: FAO (2005)

Loss of natural forests has been a core issue for environmental NGO and civil society groups for some time. Their call for action has gained new potency amongst the global policymakers in the wake of growing concerns at the onset of climate change. The Stern Review underlines the case for action by identifying avoided deforestation as the most effective and economically attractive action available to the global community to start addressing climate change (Stern, 2006).

Historically, the loss of natural forest has accompanied industrial development. The US has just 5% of its original primary natural forest cover. Today, deforestation is taking place at an unprecedented rate in the tropics. Although reasons for this vary from place to place, one common theme emerges: activities addressing immediate needs (food, fuel wood, shareholder returns etc) are more attractive than those connected with the ongoing stewardship of standing tropical natural growth forests (Chomitz, 2006).

Markets that assign financial value to the 'non wood' components of natural forests are in their infancy. For practical purposes, commercial decisions relating to forest management are based on the value of accessible standing timber, the land on which the forest grows, and the value of competing land uses. These decisions are usually taken from a short-term perspective; whilst the current value of tropical hardwood can be substantial, the high 'time value of money' in most tropical countries means that the net present value of any future/deferred harvest is often minimal. Slow growth rates, and the importance of different tree species within complex and interconnected forest ecosystems, makes the choice and execution of an appropriate harvesting regime vital.

Sustainable Forest Management (SFM) has evolved as a practical response to this need, and links the economic development of forestry with the desire for a more holistic approach to its management. SFM emphasises the development of long term asset value over short-term timber forest yield.

There are no exact figures for the quantity of tropical natural forestry currently under sustainable management. Independent certification schemes, such as the FSC, which demonstrate that sustainable management is being undertaken, remain heavily underrepresented in the tropics.

The area defined as Permanent Forest Estate (PFE) – some 858 million hectares - provides an indication of forestry currently not threatened or under threat from external sources.

Ownership & Management

Around 86% of forests are under government ownership, 79% under the direct control of central government (FAO, 2005). Governments allocate the right to manage these resources via concessions to a range of commercial, community and NGO groups. Globally about 34% of forests are managed in some way.

However the existence of clear and enforceable property rights – central to effective ownership - remains a contentious issue in many tropical countries. Local political elites have often usurped and re-allocated traditionally held community and tribal rights – rarely recorded in any official statute book – and reallocated them as lucrative logging concessions, with predictable consequences in terms of local tension and conflict.

Management of tropical forestry – natural and plantation – is summarized as follows:

- § Government land
 - § Government management (forest reserves)
 - § Concession management
 - § Conservation management
- § Privately owned land
 - § Private plantation management
 - § Private natural forest management
 - § Wood processor (vertically integrated)
 - § Small grower
- § Community Forests and Forestry Associations
- § Company Community Partnerships

Investment Flow

On a global basis, institutional investment in forestry remains focused on plantations. These man made forests can grow at up to 15 times the rate of natural forests and accommodate a far greater degree of management control, delivering a homogenous and relatively predictable supply of timber.

US investors have led the way in forestry investment. The US market, boosted by favourable tax, local supply and strong regulatory conditions, accounts for 66% of the \$35 billion currently invested in the sector worldwide. Locally based Timber Investment Management Organisations (TIMOs) have delivered impressive returns by focusing on the revenue generating capacity of plantations.

By contrast, investment flows into tropical natural forests are difficult to track. Although foreign direct investment (FDI) into emerging markets stands at \$149bn¹, and the value of roundwood

¹ 'IFC & Emerging Markets at a Glance' (IFC, 2007)
http://www.ifc.org/ifcext/50thanniversary.nsf/Content/Fact_sheet_English

removals from Africa, Asia, South America and Oceania exceeds \$32bn (FAO, 2005), tropical forestry is still 90% funded by local domestic sources (Tomaselli, 2005).

The relatively small amount of institutional investment that has occurred is focused around plantations. A small group of 'pioneer' investment managers have successfully identified and acquired attractive opportunities. This success has actually led some market commentators to speculate that 'all the great opportunities have already been taken'.

Investment in tropical forestry, both plantation and natural growth, is actively promoted by regional and local development banks, institutions and NGOs. Initiatives such as the Forestry Investment Attractiveness Index, produced by Inter American Development Bank (IADB), provide a comprehensive independent framework for assessing investment risk. Organisations such as the WWF Global Forest Trade Network (GFTN) and Forest Trends Business Development Facility facilitate market access (for finance and forest products) for smaller and medium sized producers involved in sustainable forest management, production of certified products and ecosystem services.

Sustainable Forest Management

Sustainable forest management (SFM) operators and investors seek to develop new income streams from natural forests such as carbon, conservation payments and ecotourism, and may blend this with income from plantations. The process emphasises quality and diversity of asset value and the development of long term cash flow. Enhancing underlying asset value in this way reduces overall investment risk over time.

Unlike plantations, natural forests yield a wide variety of hardwood timber species, and this requires a more flexible approach to marketing. Once a particular area has been harvested, it may be 40/50 years before the next harvest. Investment in modern processing equipment can ensure that the best use is made of the available resource, but this entails capital investment. Developing and maintaining complementary cash flow associated with SFM and payments for ecosystem services (PES), for example in achieving certification and in establishing detailed information on carbon sequestration, adds to the amount of capital required to run a forestry business.

Equity financing of SFM

Considering the perceived risk, most institutional investors view conventional exploitation of tropical natural forests as an equity play. Limiting timber extraction at an ecologically sustainable level sets up a three way relationship between (a) the value of the timber, (b) the total area/geography of the concession and (c) the cost of the concession. In short, equity financing applied to SFM tends to dictate the need for large-scale operations, which in turn carry their own additional set of risks and costs.

Debt financing of SFM

Cost effective borrowing is a well-established route through which investors can improve their equity returns. Although neither plantation nor natural forestry is particularly capital intensive relative to the primary and secondary processing activities they feed, forestry operations involve lengthy payback periods. Cost effective financing of timber inventory, harvesting and processing equipment is a key requirement for tropical forestry businesses.

The ease with which local operators can access local currency debt finance for forestry operations varies significantly. There is however a strong correlation between poor access to local capital and high deforestation rates at national level.

The use of structured commodity finance would enable forest operators to borrow against assets and/or future income. This is an attractive option because with SFM the interests of the lender are well aligned with those of the operator. In other words, they both want to protect and enhance the long term income generating potential of the forest.

The efficacy of structured commodity finance is largely determined by the level of security that can be achieved. This in turn depends on how cost effectively risk relating to forest cash flow can be isolated, managed and mitigated.

Risks of SFM

Commercial operators involved in tropical natural forestry face significant risks. The key to unlocking long term capital structures lies in the cost effective management and mitigation of these risks.

The major risks identified by investors are as follows:

- Political risk - Country risk is the greatest source of concern for investors. A high proportion of tropical natural forestry is in countries with poor governance, unstable currencies and a poor economic track record.
- Insecure property rights - Unclear or conflicting ownership or usage rights prevent the use of forestry as security and heighten potential for local tension and/or conflict.
- Property loss - Natural forests are spread over large and often remote areas. In addition to damage or destruction as a result of human intervention, they are subject to a range of natural disasters.
- Income loss - Variations in market price, failure of a major client or destruction of forestry could all lead to loss of income.
- Operational risk - Forestry is not an exact science, and the success of individual projects rests heavily on the skills of the manager. This is particularly the case for tropical forestry where the inability to easily swap managers is a considerable risk if the asset is providing security
- Reputation - NGO and civil society groups are powerful stakeholders in the world of natural forestry, and owners of substantial tracts of land in their own right. Whilst some seek pragmatic solutions to enhancing economic value of forests, others are confrontational, creating significant risks for both investor and operator.

- Investment liquidity - Lack of ability to easily buy and sell forestry limits its appeal, and adds to the cost of financing.

Risk Management & Mitigation

A number of approaches to the mitigation and management of risk are available.

- Portfolio diversification
- Political risk insurance
- Investment insurance
- Property insurance
- Credit derivatives
- Securitisation

The cost effectiveness of each mechanism depends on the asset, the asset location and the objectives of the asset manager or investor.

EcoSecuritisation

Securitisation is a well-established branch of structured finance. The mechanism enables borrowers to raise capital by pooling and transferring assets to a separate legal entity, which then issues bonds on the basis of the security provided. Securitisation can unlock lending over longer tenor and at lower rates.

EcoSecuritisation merges existing securitisation techniques with rapidly emerging environmental markets, in order to attract low cost, long term 'patient capital' to projects that have potential to generate significant Payments for Ecosystem Services (PES), such as tropical forestry.

If suitably structured, the inclusion of PES in a portfolio of SFM related cash flow substantially increases overall credit quality, due largely to the nature of the buyers. The organisations concerned are generally major businesses or municipal and national governments, entities that are likely to be familiar to capital market investors and rating agencies.

Payments for 'avoided' deforestation are currently under discussion for inclusion post 2012 regulated carbon markets, and are already a reality in voluntary markets. Tropical plantations are able to access these regulated carbon markets through production of renewable bio-fuels, payments for carbon sequestration via the Clean Development Mechanism, and payments for watershed protection.

The development of forest revenue-generating capacity in these areas, coupled with the credit quality of the buyers, and good contract structure/duration, provides an attractive target for use of structured commodity finance.

Forest-Backed Bonds

Applying the principles of EcoSecuritisation to different tropical forest revenue streams suggests a number of possible structures. Assuming sufficient credit enhancement, forest-backed bonds could be issued against a variety of cash flows, including:-

- § A portfolio of cash flows from tropical plantation, natural forest and conservation
- § Government income/licence fees from SFM
- § A portfolio of SFM related loans to small and medium forest enterprises
- § Plantation development linked to forest conservation.

Of these options, a portfolio of cash flows from tropical forest activity, structured as an export orientated future flow deal, is considered the most promising option in the short term. To be feasible the pilot deal will need to target \$100m.

The feasibility of a tropical forest-backed bond is based on the availability and cost effective application of a series of risk management and mitigation procedures. Central to these are portfolio diversity, country selection and third party credit enhancement.

The ability to secure long-term offtake agreements with national governments for certified timber and carbon, and with multilaterals for carbon, is a key component in boosting the overall credit quality of the pool. Overall economic and political stability, good local/regional demand and effective local forest governance and institutions are the main factors in country selection. In general, tropical countries with high rates of deforestation have weak governance: this will limit the capacity of the portfolio to carry projects in these areas.

The availability of insurance for medium-sized forestry operators increases the potential to include them in a portfolio. Assuming an appropriate geographic spread, and an appropriate screen for quality – such as certification to an appropriate standard - the inclusion of a greater number of relatively smaller forests will lead to additional reductions in the risk profile of the portfolio and subsequently reduce borrowing cost further when Forest-backed bonds are issued.

The Market for Forest-Backed Bonds

The key areas of focus for investors in Forest-backed bonds are country risk, duration, the nature and scale of payments for environmental services, the availability of accurate data on asset performance, and the quantity, quality and cost of available credit enhancement.

Long-term investors with an interest in matching their liabilities against secure assets, such as pension funds and insurance companies, are the primary buyers at the 40/50-year duration proposed for forest-backed bonds. These ultra cautious investors target bonds that at least keep pace with inflation and guarantee a payback in line with their obligation to pensioners and annuity holders. To be attractive to this audience, forest-backed bonds need to be issued through a supranational entity, and incorporate powerful guarantees.

Information on the underlying asset will also be central to effective rating, marketing and post-issue performance analysis of forest-backed bonds. Significant gaps exist for biological and market data relating to tropical natural forestry (although data for plantations is more readily accessible).

Next Steps

Forest-backed bonds offer an attractive and effective solution to an urgent problem. They provide a means with which to kick start major private investment in tropical natural forests, enhancing their value relative to competing land uses in a way that benefits all key stakeholders.

The next steps in the development of a tropical forest-backed bond are:-

1. Improve information flow to capital market participants on the physical, financial and legal aspects of tropical natural forests.

§ Tropical forestry businesses and traders should be approached to identify mutually beneficial opportunities for enhancing the transparency and overall effectiveness of local markets. An excellent medium term aim would be the creation of reliable local market price indexes.

§ Research should be undertaken into existing and proposed methods of gathering physical data on forests. This should identify any shortfall in information flow against the requirements of structured finance teams, rating agencies and financial regulators involved in the development of a forest-backed bond.

§ Information on the legal, political and economic environment in which tropical natural forests exist should be collected, collated and made more widely available to investors. The format should be authoritative, easily accessible, accurate and up-to-date. Contributors should be encouraged to use the site as a means of communicating challenges, achievements and opportunities related to tropical natural forests.

2. Develop existing third party credit enhancement facilities for application in tropical forestry.

§ A Tropical Forestry Reinsurance Facility should be created in order to increase the capacity of local insurers to cover key forest risks. Although this capital will be 'at risk', the likelihood of loss is very low. The facility should remain operational just long enough to build awareness and confidence amongst the global insurance community. Private capital will then be available to take its place.

§ Further research should be undertaken to establish capacity/interest amongst market participants to deliver price hedging and indices for tropical timber and other natural forest revenue streams. Consideration should be given to establishing a global tropical timber index

to facilitate equitable pricing of long-term contracts (this could be based on local timber indexes described earlier).

3. Reinforce national commitments on the purchase of sustainable tropical forest products by public bodies

- § Governments should extend and strengthen their commitment to public procurement of certified timber. Local markets are at least as important as the international market, and may be more so: government commitments should extend to all jurisdictions where significant trade in tropical timber is taking place.
- § Annex I² governments should prioritise their purchase of forestry carbon generated under the Clean Development Mechanism (CDM) for the first Kyoto phase, and should commit to making advanced purchases of carbon created through avoided deforestation at the earliest possible opportunity.
- § The EU Linking Directive should be amended to allow the inclusion of forestry carbon from the CDM within the EU Emissions Trading Scheme (EU ETS) at the earliest possible opportunity.

4. Support the structuring and issue of a debut forest-backed bond

- § A pilot EcoSecuritisation should be undertaken in 2007, enabling the issue of a tropical Forest Backed Bond early in 2008. An independent vehicle should be created and funded in order to provide a clear focus for the management and marketing of the deal. The project should bring together key capital market participants – rating agencies, insurers, governments and so on - as a 'learn by doing' exercise.
- § The pilot should target forestry operators and investors in lower middle-income countries, where forest resources come under most strain from economic growth in China and elsewhere. In the selection of countries heavy weighting should be given to the Forest Law Enforcement Governance and Trade (FLEGT) process and the presence of current or proposed Voluntary Partnership Agreements.
- § A future flow structure should be employed, and utilise existing guarantee mechanisms where possible (for example, the Multilateral Investment Guarantee Agency (MIGA)).
- § Development of a pilot EcoSecuritisation should occur in conjunction with that of the proposed Reinsurance Facility (described in 2), to allow for maximum cross-fertilization of ideas and benefits.

² Annex I countries as described by the UNFCCC which divides countries into three main groups according to differing commitments.

Abbreviations and Acronyms

AAU	Assigned Amount Unit
AD	Avoided Deforestation
BCF	BioCarbon Fund
CAR	Corrective Action Reports
CDCF	Community Development Carbon Fund
CDM	Clean Development Mechanism
CDO	Collateralised Debt Obligation
CCBA	Climate & Community Biodiversity Alliance
CER	Certified Emission Reduction
CLO	Collateralised Loan Obligation
CO ₂ e	CO ₂ equivalent
CoP	Conference of the Parties to the UNFCCC
CR	Compensated Reductions
CSR	Corporate Social Responsibility
DfID	UK Department for International Development
EUA	EU Allowance
EU-ETS	European Union Emissions Trading Scheme
FAO	UN Food and Agriculture Organization
FDI	Foreign Direct Investment
FLEGT	Forest Law Enforcement, Governance and Trade
FMO	Forest Management Organisations
FRA	Forest Resources Assessment (FAO Programme)
FSC	Forest Stewardship Council
HBU	Higher Business Use
HCVF	High Conservation Value Forests
IADB	Inter American Development Bank
IFC	International Finance Corporation
IFI	International Financial Institution
ITTO	International Tropical Timber Organization
ICER	Long-term CER
LULUCF	Land Use, Land Use Change and Forestry
MAI	Mean Annual Increase
MIGA	Multilateral Investment Guarantee Agency
MLP	Master Limited Partnerships
NGO	Non-Governmental Organisation
NTFP	Non-Timber Forest Products
PES	Payment for Ecosystem Services

PFE	Permanent Forest Estate
REDD	Reduced Emissions from Deforestation and Degradation
REIT	Real Estate Investment Trust
RMU	Removal Unit
SFM	Sustainable Forest Management
SLIMF	Small and Low Intensity Managed Forests (FSC Programme)
SMEs	Small and Medium-sized Enterprises
SMFES	Small and Medium-Sized Forest Enterprises
SPV	Special Purpose Vehicle
SWP	Secondary Wood Processing
tCER	Temporary CER
tCO ₂ e	Tonnes of CO ₂ equivalent
TIMO	Timber Investment Management Organisations
UNFCCC	United Nations Framework Convention on Climate Change
VCU	Voluntary Carbon Unit
VER	Verified Emission Reduction
WB	World Bank

Key Definitions

- **Asset Backed Security:** a financial instrument that is based on pools of assets or collateralized by the cash flows from a specified pool of underlying assets. This pooling gives the assets a more attractive risk profile than they have individually.
- **Biodiversity Offsets:** any activity which adequately mitigates or compensates for the unavoidable damage to biodiversity caused by a development project, including the creation of protected areas.
- **Certified Emission Reduction:** Reduction of greenhouse gases achieved by a project under the Clean Development Mechanism of the Kyoto Protocol
- **Conservation Easement:** A conservation easement is a restriction placed on a piece of property to protect its associated resources.
- **Economic vs. Financial Assessments:** in the case of a development or land use change, an economic analysis adjusts the financial costs and benefits to reflect the true opportunity costs of the activity, both environmental and social, at different scales (Pearce *et al.* 2003).
- **EcoSecuritisation:** The application of securitisation techniques to income flows generated through delivery of ecosystem services.
- **Ecosystem Services:** services provided by the natural environment, the value of which is more often than not ignored in traditional valuation measures. Some examples are landscape stabilisation, water filtration, flood control, climate regulation and pest control.
- **Forest-Backed Bond:** A capital market instrument created through the securitisation of future income flows related to sustainable forestry (EnviroMarket Ltd)
- **Forest Operator:** The individual or entity with overall responsible for the day to day operation of a tropical forest
- **Investor:** An individual who takes an ownership position in a company, thus assuming risk of loss in exchange for anticipated returns
- **Lender:** Any institution or individual who lends money
- **Natural Capital:** includes those elements of the natural world which provide the basis for ecosystem services, ranging from geological and atmospheric elements to ecosystems.
- **Natural Forest:** forests and woodlands can be classified according to species composition, structure - plant cover in different layers, function - ecosystem or plant physiological properties and utility - suitability for human use (Scholes, 2004). The number of classes and the resolution of different classification systems depend on the use to which they are put: here we use a broad definition with few classes, to coincide with the FAO definition. Trees are plants which live relatively long (more than 10 years) and which, under the right conditions, can grow to at least 5 m in height. The delineation between woodlands and forests is related to the extent of projected canopy cover, which can be thought of as the average proportion of shade projected under the canopy. Woodlands are defined as wooded ecosystems with a projected canopy cover limit of 10% to 75% (FAO 2005) and a basal-area

weighted mean vegetation height of more than 2.5m. These limits of course have a significant impact on the area of woodlands identified.

- Plantations: Even-aged stands of a single species tree, planted as monocultures, fertilised, thinned often with pesticides applied and harvested in rotations of 7-50 years, depending on the area, the purpose of the plantation (e.g. structural timber or pulp) and the species.
- Regulated Market: A market (for goods or services) that is regulated by a government appointed body. The regulation may cover the terms and conditions of supplying the goods and services and in particular the price allowed to be charged.
- Roundwood: Wood in its natural state as felled, with or without bark. It may be round, split, roughly squared or in other forms (FAO). Roundwood can be used for industrial purposes, either in its round form (e.g. as transmission poles or piling) or as raw material to be processed into industrial products such as sawn wood, panel products or pulp.
- Securitisation: the process of pooling existing assets (such as trade receivables) or future assets (such as the expected cash flows accruing to a business) to support a financial instrument. The process involves detailed consideration of the expected financial behaviour of particular assets, as opposed to the expected financial behaviour of the originator of the chosen assets. The structure of the financial instrument is carefully designed to maximise the efficiency with which the assets are used.
- Sustainable Forest Management: the process of managing permanent forest land to achieve one or more clearly specified objectives of management with regard to the production of a continuous flow of desired forest products and services without undue reduction in its inherent values and future productivity and without undue undesirable effects on the physical and social environment³
- Verified Emissions Reductions: VERs are the units traded by the voluntary market, and are the result of project based greenhouse gas emission reductions that have been certified by an accredited third party.
- Voluntary Markets: any environmental market which has not been mandated by central or municipal government. Such markets may place legally binding reduction targets on participants, but more are accessed on an unrestricted unregulated basis by organisations seeking to offset the impact of their carbon emissions.

³ ITTO 2005b.

1 The Forestry Sector

1.1 Forest Assets

The Global Forest Resource Assessment 2005 finds that forests⁴ cover 30% of total land area, two thirds of which occurs in just 10 countries.

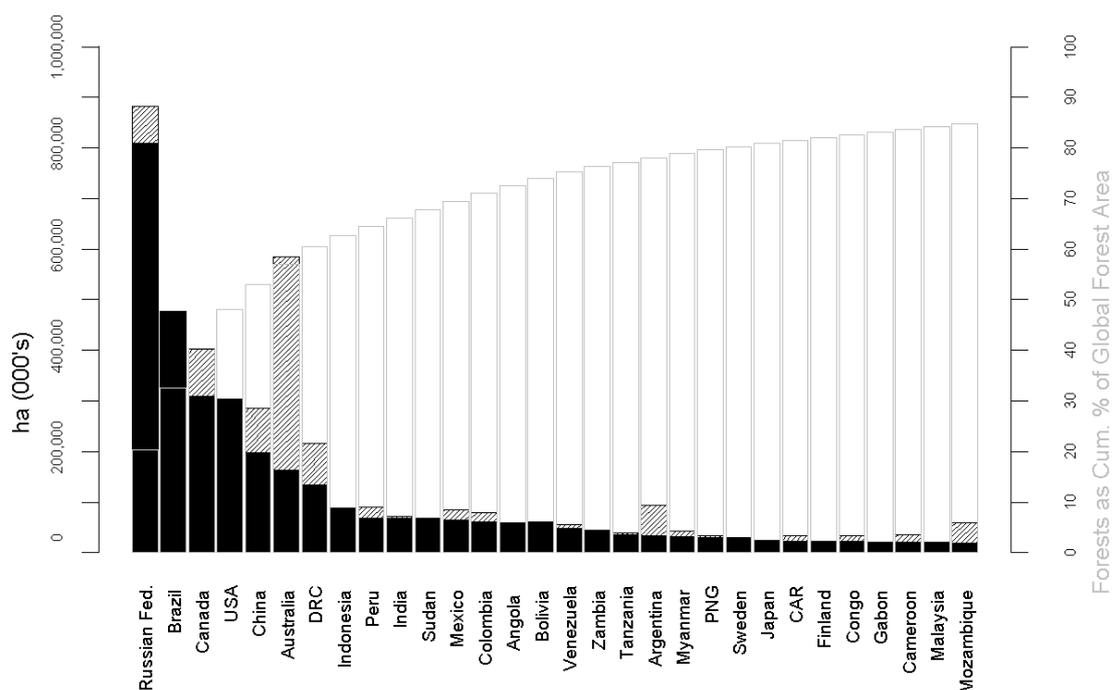


Figure 2: Global distribution of forest by country. Thirty countries contain more than 84% of global forests. Some countries additionally have 'Other Wooded Land' (5-10% canopy cover), shown here shaded. Source: FRA 2005.

Grouped by primary purpose, Modified Natural Forests⁵ make up the largest (52.7%) category of global forest resource, Primary Forest (36.4%), Semi-natural forest (7.1%), Productive Forest Plantations (3.0%).

Over the last 15 years there has been a decrease in the area of forest designated primarily for productive purposes by an average of 4.6 million hectares per year, and an increase in the area of productive forest plantations of almost 2.2 million hectares per year. This indicates that substantial

⁴ The FAO Forest Resource Assessments define forest as areas with a canopy cover of more than 10% and minimum tree height of 5 m, including bamboo and palms, forest roads and fire breaks as well as plantations primarily used for forestry or protection purposes, but excluding trees in agro forestry systems (for a full definition see FAO 2005).

⁵ Modified Natural Forest is defined as wooded land consisting of naturally regenerating species where there are clearly visible signs of human activities, while Primary Forest consists of native species where there are no clearly visible signs of human impacts and ecological processes are intact. Semi-natural forest is established through planting, seeding or assisting natural regeneration. It includes areas where there are deliberate efforts to increase the desirable properties of the forest, and may include introduced species. Productive Forest Plantation includes stands of introduced species established for the production of timber and non timber forest products, and may include monospecific stands of native species.

areas of natural forests previously allocated for productive purposes were designated for other uses, while the proportion of wood removals coming from forest plantations increased significantly.⁶ Plantations now account for around 140 million ha worldwide (FAO 2005a).

Loss of natural growth forest cover is linked to a wide range of factors (World Bank, 2006), but despite decades of research, generalisations are hard to make. Factors such as population growth and shifting cultivation, impoverishment and political ecology have been emphasised at a global level, but often conflict with results from local case studies focussing on proximate causes (Geist and Lambin, 2002). A recent meta-analysis of 152 studies (Geist and Lambin, 2002) documenting deforestation finds 4 groups of proximate causes: (1) infrastructure extension, (2) agricultural expansion, (3) wood extraction and (4) other factors including predisposing land characteristics.

These proximate causes are in turn driven by 5 groups of underlying factors which include (1) demographic factors, (2) economic factors, (3) technological factors (4) policy and international factors and (5) cultural factors. This analysis suggests that the above-mentioned factors combine variously across different geographical and historical contexts to produce the observed pattern of deforestation.

So, although there may be a general economic incentive for local actors to fell slow-growing high value tropical hardwoods and utilise cleared land for alternative activities such as palm oil, cattle ranching, soy beans, forestry plantations, how this underlying factor plays out is determined by the relative importance of the other factors mentioned above.

Box 1: Economics of deforestation

The direct causes of deforestation vary by region driven by commercial and smallholders interests. The logging process degrades the forests, often paving the way for forest conversion, thus acting as a catalyst for deforestation.

Region	Net loss ha/year	Cause
Africa	5.2m	subsistence farming and fuelwood collection (charcoal)
Latin America	4.4m	cattle ranches & soy farms
Asia	2.8m	logging & agricultural expansion (e.g. oil palm)

Source: World Bank, 2006

⁶ FAO 2005c (Global Forest Resources Assessment 2005)

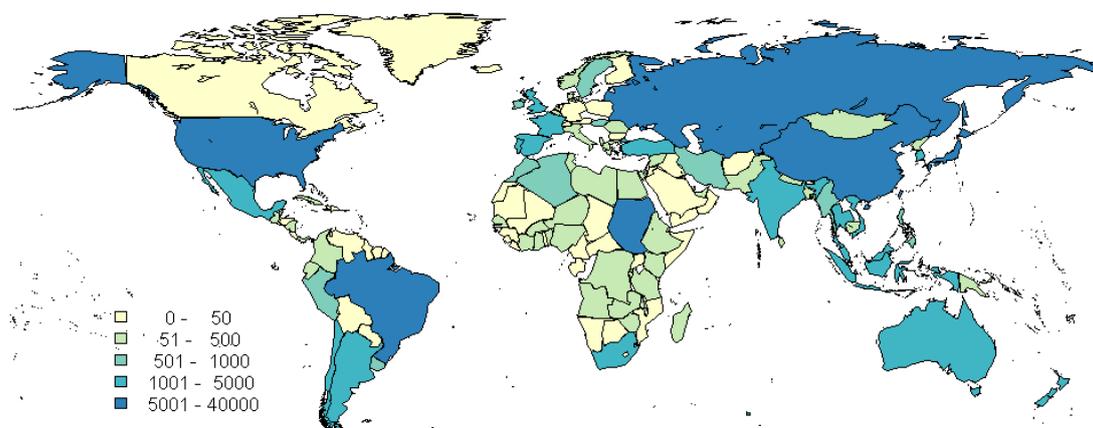


Figure 3: Geographic distribution of plantations ('000 ha). Source: FRA 2005 (data only)

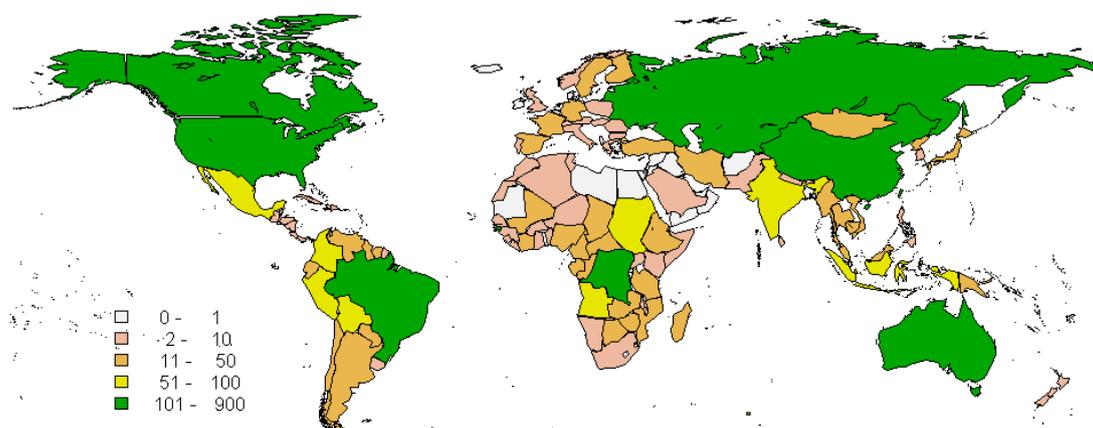


Figure 4: Geographic distribution of natural forest (million ha). Source: FRA 2005 (data only)

Concern about the depletion of natural forests arises because its loss has a major impact on local economic well-being, biodiversity, habitat conservation and environmental services, including carbon sequestration to combat climate change.

Deforestation, the majority of which is taking place in the tropics, is a major cause of climate change, contributing about 18% of annual global emissions – more than the entire global transport system (Stern, 2006). However, in economic terms the cost of avoiding this deforestation equates to the opportunity cost associated with the alternative land use driving it; on this basis the cost of carbon reductions achieved through avoided deforestation are estimated in the range US\$1–2 per tCO₂e, making avoidance of deforestation by far the most attractive (and immediate) action the global community could take to address climate change (Chomitz et al, 2006; Stern 2006).

Conventional wisdom holds that plantations reduce pressure on natural forests through generating timber in a more productive way. The sustainable biological yield of timber from managed plantations is typically many times higher than the sustainable yield available in natural growth

forests, (although the dimensions, quality, and range of timber products emanating from natural forests can offset this to some extent). Plantations now constitute 35% of global timber production and projections suggest that, by 2020, 50% of timber may come from plantations.

This major global shift towards the sourcing of timber from plantation forestry is being fuelled by a range of investment managers seeking equity returns. This trend is already well established in the US and is gaining momentum in the Southern hemisphere. Rapidly growing interest in environmental services such as carbon sequestration also appears to be centred on plantation development. These elements can add significantly to the returns available in these types of projects. Investor interest in forestry, largely focused on plantations, is growing.

Some fear that, instead of taking pressure off natural forests, plantations will out-compete natural forests, making natural forests less valuable. This would increase the economic incentive to convert natural forests for other uses such as agriculture, and push small-scale, indigenous, and low-income producers out of the market (Profor, 2004).

Protection of natural forests depends on finance being available to support their ongoing use as natural forests, which in turn depends on the way in which they are valued. This value is a combination of monetised cash flows from goods and services and other non-monetised benefits to which a value can be attributed. These are both explored in more detail below.

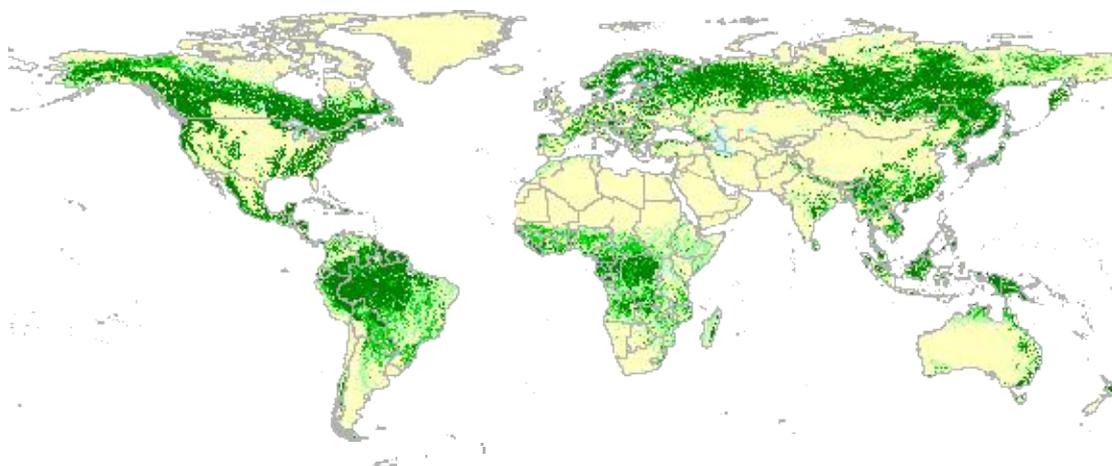


Figure 5: Actual distribution of natural forest. Source: FRA 2005

1.2 Forest ownership

Tenure and ownership of the world's forests have recently come under scrutiny as the link between investment in sound forest management and secure property rights has become clear. The questions around access, claims to ownership and who should own the world's forests are contested in many areas around the world (White and Martin, 2003). While governments still own much of the global forest estate, several hundred million people directly depend on forest resources for their livelihoods.

Under pressure from international conventions and local political movements, governments increasingly recognise land-use and ownership claims of indigenous groups and local communities. The conservation movement also recognises the positive contribution of indigenous people's traditional management practices to ecosystem maintenance, which may be enhanced by devolution of forest ownership from governments to local communities (Wunder, 2001). Furthermore, governments and their agencies generally appear to have a poor track record at managing their resources, triggering a re-evaluation of the types of private/institutional arrangements best suited for the task.

In their detailed analysis, White and Martin (2003) concentrate on tenure data for 24 of the 30 most forested countries as identified by FRA 2001⁷, and make the initial distinction between public and private property, recognising that the statistics do not identify unrecognised claims by local peoples, and that ownership does not necessarily imply control, especially in Africa and Asia. Public property, (defined as all lands owned by central, regional or local governments) is further divided into two subcategories (1) land administered by government entities and (2) land reserved for local communities, but where any rights are not secure, and may be revoked. This second group lacks the important ability to sell or raise finance against land, or claim revenues from ecosystem services sold. Countries with these arrangements include Brazil, US, India, Thailand, the Philippines, Indonesia and Zimbabwe. Private ownership, defined as a right which cannot be extinguished without some form of compensation by government, is divided into land owned by (1) private individuals or firms and (2) local communities or indigenous groups.

Table 1: Official forest ownership as a percentage of country total. Source: White and Martin (2002)

Country	Public		Private	
	Govt Administered	Reserved	Community/Ind	Individual/Firm
Russian Fed.	100	0	0	0
Brazil	77	13	0	10
Canada	93.2	0.3	0	6.5
United States	37.8	5.9	0	56.3
China	45	0	55	0
Australia	70.9	0	9.3	19.8
DRC	-	-	-	-
Indonesia	99.4	0.6	0	0
Peru	-	1.2	33	-
India	76.1	16.5	0	7.4
Sudan	98	2	0	0
Mexico	5	0	80	15
Bolivia	53.2	31.3	5.3	10.2
Colombia	-	-	46	-
Tanzania	99.1	0.9	0	0
Argentina	20.5	0	00	79.5
Myanmar	100	0	0	0
PNG	3	0	97	0

⁷ FAO Global Forest Resources Assessment (FRA) publication 2001, containing forest resource data.

Country	Public		Private	
	Govt Administered	Reserved	Community/Ind	Individual/Firm
Sweden	20.2	0	0	79.8
Japan	41.8	0	0	58.2
Cameroon	100	0	0	0
CAR	100	0	0	0
Gabon	100	0	0	0
Guyana	91.7	0	8.3	0

Table 1 above underlines the asymmetric distribution of forest land ownership. In summary about 2.8 billion ha are managed by governments, 131 million ha are reserved for communities, 246 million ha are owned by community and indigenous groups, and 443 million ha are privately owned by individuals and firms. These numbers, though probably underestimates of the non-government categories, imply around 77% of the global forest estate is administered by governments.

Managed forests currently make up about 34% of total global forest⁸. Management activities are undertaken by a wide variety of public and private entities, with a similarly diverse range of operational objectives and criteria. They span everything from (industrial) plantations that increasingly feed the raw material needs of major forest product corporations to protected areas of natural forest held by leading NGOs and conservation groups.

Effective policy and regulation are essential cornerstones of forestry management on a national level, but the ability of governments to successfully implement these measures, and of individual forestry operators to survive and develop, requires access to finance. Ownership structures have implications for the way in which the forests are managed, their social and environmental costs and benefits, and the access to capital.

Key arrangements for management of tropical forestry are as follows:

1. Government land
 - a. Government management (forest reserves)
 - b. Concession management
 - c. Conservation management
2. Private land
 - a. Private plantation management
 - b. Private natural forest management
 - c. Wood processor (vertically integrated)
 - d. Small grower
3. Community Forests and Forestry Associations
4. Company Community Partnerships

⁸ Global Forest Resources Assessment 2005 - Production of wood and non-wood forest products is the primary function for 34% of the world's forests, while more than half of all forests are used for such production in combination with other functions, such as soil and water protection, biodiversity conservation and recreation.

The above list, although non-means exhaustive, provides a useful snapshot of existing tropical forest management. A fraction of these operators are currently recognised as sustainable forestry managers by stakeholders in the international process. Each of these operators faces different challenges and constraints in the day-to-day execution of their businesses. Regulatory policies/enforcement and competition at local, national and international level (in that order) establish the framework within which these businesses operate.

Below we explore the activities of these forest managers in more detail, and provide a snapshot of commercial and financial realities for each.

Concessions management

Although it is clear from the analysis above that governments own most of the forest estate, access rights and management authority are traditionally transferred to large-scale private forestry firms through logging concessions in return for royalties and other fees. In White and Martin's (2003) analysis of data from 16 countries for which data was publicly available⁹, some 400 million ha were allocated to concessions. These arrangements typically involved a small number of private firms and allegations of illegal logging and corruption in these concessions were commonplace. Generally, few profits or government revenues from forest concessions tended to be reinvested, and uncontrolled or unsustainable logging led to boom bust cycles of local development. In the case of heavily indebted, vertically-integrated multi-national concessionaires, tax-revenues are low and profits tend to accrue to shareholders in foreign countries; as a result, this model of forest resource ownership and use has fared poorly in comparison to small to medium forest enterprises in countries like Guinea and Ghana (Mendes and Macqueen, 2006).

Conservation Concessions

The Conservation Concession is a novel approach that seeks to directly reconcile resource protection with development.

Under a conservation agreement, national authority or local resource users agree to protect natural ecosystems in exchange for a steady stream of structured compensation from conservationists or other investors. In its simplest form a conservation concession might be modelled after a timber concession; rather than log the concession area, the conservation investor would pay the government for the right to preserve the forest.

A conservation concession requires a negotiated agreement between an investor and a government or other resource owner.

Box 2: Conservation management: WWF Heart of Borneo

The Heart of Borneo (HOB) covers some 220,000km² of equatorial rainforests (equivalent to the size of the UK) and about 1/3rd of the island of Borneo the 3rd largest island in the world. The area straddles the transboundary highlands of Indonesia and Malaysia, and reaches out through the foothills into adjacent lowlands and to parts of Brunei. Borneo's biodiversity is unique, being the source of 14 of the island's major rivers, harbours up to 6% of the world's total biodiversity and inhabited by 13 species of primates and over 15,000 species of plants. The Declaration on the Heart of Borneo initiative, signed on 12 February 2007, represents a commitment between the three countries to conserve and sustainably manage the Heart of Borneo.

⁹ Governments tend not to publish this information

By way of example, in July 2002 Conservation International signed a 30-year agreement with the Government of Guyana to establish a conservation concession protecting 80,000 hectares of pristine forest.

Conservation concessions can offer an attractive stopgap – an opportunity to support key ecosystems until such time as more permanent arrangements can be made in the form of national parks and protected areas. In this context, conservation concessions offer:

- Stable source of funds for economic development – a stream of regular, low risk payment in a hard currency
- Direct, transparent conservation investments – demonstrate clear benefits to potential biodiversity investors within an outcome orientated framework.
- A market based mechanism – conservation becomes a product that can be purchased directly and provided according to clearly established criteria.

Community Forests and Forestry Associations

Although governments still dominate forest ownership, this situation is changing. Driven by political and legal reforms, the rights and legal title of land are being transferred to the communities and indigenous groups that have historically occupied them. As an indication of the scale of change in forest ownership, the Amazon basin countries have transferred 1 million km² of forest estate to community ownership since 1985. Similar changes on a smaller scale are occurring in Africa and Asia. Australia, Bolivia, Colombia and Peru together now recognise 103 million ha of forest as owned by communities, while Bolivia, Brazil, India, Indonesia, Peru, Sudan and Tanzania together recognise 113 million ha as reserved for community administration. As a result, community groups have been able to successfully challenge logging concessions, White and Martin (2003)¹⁰.

Associations often arise as an attempt to increase awareness or representation in government, but could potentially provide access to a resource base of sufficient scale to support a forest-backed bond as an alternate means of raising finance for SFM. However, there are significant challenges associated with community forests, as shown in the study of the Matto Grosso area of Brazil (see box).

Box 3: Matto Grosso and Community Forests

The Matto Grosso region of Brazil provides an example of the mixture of cultural/political context within which different associations form, often with similar economic aims. Of the 12 associations surveyed, the stated goals of all included (1) securing tenure and (2) securing credit for their members in their stated goals. Although micro- (less than 10 employees) and small to medium forest enterprises (< 99 employees) comprise 98 % of businesses and are responsible for 75 % of the timber produced in the area, they are not supported by favourable public policies, and some reasons contributing to high failure rate (only 50 % survive beyond the third year) of SMEs in the Matto Grosso were listed as:

- Weak legal status of the SME/tenure
- Inadequate access to collateral
- Lack of clear budgets and managerial control.

The hurdles faced by members of these associations underline the central issue of tenure in securing conventional finance, and highlight the likely difficulties in using forest community groups or associations as a basis for raising large-scale finance for small-scale forest enterprises.

Source: Figueirido et al. 2006

¹⁰ Also Mendes and Macqueen (2006) Guyana

Company Community Partnerships

Companies with inadequate access to raw materials may enter a wide range of relationships with individual growers or cooperatives which vary in regard to the extent to which risks, costs and profits are shared between the parties (Race and Desmond, FAO 2001). In some plantation-based cases, forestry companies are closely involved in most of the steps from planting to harvest, including arranging finance and training¹¹. Race and Desmond (FAO 2001) recognise four broad classes of out-grower arrangements:

1. partnerships in which growers are largely responsible for production, relying on companies for off-take agreements.
2. partnerships in which companies are responsible for production, paying land owners market-related prices for the wood produced
3. land lease arrangements in which land owners have little involvement in plantation management
4. land lease arrangements where some additional benefit accrues to the landowner.

The principal benefits to companies appear to involve the indirect cost savings of not having to purchase land, or the ability to secure access to resources on land which would not otherwise be available for outright purchase against the higher indirect costs of managing these arrangements, the more scattered resource and the uncertainty of long-term supply¹².

Box 4: SAPPI Mondi Out-grower Scheme

SAPPI and MONDI are two international pulp and paper companies based in South Africa which play a dominant role locally, together accounting for 40.6% of total plantation area in 2003. Since the early 1980s, these two companies have been involved in outgrower schemes to promote rural economic development and economic upliftment, and to secure access to timber. The arrangements vary depending on whether the outgrower owns the land or not (only 3.2% of total plantation area is owned by small growers), but the company generally provides technical assistance, financial support, free seedlings and a secure market for the wood at maturity. From 3 farmers managing 12 Ha in 1983 (SAPPI, Project Grow), around 24,000 farmers now belong to various schemes. In KwaZulu-Natal four schemes are operated by Sappi, Mondi Khulanathi, the South African Wattle Growers Union (Woodlot Development) and Natal Cooperative Timbers.

The focus species is generally Eucalyptus destined for pulp because of the short rotation period, relatively high growth rate and the excellent coppicing characteristics. Technical assistance given to the growers includes help in site selection and the permit application process. Where assistance in the form of finance does not fully cover the small grower's costs, the ability to raise a loan can be a stumbling block: commercial loans are issued against collateral which in the case of small growers requires the growing timber to be insured. Small growers face higher premiums than commercial growers or cannot secure insurance because fire is regarded (probably wrongly) as a higher risk in small grower areas. Administrative costs may also make small grower insurance less attractive.

Source: Mayers et al 2001; Lewis et al 2004

Generally, though, it is clear that local knowledge, such as outstanding claims on state land, will be central to determining the suitability of financing any sustainable and certified forest project by the issuance of a forest backed bond.

¹¹ Mike Howard, Fractal Forests based on the Sappi/Mondi examples in South Africa.

¹² Mike Howard, Fractal Forests.

The review of forest ownership provides a snapshot of key stakeholders involved in the development, management and harvesting of tropical forests. This provides essential background in terms of who is currently managing tropical forest assets. To be effective at promoting SFM the proposed financing mechanism should to be attractive and accessible to at least one – and preferably all - of these groups.

1.3 Forest business models

1.3.1 Background

At present the financial value of tropical forests is based on income and capital growth from three broad sources: land appreciation, growth and sale of timber products and growth and sale of non-timber forest products (NTFP). Timber products can be broken down into round logs for domestic or export use, sawn logs for domestic or export use, wood chips for export, and pulp and paper input.

However the economic value of natural forests extends well beyond this narrowly defined range, and includes a variety of global goods including landscape value, biodiversity value, carbon sequestration, amenity value, social and cultural value, value in preventing or reducing flooding and so on. Fuel wood provides an essential source of fuel for heating and cooking in the tropics, and is the major source of wood extraction from tropical forests on a global basis.

Box 5: The Millennium Ecosystem Assessment

The Millennium Ecosystem Assessment is a UN supported research program launched in 2001 focusing on ecosystem changes spanning decades, and projecting those changes into the future. In 2005 it released the results of its first four-year study (drawing on 1,360 experts worldwide) of the use and depredation of a variety of the planet's natural resources. Aiming to provide a state-of-the-art scientific appraisal of the condition and trends in the world's ecosystems and the services they provide, it concluded that 60% of world ecosystem services have been degraded. The report made recommendations which included encouraging landowners to manage property in ways that enhance the supply of ecosystem services, such as carbon storage

Source: www.millenniumassessment.org

Because the values of ecosystems services are not currently monetised, the business model associated with forests which generate greater sales of timber and non-timber forest products (i.e. plantations) are much more straightforward than those which primarily generate value in other ways (i.e. natural forests).

1.3.2 Timber production

Timber supply

Depending on the source data and survey year, numbers differ somewhat, but despite constituting around 3.5% of the forest assets, plantations produce more than 35% of current wood supply (UNFF, 2003). This is in part due to the 10-15 times higher yield of “fastwood” than the global average yield of forests and this recent trend of an increasing proportion of global wood consumption originating in plantations is set to continue (WWF 2003).

Plantation forests are generally even-aged stands of a single species, planted as monocultures, fertilised, thinned often with pesticides applied, harvested in rotations of 7-50 years, depending on the area, purpose of the plantation (e.g. structural timber or pulp), and species. Plantations are generally classified as hardwood or softwood, depending on the length of the wood fibres. Wood removal, used as a basis for the production figures shown here, excludes felled trees left in the forest but includes trees used by local people or owners for their own use, or felled in a prior period or damaged by natural causes (FRA 2005a).

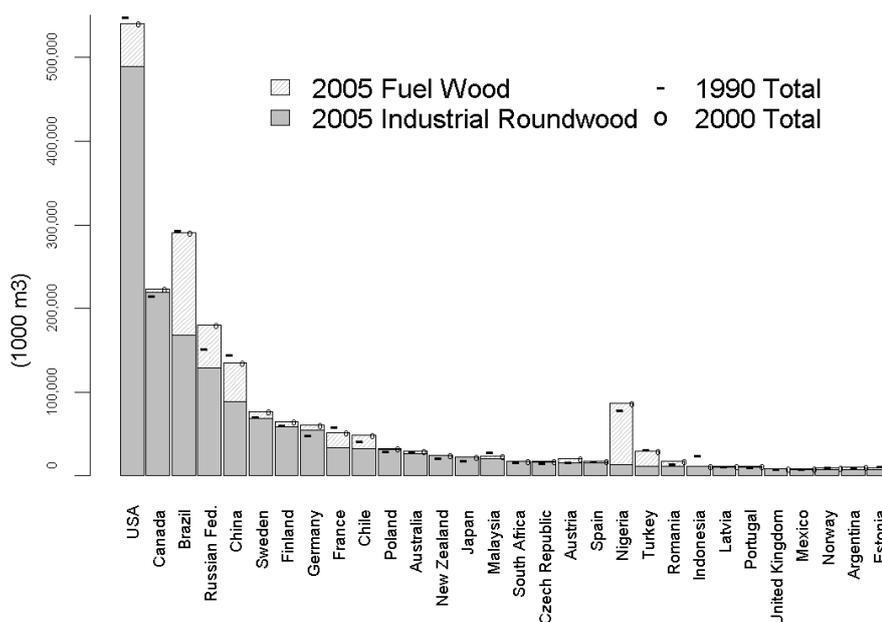


Figure 6: Global industrial round and fuel wood removal; top 30 countries in 2005. Source FRA 2005.

Roundwood removals in 2005 were estimated at US\$64 billion, mainly accounted for by industrial roundwood. The United States is by far the largest global producer of roundwood, with Canada, Brazil and Russia the next largest suppliers.

Prices for plantation softwood¹³ are much lower than those for tropical plantation hardwoods¹⁴.

¹³ Pulp wood tends to be priced per ton, sawn logs per cubic meter, although in the case of *Pinus patula* this is equivalent. Short rotation Eucalyptus pulp timber delivered at mill fetches around USD 23/t, *Acacia mearnsii* around USD 46/t in South Africa (December 2006, Mike Howard, pers comm). (cf pine pulpwood price graph the

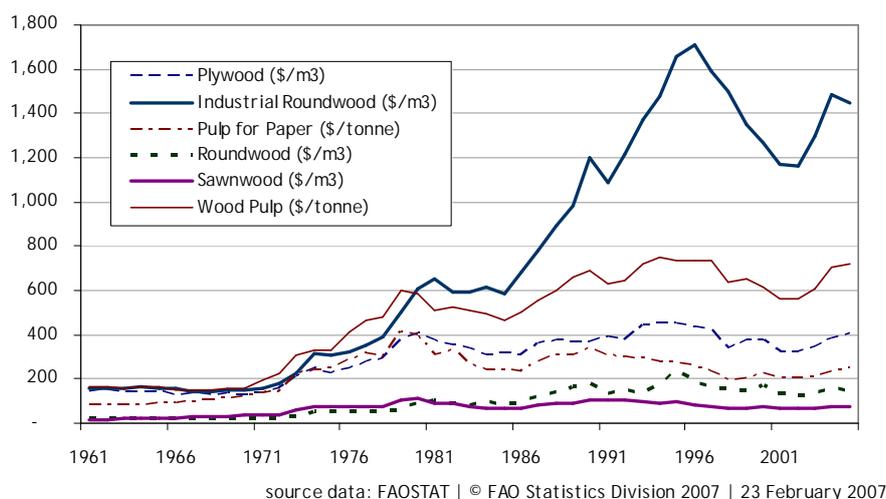


Figure 7: Key sawnlog and pulp wood price history for visual estimate of volatility and trend

Rotation length, Mean Annual Increase (MAI) and lumber prices have the greatest impact on plantation revenues. MAI varies tremendously by species and location.

Natural forests differ widely in their species composition and groupings are notoriously contentious (ITTO, 2005), and beyond the scope of this report. An illustrative list of some of the United Nations Environment Programme-World Conservation Monitoring Centre (UNEP-WCMC) forest types follows:

Lowland evergreen broadleaf rainforest	Mixed broadleaf / needleleaf forest	Sclerophyllous dry forest
Lower montane forest	Needleleaf forest	Thorn forest
Upper montane forest	Mangroves	Sparse trees and parkland
Freshwater swamp forest	Disturbed natural forest	Broadleaf evergreen forest
Semi-evergreen moist broadleaf forest	Deciduous/semi-deciduous broadleaf forest	Evergreen needleleaf forest
Exotic species plantation	Mixed broadleaf / needleleaf forest	Deciduous broadleaf forest

Most tropical countries have levels of tree species diversity in excess of 1000. Madagascar, Guinea-Bissau, Malaysia and Brazil are a few countries with exceptionally high numbers of native species.

TimberStar Trust pre sales report.) Prices achieved by *Pinus patula* sawnlogs are more variable and driven by timber quality, but for logs grown on a 25-30 year rotation, USD 40 per cubic meter may be assumed (ibid.).

¹⁴ Prices for tropical plantation hardwoods such as teak, rosewood, spiny cedar and Amarillo are significantly higher, e.g. USD 369 m3. Most analyses project global upward pressure on prices driven by demand for construction timber as well as pulp and paper demand from the Far East

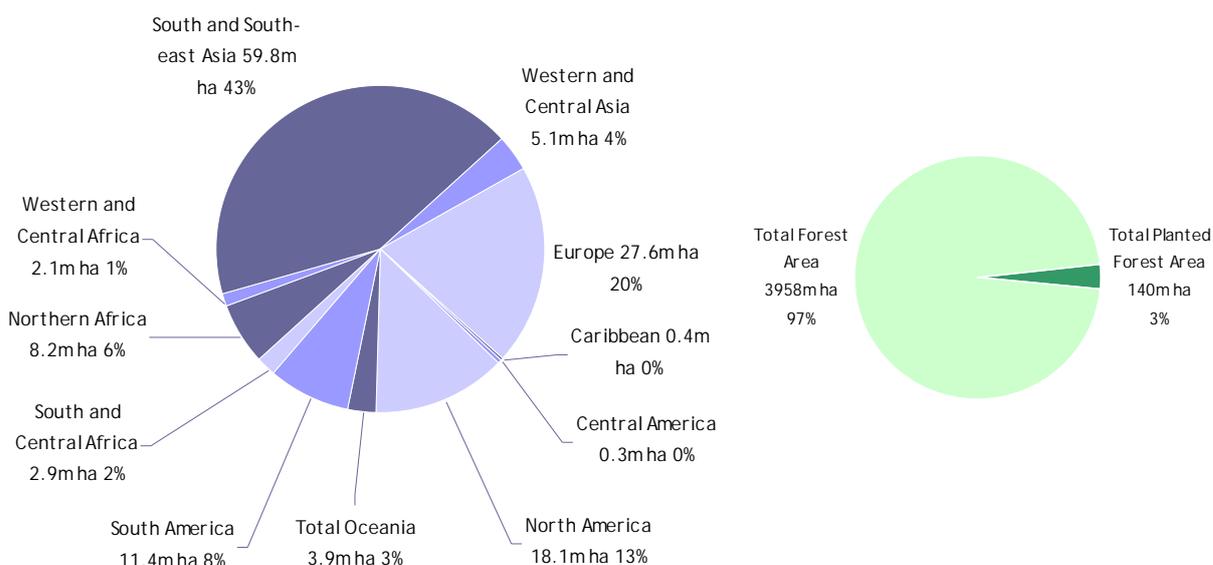


Figure 8: Regional distribution of plantations (left) and plantations as a proportion of total forest area (right). Source FRA 2005.

The business model based around the extraction of tropical timber is in some senses simpler than that of plantations. The principal costs, once the logging claim has been secured and the commercial species identified, involve machinery, the construction of roads and transport to market. Small-scale harvesting operations generally involve a combination of tractor and truck, while large-scale operations make use of specialised skidders and loaders in addition to crawler caterpillars for road construction.

Timber Processing

An integrated wood processing plant for raw timber/lumber produced would allow a producer to expand its trading base and increase exports. Cutting logs into lumber multiplies the value by 4 to 7 times with conversion rates on average 50% (ranging from 30% in the developing world to 80% in a country like Sweden). However, while large saw and pulp mills – with a capital requirement in excess of US\$50m – can tap into conventional corporate financing arrangements or development loans, cost-effective finance is often not available for smaller operators.

Timber demand

Tropical timber is traded internationally, and as such is sensitive to swings in demand from major consumer countries. For example, May 2007 saw a move away from tropical hardwoods on the part of Japanese plywood mills and Chinese furniture manufacturers, the latter in favour of US hardwoods.¹⁵ The difficulty of securing stable long-term supply arrangements is a major issue facing producers, and fierce competition over price can lead to increased pressure on resources. Other factors in pricing include exchange rate variability and restricted seasonal availability of particular species. China, the world’s largest exporter of forest products in value terms is second only to the United States (US) as

¹⁵ Tropical Timber Market Report, Volume 12 Number 10, 16-31 May 2007.

an importer of tropical timber. The Chinese have recently begun to import certified wood for re-export in finished product to environmentally-sensitive markets in Europe and North America.¹⁶

Timber sales from sustainably-managed forests attract and retain good customers and sometimes command a premium over other timber. However, the uptake of certification in tropical countries has been much slower than anticipated, and there is pent-up demand globally for products that are verifiably produced in sustainable operations, and - at a minimum - of legal origin. Legal verification of source (i.e. avoiding illegally extracted timber) is the key to responsible procurement, in the absence of fully-fledged certification of management practices. Certification is explored in more detail in section 1.4.3 below and in Appendix 7.

1.3.3 Non Timber Forest Products (NTFP)

Classical forest management models focused exclusively on the generation of timber as the primary (if not only) harvestable commodity to be obtained. The extraction of other products, whether marketable or for subsistence purposes, could be considered as a constraint on the model, or a competing use of the land base. There has been increasing recognition, however, of the value of Non-Timber Forest Products (NTFPs) in terms of income diversification and sustainable community development. The production of edible products has also come to be recognised as a valuable component of resource management systems, be it marketable commodities or locally consumed produce.

The estimated value of NTFP removals in 2005 was US\$4.7 billion (FAO 2005). However, information was missing from many countries, and the reported statistics probably cover only a small fraction of the true total value. Edible plant products and bush meat are the most significant products in terms of value. Trends at global and regional levels generally show a slight increase since 1990¹⁷.

Box 6: Scolel Te

The Scolel Te project in Mexico works with communities and small-scale farmers in Chiapas, developing both forestry and agro-forestry approaches, and involves over 400 farmers and 20 communities in a project that has been selling carbon offsets since 1997. Scolel Te was used to pilot a system called Plan Vivo, which incorporates a flexible approach to planning, to meet the specific needs of local producers.

¹⁶ UNECE Timber Committee Statement on Forest Products Markets in 2006 and Prospects for 2007

¹⁷ Also see te Velde 2006 – Entrepreneurship in value chains of NTFP's

1.3.4 Fuelwood

The collection of fuelwood is of huge importance globally, and is the primary driver of wood consumption, according to the FAO: 'Global wood removals were forecast to amount to 3 billion m³ in 2005, similar to the total removals recorded for 1990 and averaging 0.69 percent of total growing stock. It is estimated that nearly half of the removed wood was fuelwood. Informally or illegally removed wood, especially fuelwood, is not usually recorded, so the actual amount of wood removals is undoubtedly higher'.¹⁸

Fuelwood statistics are poor but despite this there is a clear dominance of fuelwood harvest in many countries; 'it is at least ten times higher than industrial roundwood production in ten of the 33 ITTO producer member countries, and five to ten times higher in another eleven countries. Several countries (e.g. Ghana, Guatemala, Nigeria, Philippines and Togo) appear to be extracting unsustainable levels of fuelwood based on these estimates'.¹⁹

1.3.5 Biofuels

The fast-growing bioenergy industry and use of biofuels is derived from biomass, a renewable energy source based on the carbon cycle. These include agricultural products specifically grown for use as biofuels such as soybeans (mostly US), flaxseed and rapeseed (mostly Europe), sugar cane (Brazil) and palm oil (mostly Asia). Worldwide, some 2.4 billion people still rely on traditional biomass for their energy needs²⁰.

However, biofuels are currently significantly less carbon neutral than other forms of renewable energy due to the high use of fossil fuels in production. Thus to be approaching carbon neutrality, wood harvest must be at or below the level of sustainable yield.

Response from environmental groups has been mixed as some of the countries producing biofuels are destroying rainforest to make room for plantations to grow palm oil, sugar cane or other biofuel crops. In 2007 the three governments of Indonesia, Malaysia and Brunei Darussalam signed an memorandum of understanding to conserve the Heart of Borneo (see Box 2) ending plans to create the world's largest palm oil plantation (1.8 million ha supported by Chinese investments). Other experts have questioned the energy savings produced by using biofuels, which require energy input to convert them from plants to fuels, and in the form of fertiliser to grow the crops.

¹⁸ Global Forest Resources Assessment 2005.

¹⁹ ITTO Status of Tropical Forest Management, 2005 (ITTO 2005a)

²⁰ The Energy challenge for achieving the Millennium Development Goals, Published in 2005 by United Nations

The UN's 2007 report into sustainable bioenergy²¹ claims that even 'sustainably' -produced energy crops could have negative impacts if they replaced primary forests, "resulting in large releases of carbon from the soil and forest biomass that negate any benefits from biofuels for decades".

The main demand and largest production potentials do not geographically coincide. Whereas the largest demand for biofuels is concentrated in industrialised countries, the largest production potential is found in tropical countries (in South-America, sub-Sahara Africa and East-Asia) as well as countries with relatively low population density such as Canada and Russia²²

The biofuels industry is still heavily dependent on government subsidies in most countries, which has helped cushion the US and Europe against market prices. The market has been spurred by the increasing emphasis on energy security in the US, which announced plans in early 2007 to reduce petrol usage by 20 per cent within a decade, largely through an increase use of biofuels.

1.3.5 Carbon

In response to climate change, markets have been developed to effect reductions in carbon dioxide emissions. Forestry projects can generate carbon reductions in one of two ways. Firstly, new trees can be planted and grown to absorb ('sequester') carbon from the atmosphere. Secondly, action can be taken to slow or halt deforestation. As there are vastly more natural forests in the world than plantations, and ongoing destruction of these has already been identified as one of the major source of emissions of carbon dioxide worldwide, the potential to generate reductions through this approach are considerable. However, the challenges of creating a market for carbon reductions generated from forests are also significant, stemming primarily from a lack of permanence; leakage; and issues around quality and ownership.

Because forestry carbon is not static, forestry carbon projects need to adhere to exceptionally thorough methodologies to ensure the environmental integrity of the credits they generate. The wide range of social and local environmental benefits, while of interest to a high proportion of potential buyers, add another layer of complexity around measurement and monitoring of impacts.

Forestry carbon credits are generated and traded both in the regulated carbon market, where rules are established and mandated by legal authority and buyers face binding compliance targets, and in the voluntary markets, where projects are undertaken according to independently established standards, and buyers engage largely to demonstrate corporate social responsibility and protect/enhance brand value. In the boxes below we examine the main system of forestry carbon credits in the regulated market, created under the Clean Development Mechanism (CDM), and under a

²¹ Sustainable Bioenergy: A Framework for Decision Makers, UN May 2007

²² Slingerland S and Van Geuns L., Drivers for an International biofuels Market, CIEP Future

highly regarded alternative from the voluntary market, Plan Vivo.

The Regulated Carbon Market

The regulated carbon market dominates the global market, with an estimated value of \$30bn in 2007. The vast majority of this activity is related to the trading of EU Allowances within the EU Emission Trading Scheme. The most significant regulated market for project based reductions – of which forestry projects are a variety – is the Clean Development Mechanism, authorised under the Kyoto Protocol, which accounted for \$5bn in 2007 (World Bank, 2007). Under current rules the CDM can be utilised for forestry projects involving afforestation and reforestation, but CDM excludes emissions reductions delivered through avoided deforestation.

Forestry has had a slow start under the CDM. Rules and modalities were not agreed upon until the Conference of the Parties 9 (CoP 9) in December 2003. Additionally, the Kyoto Protocol caps the use of carbon credits from forestry by Annex 1 countries in its first commitment period, limiting import to 5% of 1990 levels. Partly as a result of this delay, forestry projects have been excluded from the first phase of the European Union's Emissions Trading Scheme (EU-ETS), the trading scheme which has been the engine of growth for the global market. Land Use, Land Use Change and Forestry (LULUCF) projects currently account for just 1% of project based emission reduction under the Kyoto Protocol.

Box 7: Kyoto-compliant Forestry Carbon

The Clean Development Mechanism (CDM) accommodates the non permanent nature of forestry projects through the creation of two types of expiring Certified Emission Reductions (CERs) – a short term credit referred to as a Temporary Certified Emissions Reduction (tCER), and a long term credit referred to as an ICER.

tCERs are issued against validated forest carbon stocks, and remain valid for one Kyoto commitment period of five years. At the end of the period, a new batch of tCERs are issued on the basis of stock at the end of each verification period. tCERs can only be used in the commitment period in which they are issued and must be replaced at expiry with another tCER, a permanent CER, Emissions Reduction Unit (ERU), Removal Unit (RMU – a carbon credit derived from a carbon sink) or Assigned Amount Unit (AAU – the unit of measure for a country's allocated emissions under the Kyoto protocol).

By contrast, once issued an ICER is valid until the end of the crediting period for the project itself, which could be 30 years. At expiry an ICER must also be replaced, but this cannot be with another ICER, not a tCER. An important feature is that, unlike tCER, ICER do create a liability for replacement in the event that verification shows the total biomass has decreased since the last verification.

Use of tCER and ICER in the first commitment period of the Kyoto Protocol is limited to a theoretical total of 231m tCO₂e. Some countries have already put policies in place at national level that either limit or restrict access altogether, further limiting demand within the Kyoto market to around 100m between 2008 and 2012 (CATIE, 2007).

The temporary nature of tCERs generated by a CDM AR forestry project means that these credits should trade at a discount to permanent CERs. As they have to be replaced or expired at the end of their 5 year term, the net effect of buying a tCER is to delay the need to purchase (a) another tCER, (b) a permanent CER/ERU/EUA or (c) reducing emissions. A sensitivity analysis of the factors influencing the theoretical financial value of tCERs from the perspective of a potential buyer shows strong correlation with discount rate and duration. The longer the duration of the credit and the higher the discount rate (applied to the deferred action), the higher the current value of the tCER.

Source: EnviroMarket Ltd

Although the on-going exclusion of Temporary Certified Emission Reductions (tCERs – see box 7) from the EU Emission Trading Scheme continues to be a significant cap on overall demand from major corporate buyers, some governments and carbon funds are beginning to emerge. At present the World Bank BioCarbon Fund is by far the most significant buyer of forestry CDM credits, with a portfolio of potential of candidate projects with volume exceeding 22m, 9m of which are currently under contract. The BioCarbon Fund buys carbon in the range US\$3.75 - 4.35.

Discussions are under way regarding the mechanics of admitting credits from avoided deforestation post 2012. Considering the potential scale of their contribution this could well form a key component of the global regulated market that emerges to succeed the Kyoto Protocol.

The Voluntary Carbon Market

At \$100m, the voluntary market is far smaller than the regulated market (World Bank, 2007), but a greater proportion of projects undertaken are forestry related. Historically a range of different methodologies has been employed, and the inherent flexibility of the voluntary market has been considered one of its unique strengths. However the general proliferation of offset suppliers in the voluntary carbon market has led to concerns over the environmental integrity of some voluntary carbon offsets.

The voluntary market is currently undergoing a period of rationalisation. Pressure has been exerted by regulators keen to protect the environmental integrity of this rapidly growing section of the carbon market, and from major users/traders desiring a more standardized product. In response, the market has begun to polarize between smaller volume, bespoke projects, and larger more standardized projects.

Prices in the voluntary market have been subject to wider variation than in the regulated market. Offsets from projects or suppliers with a higher perceived sustainable development value have been able to retail at higher prices. For example, Conservation International has sold voluntary carbon credits at \$10.

Box 9: Plan Vivo

The Plan Vivo system, developed at the Edinburgh Centre for Carbon Management, supports voluntary carbon projects that have the potential to improve rural livelihoods in developing countries.

Plan Vivo allows Verified Emissions Reductions (VERs) to be purchased ex-post (i.e. after the carbon offset has been generated) or ex-ante (i.e. in advance of the offset being generated). In most cases, VERs from forestry projects are sold ex-ante, allowing carbon income to be generated before activities are established, which helps to cover start up costs. The system requires a risk buffer of unsold VERs to be held to cover for any unexpected shortfall in the anticipated generation. The size of this buffer is determined by the overall profile of the project or group of projects apply the system. Crediting periods are also flexible, but there are strict requirements that an accurate database be kept with details of all transactions.

Source: planvivo.org

Whilst the carbon value of projects reducing deforestation is not expected to enter the regulated carbon market until at least 2012, a number of conservation organisations are exploring the possibilities of creating and marketing high quality voluntary offsets backed by considerable on the ground expertise. An example is Makara (see box 8).

Box 8: Makira Conservation Project, Madagascar

The Makira Forest Project is a joint initiative of the Wildlife Conservation Society and Conservation International, in cooperation with the Government of Madagascar-Ministry of Water and Forests (MEF), Association Nationale pour la Gestion des Aires Protegees (ANGAP), and other rural development and local partner organizations, to create a new Site de Conservation in the Makira region of northeast Madagascar. The project combines greenhouse gas (GHG) emissions avoidance, biodiversity, and rural development objectives and aims to generate emissions reduction credits for sale to a potential carbon investor under one of the existing or anticipated future mechanisms.

A feasibility study identified dynamic deforestation rates for both with- and without-project scenarios. Applying these rates to the initial forested area of 350,000 hectares in the Site de Conservation as of 2000, and multiplying by the value of average carbon stocks, provides a figure for the total amount of carbon emissions avoided. Over the 30-year analysis period, the project yields a total carbon emissions avoidance of 2,589,898 t C, or 9,496,294 tCO₂ equivalent.

Source: Wildlife Conservation Society (WCS)

Standardized forestry credits are traded on North America's only active, legally binding, trading system, the Chicago Climate Exchange (CCX), as Carbon Financial Instruments (CFI). Total market turnover for CCX in 2006 was US\$38m, but it is not clear what proportion of this volume related to forestry deals. Prices for these more standardized credits on CCX have varied from \$1 to \$5.

Costs

As with certification of timber, mechanisms for capturing revenue for carbon reduction entail up-front costs. These can become particularly significant for smaller and medium scale operators interested in accessing the regulated markets. To comply with the need for environmental additionality, operators are required to demonstrate on paper that the generation and sale of carbon credits is a commercial prerequisite for their project to go ahead. In this context, the costs associated with developing, registering and monetising carbon credits are very important. As a consequence, projects need to be of significant scale to cover these costs and meet the required financial hurdle rate.

In recognition of the potential barrier that start up costs may present, the Clean Development Mechanism

Box 10: Typical transaction costs under the CDM

The key sources of transaction cost for regular size projects under CDM are as follows:-

- § Project preparation: this is usually undertaken by a consultant and depending on scale and complexity could vary from US\$60,000 to US\$180,000
- § Validation (by a Designated Operational Entity (DOE)): approx US\$15,000-25,000
- § Registration fee (by the Executive Board (EB)): US\$0.10/CER for the first US\$15,000 CER then US\$0.20/CER
- § Monitoring costs: depends on project and sample size, monitoring and intensity.
- § On-going verification (by DOE): depends on size, complexity US\$15 -25k per audit
- § Issuance fee: every time CER issued – charges as for registration.
- § Adaptation levy: EB retains 2% of CER generated for adaptation to climate change
- § Taxes: Some countries claim a share of CER for approving projects

Executive Board has introduced a simplified set of modalities and procedures for small-scale projects not exceeding 8000 Certified Emissions Reductions (CERs) per year.

Additionality

Project based carbon mechanisms require that revenue-generating opportunities in these areas be considered at the outset or earliest stages of a project. An assessment of carbon as 'the icing on the cake' suggests a fundamental misinterpretation of how these innovative mechanisms might yield value. Fundamentally carbon credits are intended to extend the range of sustainable forestry projects that can be undertaken, rather than increase the profitability of commercially viable operations.

In the boxes below we explore the use of carbon by two very different forestry projects; an SFM operation in the Brazilian Amazon, and a watershed afforestation in rural China.

Box 11: Precious Woods: alternative approaches to regulated carbon

The majority of tropical forestry carbon projects being developed for the regulated carbon market utilise AR methodologies approved (or under review) for the CDM. Carbon benefits generated through AD are excluded from regulated markets until at least 2012, closing off direct access to a significant new revenue source for SFM operators and conservation groups.

Precious Woods is Swiss based developer and manager of tropical forestry. The group has SFM operations in Brazil and reforestation in Central America. Both have been able to access the carbon market, but in different ways.

In Nicaragua PW is successfully generating carbon credits under a CDM reforestation methodology. In Brazil, where PW manages FSC certified SFM operations in 450,000 ha of natural forest in the state of Amazonas, and 76,000 ha in Para, a different approach has been adopted. Whilst the group estimates a total carbon saving related to AD of over 1 million tCO₂e per year, this value is not realisable through the regulated carbon market.

Instead, with the support of Forest Trends' Business Development Facility (BDF), PW has been able to utilise regulated carbon markets in order to reduce the carbon emissions of their processing operation. By replacing the 20 diesel generators being used in and around their remote, off-grid processing facility with power plant fired by waste wood chip, PW unlocked a carbon reduction of over 150k tCO₂e per year.

Source: preciouswoods.com

Box 12: Shanxi Afforestation for Watershed Management, China

Shanxi Afforestation project is sponsored by the Taiyuan Relord Enterprise Development Group with a range of interests spanning forestry, eco-agriculture and medical instruments. The project is situated in a hilly area around in the Jiaocheng Country province of Shanxi Province. Soil erosion is particularly severe, and the intensity and frequency of sandstorms has increased over the last decade. The local coking industry adds to serious air pollution. Unfavourable climate, poor soil and lack of additional income mean many people are leaving the area. The adjacent part is an important wildlife habitat, including 21 species classified as rare and endangered under the national protection legislation.

The overall goal of the afforestation project is to control soil erosion and sand storm impact, improve air quality, raise cultural value and improve the condition of local people and biodiversity. The proposal involves planting a mixture of forestry with 2,800ha of multiple functions in one area and 4,200ha of watershed conservation in another. The Relord Company has shareholder agreements with local farmers, in which they provide lands and share in income from forest products and CERs.

The project utilises the first methodology approved by the CDM Executive Board, AR-AM0001, and estimates a total of 425,200 tCO₂e will be sequestered up to and including 2017.

Source: UNFCCC

1.3.6 Ecotourism

Tourism revenues in a forest context are project specific and are impacted by a number of variables:

1. distance to urban centre/
2. accessibility, airport infrastructure
3. uniqueness of the biota and or landscape
4. target market – low impact low volume high value vs. variable impact high volume
5. suite of activities
6. Value add in terms of places to stay or day centres.

Many natural forests simply do not meet the criteria to access the eco-tourism market. In addition, as environmentally-conscious consumers reduce the extent to which they travel to holidays by air in order to reduce their own carbon emissions, the eco-tourism market will be impacted.

Box 13: Iwokrama

The Iwokrama Forest covers nearly 3710km² of central Guyana located in the heart of the Guiana Shield, one of the four last pristine tropical forests in the world (Congo, New Guinea, and Amazonia being the others). The area is covered with lowland tropical forest, dominated by tall tropical trees with a dense canopy up to 100 ft high.

The Iwokrama International Centre for Rainforest Conservation and Development (IIC), formed in 1996, manages nearly 1 million acres (371,000 ha) of forest. The IIC has developed an international reputation for research into community-inclusive, rainforest conservation demonstrating how tropical forests can be conserved and sustainably used to provide ecological, social and economic benefits to local, national and international communities.

This has resulted in successful models for commercially sustainable management of tropical forest assets and resources. The community-inclusive land-use plan for Iwokrama forest defines a 108,000 ha area reserved for sustainable forestry. The EPA-approved Environmental & Forestry Management Plan allows 20,000m³ extraction per annum.

Source: www.iwokrama.org

1.3.7 Payment for other ecosystems services

Ecosystems services can be characterised as provisioning, regulating, cultural and supporting services, as outlined in Table 2 below.

Table 2: Ecosystem services (source: Millennium Ecosystem Assessment 2003)²³

<p>Provisioning Services Products obtained from Ecosystems</p> <ul style="list-style-type: none"> • Food • Fresh water • Fuelwood • Fiber • Biochemicals • Genetic resources 	<p>Regulating Services Benefits obtained from regulation of ecosystem processes</p> <ul style="list-style-type: none"> • Climate regulation • Disease regulation • Water regulation • Water purification • Pollination 	<p>Cultural Services Non-material benefits obtained from ecosystems</p> <ul style="list-style-type: none"> • Spiritual and religious • Recreation and tourism <ul style="list-style-type: none"> • Aesthetic • Inspirational • Educational • Sense of place • Cultural heritage
<p>Supporting Services Services necessary for the production of all other ecosystem services</p>		
<ul style="list-style-type: none"> • Soil formation 	<ul style="list-style-type: none"> • Nutrient cycling 	<ul style="list-style-type: none"> • Primary production

For many ecosystem services, the benefits are diffuse (society as a whole), and therefore it is difficult to identify who should pay and how much. In the case of some services, however, the beneficiaries are distinct and identifiable. Having an identifiable group of stakeholders receiving direct benefits strengthens the case for PES. This is true of watershed ecosystem services, which is one of the most developed areas of PES at present.

Some 40% of major cities rely on forests or protected areas for their drinking water²⁴. Payments for watershed protection services vary - ranging from water quality to flood control.

The New York City Watershed Management Program²⁵ is a cooperative effort to protect safe drinking water supplies while allowing sustainable growth in a key watershed area. The City’s drinking water system serves 9 million people daily and is the largest unfiltered water supply in the US. The program uses a mix of fiscal and market-based measures to get upper watershed operators to adopt more sustainable practices to counteract future pollution damage.

Whilst the specific role of forests is often site specific and lacking a strong scientific basis²⁶, some innovative projects combine PES, watershed and reforestation activities (See box 14).

²³ Millennium Ecosystem Assessment. 2003. Ecosystems and Human Well-being: A Framework for Assessment. Millennium Ecosystem Assessment/Island Press, New York

²⁴ Dudley, N. and Stolton, S. 2003. Running Pure. Washington, D.C. World Bank and WWF

²⁵ <http://www.epa.gov/r02earth/water/nycshed/filtad.htm>

²⁶ Richards M., and Jenkins M., Policy Options for Innovative Financing and Incentives for Sustainable Forest Management and Conservation. Draft Paper for GLOBE International. May 2007

Box 14: PES, watershed and the Panama Canal

This proposal seeks to use financial markets to arrange for companies dependent on the canal to pay for reforestation (watershed protection). The plan is to create a long duration bond that would pay for the forest to be replanted and would be targeted at companies which insure and pay high premiums against potential losses if the canal is closed. The intention is that buying the bond would reduce the risk premium.

1.3.8 Relevance of business models

This section has explored the key revenue generating opportunities related to tropical forestry under sustainable forestry management, including PES. Analysis of these flows provides an indication of the level and quality of income that natural forests can generate if managed in a sustainable fashion. This in turn enables us to construct a better understanding the risk/reward profile of the forest as an asset, and understand how this may develop over time.

1.4 Sustainable Forest Management

Forest-backed bonds will enhance the uptake of tropical SFM by unlocking the additional social and environmental returns that natural forests offer investors. In order to achieve this effectively it will be necessary to support and track the sustainable management of forests across a range of operators and geographies. The concept of “sustainable forest management” which meets transparent criteria is explored in more detail in the next section.

1.4.1 Background

Sustainable Forest Management (SFM) is a generic term that covers a multitude of approaches aimed at securing the long-term viability of active management of forest resources for the purposes of extracting timber and other products, whilst ensuring the ongoing provision of ecosystem services, including biodiversity conservation, and the continued integrity of ecological functions.

The NGO community, consumers and other stakeholders need a system or process that will help them to differentiate between the timber products which emerge from sustainably managed forests, and those that did not. One way to achieve this is to require timber producers to have their operations “certified” by an independent body. Logos indicating the origin of wood products in certified operations have come to represent a guarantee to consumers that forests are being well-managed in accordance with best practices as dictated by present levels of scientific knowledge concerning tropical ecosystems. Forest certification schemes have developed 'chain of custody' systems which consist of tracking mechanisms, to trace the provenance of products from the forest floor to the end-user, thus ensuring that certified and non-certified products are dealt with separately. Increasingly, GIS systems are being used to provide live data.

However, certification in the developing world has been controversial. According to Roda (2002), about a third of tropical forests certified under the FSC are plantations. For example, 73% of the Brazilian FSC-certified forests (0.77 million hectares) are plantations located in the south, southeast

and central-west of the country. MTCC and Keurhout certification schemes are solely for natural forests.

Demand for hardwood products derived from tropical forestry operations that have been certified by independent third-party audit continues to exceed available supply. A major challenge in some markets has been matching up supply and demand for certified product, and building new linkages through the supply chain.

In spite of growing demand for certified products from tropical forests, certification has yet to gain the prominence that it has in developed world markets. According to Cashore et al. (2006), existing commitments from developed world markets have not yet been strong enough to influence significantly forest management choices in some of the world's most environmentally sensitive forests.

1.4.2 Distribution of Tropical SFM

According to the International Timber Trade Organisation (2005), the clearest measure of progress towards global sustainable forest management is the area secured as Permanent Forest Estate (PFE) and the area within that which is sustainably managed (defined using 7 key criteria²⁷). Areas outside of the permanent forest estate are at risk of being cleared for conversion to agriculture, settlements or infrastructure, and the large areas involved are sometimes deliberately set aside for later planned conversion or reserved for other uses. Production estate may be further separated into natural and planted.

Globally, some 21.7% of total forest asset or some 858 million hectares is PFE, used for natural or planted forest production or protection. The difficulties of using for example FSC as a proxy for sustainably-managed forest as an asset class are highlighted by Table 3 which shows the proportion in production or protection forests broken down by region: in Africa for example some 14% of natural production forest is covered by a management plan, but only 6% meet the 7 ITTO criteria and even less (2%) have certification status. In Latin America and the Caribbean the equivalent numbers are 17% covered by management plans, 4% meet ITTO criteria and 2% and certified.

We use the ITTO Status of Forest Management Report (ITTO 2005) to narrow down the FAO data using a broader set of criteria (but limited to the 33 ITTO countries) then develop the sustainably-managed forest asset class using the FSC database.

²⁷ These criteria cover 1. Enabling conditions for SFM, 2. Extent and Condition of Forests, 3. Forest Ecosystem Health, 4. Forest Production, 5. Biological diversity, 6. Soil and Water Protection and 7. Economic, Social and Cultural Aspects (ITTO, 2005b).

Table 3: Breakdown of Permanent Forest Estate by Management Status and Region ('000 ha).

Adapted from ITTO (2005)

	PRODUCTION						PROTECTION			ALL	
	NATURAL				PLANTED		Total Protection Area	% with mgmt plans	% Sustainably Managed	% Total Area	% Sustainably Managed
	Total Production Area	% with mgmt plans	% Certified	% Sustainably Managed	% with mgmt plans	% Certified					
AFRICA	70,461	14%	2%	6%	1%	0%	39,271	3%	4%	110,557	5%
ASIA AND PACIFIC	97,377	57%	5%	15%	12%	0%	70,979	12%	7%	206,705	9%
LATAM AND CARRIBEAN	184,727	17%	2%	4%	1%	1%	351,249	2%	1%	541,580	2%

At the end of 2006, some 84.3 million ha of forest were certified (FSC 2006), dominated by Europe (49.7%), and North America (31.5%), with the largest certificates issued in industrialised countries, for e.g. the largest current FSC certificate is in Canada for 5.5 million ha, and the largest 10 certificates are dominated by boreal forests with the exception of Brazil (approx 1.5 m ha). Most FSC certified forests lies in the boreal (46%) and temperate (39%) biome, with only 15% in tropical/subtropical biomes (FRC 2006).

Table 4: FSC Certified Forests by Region to December 2006, '000 ha (FSC 2006).

Region	Area Certified	Number of Certificates
Europe	41,923	378
North America	26,568	143
South America & Caribbean	10,379	240
Africa	2,494	39
Asia	1,642	49
Oceania	1,282	27

By area, most of the certificates (62%) cover public land, 33% private land and 5% communal land, however, by number of certificates issued, private land constitutes 487, public land 254 and communal 135 certificates.

FSC certification covers a larger area (53% of natural forest) than Natural and Plantation Forests (38%) or Plantation Forests alone (9%).

1.4.3 The advantages and disadvantages of certification

The extent of certification is critical in the decision on whether certified forests should be the pool from which an appropriate portfolio of forest assets might be taken. Also critical to this decision are the positive and negative social and environmental impacts of certification, which are explored in this section.

A key piece of work on the impact of certification around the world is the final report resulting from an extensive study process led by researchers at the Yale School of Forestry and Environmental Studies, on 'Forest Certification in Developing and Transitioning Countries'.²⁸ Case studies from Indonesia, Malaysia, Papua New Guinea, the Solomon Islands, Estonia, Latvia, Poland, Russia, Bolivia, Brazil, Guatemala, Mexico, Gabon, South Africa, Gabon, Uganda, and Zambia are included in the final report. Discussion focuses primarily on forest certification under the FSC system, but the wider context of national level schemes, some accredited by the PEFC, is also considered.

This study identified a range of positive impacts of certification, including

- (i) improved political relationships
- (ii) stimulus to the discussion of the nature of sustainable forest management
- (iii) improved pay and conditions for workers, especially in terms of safety procedures
- (iv) microeconomic benefits such as improved market access, better prices, more stable contracts, more favourable credit arrangements, improved production efficiency and enhanced public image
- (v) increased transparency
- (vi) environmental benefits, especially biodiversity protection
- (vii) increased attractiveness to investors

However, the study also highlighted the potential negative impact arising from concentration of the industry as a result of market advantage accruing to certified companies.

These benefits and the potential negative impacts are explored in more detail in Appendix 7.

1.4.4 The Impacts of illegal logging

Illegal logging falls into several categories, ranging from the 'simple' violation of forest harvesting regulations (such as over-harvesting), through more systematically corrupt practices (perhaps including money-laundering), to the outright theft of timber, including from conflict zones or regions where abuse of human rights is an integral part of the timber trade. From a social impacts perspective, it is important to distinguish between subsistence-level harvesting of wood (including for fuel), and the industrial-scale extraction of timber for trade, often driven by export markets. Some traditional uses of forest resources could arguably stake a claim to legitimacy, as they pre-date the formal management of forests, often introduced in the colonial period.

The net impact of different extractive practices may have seriously negative impacts on forest conservation, and legal enforcement is a pre-condition to the establishment of a sustainable management regime. Most of the financial benefit from the illegal trade typically accrues to external interest groups, rather than local communities. The broader economic impacts of illegal logging activities are significant – the World Bank has estimated that the annual global market loses US\$10

²⁸ Cashore, Gale, Meidinger, Newsom, Eds., July 2006.

billion annually from illegal logging, with governments losing an additional US\$5 billion in revenues.²⁹ Meanwhile, a study by the American Forest & Paper Association has estimated that illegal logging depresses world timber prices by between 7% and 16% (depending on product), causing US firms losses of at least US\$460 million each year.³⁰ The extent of illegality can dominate the industry at the regional or national level, for example in the case of Indonesia, where 83% of timber production has been categorised by some observers as illegal.³¹

Illegal logging is driven by high demand for forest products, coupled with weak rule of law in producer countries, and a lack of will or ability to scrutinise imports on the part of consumers. The impact on pricing has major implications for producers committed to pursuing more sustainable practices, as competition from illegal product can drastically undercut markets at the local level and globally. In the US, the Sierra Club and the United Steelworkers of America (and ENGO and trade union, respectively) have filed a case with the Department of Commerce, to investigate whether lax enforcement of logging laws amounts to an unfair subsidy of timber imports.³²

The existence of adequate legislation governing forest management activities, and the capacity for consistent enforcement, help create a 'level playing field' for those bringing products to market with the costs that legal compliance and proper management practices entail. A number of entities are increasingly active in the verification of the legal origin of timber in the international marketplace, whether to strengthen existing regulatory structures, or to complement them. Legal verification systems typically build on the approach to traceability of forest products developed through the 'Chain of Custody' mechanisms applied to various major forest certification schemes, but may or may not be implemented in conjunction with forest certification per se. The FSC has recently rolled-out its 'Controlled Wood' standard, which is designed to eliminate all material considered to be of controversial origin from the supply chain of companies and governments that commit to responsible procurement.

The overall impact of increased law enforcement will thus be to create verifiable minimal thresholds of compliance, which financial entities are seeking as the baseline for investment prospects, prior to considering the certification status of target projects or companies. Sourcing illegal timber is now perceived as a material (and reputational) risk for investors and manufacturers/processors.

1.5 Relevance of SFM to Key Forest Stakeholders

The following section outlines how the interests of key forest stakeholders are aligned in achieving the sustainable management of forest resources.

²⁹ World Bank. 2006. Weak Forest Governance Costs US\$15 Billion A Year. Press Release.

³⁰ American Forest & Paper Association, Seneca Creek Associates and Wood Resources International. 2004. Illegal Logging and Global Wood Markets: The Competitive Impacts on the US Wood Products Industry.

³¹ Tacconi L., Obidzinski K., Agung F. 2004. Learning Lessons to Promote Certification and Control Illegal Logging in Indonesia, Report for the WWF/TNC Alliance to Promote Forest Certification and Combat Illegal Logging in Indonesia, Centre for International Forestry Research.

³² Zakreski, S., Metafore. March 2007. Illegal Logging Brief.

1.5.1 Guiding Bodies & Initiatives

Concerns over the impacts of unsustainable forestry practices were the impetus for the establishment of the Food and Agriculture Organization's Tropical Forestry Action Plan and the International Tropical Timber Organization (ITTO).³³ While a high degree of consensus existed around the need to diminish the deforestation occurring in many tropical countries, there was also considerable agreement that the tropical timber trade was a key element in the economic development of those same countries. Hence, rather than focusing on the preservation of key forest areas (and strict exclusion of human activity), the focus for entities such as the FAO and the ITTO has largely been on combining active management of forests to provide livelihoods for local communities with achieving conservation objectives.

1.5.2 Pulp & Paper / Forestry Companies

One of the main motivating factors for processors and manufacturers has been securing an adequate supply of fibre. Unsustainable levels of logging have led to worldwide fibre shortages, affecting many regions including North America (REF). High prices of raw material make previously uneconomic areas more attractive to harvest, and so the impacts of industrial-scale forestry operations extend over increasing areas of the global forest estate, and pulp mills are re-tooled to handle previously non-commercial species and dimensions. Over-capacity is a major issue, and secure supply of fibre is not generally given adequate consideration when investment in plant is made. This alone constitutes a very strong case for engaging in sound planning both in establishing and in managing operations.

The global impact of the forestry industry has received a lot of bad press, and companies in any part of the world may find they need to negotiate what has been termed a 'licence to operate'. In other words, in order to thrive, they need to address stakeholder concerns and issues of social engagement, or risk labour disputes, market campaigns (e.g. Greenpeace occupation of Kimberley-Clark's offices in downtown Toronto as part of 'Kleenex' campaign), high turnover rates, difficulty recruiting, community sabotage or blockades, and potentially more serious conflicts over resources in some areas. Engaging in sustainable forest management in a demonstrably committed fashion can make a significant contribution to negotiating the complexities of stakeholder consultation and their engagement in meaningful and productive dialogue. The very process of establishing standards for certification has led stakeholder groups to come together in previously unknown alliances, and led to the establishment of common goals and objectives where previously a more antagonistic relationship existed.

1.5.3 NGOs

Environmental and socially-focused NGOs have largely come to agreement around the necessity of combining the objectives of socio-economic development with those of environmental conservation and biodiversity protection. The complete exclusion of human populations from protected areas is

³³ Elliot and Donovan 1996.

rarely feasible, and efforts to control and restrict traditional management and extractive practices in forested landscapes have tended to fail when imposed 'from the top-down'. While the development of sustainable forest management may have its origins in the perceived (and real) need for the conservation of environmental attributes, social components have increasingly been integrated into the systems that are now common currency. Some elements of the NGO community have moreover made a pragmatic (if not ideological) shift from a stance of opposition to 'business as usual' or the maintenance of the status quo, to a policy of 'positive engagement' with the forest industry, where such accommodation has been possible, in the design and implementation of sustainable forest management standards. NGOs have in some cases been able to act as arbiters between government, industry, and civil society at large, and the NGO sector has grown in importance in the same timeframe that the emergence of sustainable forest management has occurred. Lobbying for the application of Best Management Practices (given present levels of knowledge) such as those encapsulated in certification standards for sustainable forest management has proved a valuable tool for NGOs to achieve their core objectives.

Box 15: Greenpeace and WWF in Democratic Republic of Congo

In February 2007, Greenpeace launched an offensive against the existence of widespread illegal logging in the Democratic Republic of Congo (DRC), releasing results of its own investigations into operations that the ENGO claimed were in violation of a 2002 moratorium on the allocation of logging titles. The press release came one week in advance of a conference in Brussels on 'The sustainable management of the forests of the DRC', with participation of the World Bank and other major donors.

Meanwhile, WWF (World Wildlife Fund), another key international environmental NGO, participated directly in the Brussels meeting, presenting the case for forest certification as a valid method for achieving the sustainable development of forest resources in the DRC. The contrast between the two NGO positions serves to highlight the diversity of opinions and tactics amongst the ENGO community. One position favours the exclusion of commercial logging altogether, until a comprehensive participatory land-use planning process can be conducted, accompanied by improved governance to preclude the continuation of poor practices. The other position appears to take a more pragmatic line, perhaps recognising that the suspension of all harvesting from the forest is not easy to achieve, and choosing to work with companies perceived to be susceptible to improving management practices incrementally, in order to maintain access to markets with a degree of environmental sensitivity.

Source: World Bank, 2006

1.5.4 Investors (Banks & Funds)

In order to effectively grapple with the complexities of sustainable forest management and achieve the certification of their operations, companies need to have strong management capacity. Management performance is widely viewed by analysts as a key determinant of potential to outperform benchmark in any sector, and forestry is no exception. There has been an increasing trend for progressive financial institutions to make commitments to give preference (or exclusive consideration) to sustainable companies and projects. This has perhaps been prompted by increased awareness amongst consumers of the impacts of forestry operations in the past, and campaigning by environmental groups against investment in projects or companies that are not aligned with the sustainability agenda. On the risk-management side, guiding investment decisions by sustainable practices may serve to protect the reputation of institutional investors; on the upside, the correlation between sustainability-focused businesses and long-term aggregate profitability is increasingly being examined and quantified by financial analysts and ratings agencies.

Box 16: HSBC and Sustainable Forestry

HSBC has had a forest sector guideline in place since May 2004, known as the 'Forest Land and Forest Products Sector Guideline', which covers lending to the following industries and activities: forestry; timber and timber products/processing; timber trading; plantations (pulp, timber, oil palm, rubber); and forest conversion.

The intent of the guideline was that it should be acceptable to a number of stakeholders, based as it is on widely adopted international standards. The guideline clearly excludes certain activities from consideration for financing, for example commercial logging operations in Primary Tropical Moist Forest or High Conservation Value Forests (HCVF); neither will operations built on illegal logging be supported nor those that harvest any CITES Appendix I species.

HSBC's explicit preference is to deal with sector participants either operating managed forests that are certified by the Forest Stewardship Council (FSC), or trading in products that are FSC certified or equivalent. Crucially, both clients who are not FSC or equivalent certified but are following a credible path towards achieving compliance, and entities certified by 'an equivalent FSC-recognised standard' are also included in the scope of acceptable customers. The FSC, according to HSBC materials, was accepted as the Group's own standard of good forest management due to its global application, and the fact of being the only internationally agreed forestry standard.

In May 2005, HSBC Holdings became the first financial institution to join the Tropical Forest Trust (TFT), to help lending officers to implement the forestry sector guideline Group-wide; TFT has reportedly helped HSBC to develop and deliver internal training courses for staff involved in lending to this sector. HSBC has stated that the TFT will help lending managers to understand the complexities of obtaining FSC certification.

1.5.5 Communities

The importance of sustainable forest management to forest-based communities is determined in the first instance by the tenure system under which forestry operations are conducted. The dominant models would perhaps be characterised as direct ownership, usufruct, Joint Forest Management (JFM), or in the case of public lands, principally as a source of employment. Traditional or pre-industrial practices in many regions are as important now as previously, and may include a number of different elements, ranging from cultural and spiritual uses to hunting, fishing, trapping, and the gathering of firewood or construction lumber, as well as Non-Timber Forest Products (NTFPs), from edible to medicinal products and fibre for clothing and so forth. More contemporary industries would be remote or wilderness tourism, or eco-tourism ventures.

Box 17: Carbon rights and local communities

The exploitation of indigenous people and communities over the ages is well documented and resulted from the exclusion of forest communities from the basic tenets for development created by the wealth generated by traded property ((Saunders et al. 2002). Carbon rights provide a historic opportunity for low-income forest owners and producers to benefit economically from good husbandry of their forest resources (CIFOR, 2002).

Carbon tradable-rights could provide a means to convert the forest property into financial capital, while protecting the physical property of forests, thereby providing new incentives for in situ forest management. One virtue of trade is that it can be made subject to constraints and the challenge is therefore to ensure that the value of tradable carbon credits will be discounted or invalid if they do not meet certain criteria. Such conditionality would provide parties with strong incentives to achieve the necessary performance standards relating to both processes and contracts.

However for carbon trading to develop social capital from natural capital will require the inclusion of forest communities into management of forest resources, requiring clear rights entitlements and with the proviso that trading respects the rights and needs of indigenous people (Saunders et al. 2002). Market based trading systems and the property systems they depend on will need to be more accountable, transparent and inclusive to reduce livelihood risks and increase social benefits.

Community-based projects have the highest potential for local livelihood benefits and pose the fewest risks to communities because the creation of carbon benefits are contingent on the collaboration of communities (CIFOR 2003).

All of these non-timber focused activities require the incorporation of multiple objectives into the forest management system, beyond simply modelling fibre flows. Ecosystem services, of huge value to society at large, may be absolutely critical to the day-to-day survival of forest communities; prevention of soil erosion, provision of water for drinking and irrigation, to name but two examples. If the involvement of local people is mostly waged labour, then issues of health and safety, wages, and working conditions, will be key, as well as provision of wider community benefits and infrastructure. The implementation of sustainable practice will often be critical to communities' long-term survival.

1.5.6 Governments

Governments around the world have been instrumental in undertaking the development of criteria and indicators for sustainable forest management over the last couple of decades, particularly since the Rio conference (UNCED) of 1992. Governments have shown varying degrees of accommodation to the voluntary sustainable forestry schemes that have arisen since the early '90s, and where resistance to participating actively in these processes has arisen, this has perhaps been due to concerns around jurisdiction. The fact is that the capacity of government in many countries to formulate and

effectively enforce forest law has historically been limited to say the least, which accounts for the huge volumes of illegally harvested timber that still abound in the global marketplace.

The issue of legality has become a critical one, as illegal logging has the potential not only to deplete a country's natural capital, but also to significantly diminish the government's tax-base. Government is of course the ultimate authority charged with the protection and management of natural resources, and the wellbeing of the population as a whole, and poor or nonexistent management of forests has of course exacerbated environmental degradation and poverty. Sustainable management of forests, and the mechanism of certification, has proven to be a powerful tool for the effective control of timber extraction and bringing commodities to market in a regulated fashion that promotes fiscal stability and enables improved governance.

Box 18: Political Initiatives: Globe International and COMIFAC

GLOBE International (Global Legislators Organisation for a Balanced Environment)'s aim is to facilitate high level dialogues amongst legislators on key environmental issues, working outside of formal international negotiations. It was originally founded in 1989 as an inter-parliamentary group between the US Congress and European Parliament to respond to urgent environmental challenges, and its current Presidency (rotating every 3 years) resides with GLOBE UK (www.globeinternational.org).

The Central African Forests Commission (COMIFAC) is a regional forum for the conservation, sustainable and joint management of forest ecosystems in Central Africa. The forest ecosystems found in Central Africa (which includes the Congo basin) forms the second largest tropical forest in the world after the Amazon, threatened by poaching, logging and mining. COMIFAC's mandate is to direct, harmonize and monitor forest and environment policies in the region. Its activities are based around a common signed declaration, commonly called "Yaoundé Declaration" with 12 resolutions.

This section has outlined the forest assets that are available for investment. It has considered the types of ownership, existing and potential future revenue streams, and has identified the specific characteristics of sustainable forest management. It has assessed the relevance of sustainable forest management for key stakeholders. The next section provides an overview of the current state of play in financing tropical forests, and considers the drivers for private investment.

2 Tropical Forest Finance

This section opens with a review of basic financing requirements for the different tropical forest operators, the basic financial implications of SFM, and some of the innovative approaches that are already being explored to accommodate these requirements.

We then step back to take a look at current trends in institutional investment in forestry globally, focusing on the scale and type of investment targeted at tropical forestry.

The analysis then explores the key risks and opportunities that investors associate with tropical forestry, and examines the extent to which the economic value of natural forests over and above that

of wood and land (such as carbon sequestration) currently feature in investors' perceptions of opportunity in this sector.

The section closes with a review of current and proposed mechanisms that allow investors that allow investors to manage and mitigate risks associated with tropical forests.

2.1 Financing Requirements of Forest Operators

2.1.1 Background

The forest products industry is diverse, covering a broad spectrum of products and services and ranging from individuals through small and medium-sized forest enterprises (SMFEs) right up to the large local and multinational manufacturing companies. Whilst large companies have access to international money markets, SMFEs and those entering the formal markets are financially vulnerable and short-term finance provides essential support to temporary working-capital problems. All forest enterprises, irrespective of size, require long-term capital for land purchases and operational costs.

Although it is not possible to devise an optimum capital structure for any sector, especially one as diverse as tropical forestry, some general observations are possible, and provide a useful framework for later analysis.

Debt tends to be more risky for a company, because debt servicing can become onerous when business is bad. However, debt financing brings tax benefits because interest payments, unlike dividends, are deductible from income tax. As a general rule of thumb, companies with safe, tangible assets and plenty of taxable income to shield benefit from high debt ratios, whereas unprofitable companies with risky, intangible assets should rely primarily on equity finance.

Moors (2006) outlines four key factors that should guide relative levels of debt and equity:

- § Taxes
- § Business risk
- § Asset type
- § Need for financial slack

In general, most emerging market companies remain undercapitalised due to capital flight; investors and owners simply prefer to keep as much of their equity as possible away from local risks. This is particularly true of some of the poorer tropical countries with high tropical forest cover.

In this context, improved access to borrowing³⁴ can provide SFM operators and investors with increased commercial flexibility, and in so doing potentially increases the range of situations in which SFM can be undertaken in a commercially viable way.

³⁴ This enhanced lending capacity should reflect enhanced asset value of natural forestry based on recognition of ecosystem services, social and local economic value, and is not in anyway intended as a subsidized or non-commercial loan.

As far as sustainable forestry operations in the tropics are concerned, necessity has been the mother of invention in terms of raising finance and innovative financing mechanisms are being developed. Some of these bypass the institutional market altogether but, where conditions allow, others are tapping capital markets. Below we describe the financing strategy of two of the projects we analysed during this study.

2.1.2 Financing Futuro Forestal

Futuro Forestal is an FSC certified German-Panamanian tropical forest management organisation. The group offers investors worldwide the opportunity to own a forest, to invest in a high yield product and to foster ecological and social development. By cultivating a diverse ecological portfolio, including 7 primarily native species, Futuro Forestal delivers powerful benefits in terms of developing local biodiversity and soil quality. The Company is committed to a strong social policy and makes support and development of its staff a key priority. Futuro Forestal also has the capacity to generate voluntary and Kyoto compliant carbon credits through its operation, and is currently negotiating to supply carbon credits to the World Bank BioCarbon Fund.

Futuro Forestal has created an instrument designed to appeal directly to the retail market. "WoodStockInvest" is a turnkey package in which investors purchase the land – typically a 1 hectare parcel or multiple thereof - and contract Futuro Forestal to service the forest for a term of 25 years. The first investment cycle is over 25 years; relatively small returns are delivered from the generation of carbon credits in the growth phase, and from the thinning of the stand at various stages between year 10 and year 22, and sale of seeds at year 15. Insurance is delivered via a pool system in which 5% of investor's reforested land is set aside in guarantee in case of total loss. The rate of return on offer is 11%, and local profits from timber sales are tax-free.

2.1.3 Financing the Lignum Fund

The Fondo Forestal Lignum (the Lignum Fund) is a Chilean forest finance initiative being developed by Sociedad Inversora Forestal S.A. (SIF) and a group of private investors, under the umbrella of Fundacion Chile. The project scales up an early pilot programme, in which SIF acquired 4,600 hectares of standing forests and planted 3,100 via agreements with small and medium landowners, and subsequently issued a 10-year \$13m bond backed by forestry cash flow to refinance the deal. The Lignum Fund involving the launch of an 8-year \$34 million forestry fund to acquire 20,000 hectares of standing radiata pine trees and plant 30,000 hectares of radiata and eucalyptus under long term land use right agreements with small and medium landowners and farmers. A forest backed securitized instrument will be introduced to the Chilean capital markets supported by the net proceeds of the harvest and commercialisation of forestry assets under long term administrative and off-take agreements with Forestal Celco S.A. and Forestal Mininco, two of Chile's leading forestry companies. The Lignum Fund pays an annual fee for the land use rights to plant eroded lands and will also share a portion of the net margin of the harvest proceeds with these participating landowners.

2.2 Trends in Forestry investment

2.2.1 Sources of Investment Return

There are currently three main sources of financial return on forestry investment –

- (1) Biological growth
- (2) Timber product prices
- (3) Appreciation of land

Historically, the substantial part of returns from forestry (an estimated two thirds) has come from biological growth. Timber prices have tended to account for one third, and appreciation of land has had a negligible effect on returns.

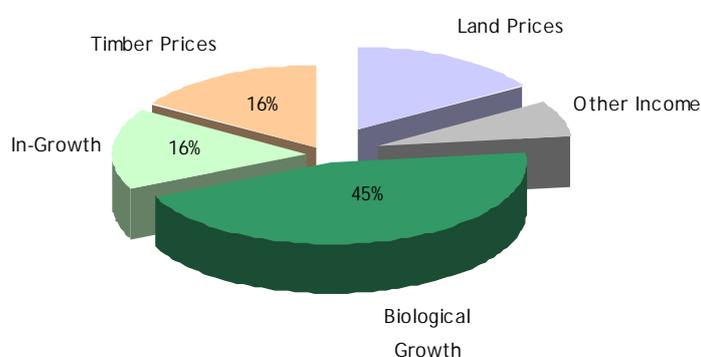


Figure 8: Breakdown of tree-derived income. Source: GMO, FourWinds Capital Management

The increasing value from biological growth arises both from the increasing volume of wood as the trees grow, and from the more attractive markets for larger timber. Young trees are most easily utilised for paper pulp based products, oils and low-end fibre. Mature trees, often known as saw timber, can be marketed for medium-value end uses such as hardwood floors. Fully mature timber can access high-end markets such as furniture. Although the growth rate slows with age, the liquidity of the product tends to increase. The risk-return profile of individual plantations or ventures will vary substantially depending on the maturity of the trees.

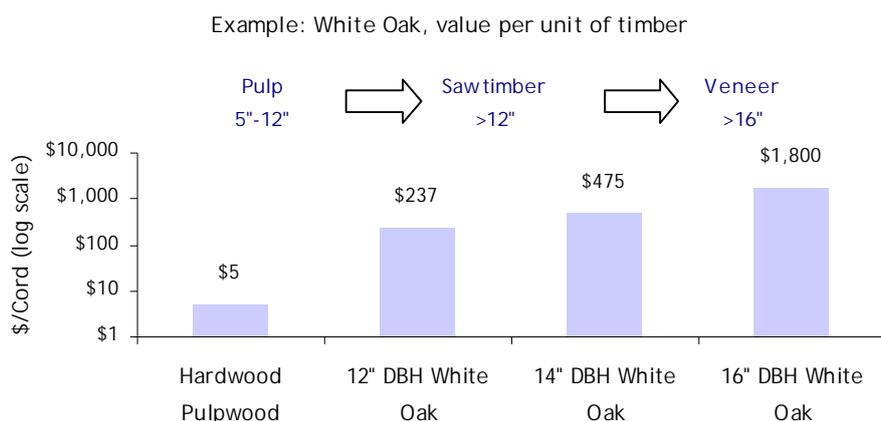


Figure 9: Illustrating increased value of wood with age. Source: GMO, FourWinds Capital Management

Table 5: Biological Growth Characteristics of Timberland

	Emerging	Established	Mature
Time Horizon	Up to 10 years	10 to 20 years	Older than 20 years
End Product	Limited use: primary end use is pulpwood for making paper	More marketable: "chip & saw" timber – 2x4s, 2x6s, paper & plywood	Highest-value use: saw timber; chief by-product is lumber used in housing
Growth rate	10-15% per year	6-12% per year	3-5% per year
Volatility (in price of timber)	Low	Moderate	High
Liquidity (ease of timber sale)	Low	Moderate	High

Source: Mercer Investment Consulting, *Timberland as an investment for institutional portfolios July 2006*

Fluctuations in timber product prices represent the greatest risk for investors. This is mitigated to some extent by the fact that investors can choose when to harvest and sell timber, depending on current prices and their cash flow needs. Also, timber investors can diversify into forests in different regions and can tap into various markets for the finished products.

Standard forest investment analysis does not currently value carbon and ecosystem services, but some investors are taking into account the likely future development of these markets. The commercial engagement of conservation organisations – for example in the conservation easement programme in the US – has created strong returns because the structure delivers up-front payments for delivery of environmental benefits over a long period.

2.2.2 Developed World – Sources of Finance

Sources of Equity

In the US, large scale financial restructuring within the pulp and paper sector, coupled with increasing environmental legislation, and changes in taxation (Employee Retirement Income Security Act (ERISA) legislation on retirement income security) have resulted in a major influx of institutional and private investment into the sector over the last 15 years. Institutional investment in the US increased from about US\$1bn in 1989 to over \$35bn by the end of 2006. To place this in perspective, private owners in the US account for some \$150bn, and forest product companies still account for \$50bn.

The institutional investors tend to fall into one of the following categories -

1. Pension funds with a clear social and environmental mandate and/or an enlightened approach to alternative asset classes
2. Superannuation Funds of private or public sector workers, such as the health services sector
3. Endowments Funds operating on behalf of academic institutions
4. Private investment offices of High Net-Worth Individuals
5. Foundations

Institutional investors access through forestry through:

- § Direct ownership
- § Ownership of a portfolio through a dedicated account with a specialist adviser
- § Shares in an integrated paper and forest product with large timber assets
- § Shares in a publicly traded Timber Real Estate Investment Trust (REIT) (in the US)
- § Subscription to units of a partnership or co-mingled forest fund

The most significant feature of this transition has been the emergence of a new breed of forestry investment managers, focused on maximising return on investment rather than simply supplying timber for the mill. These organisations fall into two broad categories: Timber Investment Management Organisations (TIMOs) and Forest Management Organisations (FMOs).

TIMO investments are capital assets. The portfolio in a TIMO can be spread across a range of geographies and timber types. Typically a TIMO will determine the geographic allocation of forestry investment, identify land acquisitions, and oversee the operations of the forestry resource.

The main TIMO vehicles currently in operation in the US are Real Estate Investment Trusts (REITs), Master Limited Partnerships (MLPs), and Income Trusts. Ownership of underlying assets, in particular private or long-term leased land, coupled with relatively stable cash flows, enables these organisations access to debt at competitive rates. Depending on cash flow projections, debt to equity ratios of between 35% and 60% can be supported.

Based on past performance, institutional investors in TIMO vehicles are currently targeting returns in the range 8% to 15%, although private investors in lower risk opportunities may be comfortable at the lower end of this range.

A central concern in TIMO investment management is cash flow projections. Delays in, or potential disruptions to, cash flows materially alter perceptions of risk. Hence young afforestation and reforestation projects, and /or those located in less stable areas of the developing world, may struggle to attract TIMO investment even though some are able to show theoretical returns of 20-30%.

Forest Management Organisations (FMOs) manage their own timber operations, employing foresters directly. A typical arrangement would involve an FMO leasing private land in order to supplement fibre supply. Backed by an increasing flow of institutional capital, early investors were able to buy well-managed forestry assets from eager sellers, and apply their investment management skills to develop returns. Ironically many of these deals involved the sale of timber back to the organisation initiating the disposal under long-term supply contracts.

Whilst the majority of institutional money invested in developed world forestry has been channelled through TIMO and FMO investment managers, these organisations are not the only buyers in the market. Conservation groups, such as the Nature Conservancy have also emerged as significant buyers, both in the US and elsewhere. The arrival of increasing amounts of conservation orientated capital, coupled with enabling frameworks, such as the US conservation easement programme, widens the range of financial (and therefore operational) arrangements that can be considered that encompass environmental considerations.

Sources of SFM-Orientated Finance

This section looks at the innovative use of structured finance to support SFM orientated initiatives.

Community Forestry Bonds

In the US, wide-scale changes in ownership are taking place as institutional capital continues to flood into the sector. The concept of a Community Forest Bond has been floated³⁵ as one possible mechanism that would enable conservation orientated initiatives to compete more effectively with traditional production orientated development.

The scheme rests on providing conservation-orientated developers with access to the municipal bond market, the US\$300bn capital pool usually accessed by state and local authorities. If issued by a state sponsored entity, Community Backed Bonds will enjoy a government level credit rating, enabling them to offer investors a lower return over a longer time period.

The proposal, which has attracted widespread support from NGO, industry and government commentators, rests on three things; firstly the enactment of laws enabling certain states to create issuing entities, secondly federal legislation enabling private non-profits to issue tax-exempt debt, and thirdly the availability of equity from individual, philanthropic and/or public organisations.

³⁵ By US Forest Capital LLC <http://www.usforestcapital.com/overview.html>

Conservation Easements

A conservation easement is a restriction placed on a piece of property to protect its associated resources. It takes the form of a voluntary but legally binding agreement limiting the types of use or development that can take place on the land going forward. A landowner voluntarily donates or sells certain rights associated with his or her property, such as the right to subdivide, and a private organisation or public agency agrees to hold the landowners promise not to exercise those rights.

Many types of private land use, such as timber harvesting, can continue under the terms of a conservation easement, whilst qualifying the landowner for certain tax benefits.

The mechanism, originally utilised in 1961, has been used to successfully protect millions of acres of wildlife habitat and open space in the US and elsewhere. In recent years the use of easements has been expanding into Latin America, Canada, the Caribbean, Australia and the Pacific.

The option to place conservation easements on private land is an important private property right that comes with land ownership in the United States.

2.2.3 Developing World – Sources of SFM Finance

Sources of Equity

Interest in emerging market forestry assets has picked up significantly in the last 18 months. Continuing shortages of certified tropical hardwood species, and speculative interest in carbon sequestration are beginning to generate increased interest in tropical forest concessions amongst some institutional investors. However, the fact remains that a high proportion of tropical forestry exists in jurisdictions with poor credit ratings, weak regulatory and legal frameworks and minimal capital market infrastructure. Much of the 'risk premium' associated with individual projects is based on investor perceptions of local economic and political conditions, and the length of time their capital will be exposed to these uncertainties.

Where available the majority of institutional funding for emerging market forestry is in the form of equity – the most significant is the size of target investment and the nature/stage of development of the operation. Investors are looking for opportunities in excess of US\$50m-\$100m which have a strong existing cash flow – even if they are able to show target returns in the order of 20-30%, start up and early stage operations are unlikely to be considered attractive.

In any case, the majority of rural individual and forestry based small and medium-sized enterprises, whose activities underpin local forest based economic growth, are unlikely to have access to formal banking facilities or off-take agreements which would awake the interest of capital markets. Family, friends and the local community are key sources of finance for these groups. The first tier of 'external' finance is likely to be through some form of microfinance, or possibly trade finance (from a customer or a supplier). The availability of local debt finance varies significantly: formalised and more advanced businesses may approach an international lender such as IFC. The difficulties that

SME forestry operators face when attempting to raise debt in local markets is well known, and was highlighted by several commentators as one of the key factors holding back progress.³⁶

A small but growing number of TIMOs are actively pursuing investment opportunities outside 'mainstream' markets such as the US. Some operators, such as Global Environmental Fund, New Forests, and Carbon Capital operate more like forestry asset/investment managers, actively seeking to develop value based on sustainable forestry management and ecosystem markets. These organisations raise money in order to invest in and work with local growers.

These organisations seek investment opportunities that offer both scale and significant upside potential – there appears to be an increasingly limited availability of commercially attractive investment opportunities that match their criteria. As with conventional TIMOs, project economics strongly favour forestry assets with established cash flow.

Sources of Debt

Domestic investment vastly exceeds foreign direct investment (FDI) globally and, whilst there is a huge amount of FDI in developing countries, very little reaches the forestry sector³⁷. Where investment exists it is mostly focused on protected areas and even then largely under-funded with very little direct involvement in commercial forestry³⁸ (Whiteman, 2006).

The low level of investment in natural tropical forest-based enterprises is a major limiting factor in the spread of sustainable forest management³⁹. Public sector funding is falling short of the financing demands for SFM and conservation. One constraint is the industry's lack of integration into the capital markets, which limits access to mainstream private capital, especially in developing countries.

Possible lending sources

- § Industrial investors
- § Investment and Pension funds
- § Foundations and Endowments
- § SRI investors
- § Project funding
- § Commercial banks (lenders)
- § Development Agencies
- § Donor funding (e.g. USAID)
- § Government funding

The wood products market is heavily weighted to domestic needs. In the Brazilian Amazon, as much as 86% of the wood harvested is consumed within Brazil⁴⁰. Equally the importance of the smaller and medium-sized forest enterprises (SMFEs) should not be overlooked. Revenues generated by SMFE logging in Guyana are on a par with those large enterprises⁴¹.

³⁶ For example, J.Clements, J Earhart.

³⁷ Jenkins M., Natural Tropical Forests: Opportunities and Constraints to Investment. Presentation to the "International tropical forest investment forum: issues and opportunities for investment in natural tropical forests", 26-27 April 2006, Cancún, Mexico

³⁸ Whiteman A., Financing sustainable forestry in the tropics: A global overview, presentation for "International Tropical Forest investment Forum: Issues and Opportunities for Investment in Natural Tropical Forests", 26-27 April 2006, Cancun, Mexico

³⁹ ITTO, Investing in natural tropical forest, Tropical Forest Update, 2006 No 2 pp.4-8, industries.
[http://www.itto.or.jp/live/Live_Server/1593/tfu.2006.02\(04-08\).e.pdf](http://www.itto.or.jp/live/Live_Server/1593/tfu.2006.02(04-08).e.pdf)

⁴⁰ ibid

⁴¹ Thomas, R., Macqueen, D., Hawker, Y. & DeMendonca, T. 2003. Small and medium forest enterprise in Guyana. Guyana Forestry Commission, Georgetown, Guyana and International Institute for Environment and Development, London, UK

In developing countries, banks generally avoid retail credit risks and rarely provide SMFE producers with necessary working capital. Traditional banks are reluctant to lend due to risk to reputation, unstable supplies of raw materials, lack of collateral, informality and illegality. Instead SMFEs gain access to finance through informal moneylenders and often face high and potentially crippling interest rates. In addition, many investment mechanisms in use in developed countries (such as TIMOs) are not useful in the tropical natural forest-based industry due to long-term country risk. Small-scale forest enterprises deliver significant local economic benefits. As far as sustainable extraction from natural tropical forests is concerned, it has been suggested that small-scale low overhead organisations may be more economically viable than a single industrial operation at yields available in the majority of remaining accessible stands (FAO). However, limited access to microfinance services is one of the major constraints to the development of these enterprises in the tropics (FAO, Forest Trends).

The FAO (2005) highlights several potential interventions that governments could make in order to facilitate wider provision of finance in the space:

- § Establishing a policy framework conducive to microfinance,
- § Securing appropriate land tenure and property rights,
- § Providing business development services and market infrastructure in support of production and marketing
- § Enhancing the capacity of microfinance institutions to effectively service such enterprises.

There are a number of interesting examples of innovative lending mechanisms, some of which are outlined below.

- (a) The WWF Global Forest Trade Network, with support from World Bank and USAID, has examined the idea of public private partnerships for the finance of small-scale operators in Latin America. Initially through the Certification and Development of the Forestry Sector (CEDEFOR) Trust in Peru and more recently the Nicaraguan Forest Finance Fund (FONFOR), Global Forest Trade Network (GTFN) have explored the provision of a financing mechanism aimed at creating tangible incentives for processors and producers dedicated to Responsible Forest Management and Trade in wood product sources from Nicaraguan operations that comply with WWF/GTFN guidelines.
- (b) CEDEFOR provides funding to community groups and concessionaires alike with the purpose of providing equal support to both sectors in line with the Forestry Law for Wildlife (2003).
- (c) FONFOR comprises a blend of commercial, Nicaraguan bank money couple with 'softer' money from the IFC and IADB (via CATIE and FOMIN).
- (d) In Mexico, FIRCO (Fideicomiso de Riesgo Compartido – so called 'First-to-Default' contractor of shared risk) provides affordable medium-term credit to forestry companies denied access to commercial credit. Its mission is to improve agricultural productivity through the introduction of new technology. After initial success and credibility for its methodologies and because of its

bundling of large numbers of small loans into larger, consolidated debt, FIRCO was able to leverage GEF grant money for critical expansion of its activities. FIRCO went on to ensure the long term viability of the new markets it had developed by supplementing its core activity lending with value adding schemes for community capacity building, institutional strengthening, pilots and demonstration projects (Canby and Raditz, 2005)

To be attractive from the lender perspective, the overall balance between risk and reward needs to be considered at least as good as that available elsewhere in the market. The most traditional way in which lenders reduce their risk exposure is by taking a charge over some or all of the borrower's assets, usually for the duration of the loan. In the event of non-payment of interest and/or principal, the lender has the right to foreclose on the assigned asset in order to recover the outstanding debt and any associated expenses.

Any lack of clarity over legal ownership, or other uncertainties that might affect underlying security offered by the asset reduces and possibly eliminates its consideration by the lender. For less profitable transactions and/or non-core business this is likely to be true even to the extent that the lender simply isn't familiar with the asset class, and/or doesn't have the necessary internal resources to evaluate it.

In order to explore the potential for further investment in developing country forests, we need to take a closer look at the various components of risk, perceived and actual, for investors.

2.3 Forestry Investment Risk

The predominant concern for any investor, whether providing risk capital or lending, is the potential for "loss" of both the capital invested and expected return. To understand how investors judge the probability of these events occurring it is necessary to look more closely at the underlying categories of risk that tropical forestry assets are exposed to.

In the table below we list these under 3 sections: political (P), market (M) and business risks (B)

Table 6: Investors' perception of risk in forestry investment

Risk Level	Risk	Sub-Risk Examples
High risks	1B - Business Strategy & Market (B)	Eco-services Business Model, Carbon Credit Market Viability
	1B - Natural Event (B)	Fire, Wind, Pest, Disease
	1M - Currency (M)	Volatility, Convertibility
	1M - Legal (M)	Forest Law, Enforcement
	1P - Civil Society Pressure (P)	Forest Inhabitant Pressure, Boycotts, Sanctions
	1P - Political (P)	Expropriation, Nationalisation
	1P - War & Conflict (P)	Civil War, Terrorism
Medium Risks	2B - Balance Sheet (B)	Debt / Equity Structure, Asset Liability
	2B - Business Disruption (B)	Internal / External Factors, Labour Action

Risk Level	Risk	Sub-Risk Examples
	2B - Capital Adequacy (B)	Equity, Debt Burden
	2B - Credit (B)	Borrower, Supplier
	2B - Fraud & Corruption (B)	Employee, Government
	2B - Global Impact Event (B)	Sept 11 th , Oil Price Shock
	2B - Income Statement (B)	Profitability, Return on Assets
	2B - Liquidity (B)	Cash-flow, Interest Cover
	2B - Management Systems & Operations (B)	Production, Control
	2M - Competition (M)	Foreign, Domestic
	2M - Financial System (M)	Payments, Access
	2M - Interest Rate (M)	Domestic, Foreign
	2M - Policy Change (M)	Taxation, Regulatory
Low risks	2M - Policy Failure Event (M)	Banking Crisis, Fiscal Crisis
	3B - Business Support (B)	Accounting, Recruitment
	3B - Environmental Factors (B)	Asset-caused Air Pollution, Water Pollution
	3B - Technology (B)	New Proven, Equipment
	2M - Infrastructure Service Failure (M)	Transport, Power
	3P - Credit-worthiness (P)	Sovereign, Provincial

Source: Adapted from Mistry and Oleson (2003) B: Business Risk, M: Market Risk, P: Political Risk

The extent and scale of these risks varies by country, nature of the operation, and by duration of the investment.

The location of a forest is its most significant determinant of risk. Location determines a number of factors, including favourable growing conditions, strength of local regulatory regime (especially tax and fiscal incentives), strength of legal regime (especially property rights), access to market and degree of economic/political stability.

Country risk is of particular importance in relation to natural forests. Ebeling (2006) highlights the correlation between tropical countries with high potential income based on payments for avoided deforestation and overall local governance and rule of law.

Table 7: Governance indicators of countries with major income potential from avoided deforestation

Country	Potential forest income at 10% reduction in deforestation, €15 /tCO ₂ (€m)	World Bank governance indicators (Mean of 2 indicators)
DRC	285.5	-1.53
Zambia	127.39	-0.64
Bolivia	136	-0.67
Indonesia	700.64	-0.91
Ecuador	82.29	-0.73

Note: WBI governance indicators used were those for "Rule of Law" and "Corruption". Lower values represent greater governance problems (the indicator range is +/-2.5 for all countries, including Annex 1) ⁴²

⁴² Source: adapted from Ebeling, J. (2006) 'Tropical Deforestation and Climate Change: Toward an International Mitigation Strategy' Dissertation for MSc Environmental Change & Management, University of Oxford# (2006)

Box 19: Forestry Investment Attractiveness Index (IAIF)

The Inter-American Development Bank (IADB) is the largest source for development finance in Latin America. Both plantation and natural forestry play a central role in the economic and cultural life of the region. Whilst historically a major exporter, the continuing development of highly competitive local processing businesses means demand for timber is increasing localised. Competition for remaining accessible forestry resource is strong; investment is urgently required if overall increases in demand are to be met in a sustainable fashion.

Dr Jose Rente Nascimento of IADB has created Forestry Investment Attractiveness Index as a means to measure the business climate for investments in the sustainable forestry. Consisting of 20 principal indicators, using more than 80 variables, the IAIF index presents the forestry business climate for each country as a single numerical rating. The indicators include exchange rate stability, political risk, trade openness, rule of law, licenses and permits, social and economic infrastructure, agricultural policies, planting and harvesting restrictions, forest resources stock and flows, supportive or adverse activities, and the forest products domestic market size. In addition to assisting potential domestic or foreign investors in making an initial screening, the index is also expected to clarify policy strategies, improve stakeholder dialogue, and indicate areas for further research

The IAIF is calculated every two years by the Getulio Vargas Foundation and INCAE, and published by IADB on its Sustainable Forest Portal (www.iadb.org/pforestal). At present IAIF is only compiled for Latin and Central America

Source: iadb.org

The key features of country risk can be summarised as follows (Forest Trends 2005)⁴³

- § Political stability and Security (verification of rights to land and other property, effective legal system, effective contract enforcement, crime/corruption and bribery, rent-seeking behaviour, uncompensated expropriation of property)
- § Regulation and Taxation (expropriation, regulatory interference)
- § Financial markets (currency exchange and convertibility risks, access to finance)
- § Quality of Infrastructure (telecommunications, energy / electricity, transportation)
- § Human resource, management and labour markets

The overall competence and experience of the forestry operator is also a central component of risk⁴⁴; forestry capacity aside, the financial and commercial capacity of operators, especially in the SME category, varies widely. In this regard access to reliable local knowledge is an invaluable risk management tool. Larger domestic and international operators enjoy significant advantages over their smaller competitors – not only are they more likely to have effective management systems in place and enjoy better access to markets, but they are also better able to seek out potential investors nationally and internationally.

⁴³ Canby K. and Cary Raditz C., Opportunities and Constraints to Investment: Natural Tropical Forest Industries. Forest Trends 2005, ISBN: 1-932928-20-0

⁴⁴ Compared with traditional management of tropical natural forestry, SFM, particularly in combination with PES is relatively complex.

Finally, as with any investment, the longer the duration of the investment the greater the overall risk of loss. Generally the duration of an investment is of most concern lenders. By their nature equity investors are speculative - they invest directly, accepting the possibility of outright loss in exchange for a share of anticipated upside. By contrast lenders are in the business of providing capital, and make money by charging (interest) until the capital is repaid. This capital is provided either by their own investors and customers, or through inter-bank lending. Notwithstanding the ability to recover all or part of a loan through legal action, or by 'selling' the rights to repayment to a third party, the lender remains exposed for the full duration of the loan. Longer the exposure implies greater risk and higher capital costs to the borrower.

A wider understanding of the risks relating to tropical SFM and associated PES developments, and available mitigation strategies, therefore lie at the heart of the quest for more effective capital structures for these projects.

2.4 Forestry Risk Mitigation Strategies

2.4.1 Overview

A variety of instruments are available, or becoming available, that enable investors to manage and/or mitigate risks associated with tropical forestry assets. These include:-

- § Portfolio Diversification
- § Property Insurance
- § IFI Investment Insurance
- § Commercial Investment Insurance
- § Derivatives

Each instrument has its own advantages and disadvantages in the context of forestry. Table 8 below provides an overview, together with an estimate of likely cost for each instrument based on a recent market survey⁴⁵. We then look in more detail at three key areas: portfolio diversification, insurance and credit enhancement. From a capital markets perspective the success or otherwise of a particular risk strategy will be reflected in the credit rating of the instrument involved, and so we conclude the section with a brief look at what these ratings actually mean, and the requirements of organisations providing this service.

⁴⁵ A study by The Global Exchange for Social Investment (GEXSI) and VantagePoint Global. Gaines and Karius (2006)

Table 8: Key Forest Risk Mitigation Instruments

Instrument	Definition	Examples	Advantages	Disadvantages	Cost
Portfolio Diversification	A risk-reduction strategy that involves spreading assets across a mix of companies, investments, industries, geographic areas, maturities, and/or investment categories.	§ Standard diversification strategies	§ Covers all risk categories (except some currency and political risks) § More stable returns	§ No reduction of systemic or disaggregated business risk; blunt risk mitigation instrument § Limited access for most investors in forestry assets	1-3% of investment (depending on security type)**
Property Insurance	See "Investment Insurance" – involves insurance of physical assets rather than investment cash flows	§ Axa § Saffire § Mapfre § Sul America	§ Covers risks most likely to cause loss on forests: fire, wind, disease, pests	§ No coverage of political or market risks § Limited re-insurance capacity worldwide limits primary insurance coverage	c. 1% (but up to 8%)
IFI-backed Investment Insurance	A contract in which an IFI-backed underwriter agrees to pay for another party's financial loss resulting from a specified, agreed event that can be anticipated, and whose probability of occurrence can be adequately estimated	§ Multilateral Investment Guarantee Agency (MIGA) § UK Export Credit Guarantee Department export insurance policy	§ Guaranteed coverage of extremely high-risk countries § Flat pricing structure § "Soft" power of IFIs ensuring coverage in time of crisis	§ Generally only covers political risks § Lengthy application process § Information requirements onerous § Full coverage not available (often limited to political risk coverage)	0.3 – 3% of investment / expected return
Commercial Investment Insurance	A contract in which a commercial underwriter agrees to pay for another party's financial loss resulting from a specified, agreed event that can be anticipated, and whose probability of occurrence can be adequately estimated	§ Commercially underwritten political risk insurance (e.g. Lloyd's)	§ Covers political risks of emerging market economies § Highly flexible coverage and contract structure § Fast processing speed § Streamlined portfolio coverage process	§ Limited business or market risk coverage § Contract duration limited to 5-6 years	Up to 2% of investment / expected return
Derivatives	An investment tactic in which securities are purchased on both sides of a risk, so that any loss in one security is countered by gains in the other securities.	§ Currency hedging § Commodities futures § Credit default swaps (see section 1.1.4)	§ Covers volatile currency risks in emerging markets	§ No coverage of business or political risks § Has no impact on the inherent risk of the assets	3 – 8% of investment amount covered

Source: adapted from Gaines and Karius (2006) **Rough estimates as limited market data available

2.4.2 Portfolio Diversification

A well-distributed portfolio of risks minimises exposure to any one risk, and reduces the potential for overall loss in the portfolio. The strength of the approach is clearly dependent on the number and distribution of risks within the portfolio, and the extent to which their occurrence (or non-occurrence) is correlated.

In general effective portfolio diversification is central to the effectiveness of all insurance and securitisation instruments. Whilst resource intensive to construct, well diversified forestry portfolios have been proved to deliver significantly better results.

Box 20: Portfolio Diversification: FourWinds Capital's Phaunos Timber Fund

Diversification reduces the risk of a portfolio whilst not necessarily reducing the returns - hence why diversification is often referred to as the only free lunch in finance. The recently launched alternative commodity Phaunos [Greek god of the forests] fund aims to offer attractive long term total returns through a diversified portfolio of timberland and timber related investments. Risk is mitigated by seeking:

- (i) Exposure to timberland and timber related investments on a global basis;
- (ii) Diversification by tree species, age classes and geographical timberland markets, with no predetermined geographical limits and will invest in at least three different regions;
- (iii) Investment vehicle selection and implementation of risk control strategies.

Source: phaunostimber.com

2.4.3 Insurance

Physical insurance of forestry covers potential damage/loss of physical assets, such as trees and equipment, and also harm to staff. There is currently a significant shortfall in insurance cover for forestry businesses in the tropics, in particular for smaller businesses. This is largely due to a general retrenchment of the insurance sector following 9/11 and a dramatic rise in premiums charged to property businesses (in which category forestry is often classed) in 2002/3. Where available, existing cover is written by regional providers to cover key risks such as fire and wind damage. Headline insurance rates before discounts for loss limits or high-risk retention by insured come in at between 0.15% – 3.5% of sum insured.

Table 9: Providers of Forestry Insurance

Company	Country
Sul America	Brazil
Las Buenos Aires Argentins	Argentina
Mapfre Chile	Latin America
Axa UK	France
Central Asia	Indonesia
IF	Scandanavia originally Skogbrand
Royal Sun Alliance	Chile and Argentina
Saffire	South Africa
Kyoei Mutual	Japan
PICC China	China

The ability of these companies to write forestry policies is heavily influenced by their ability to cede risk to the reinsurance market. At present forestry remains at the periphery of mainstream reinsurance business; even innovative and commercially promising initiatives that will extend cover have found it difficult to gain traction. Table 10 lists major providers of reinsurance capacity.

Table 10: Providers of Reinsurance

Company
IRB Brazil (compulsory ceding to IRB, a state reinsurance company)
Kiln Syndicate Lloyd's
Hiscox Syndicate
Hyeland (London)
PartnerRe
SwissRe
MunichRe (often 'hidden' in property portfolios)
SCOR (France)
HanoverRe (Germany)

For tropical forestry investments, insurance against political risk is also a pre-requisite. The long term nature of forestry means that these assets are highly exposed to changes in local government policy. Long term political risk cover is available in the London market, and can extend to 15 years for low to medium risk countries. However, in higher risk tropical countries such DRC, the World Bank Multilateral Investment Guarantee Agency would be the most likely source, although the facility has yet to be utilised in this way.

Box 21: ForestRe

ForestRe is a London based start-up providing specialist insurance capacity for risks associated with investment in forests and related ecosystem services worldwide. The founders, all experienced underwriters and forestry professionals, formed the business in response to a growing gap between supply and demand in this niche section of the insurance market. ForestRe takes advantage of some rapid advances in Geographical Information Systems (GIS) in order to implement a highly efficient portfolio management and accumulation monitoring and control system. These are key variables for insurers seeking to achieve portfolio diversity and minimise volatility – better control of these key data sets enables insurers to offer consistent and effective cover to insurance buyers.

Source: forestre.com

Box 22: Multilateral Investment Guarantee Agency (MIGA)

MIGA, a member of the World Bank Group, exists to promote foreign direct investment into developing countries. Outside a small number of 'advanced' developing countries concerns about investment environments and perceptions of political risk often inhibit investment. MIGA address these by providing political risk insurance, technical assistance and dispute mediation services to investors and lenders in high risk low income countries. MIGA leverages its relationship with shareholder governments to deter harmful action. By providing political insurance cover for up to 20 years, its involvement can increase the availability and tenor of loans.

Source: miga.org

2.4.4 Credit Enhancement

Cash flow from tropical forestry projects are subject to wide range of risks over and above those related to physical damage to the forest. Credit enhancement encompasses a range of mechanisms that can be applied to bridge any gap between the level of risk required to attract a particular investor group and the basic security offered by a diversified forestry portfolio. At the core of credit enhancement is the concept of the pledge for repayment.

The degree of credit enhancement required to achieve any given level of risk is related to:

- § Probability of loss
- § Standard deviation from loss
- § Loss severity and the extent of recovery if things go bad
- § Correlation factor between different assets in the pool

Credit enhancement is achieved in three ways:

- § Via the originator: in which case the entity providing the assets accepts some of the risk relating to its future performance
- § Via the payment structure: in which risks associated with payment are redistributed amongst investors, resulting in one group of effectively credit enhancing another.
- § Via a third party provider: in which specific risks relating to asset performance, credit and interest rates are transferred to third parties.

Originator

Credit enhancement provided by the originator usually entails them taking the highest risk component of the payment structure (the 'first loss'), thus proportionally lowering the overall risk profile on the remainder of the debt. They may also provide an injection of cash to be held as collateral, providing credit and liquidity enhancement for the underlying cash flow.

Payment structure

Structural credit enhancement is central to most securitisation transactions, and entails carving out securities with different risk return attributes to create senior, mezzanine and junior or subordinated securities.

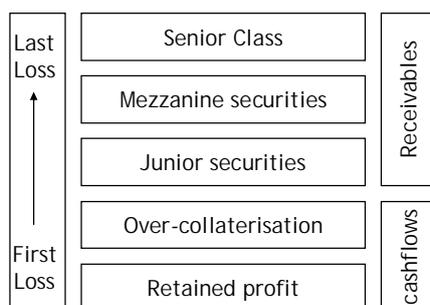


Figure 9: Illustration of a typical credit enhancement structure. Source Kothari (2006)

Senior securities have first claim over receivables; once obligations to holders of senior securities have been satisfied, mezzanine investors are paid, and once they are satisfied junior investors are paid. In this way the security at the base of the structure will be the first to be hit if any shortfall occurs in predicted cash flow – if not taken by the originator, the required level of security on this 'first loss' element will be determined by whatever is sellable in the market.

By distributing credit risk in this way, and assigning returns according to the risk on each security, the overall support required is considerably reduced. The originator achieves an average weighted cost of funds, whilst the structure accommodates different investor objectives.

Third party

A wide range of public and private third party credit enhancements are available that reduce the overall risk associated with a particular portfolio.

Credit protection is usually sought in the context of counterparty failure or non-payment. The most widely available form of credit insurance in the private market is provided by monoline insurers. These organisations provide guarantees on investments that are already low risk. Research conducted for this project suggests the relatively illiquid and non-transparent nature of the tropical timber market would make it difficult for a tropical timber portfolio to reach the prerequisite level of initial security for a monoline.

A portfolio generating cash flow from forestry activity could also have significant exposure to market risk due to variation in commodity price. Whilst diversification across geographies and types of activity can reduce the need, price hedging can be accomplished through providers such as banks, insurance companies or commodities exchanges.

The amount of third party enhancement needed to make a structure attractive is important. Although it improves rating – and hence lowers the cost of funding - it also adds cost.

The table below explores a range of instruments that could be considered for use with a forestry portfolio, and offers a brief assessment of their potential.

Table 11: Options for Credit Enhancement

Instrument	Definition	Provider	Cost	Asset Class / Instrument Compatibility	Assessment
Equity Subordination	See "Debt subordination" – similar mechanism but applied to dividend payments and exits associated with equity participation	§ Various legal advisors to Private Equity / Venture Capital providers	NA	§ Single equity investments § Equity portfolios	§ Same as "Debt Subordination" if public or private equity participant takes "subordinate" position
Debt Subordination	Debt securities with subordination to other forms of debt in the hierarchy of obligations of an issuing entity – i.e. priority of repayment claim in case of default	§ Various legal advisors to institutional lenders	NA	§ Loans § Bonds § Securitisation	§ Highly viable option if public or private lender is willing to take subordinated position on a given transaction
A/B Loans	Syndicated loan structures involving IFI-financed lead (A) and commercially-financed (B) loan providers	§ IFC § EBRD § IADB	NA	§ Loans	§ Suitable only for institutional lenders
Credit Default Swaps	An agreement between a protection buyer and a protection seller whereby the buyer pays a periodic fee in return for a contingent payment by the seller upon a credit event (such as a certain default)	§ Goldman Sachs § Merrill Lynch	c. 0.5-4%	§ Bonds § Fixed income assets	§ Potentially applicable to lenders if the security can be traded "Over The Counter" (OTC) – i.e. between two counterparties, as opposed on an exchange
Financial Guarantee Insurance (Monoline)	An insurance product that provides guarantees to bond issuers, often in the form of credit wraps, that enhance the credit of the issuer	§ MBIA § XL Capital § Ambac § CIFG	< 1%	§ Bonds	§ Realistically only applies to "almost AAA" bond issues; difficult to underwrite non-investment grade securities
Partial Credit Guarantee	An agreement between a creditor and a guarantor which sets forth the terms and conditions under which the guarantor will pay the debts or obligations of another person	§ IFC § USAID § IADB § ADB	0.4-4% of investment covered	§ Loans § Bonds § Floating rate notes	§ High potential for sustainable forestry securitisation transactions due to "development" interest of guarantee providers § Long lead time, potentially politicised (i.e. restricted to certain types of investors)
Credit Insurance (Trade)	A risk management product that protects balance sheet assets and accounts receivable from loss due to credit risks such as protracted default, insolvency, bankruptcy, etc.	§ Atradius § Coface § Euler Hermes § Bi-lateral Export-Import Banks	Generally less than 1% of annual turnover	§ Trade receivables	§ Generally only for corporations to protect against bankruptcy, insolvency and bad debts of clients or suppliers – not applicable to generic investment flows
"Private Risk Capital"	The application of private capital (i.e. hedge fund) as collateral, partial credit guarantee	§ NA – theoretically specialized hedge funds	1-8%	§ All	§ Theoretically possible but would require an interested hedge fund or similar capital provider to structure the deal

Box 23: IFC and credit enhancement

The International Finance Corporation (IFC) is the independent private sector arm of the World Bank Group, and provides a range of advisory services and financial products covering equity, debt and structured products, guarantees and risk management tools to emerging market businesses.

To date the IFC has been involved in over \$US 5bn equivalent of emerging market structured finance transactions, primarily providing guarantees. It uses its structuring and credit enhancement capacity to spearhead the development of local capital markets, acting as a bridge until such time as a new asset class becomes established and institutional investors become comfortable taking on subordinated risk. IFC credit enhancement has recently helped to mobilise financing for municipalities in Mexico, South Africa, Guatemala, and Russia; for microfinance institutions in the Balkans, Mexico, and Morocco; for schools and students in Ghana, Chile and Peru; and for environmental lending in China and Hungary.

Source: ifc.org

Box 24: Monoline Insurance

A monoline insurer is one writing only a single line of business, such as credit insurance. Securitisation transactions often make use of monoline insurance to provide credit enhancement. Organisations such as MBIA, Financial Security Assurance and XL Capital provide unconditional and irrevocable guarantees that interest and principal on a bond or other security insured will be paid on time and in full in the event of a default. By providing this protection to capital market transactions, monoline insurers provide investors and issuers with financial security and liquidity. A number of benefits are perceived:-

- § confidence that an insured security will pay in full, even under worst-case stress scenarios, an expertise in credit analysis allowing for the application of conservative, zero-loss underwriting criteria to insured transactions,
- § monitoring of collateral and servicing performance in order to take any action necessary to avoid deterioration of assets or underlying credit quality,
- § a level of scrutiny and analysis beyond the rating agencies, ensuring that most transactions are believed to be investment-grade before they are wrapped

Source: The Association of Financial Guaranty Insurers

Box 25: Managing commodity price risk

In addition to the commercial and political risks already described, commodity exporters are exposed to the risk that the commodity being sold may fall in price to such an extent that it compromises their ability to meet debt service obligations. They may also be exposed to foreign exchange and interest rate risk.

Hedging of price risk can be accomplished either over the counter (OTC), with banks and other providers such as insurance companies, or through a commodities exchange or internet based market place. Three basic approaches can be incorporated into transactions:-

- § Fixing prices or establishing floors in a structured prepayment or export receivables financing
- § Linking interest rates or principal repayments to prices
- § Selling options to subsidise interest rates

A key factor in relation to hedging price risk related to tropical timber is the overall liquidity and transparency of the market; whilst the ITTO produces regular biweekly price updates, and a number of internet-based exchanges have emerged in recent years, the overall picture remains fragmented. Such a situation will tend to make it difficult for hedge providers to be certain their side of the transaction will be profitable, especially at longer duration.

Source: Moors, E., 'Structured Commodity Finance: Techniques and Applications for Successful Financial Arrangements' (2003) EuroMoney Books in association with UNCTAD

2.4.5 Credit Ratings & Rating Agencies

Credit ratings provide investors with an independent assessment of the overall credit worthiness of a company or county, and its ability to pay principal and interest in a timely fashion. A rating can refer to an entity's specific financial obligation or to its general creditworthiness.

A sovereign credit rating provides the latter as it signifies a country's overall ability to provide a secure investment environment. This rating reflects factors such as a country's economic status, transparency in the capital market, levels of public and private investment flows, foreign direct investment, foreign currency reserves, political stability, or the ability for a country's economy to remain stable despite political change.

Ratings are expressed as letters ranging from 'AAA', which is the highest grade, to 'C' ("Junk") which is the lowest grade. Different rating agencies use the same letter grades, but with various combinations of upper- and lower-case letters to differentiate themselves.

The table below illustrates rating symbols used by two major rating agencies: Moody's and Standard and Poor's:-

Table 12: Bond Ratings

Moody's	Bond Rating		Grade	Risk
		Standard & Poor's		
Aaa		AAA	Investment	Lowest Risk
Aa		AA	Investment	Low Risk
A		A	Investment	Low Risk
Baa		BBB	Investment	Medium Risk
Ba, B		BB, B	Junk	High Risk
Caa/Ca/C		CCC/CC/C	Junk	Highest Risk
C		D	Junk	In Default

Source: www.investopedia.com

These ratings correspond to mortality rates and confidence levels calculated by the agency on the basis of their rating methodology. Figure 10 below illustrates these for a five-year bond rated by Standard and Poor's.

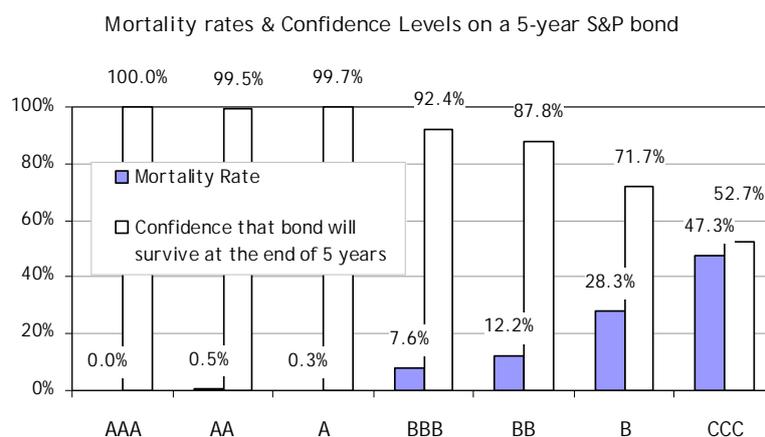


Figure 10: Ratings and associated confidence levels. Source: Kothari (2006)

A number of timber based financial instruments have been rated, most recently Timberstar by Moody's. The available literature reviewed in this research suggests that none of the rating methodologies applied to date have been required to evaluate revenue flow from ecosystem services. Whilst this may be another indicator of the novelty of these markets, this will be an important aspect to address in the rating of a Forest Backed Bond, given the anticipated significance of these income streams.

2.4.6 Certification to Manage Reputation Risk

Apart from the operational risks outlined above, investors have to consider the risks to their own reputation and brand of being associated with deforestation in any way. NGOs are actively scrutinising the behaviour of banks in this regard.

A joint WWF-Bank Track report launched at Davos in January 2006 ('Shaping the Future of Sustainable Finance') scrutinizes the commitment of major global banks to adopt screening policies for investment in the forest sector (amongst numerous other factors) that favour more sustainable management practices. A number of banks have formulated public investment policies in recent years, including ABN-AMRO, HSBC, Citibank, Rabobank, Bank of America, JPMorgan Chase, Barclays, and ING. The report ranks the various approaches taken, including on elements such as strictures around land-use change, and the positive weighting of FSC certification.

Another initiative involving WWF in the sphere of forestry finance has been the development of a discussion document, 'Draft guidelines on Corporate Responsibility Reporting for the Forest Industry, with specific focus on the Pulp and Paper Sector'. To some extent this document is intended to compensate for the absence of sector-specific guidelines for the forestry sector developed by the Global Reporting Initiative (GRI). At least one international forest products company, Masisa S.A., has already used the WWF guidelines in the preparation of its sustainability report.

Clark Binkley, Managing Director of International Forestry Investment Advisors has indicated meanwhile that IFIA considers FSC certification valuable for three main reasons, as follows:

1. Good management practice requires an environmental management system, and FSC certification comprises such a system for a forestry operation.
2. IFIA's investors are quite environmentally sensitive, and FSC certification provides them some comfort that the company is on the right track.
3. FSC certification should moreover help in the management of relationships with environmental organizations and local stakeholders.

In some, likely rare, instances, FSC certification may provide some advantages in marketing products, either price or terms.

As a result of these pressures, many investors are likely to find a bond backed by sustainable forest assets more attractive than one backed by unsustainable forest assets. Because they need to be able to demonstrate the sustainability of these forests, many investors will be looking to have a recognisable independent mark of assurance, such as FSC.

3 Securitisation of Forestry

3.1 Background

One way for lenders to reduce their exposure and develop their portfolio is to link the provision of capital with the underlying asset or service it is being borrowed to finance. The use of structured finance in connection with developing world commodity business has grown rapidly in recent years. Moors (2006) refers to the activity as structured commodity finance, and defines it as follows: 'financing transactions whereby an inventory and/or flow of commodities can be isolated from its owner and used as collateral for security and repayment'.

The process of securitisation extends the idea of a privately negotiated bi-lateral asset backed transaction by incorporating its main elements into a marketable 'asset backed' security. The inclusion of a physical asset for security is not a prerequisite for a successful structure; future flow securitisations are based purely on the reassignment of anticipated income from future sales of a particular product or service.

The use of structured finance in forestry is not new, but its application to tropical SFM and ecosystem services such as carbon sequestration is largely untested and holds attractive possibilities. In the following section we identify the reasons that securitisation is attractive to investors, and the conditions that would be required for a successful timber securitisation, based on existing experience. Based on a review of the overall objective of our instrument, and the countries that could be involved

we then propose a potential structure as the basis for further discussion in the next section of the report.

3.2 Benefits of Securitisation

Securitisation works well with collections of relatively homogeneous but illiquid assets. Once pooled and repackaged, incoming cash flow and other economic benefits from a pool can be sold as securities. The most common example of this is the pooling and repackaging of repayments on mortgages and car loans. In recent years securitisation been applied to everything from airline tickets to the royalties on David Bowie's back catalogue.

Securitisation provides capital market investors with two key benefits:-

1. Structural preference – The collection of assets that get included in a securitisation have either performed well on a historic basis or are believed likely to do so going forward, so the default risk is low.
2. Legal preference – While a conventional investor claim is subject to the bankruptcy procedures of the jurisdiction in question in the event of a default, an asset backed investor will already have legal control of the assets securing their claim. Creating this legal preference - isolating the asset from any other claim - is the key to securitisation, and requires the establishment of what is called a Special Purpose Vehicle to hold the assets.

Furthermore, from an investor perspective, having a claim over a diversified portfolio is a significantly lower risk than a claim over an individual asset. In this context the number of individual assets included in the pool, and the extent to which their cash flow is correlated, is fundamental. Similarly the greater the level of earnings predictability in individual assets, the less work needs to be done to stabilise the overall earnings predictability of the pool.

Box 26: Impact of Basle II

Structured finance mitigates the risk of default on an underlying loan. Whilst this is good from a bank's perspective, up until recently it had not been recognised as such within provisioning requirements set by bank regulators under the 1988 Capital Accord. Provisioning requirements are guidelines on the minimum capital that banks must apply to their operations in order to reduce the risk of insolvency.

However changes with the new Basle II Capital Accord, which considers structured commodity finance as 'specialised lending' and enables its credit risk mitigation properties to be taken into account. In so doing, Basle II significantly enhances the appeal of structured commodity finance compared to conventional debt finance.

Most Asset Backed Securities redistribute income from a portfolio through a tiered arrangement, referred to as a payment 'waterfall'. Within this structure the most cautious investors sit at the 'top' of the waterfall having invested in the lowest risk 'senior' notes, below them and next in line in the

payment pecking order are mezzanine investors, and below them again a class of junior, or 'first loss', note holders at the base.

Although the pool will be structured to meet the interest and principal repayments for all bondholders, there is inevitably a risk that a payment shortfall could occur. As payments flow 'down' the structure, it is the junior bondholders who stand to take the 'first loss' associated with the pool. Conversely any 'over performance' of the asset pool leads to the accumulation of extra revenue at the base of the waterfall. In this way the ABS can be manipulated so that different levels within the waterfall provide the level of risk/reward for which there is most demand in the market.

3.3 Relevant Structures

A range of securitisation structures has been employed in the securitisation of forestry, and in broadly related areas, such as infrastructure commodities and microfinance in recent years. Useful insights can be obtained by reviewing the merits and demerits of these, in particular the analytical approach adopted by the rating agency in analysing them to establish an appropriate rating. We explore some of these in the table below:-

Table 13: Securitisation Deals

Issuer	Asset	Country	Date	Deal Type
Microfinance Bond (Blue Orchard, Developing World Markets, Grameen Foundation)	Microfinance institution cash flows	(Portfolio)	2006	CDO
TimberStar	 Whole business (US forestry assets)	US	06	Whole Business
Micro loan Securitisation 1 (MLS 1)	Microfinance loans	India	Jun 06	CLO
Essential Public Infrastructure Capital II	Infrastructure project loans diversified by	Germany	Jun 06	Synthetic CDO
Lignum fund	 Forestry	Chile	Jun 06	Future Flow
Fideicomiso Financiero Lartirigoyen	Agricultural trade receivables	Argentina	Dec 05	Trade Receivables
CSN Export Trust	Steel exports	Brazil	Aug 05	Future Flow
IndoCoal Exports	Coal export receivables. Rating BBB- (Indonesia BB-)	Indonesia	Jul 05	Future Flow
Blue Orchard Microfinance Securities I	CLO of loans to geographically diversified microfinance lenders	Portfolio	Mar 05	CLO
Titularizadora Colombiana 2004	Non-performing mortgage loans in Colombia	Colombia	2004	
Gazprom International SA	Receivables from Russian gas export to Western Europe. Rating BBB- (Gazprom BB; Russia BB+)	Russia	Jul 04	Future Flow
TCW Global Project Fund II	Portfolio of project finance loans, mostly for power projects	(Portfolio)	Jun 04	CLO
ArceI Finance	 Wood pulp export	Brazil	May 04	Future Flow
Tornator Finance Plc	 Forestry business	Finland	Apr 03	Whole Business
FARMS Securitisation Limited	Agricultural/forestry loans	Sweden	Nov 01	Synthetic CLO

Issuer	Asset	Country	Date	Deal Type
Asian Diversified Bond CBO	A managed fund of Asian bonds	Portfolio	Sep 99	CBO
SIF Sociedad Inversora Forestal	 Forestry business	Chile	Jun 99	Future Flow
UBS Brinson Forestal	 Forestry business	Argentina	Feb 99	Whole Business
Scotia Pacific Co.	 Forestry business	US	Oct 98	Whole Business

An analysis of the main characteristics of each of these deals highlights some of the key operational benefits and constraints for each of the five main structures reviewed: future flow, trade receivables, whole business, collateralised loan obligations and asset-backed securities.

Table 14: Summary of securitisation structures (more detailed table provided in appendix)

	Description	When appropriate	Benefits	Conditions	Data/reporting requirements
Future Flow	Securitisation of future sales of commodity products for export. Revenues from sale are collected offshore	Company located in a developing country generating large volumes of export receivables (commodities?) to strong markets	Raise financing at the 'going concern' rating of the seller, which could exceed the sovereign rating & company debt rating	Seller must have strong local rating, asset volume must be large, export market must be solid	3 yrs + of historical receivables data, long term information on export prices/volumes, calculations of any performance ratios during the life of the deal, details of cash collections and asset performance during the life of the deal
Trade Receivables	Securitisation of invoices generated by provision of goods or services to clients by the originator, typically with payment terms of 30 days to 1 year	Strong company or companies with excellent historical data & reporting systems in a jurisdiction with securitisation law or equivalent	Issued notes can achieve a rating higher/lower risk/lower cost than the asset originator rating, since a default of the originator should not affect the ability of revenue from the assets repaying the notes	Seller should ideally have a minimum of BB+ equivalent rating, be located in a creditor-friendly jurisdiction, must have a good reason to do the securitisation & incentives to maintain its performance. The market for the product must be stable.	Detailed financials (for company credit assessment, since a term deal relies on the company's ability to generate more receivables), clear & consistent origination, credit & invoice servicing policies, comprehensive data systems, able to calculate & report dynamic credit enhancement requirements
Whole Business	The securitisation of the business & assets of an operating company	Strong company with a straightforward business in a creditor-friendly jurisdiction	Like straightforward secured debt, whilst achieve a higher rating/lower risk/lower cost than secured loans	Company should be operating in a sector with high barriers to entry, own tangible assets with long term value, long term sustainable revenues and profits, ideally subject to price/operational regulation	Historic revenue & cost information demonstrating 3+ yrs of stable trading, detailed company financials, ongoing reporting of performance ratios
Collateralised Loan Obligations (CLO)	A securitisation of a portfolio of individually credit-assessed loans ⁴⁶	When the underlying loans are diversified (by sector, country), & can be individually credit-assessed (or rated)	Can raise debt against a portfolio of loans at a rating higher than the underlying loan ratings, thanks to a portfolio diversification effect	Either each individual loan or the portfolio originator will need rating/credit assessment to determine its default probability & expected recover rate upon default	A way of assessing the credit quality of the underlying loan obligors: either through originator's credit assessment & origination system or through analysis of the underlying obligors' financials
Asset-Backed Securities (ABS)	The securitisation of consumer receivables, normally by a financial entity	For a company with a large pool of receivables (e.g. Leases, unsecured loans) extended to a highly diversified pool of obligors	Can raise financing at a rating higher than that of the company	Fairly standard homogenous assets with consistent origination and servicing protocols & good historical data	Historical and continuous reporting of Receipts, Delinquencies, Defaults, Recoveries & Prepayments for the underlying portfolio

⁴⁶ CLOs of project finance were considered, but there would be significant obstacles to building a portfolio of rateable projects diversified enough so that the structured notes can achieve an improved rating

Focusing in on the limited number of large-scale timber securitisations, rating agencies make the following additional observations with regard to the suitability of the structures employed:

- § Timber has a strong market of buyers, many high-grade companies, and can be sold under long- term contracts. This makes it a suitable asset for future flow deals, which benefit from binding off-take agreements with strong overseas buyers
- § The basic growing of commercial trees for timber is an ideal subject for whole business securitisation since it is possible to hand operations over to a third party, to be continued without disruption, if the sponsoring company goes bankrupt. Forestry operations requiring more skilled management, in the form of biodiversity management or multiple forest products, might be less suitable for whole business securitisations for this reason.
- § Securitisations require consistent cash flows, so the structure and associated interest and principal payments need to be planned with some flexibility in mind, especially if the aim is to manage the forest sustainable fashion and not over-harvest in years when growing conditions have been poor.

In tropical jurisdictions with little or no previous securitisation transactions or examples in the proposed asset class, and limited securitisation legislation, the local legal environment needs to be carefully considered.

Box 27: Structured Commodity Finance – MagForestry, Congo

Eucalyptus Fibre Congo (EFC) leases a 68,000 eucalyptus plantation in Point Noire from the Government of the Republic of Congo on a 50-year concession, with the provision for a 21 year extension. The operation was developed by Shell Renewables between 1991 and 2000, based on fast growing species, with the overall objective of establishing a high yield but renewable source of biomass for future energy generation. Following a major restructuring in 2002 Shell pulled out of their forest/biomass operations, and failure to find a buyer for EFC brought operations to a halt in 2004.

MagIndustries, a Canadian company with subsidiaries operating and developing major industrial projects in the Republic of Congo and Democratic Republic of Congo, acquired a controlling interest in 2005. EFC recommenced shipments of eucalyptus pulp logs and pine poles for utility purposes in the last quarter of 2005 under the control of MagForestry. Pulp logs are exported to European buyers; poles exported to the local West African market.

In early 2006 MagForestry commissioned a feasibility study for a 500k t per annum log chipping plant. The results of the study indicated a robust IRR of 35%, a capital cost of US\$25 million, and a 4 year pay back, based on annual revenue from chip sales of US\$30m. MagForestry anticipated securing advance purchase contracts for 100% of capacity. On this basis the MagForestry reached in principal agreement with a major South African bank whereby 70% of the capital cost of the project will be financed using a structured debt facility.

Source: www.magforestry.com

The following points are of particular concern:-

- § The legal ability to transfer assets & attached security to a third party (so that ownership of assets by the Special Purpose Vehicle (SPV) cannot be challenged in the event of the originator's bankruptcy)
- § The requirement in some jurisdictions to notify underlying obligors in writing of the transfer of assets to the SPV / receive confirmation from the obligor/s
- § The existence and reliability of SPV regulation⁴⁷, including laws covering bankruptcy and foreclosure
- § Whether a securitisation deal requires regulatory approval
- § The potential impact of other legislation, such as consumer and data protection and usury laws
- § The potential impact of tax, including profit, stamp duty and VAT

Further issues relating to the proposed asset and its operating environment are explored below.

3.4 Securitisation in Tropical Countries

In addition to the requirement for an adequate legal framework - outlined above - a further set of factors emerge from the analysis, relating to the performance and operating environment for tropical forestry, that affect the potential use of securitisation as a financing mechanism. These are as follows:-

- § The difficulty of finding companies with sufficiently strong portfolio tracking systems to provide enough data to demonstrate solid future cash-flow expectations to investors/rating agencies
- § The greater prevalence of poor corporate governance so that cash flows might need to be audited on an ongoing basis and this could add significantly to the ongoing transaction costs.
- § Convoluting ownership models
- § On the positive side, a lower correlation between activities in developing countries and in the developed world than between countries in the developed world. For example,

⁴⁷ see Fitch report "SPVs in Securitisation Transactions"

microfinance loans in developing countries are attractive for investors because of their low performance correlation with growth and contraction in the global economy.

- § The smaller and more localised the developing country companies, the less correlated with the global economy, but the more individually risky and data-poor.

3.5 Future Flow Transactions

Working on the basis that a significant portfolio of sufficiently robust tropical forestry cash flow could be attracted, and the management of a financing vehicle agreed, a pool of long-term capital could be raised. Given the location and nature of the forest asset class, and potential for portfolio diversification, we consider that future flow securitisation will offer the most appropriate structure to enable the issue of a Forest Backed Bond based on such a portfolio.

In future flow securitisations, the borrowing entity (originator) in a developing country sells its future products (receivables) directly or indirectly to an offshore Special Purpose Vehicle, which then issues an instrument backed by this income stream. Designated international customers (obligors) are directed to pay for the goods they import from the originator directly into an offshore account managed by a trustee. The collection agent makes principal and interest payments to lenders. Any funds left over are forwarded to the originator.

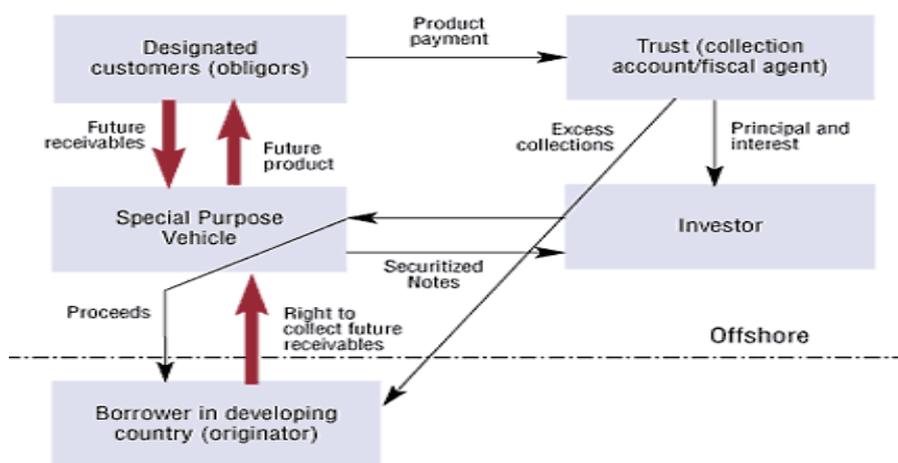


Figure 11: Structure of a typical future flow securitisation. Source: Ketkar *et al* (2001)

These arrangements substantially mitigate sovereign transfer and convertibility risk, because the overseas customers of the borrowing entity make payments for goods or services received directly to an offshore SPV. However, it is worth noting that this does not entirely isolate the lender from the operations of the borrower. Whilst the SPV is unlikely to go bankrupt, the lender remains dependent on the continued operation of the originator to produce the goods or services that generated cash flow used for servicing debt. For this reason the use of future flow transactions is limited to relatively

creditworthy borrowers that will have a strong capacity and incentive to deliver the product or service once the transaction has been completed.

Box 28: Arcel Finance Ltd - A Brazilian Future Flow Deal

Aracruz Cellulose S.A is the world largest producer of bleached eucalyptus kraft pulp (BEKP), currently rated 'Baa3/BBB-'. Almost 100% of production is exported to the US, EU and Asia through long term supply contracts with several large international tissue producers, with sales denominated in US\$. In order to raise money to reduce outstanding debt and fund an increase in production capacity, the company entered a future flow securitisation, by selling its future revenue to Arcel Finance Ltd, a Cayman Islands SPV. Revenues from wood pulp exports are deposited by clients into an offshore account. Arcel has issued 3 bonds, the most recent of which was for US\$825 million in May 2004, had a term of 8 years and was rated BBB, four notches higher than that of local sovereign debt at the issuance date ('BB-').

Credit enhancement for the deal was provided by over collateralisation and minimum debt service coverage levels. A number of other performance limits were put in place, the breaching of which trigger the channelling of all revenues to amortise the bonds:-

- § Aracruz must be worth more than US\$1.5bn
- § Net debt / capitalisation must be less than 0.6 to 1
- § Collections from receivables must be more than 2.5 times debt service payments

Source: Fitch & Co; and Ketkar, S., Ratha, D. 'Securitization of Future Flow Receivables: A Useful Tool for Developing Countries' Finance & Development Magazine March 2001, Volume 38, Number 1 <http://www.imf.org/external/pubs/ft/fandd/2001/03/ketkar.htm>

As lenders have no physical security, and are entirely dependent on the generation of future cash flow, credit enhancement and rating play an absolutely critical role in future flow transactions. In particular future flow transactions often involve a significant degree of over-collateralisation, requiring that the income from the portfolio always exceeds that required to maintain the coupon payment at some pre-agreed ratio over the actual payment. Unless carefully balanced, requirements such as this can rapidly burn up the economic benefit associated with undertaking the transaction in the first place.

The Arcel Finance deal described in the box illustrates all of the key features described in this section, and involves the export of large quantities of a homogenous product (Bleached eucalyptus kraft pulp - BEKP).

4 Potential Models for a Forest Backed Bond

4.1 Introduction

The overall aim of this project is to test the feasibility of an instrument that could reflect a pattern that exists in nature: the steady slow growth of natural forest that matures in a minimum of 40/50 years.

In previous sections we have framed the practical aspects that the instrument would need to fulfil in order to be considered feasible. By identifying these, and attempting to establish which are “must haves” in order for the final design to be viable, we derived a basic set of design parameters:

- § We first looked at the asset; this entailed identifying location, ownership and current management
- § Second, we looked at the revenue-generating capacity of the asset; here we considered different ‘business models’ or cash flows that might be developed beyond timber, an approach that lies at the heart of SFM
- § Third, we looked at existing finance for sustainable forestry from the perspective of both forest operators and investors: this provides a picture of the competitive landscape for our new instrument.
- § Finally, we looked at the underlying risks and available approaches to mitigating risks; this provided us with an understanding of the mechanisms available to us for constructing our instrument.

The forest-backed bond models proposed below include a range of sustainable forestry related assets in different financial structures. Each model is designed to manage and mitigate key risks associated with the underlying asset pool, and in so doing offer investors access to a range of attractive investment opportunities within a single structure.

Table 15: Suggested models summary

Model		Advantages	Disadvantages	
A	A bond backed by government income from forestry concessions	<ul style="list-style-type: none"> § predictability of income § captures the long term benefits of sustainable forest management ‘upfront’ 	<ul style="list-style-type: none"> § rent collection from forestry concessions historically mismanaged 	
B	A bond backed by a diversified portfolio of sustainable forestry	B1 Local Trade	<ul style="list-style-type: none"> § Reduced exposure to market price variation § interest in natural growth forestry § attractive property rights 	<ul style="list-style-type: none"> § would also require an equity vehicle § exposure to national economic performance § requires sufficient security over the portfolio assets
		B2 Export	<ul style="list-style-type: none"> § access to competitive long term debt finance from international capital markets 	<ul style="list-style-type: none"> § rely entirely on credit enhancement to provide investors with security
C	A bond backed by sustainable forestry loans issued by local banks	<ul style="list-style-type: none"> § local banks in some countries are already incentivised § creates a ‘virtuous circle’ of lending, development and refinancing 	<ul style="list-style-type: none"> § could be complex/costly for local banks to implement lending criteria/checks. 	
D	Zero coupon bond	<ul style="list-style-type: none"> § Reduced exposure to market price variation § interest in natural growth forestry § attractive property rights 	<ul style="list-style-type: none"> § would also require an equity vehicle § exposure to national economic performance § requires sufficient security over the portfolio assets 	

4.2 Model (A) – A bond backed by government income from forestry concessions

Description

A forest-backed bond could be issued by a central or municipal/state government, based on future revenues from various elements of sustainable forestry management. Governments are uniquely placed to use their sovereign status in order to raise capital for sustainable forestry, subject to their rating and standing in financial markets. In the event that the portfolio fails to perform as planned the government is well placed to ensure that any outstanding payments on the bond are made. One option would be for a government to issue a bond backed by the payment of regular license fees for the right to develop various opportunities within the portfolio (e.g. development of carbon projects).

As discussed in section 2.5 above, the success of bonds backed by tropical forestry would rely heavily on the appropriate use of credit enhancement in order to make the deal attractive to investors – provision of this could potentially be tied to long term commitments in areas such as forest governance and certification.

Incorporating rent from a range of different operators would deliver a degree of diversity to the portfolio, but would still represent exposure to one national economy. Incorporating several countries within the structure would be one way to effectively reduce portfolio risk.

An understanding of the range of operators, their rent paying capacity and the extent to which the rent collection process is ‘normal’ would all be pre-requirements of this system. An understanding of the probability of payment default/loss/shrinkage on different types of licence income would be necessary in design an effective structure for investors. More uncertain payments would need to be assigned a lower rating.

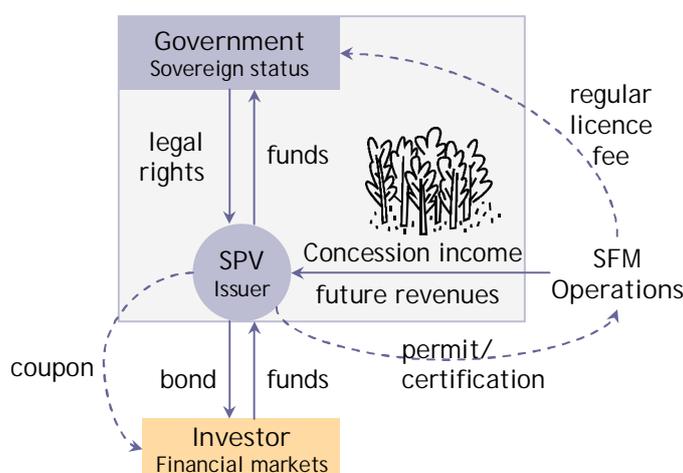


Figure 12: Model A – a bond backed by government income from forestry concessions

Advantages

1. The structure enjoys greater predictability of income - revenues backing the bond would be largely independent of variations in the underlying market for timber/carbon etc.
2. The structure provides a means of capturing the long-term benefits of sustainable forest management 'upfront'. Capital raised could be used to improve local institutions and operational environment for sustainable forestry. If linked to Forest Law Enforcement and Governance (FLEG) strategies such an issue could provide a useful 'carrot' rather than 'stick', whilst simultaneously providing the government with funds to introduce such measures.
3. The structure simultaneously provides finance to address improvements in design and enforcement of forest law/ regulation and an incentive to ensure funds deliver the desired improvement in resource management.

Disadvantages

1. Rent collection from forestry concessions in the developing world, in particular natural forestry, has often been manipulated or mismanaged. Further work also needs to be done in order to understand the overall potential scale of income, and whether the economics of such a deal would work.
2. The viability of natural growth sustainable forestry operations can vary significantly – the short to medium term impact of a blanket increase in concession fee would not be uniform. Harvesting primary moist tropical forest can yield \$3,000 per hectare, whilst secondary dryland forest may deliver no more than \$20 per hectare⁴⁸.
3. Without projected improvements in forest governance and other local measures, this structure could worsen the viability of sustainable forestry operators, potentially leading to an increased rate of deforestation/biodiversity loss.

Social and Environmental Impact Context

Ramping up access to capital of governments could vastly increase the ability of state agencies to monitor and enforce forest law, and, through offering competitive salaries and benefits, create disincentives for officials to abuse authority. This model would increase the ability of government agencies to engage in long-term planning processes. Funds might also be channelled into baseline scientific research and the development of criteria and indicators for benchmarking sustainable management practices, where these do not exist. A potential risk would be whether investment might be funnelled into partisan uses to suit the interest groups in power, according to political timeframes, if capital were to be available in concentrated short-term inputs. Industry is generally anxious to obtain longer-term leases on concessions, and greater stability fomented by this model would tend to promote more long-term thinking in terms of forestry practices, and create greater

⁴⁸ Adrian Whiteman ITTO briefing note

incentives to manage the resource to generate increased value over time rather than favouring short-term profit motivations. Communities would stand to benefit from reduced pressure on the resource base, although the nature of tenure arrangements would heavily influence the likely impacts of this model on equity, empowerment, and income distribution. Joint management regimes might be required, where these do not exist, to ensure participation of all stakeholders in benefits; NGOs could play an important role in mediating between local communities, government, the private sector, and the broader civil society.

4.3 Model (B) – A bond backed by a portfolio of sustainable forestry

A bond backed by a portfolio of sustainable forestry could be issued by a private entity, local government or an international institution. Asset location, ownership and the stability of related cash flows are the central considerations in the design of this structure.

The viability of sustainable natural growth forestry in the tropics depends upon factors including the stocking of commercial tree species, local pricing for those trees, operational conditions (e.g. such as time available to harvest) and value add through secondary wood processing (SWP). Although the approach protects a range of critical ecosystem services, the systems aimed at monetising these benefits – especially carbon storage in the form of payments for avoided deforestation – have yet to come into widespread use.

Harvesting in moist tropical forests containing high value tropical species can be very profitable, with the potential to deliver net profits of US\$3,000 per hectare excluding labour costs. However few such forests remain accessible, and harvesting of secondary forest is an order of magnitude less profitable (between US\$20 - US\$100 per hectare) (Whiteman, 2006).

The failure of governments to restrict illegal logging, coupled with the willingness of global consumers to accept timber harvested in this way, further erodes the competitive position of natural growth sustainably-managed forest operations even further.

For the reasons described above, investors have tended to consider investment in natural growth sustainably-managed forests as high risk and structure their investment accordingly.

Conversely, tropical plantations offer a high degree of consistency and predictable cash flows. In addition, demand for core products such as pulp and new areas, such as bio-fuels, is strong, consistent and growing. From a commercial standpoint these assets are lower risk, and are generally more attractive for lenders.

This bond pools certified natural growth with plantation forestry to create a blended portfolio of assets suitable for securitisation. The viability of the model is strongly driven by (a) the relative

proportion of plantation and natural growth in the portfolio (b) the capacity of local capital markets to support a securitisation, and (c) local forestry ownership and use rights.

Depending on these factors two variants are possible, (B1) Local Trade and (B2) Export:

4.3.1 Model (B1) - Local

Description

Provided sufficient security can be established over the assets of the portfolio, and the forest manager involved is a well-established and significant local player, a forest backed bond could be issued against a national portfolio of plantation and natural growth forestry. Different cash flows within the portfolio would flow to different tranches of the structure. More predictable revenues, such as those from plantations, would be assigned to the senior note, whilst less certain revenues such as those related to possible realizable value of ecosystem services would be assigned to junior note/first loss.

Subject to essential property rights and legal regime being in place, underlying security for the deal would be taken on either the land and/or trees. An attractive option would be to identify land suitable for both plantation and developmental purposes (HBU). This alternative use provides additional security for senior note investors in case the plantation fails. An additional benefit of these selection criteria is that ecosystem service opportunities are more likely to occur in areas where development potential exists, although the potential of the land will need to be taken into account.

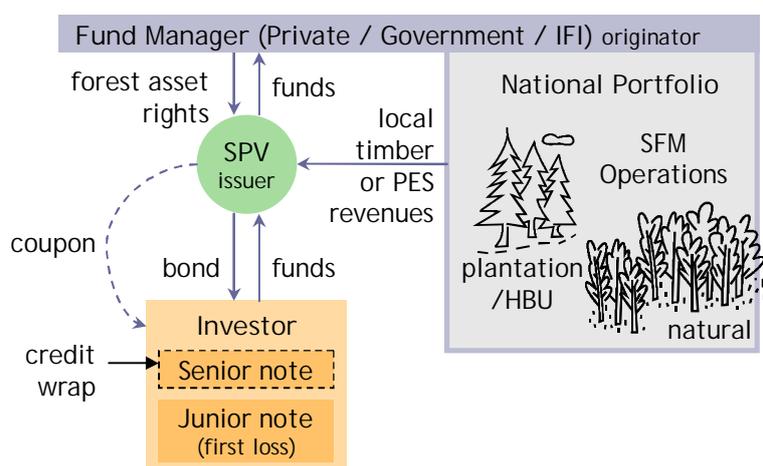


Figure 13: Model B1 – a bond backed by a portfolio of local sustainable forestry

Advantages

1. The provision of credit enhancement and inclusion of Payments for Ecosystem Services (PES) in the structure addresses a key investor concern regarding the exposure of existing timber-backed structures to variation in market price of timber.

2. Concepts such as conservation concessions have found widespread support with forest stakeholders in the developing world. This type of vehicle would offer conservation organisations an alternative vehicle through which to access similar types of outcome.
3. The last 18 months have seen a growth in investor interest in natural growth forestry, which indicates increased willingness/capacity to take on the risks described for this part of the portfolio.
4. Advanced developing countries have the fastest economic growth in the world and can therefore be expected to utilise an increasing amount of wood. Local demand for plantation outcome will be robust over the long term. This increase in demand clearly also represents a threat to natural forest resources, if plantations are not able to provide a sustainable supply of fibre.
5. Some tropical countries do share well-established forestry property rights and relatively well-developed or developing capital markets, making a local issue (with appropriate support) a viable option.

Disadvantages

1. The assembly and alignment of the portfolio is likely to take time – and would probably necessitate the formation of an equity vehicle in order to make the necessary initial investments (although the forest backed bond may represent an attractive exit for potential hedge fund/VC investors who might back such an acquisition vehicle).
2. If focused on a single country this instrument lacks diversification.
3. Although advanced developing countries with substantial natural growth and plantation assets (e.g. Brazil) may make good targets from an origination point of view, the risk adverse nature of local investors may limit internal demand, whilst currency and country risk could limit external demand.

4.3.2 Model (B2) – Export

Description

Where local economic and legal conditions are not suitable for a conventional securitisation, an export orientated future flow transaction could be considered based on a similar portfolio.

In this structure products and services generated by the portfolio would be exported, usually in a hard currency – e.g. wood pulp to a Finnish paper mill, carbon sequestration to an EU government etc.

Rating agencies and investors assessing an export orientated future flow transaction would look very closely at the originator (in order to assess their ability to continue producing forest

products/services), the extent to which the ongoing cash flows are isolated from any performance failure by the originator, and the degree of credit enhancement protecting future payments.

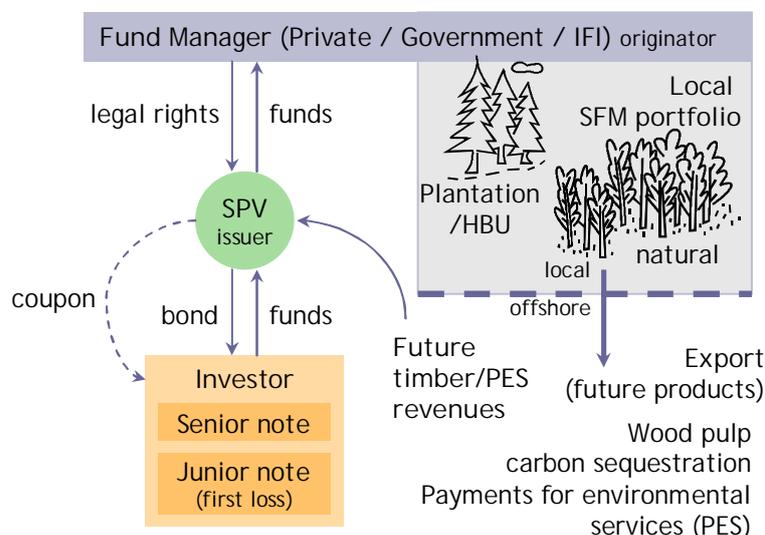


Figure 14: Model B2 – a bond backed by a portfolio of exported future flows

Advantages

1. The issuer gains access to long-term debt finance from international capital markets.
2. Future flow is a well tested and understood risk management mechanism, which would be familiar to investors.
3. The structure enables investors to access different parts of the value proposition according to their risk appetite, including certified timber, bio-fuels and Kyoto compliant carbon credits. From the investor's point of view these structures enable access to different elements of environmental value.

Disadvantages

1. The 'whole' may not be seen as 'more than the sum of the parts' by investors. The inclusion of low income high risk sustainable natural growth forestry in a portfolio of low risk assets may be seen as nothing more than a drag on financial performance.
2. Export contracts for the supply of timber or carbon would most likely be of significant size and limited number. A low number of high impact customers means that the portfolio will lack diversity – a key element of securitisation.
3. Future flow transactions rely entirely on credit enhancement to provide investors with security, in particular the extensive use of over collateralisation. In economic terms this can make it an expensive option – the degree to which it is attractive depends on the cost and availability of alternative funding.

4. Adverse economic conditions may create an incentive for the forest manager to over-harvest timber in order to maintain revenue streams sufficient to pay the interest and principal due on the notes. It is therefore crucial to carefully align sustainable practices and shorter-term note-holders' interests.

Social and Environmental Impact Context

One of the key strengths of this model is that it provides a great deal of flexibility in approach, with the capability to blend a diverse portfolio from several countries. This not only serves to manage risk exposure, but also presents an opportunity to deal with the complexities inherent in the goals of sustainable development. The articulation of societal needs for fibre and forest products with the need to conserve critical ecosystem attributes can best be achieved precisely through the two-pronged model of intensive plantation production combined with an extensive approach to low-impact natural forest management – a third element in comprehensive land-use planning would be the setting aside of protected areas where no extractive activities are permitted.

The question as to why investors should consider a diversified portfolio over a straight fastwood plantation play could be answered not only by pointing up the environmental benefits of financing the sustainable management of natural forests, but also with the latent potential of PES and nascent markets in NTFPs. Meanwhile, the impacts of the various portfolio components would be determined by the specifics of multiple variables, key amongst which would be ownership, the nature of the entity controlling the portfolio, and governance issues.

A key differentiator between the two sub-headings outlined above [B1 local/B2 Export] is the proportion of added value that may be captured in-country, as opposed to exported offshore along with product that has undergone only primary transformation. This factor would clearly have major implications for employment levels in producer countries, and the pro-poor agenda would perhaps be better served by either investing in plant to add value to forest products locally, or perhaps shipping to regional centres with a competitive advantage in manufacturing and processing, rather than the greater part of value being added in developed nations.

4.4 Model (C) – A bond backed by sustainable forestry loans issued by local banks

Description

The most significant and diverse contribution to pro-poor growth within and around natural growth forests is made by forestry SMEs and community groups. These organisations have taken centre stage as beneficiaries of various voluntary and regulated PES schemes, such as FONAFIFO in Costa Rica and the WB Community Development Carbon Fund. Successful PES schemes can add significant ecosystem revenue streams to these operations.

The ability of these organisations to further develop their business could be enhanced by the availability of a dedicated sustainably-managed forests loan facility. By taking a proactive stance on ownership rights, local sustainable trade networks and PES revenue, such a facility would help develop the potential market for loan providers by enhancing their knowledge of (and ability to take security over) borrower assets.

In order to be attractive to local institutions, this opportunity must meet or match existing lending criteria. Experience within the microfinance sector demonstrates there is good profit potential at the small-scale end of the lending spectrum, but accessing this involves significant risk exposure and administrative burden. Local banks would work with the facility to originate loans focused on sustainably-managed small and mid-sized business in the forestry sector. A core component of the facility function would be to offer participating banks a re-financing of these loans.

This forest backed bond would be issued to support the re-financing of loans to SMEs. The bond could utilise a conventional Collateralized Loan Obligation (CLO) structure. Although similar in nature to a microfinance securitisation, careful consideration of credit enhancement would be required given the sector specific focus. Another important factor would be assessment of loan performance; the sustainable criteria create a restriction on the potential size of the portfolio as the approach will not be attractive or feasible to all forestry SME. Further since little loan history exists in this sector, there is no certain way of knowing whether, once created, the portfolio will be suitable for re-financing.

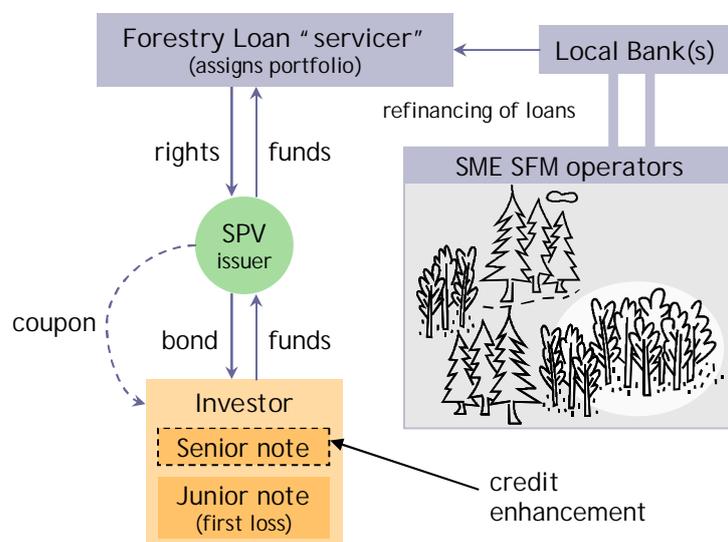


Figure 15: Model C – a bond backed by sustainable forestry loans issued by local banks

Advantages

1. In some countries, local banks are already required by their central bank to commit loans in favour of developmental aims.

2. The structure could reduce the exposure to small & medium forest managers on the lending banks' books, and provide them with extra cash, thereby allowing the institutions to originate more loans, and thereby benefiting local forestry communities.

Disadvantages

1. This type of structure is heavily reliant on information availability: unless each underlying borrower's credit rating is known, the lending bank must have well-developed & consistent lending criteria, and sufficient historical data to enable a portfolio credit assessment by investors (and rating agencies).
2. There is also an expense associated with the rating of the underlying borrowers, or the mapping of their credit quality (progressively more expensive for less adequate systems and data).
3. There must be sufficient motive for the lender to want to securitise. The lending institution (providing it has adequate size, data history, systems) could potentially have access to other sources of financing.

Social and Environmental Impact Context

This model has perhaps the greatest potential to promote the twin agendas of poverty alleviation and biodiversity conservation, although the burden of due diligence would be significant. Providing greater access to affordable capital for SMEs in emerging markets could generate major social benefits in terms of increasing household incomes in rural communities through increased and better employment and the potential for greater investment in plant and infrastructure to enable the retention of a much higher proportion of product value in the regions of origin.

Entirely new markets may also be created with the purchase of machinery capable of handling species previously not commercially harvested, and areas not economically viable to access. The major caveat to this is that if not tempered by rigorous environmental standards and robust mechanisms of planning and control, a sudden injection of capital where this was previously a limiting factor to development could have a negative impact on conservation.

Strict adherence to high standards would have to be enforced (as with all the proposed models) through the screening of target recipients and field audits of management practices (as required by third-party global forest certification schemes). The difference in the case of this model is the disproportionate burden implied by the costs of due diligence and transaction costs for smaller entities, where the economies of scale present in large-scale industrial operations are absent. The direct and indirect costs of certification, for example, are significantly higher on a per hectare basis for smaller operations; the formation of group certification schemes amongst investment recipients may help attenuate these, subject to geographical compatibility and other factors.

4.5 Model (D) – A ‘zero coupon’ bond backed by a sustainable forestry portfolio

Description

Sustainable harvesting in natural growth tropical forests involves low yields of relatively high value, diverse species of wood. These outputs do not lend themselves well to long term supply arrangements; harvest decisions are likely to involve balancing available timber against competing interests of current price and anticipated future price (taking into account cost of capital/carry to arrive at the net present value).

A forest backed bond could be issued against a portfolio of sustainable forestry assets effectively postponing both interest and capital repayments until the maturity date of the bond. These securities are referred to as ‘zero coupon’ bonds; they are sold at a discount to face value and repaid in full at maturity.

Sustainable management in natural tropical forests entails harvesting individual trees from discrete geographic blocks of forest at different points in time; zero coupon bonds could be scheduled against the harvesting of individual blocks. Cash flows from natural growth harvest could be balanced by steadier income elsewhere in the portfolio, e.g. from plantations with long term wood supply contracts, or regular payments for conservation and biodiversity protection.

Assuming a sufficiently large and diverse portfolio, one interesting possibility would be the issue of a sequential series of annual zero coupon forest bonds. If a liquid market could be created in these forest-backed bonds they could potentially provide a sustainable/certified timber benchmark price.

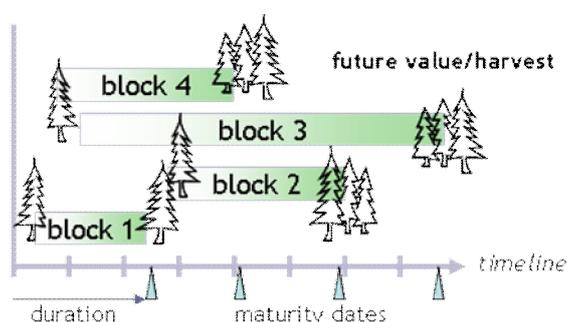


Figure 16: Model D – a ‘zero coupon’ bond backed by a sustainable forestry portfolio

Advantages

1. It would deliver greater flexibility to the forest manager. The attractive aspect of timber from an investment perspective is that forests act as both a factory (growing wood) and a warehouse (storing wood). Forest managers are able to leave their timber ‘uncut’ until such time as prices

become favourable. Delaying harvest in this way has another benefit – the unit value of the timber tends to increase as it matures, as increase in girth of stems can produce higher value logs, for example suitable for dimensional lumber or veneer rather than pulp, depending on the species in question.

Disadvantages

1. It may be difficult to price this bond over the target 40/50 year range. The most likely option would be to issue a short dated security and then refinance the portfolio at appropriate intervals.

Social and Environmental Impact Context

Social and environmental impacts are likely to be similar to B1

4.6 Testing the Market for Forest-Backed Bonds

4.6.1 Background

The models described above outline a series of approaches that could potentially link the development of sustainable development in the tropics with long term capital markets. From a structured finance point of view, each of the models offers a very different solution; this reflects the findings of our research undertaken to identify current financing gaps relevant to tropical natural forest. The models we suggest here address an identified need for long term financing within small and medium, as well as large scale operations, and for local governments, who face the critical task of delivering effective forestry policies and institutions.

Given the limited scope of this initial feasibility project and resource dedicated to scoping an instrument, market testing has focused on just one of these models. Model B, a future flow securitisation of export receivables was selected, on the basis of its applicability to export orientated countries, in particular tropical countries in Africa and Asia, where the impact of increases in international demand for tropical timber have been felt most significantly.

The market research consisted of a desk-based literature review evaluating general conditions within capital markets, and a series of semi-structured interviews based around the discussion of a hypothetical bond structure with features reflecting model B. This provided useful anecdotal insights; further research should concentrate on the development of financial models based on real assets which most interviewees considered key to making an objective judgement on the approach.

4.6.2 Summary of Feedback

Based on the sample of investors interviewed we were able to identify attributes of the proposed products that were attractive to investors and attributes that were broadly unattractive. Investors confirmed that, as an asset class, forestry is increasingly being recognised as likely to grow significantly in the short to medium term, as one of a basket of "alternative investments". There was broad consensus that the following characteristics would be essential if forest-backed bonds are to be successfully introduced:

- § *Credit enhancement* – some form of credit enhancement is vital to attract investors
- § *Rating* – some kind of rating would provide potential investors with the minimum level of comfort they require
- § *Returns* – need to be credible.
- § *Geographical diversification* – this is important in order to spread the risk
- § *Liquidity* – some form of liquidity is required if mainstream investors are to get involved.

Investors raised particular concerns about -

- § *Political risk* - if assets are based in certain countries (and some interviewees expressed concern and scepticism about Model A which would be more greatly exposed to political risk)
- § *Currency risk* – 'new world' / emerging market currencies are generally less attractive than 'old world' currencies (for example, dollar and sterling)
- § *Underlying asset class risk* - for example, security, fire, drought, flood and yield loss
- § *Returns* – returns from natural growth forests are likely to be lower than industrial plantations
- § *Size of proposed products* – to the larger institutions, \$100m is not going to be worth the time and effort to analyse (unless there is a steady conveyor belt of these products in the pipeline)
- § *Value (and ownership) of carbon & biodiversity credits* – some investors thought it was wrong to 'give this away for free' before the markets are well established; others thought it added the kind of upside potential required to attract certain types of investors
- § *Benchmarking* – the larger institutions only invest in benchmarked securities⁴⁹ (e.g. Lehmann Aggregate).

Other points related to -

- § *Equity investment in forestry* – some argued that greater equity investment in forestry is required as a first step (to increase awareness/ comfort with the broad class) before bonds could be considered; others seemed happier with the notion of bonds backed by forest assets
- § *Country ratings* – many lenders use these as the benchmark and often government policy does not support good ratings but there are creditworthy projects within the country.

⁴⁹ The choice of a security as a standard for the return on a particular class of securities that serves as a guide for other comparable issues.

The notion of forest-backed bonds did appeal to the investors we spoke to, but they are concerned about too big a 'leap'. A stepped process is recommended to facilitate their introduction, starting with perhaps 'safer' more developed world-focused assets and gradually moving towards a greater focus on *emerging market* forest-backed bonds. The products need to be kept as simple as possible (at least initially) and there are a number of hurdles that will need to be overcome before this becomes 'sellable' on a larger scale.

There does appear to be some appetite amongst certain investors (if packaged in the right way), but the evidence is not substantial enough at this stage to convincingly argue the case. Clearly targeting the 'right' type of investors is key. Further research is recommended to drive this forward.

The following important points are based on the sample of investors interviewed:

- § *Geography of the first deal* – The geography of the first deal will be important and many investors will feel more comfortable with a deal in Latin America, rather than Africa. A table at Appendix 5 provides a few initial observations relating to country selection.
- § *There is a trade-off between sustainability and simplicity* – the simpler the product, the easier it will be to sell; but this needs to be traded off against the inherent objectives of the proposed products, namely promotion of sustainable forestry, positive pro-poor impact and environmental protection.
- § *The 'right' investors* – the 'alternative investor' category is the most likely in the short-term; possibly also mainstream pension fund/ life assurance/ insurance type investors, who have a long investment horizon in mind
- § *Structure is key* – clearly the different tranches will appeal to different investors and making each tranche attractive may be difficult
- § *Tax* - tax incentives could be a useful way of attracting more mainstream investors

5 Conclusions and Next Steps

5.1 Securitisation

5.1.1 Existing Use of Securitisation

Securitisation has been applied in the forestry sector in a range of different ways, but only covers a proportion of structured finance activity.

The overall aim of securitisation is always to reduce costs by enhancing the capital structure of the originator. Key features of securitisation deals are –

- (a) A diversified pool of secured assets with a strong and predictable cash flow

- (b) High transaction costs - deals have to be big (more than US\$100m) to be economic
- (c) An independent rating enabling a investors to quickly and accurately assess market value

Forestry securitisation deals have been undertaken by major entities mainly in the US and Europe, and a small number in advanced developing countries. In the latter, “future flow” securitisation has been employed, an approach that utilises expected cash flows as security rather than existing (physical) assets. For future flow deals to be attractive, the originating entity requires a strong local rating and needs to be exporting substantial quantities of product in order to cover the costs of the considerable credit enhancement required.

Outside of securitisation, unrated local transactions have taken place, backed by timber-related trade receivables. These have involved timber buy-back agreements coupled to the sale of forestry. To date these types of deal have not generally been structured with the aim of trading beyond the initial placement.

Finally US investors are currently exploring the use of municipal bonds markets to support conservation forestry in the US. Although this is not an asset backed security, and assuming the local government issuing the debt has a good credit rating, this approach offers an innovative solution to capturing the public good element of sustainable forestry.

5.1.2 Limitations of Securitisation for Forests in Developing Countries

Although plantation forestry displays bond-like characteristics – i.e. it exhibits steady long term growth leading to a payback at harvest - there are currently significant limitations to the creation of forest-backed bonds based solely on tropical natural forests. These arise from the overall financial performance of the asset and from the geographic location of the key forests relevant to this exercise.

Limitations of natural forests as an asset for securitisation

Low returns from timber - The first limitation arises from the returns which can be achieved from the sustainable harvesting of natural forests. Many of the accessible stands of high value (species rich primary rainforest) have already been exploited. Weak cash flow based on sustainable extraction from secondary natural forest assets makes these assets challenging to securitize in isolation. In the absence of extensive third party credit enhancement, or the emergence of a significant supplementary revenue stream (for example, payments for avoided deforestation), their inclusion in a portfolio of sustainable forestry will increase the overall risk profile of the portfolio from the lender’s perspective, significantly increasing the cost of borrowing.

Limited cash flow diversity – Natural forests have the capacity to deliver a diverse range of cash flows but in many cases the relevant markets are early-stage or have yet to emerge. The issue can be addressed by blending natural forest cash flow with cash flows generated by plantations, plantation-

related activity, and ecosystems services. If based on tropical forests, such a portfolio will require cost-effective credit enhancement, in particular to support plantation related cash flow⁵⁰. Such a portfolio will benefit from the inclusion of a higher number of smaller and medium forestry assets, as this increases diversity. However, this approach will add costs in other areas.

Issues arising from geographic location

The majority of natural growth tropical forestry is located in countries with non-existent or underdeveloped capital markets and legal systems. This both increases risks associated with the asset and limits the ability to mitigate those risks.

Tenure and ownership rights – In tropical countries with unclear tenure and ownership rights and inadequate or untested legislation, it will be extremely difficult to complete the ‘true sale’ of forestry assets that would be required to create a Forest Backed Bond based on an asset backed securitisation. A structure based on future flow securitisation of export earnings can be employed to mitigate these issues, and is the only realistic approach for developing a Forest Backed Bond in these countries. The cost of credit enhancement will determine the attractiveness of this approach.

In advanced developing countries such as Brazil and Chile, with rapidly developing capital markets, strong and growing local demand for timber, and a major timber resource, structuring Forest-backed bonds as an asset backed security offers a more immediately attractive approach.

Local SME and community groups may be able to manage natural growth forests at a lower intensity than industrial loggers, but values and objectives are unlikely to translate well in conventional financial risk assessments. Size and lack of management capacity is likely to be a concern for structuring teams considering the direct inclusion of assets from this source.

Opportunities exist to enhance the provision of finance to local SME and community groups by supporting the lending practices of local banks. A portfolio of locally originated sustainable forestry based loans would be an attractive target for a CLO.

High costs associated with inadequate or untested legislation - Legal costs for a conventional deal could be expected to exceed US\$200k, and with the complexities inherent in a developing country transaction, the first ones at least could be expected to be even more expensive.

Country risk - The particular concerns over country risk and political risk in developing countries mean that a transaction would also require significant third party credit enhancement and an external rating.

Sustainable forest management - Many investors will want to see evidence that the forestry assets underlying a financial instrument are being managed sustainably. There are limits to the certification

⁵⁰ We have identified government income from concessions and forestry loans to SME as two suitable ‘non-physical’ assets.

of forests in developing countries (most particularly the smaller forests) and this could be a constraint, unless new systems and procedures can be developed to enable more widespread application of the principles. The higher costs associated with certification could potentially be matched by reduced operating risks which can lead to lower insurance premiums.

5.1.3 Enhancing value through Payments for Ecosystems Services (PES)

At present the most significant economic benefit relating to ecosystem protection involves upfront payments for conservation, such as takes place in the US conservation easement programme. From the forestry manager's perspective, these deals offer a similar outcome to the issue of bonds (i.e. upfront access to capital through sale of an asset), but are more straightforward to execute and manage.

Critically, technical concerns over the capacity of forests to deliver long term reductions in carbon dioxide emissions have led to their exclusion from the EU Emissions Trading Scheme, the primary driver of this growth in this \$15 billion pa market.

Voluntary markets, involving unregulated entities offsetting their carbon emissions by buying reductions from qualifying projects, have played a more significant role for forestry projects. However, although they are growing fast, the voluntary market remains fragmented and relatively small. To be appealing to voluntary buyers projects must deliver high conservation or social value. Standards such as the Voluntary Carbon Standard are emerging which will enable buyers to better assess these characteristics.

And interest in payment for forest-based ecosystems services is growing rapidly, focused around the carbon market with multilateral groups like the World Bank and government buyers leading the way. Significant interest in the sector is also reported from potential corporate buyers in the EU ETS, and from voluntary buyers in the US and Australia. These are major organisations with strong credit ratings.

However, the market for forestry carbon suffered a slow start and has yet to establish a significant track record.

This means analysts interested in rating these markets cannot look to past performance in order to assess the predictability of their revenue streams, which in turn make them awkward to include in a securitisation.

It remains the case that if long-term contracts can be secured with highly credit-worthy counterparties, and if these are structured to provide a reasonable degree of certainty on pricing, then a substantial proportion of the risk can be offset. By definition, revenue flows related to

Box 30: The role of the World Bank in forestry carbon markets

The World Bank, through its Bio Carbon fund (BCF) and Community Development Carbon Fund (CDCF), has played a crucial role in developing and shaping the emerging market for forestry carbon. The BCF buys forestry related carbon credits in both Kyoto compliant projects and broader land-based activities. The CDCF focuses on projects that have a major rural development component.

BCF has signed Emission Reduction Purchase Agreements (ERPA) with twelve forestry projects contracting for a total of over 9 million tonnes of CO₂e up to 2017. The CDCF has four projects under development delivering reductions of over 3m tonnes of CO₂e.

tropical forestry carbon payments are based on hard currency 'exports' from the developing world. This is exactly the type of situation future flow securitisation is designed to accommodate.

When demand for forestry carbon spreads, the ability to credit enhance ecosystem service flow will also significantly increase the overall value of these cash flows. IFC already offer such a service to developers of conventional CDM projects, leveraging its own AAA credit rating to guarantee delivery of carbon credits from CDM developers.

The availability of long term political and credit insurance for tropical timber flows will also be essential to the successful structuring of forest-backed bonds. In this regard, MIGA, who have played a central role in underwriting political risks associated with conventional infrastructure projects, should focus their attention of natural infrastructure.

5.2 Market for Forest Backed Bonds

In order to be commercially feasible a Forest Backed Bond must be attractive to tropical forestry investors and/or operators as a means of accessing capital, and to the capital market investors who are effectively lending to these projects by buying Forest-backed bonds.

Investor interest in tropical forestry is increasing rapidly, although from a low base. The underlying asset class offers a compelling investment thesis based on US experience. The most significant impediment to wider institutional interest outside the US appears to be high country risk and a shortage of investment opportunities that meet current investment criteria. Ownership rights and inadequate legislation in developing countries are additional areas of exposure. As outlined above, the upside profit potential from PES is not yet sufficiently well-developed to attract mainstream investors, although the market is evolving rapidly in this area.

A hallmark of the US timber investment market has been the availability of attractive local assets to invest in, a situation created by the on-going disposal programmes of major pulp and paper corporations. The reverse trend is apparent in much of the developing world, where shortages of supply are leading major users to buy forestry assets a factor that may further squeeze supply.

Not surprisingly, the availability of finance tends to correlate with the scale of the business. This is also true of access to revenue 'kickers' designed to support and encourage sustainable practices, such as certification and PES. Smaller and medium sized operators continue to face significant challenges in funding their businesses, major operators less so.

In this context, the ability to utilise an asset backed financing mechanism like Forest-backed bonds – and gain access to a pool of low cost capital - will be an attractive draw both for forestry operators, and for equity investors interested in tropical SFM.

A steady decline in the issuance of longer dated bonds, especially by governments, has led to a significant shortage of investment opportunities in this class of asset globally. This has led to historically low yields, and heightened investor interest in alternative investment opportunities. To be attractive to potential buyers in the capital markets, a forest backed bond will need considerable credit enhancement.

A number of complementary themes emerged as factors likely to influence buyer interest, including:-

- § Local tax treatment and targeted subsidies have played a key role in directing financial flows in the forestry sector globally, and will play an important role in enabling the development of Forest-backed bonds. This could be relevant in the context of origination of assets and distribution of Bonds.
- § The extent to which governments and supranational agencies increase their direct support for sustainable forest management, in particular through long term commitments to purchase certified timber, and forestry carbon etc⁵¹.
- § The extent to which increased political support emerges for the integration of forests into post 2012 climate change architecture, and mechanism/s by which this is achieved.

⁵¹ National initiatives such as the UK government sustainable timber procurement programme.

5.3 Next Steps

This project explores the feasibility of potential impact of an innovative new financing mechanism that will link tropical natural forests with capital markets – a Forest Backed Bond.

We have identified a number of possible structures. The most attractive option is a Forest Backed Bond that draws on a diverse portfolio of tropical forest cash flow, and combines revenue generated from the sustainable management of natural forests with that from plantation activity, conservation and ecosystem services, through a process we've branded 'EcoSecuritisation'.

The practical development of Forest-backed bonds requires coordinated action in four key areas:-

1. Improve information flow to capital market participants on the physical, financial and legal aspects of tropical natural forests.

Organisations such as the FAO and ITTO, and consultancies such as Poyry & DANA, provide a range of reference material on forestry, there remains a lack of publicly available information on the performance of individual forests outside a few 'popular' tropical countries. Although the international trade in tropical timber is significant, a far higher proportion of the overall global trade takes place on local markets. This is a trend that can be expected to continue.

Although some local markets are relatively open – for example, those within Brazil and Chile – others are far more opaque – for example, in DRC. In practice, importers and traders access these areas by developing strong commercial and/or political relationships with local partners.

Access to accurate and verifiable information on forest management and cash flow in these areas will be key requirement if local operators are to benefit from a Forest Backed Bond. A clear picture of local trading activity is required if these flows are to be incorporated.

- 1.1. Anecdotal evidence collected during this study suggests that there is a significant amount of information related to commercial aspects of tropical forest that remains outside the public realm.

Tropical forestry businesses and traders should be approached to identify mutually beneficial opportunities for enhancing the transparency and overall effectiveness of local markets. An excellent medium term aim would be the creation of reliable local market price indexes.

- 1.2. Recent advances in satellite technology hold great promise for independent collection and assessment of physical data related to forestry. It may soon be possible to monitor individual trees from space, and map areas of deforestation etc. These develops have a major implication

for the provision of forestry insurance; increasing the ease and accuracy with which data can be collected from remote locations also reduces the cost of delivering insurance.

Research should be undertaken into existing and proposed methods of gathering physical data on forests. This should identify any shortfall in information flow against the requirements of structured finance teams, rating agencies and financial regulators involved in the development of a Forest Backed Bond.

- 1.3. Uncertain property rights reduce or eliminate the security that natural forest assets (such as the rights to carbon) might otherwise offer potential lenders. Worse still, lending in this situation can damage the reputation of the bank or investor concerned.

EcoSecuritisation entails the sale of cash flow that has yet to be earned. The rating agency must be convinced that the structure of an EcoSecuritisation provides (a) a strong incentive for operators to continue servicing/processing forests in line with the agreed management plan once they have received 'up-front' benefits, or (b) an effective means to recover the situation if the operator fails to keep their part of the deal. The most likely means for taking action against a failed operator would be through local courts – this requires local legislation that is favourable to such actions and an effective judicial system.

Information on the legal, political and economic environment in which tropical natural forests exist should be collected, collated and made more widely available to investors. The format should be authoritative, easily accessible, accurate and up-to-date. Contributors should be encouraged to use the site as a means of communicating challenges, achievements and opportunities related to tropical natural forests.

2. Develop existing third party credit enhancement facilities for application in tropical forestry.

Credit enhancement is the mechanism by which the credit quality of the initial asset pool is enhanced so as to boost the overall rating of the subsequent asset backed security. Improvements in rating reduce the cost of borrowing, but the inclusion of third party credit enhancement (such as insurance) adds cost to the structure. The cost effectiveness of third party enhancement is therefore based on the extent to which it improves the credit quality of the instrument, and lowers the cost of borrowing.

Credit enhancement is an essential component in all securitisation deals. The availability of cost effective third party credit enhancement will be key to any EcoSecuritisation involving tropical natural forests. Key areas will be insurance against loss of cash flow in the portfolio, and hedging against adverse movements in the price of underlying forest products and services.

Insurance is required to mitigate losses that could potentially occur as a result of failure of the income generating asset (e.g. forest, processing plant etc), or failure of the off taker (e.g. buyer

of timber). Hedging provides a means of limiting exposure to any future variations in the price of the underlying product or service from which portfolio cash flow are derived.

From a capital markets perspective, the value of either of these forms of credit enhancement (i.e. the extent to which they lower the risk profile of a Forest Backed Bond) is directly related to the on-going credit quality of the provider/counterparty.

From the point of view of the institution providing the credit enhancement, the attractiveness of the instrument will depend in large part on the extent to which mainstream investment funds can be leveraged in alongside this credit enhancement facility.

- 2.1. There is a major lack of insurance capacity for tropical forestry assets outside key countries (e.g. Brazil, Chile), particularly for small and medium sized operations. This situation has worsened in recent years as a result of a general decrease in appetite for 'esoteric' and non-core business throughout the insurance sector. The inability to insure against physical loss from basic perils such as fire and wind in countries where country risk is already a concern presents a significant challenge for creation of a Forest Backed Bond. In addition to loss of timber revenue, unplanned loss of trees will result in loss of revenue related to ecosystem services.

Difficulties in insuring forests stem from a lack of capacity in the reinsurance market. A Tropical Forestry Reinsurance Facility should therefore be created in order to increase the capacity of local insurers to cover key forest risks. Although this capital will be 'at risk', the likelihood of loss is very low. The facility should remain operational just long enough to build awareness and confidence amongst the global insurance community. Private capital will then be available to take its place.

- 2.2. In liquid commodity markets the business of providing price hedging can be a lucrative one. However this is less so in illiquid markets where accurate independent price discovery is difficult. In local timber markets, as in any other small market, pricing may be skewed by asymmetric flow of information and local commercial allegiances.

An alternative to price hedging in the open market is the negotiation of a long term fixed or semi-fixed price contract. In the absence of cost effective price hedging, this approach will be essential in order to minimise earnings volatility within the portfolio. However, entering a long term fixed price agreement may not be the most secure approach if one of the counterparties is based in a jurisdiction where enforcement of the contract will be difficult in the event of an unfavourable price movement.

Whether pricing is floating or fixed, major buyers that are faced with increasing shortages of forest products are interested in signing long-term contracts.

Further research should be undertaken to establish capacity/interest amongst market participants to deliver price hedging and indexes for tropical timber and other natural forest revenue streams.

3. Reinforce national commitments on the purchase of certified forest products by public bodies

For market-based mechanisms like SFM and PES to work in practice, strong and consistent price signals for the products and services being produced are essential. Without this these initiatives are at best irrelevant, and at worst distract from the critical task of halting tropical deforestation.

Stern (2006) highlights the economic costs associated with climate change, and pinpoints action to reduce tropical deforestation as the most cost effective short-term measure that can be taken to address the problem. On this basis, Governments have a fiduciary responsibility, as well as a public duty, to act.

Public procurement policies are increasingly being used to build markets for legal and sustainable timber products⁵². The emerging market for forestry carbon generated through afforestation and reforestation is currently dominated by multilateral and government agencies, led by the World Bank BioCarbon Fund. Similarly, potential buyers of watershed services tend to be major corporates, utilities and municipalities.

The credit quality of different off-takers within the portfolio is a key determinant of the overall credit quality of the cash flow. EcoSecuritisation of cash flow from AAA-rated long-term supply contracts reduces the demand for additional third party enhancement, thereby improving the cost effectiveness of Forest-backed bonds.

Governments should extend and strengthen their commitment to public procurement of certified timber. Local markets are as important as international trade – government commitments should extend to all jurisdictions where significant timber purchasing is taking place.

Annex I governments should prioritise their purchase of forestry carbon generated under the CDM for the first Kyoto phase, and should commit to making advanced purchases of carbon created through avoided deforestation at the earliest possible opportunity.

The EU Linking Directive should be amended to allow the inclusion of forestry carbon from the CDM within the EU ETS at the earliest possible opportunity.

⁵² It is estimated that government accounts for about 15-20 per cent of purchases in most developed countries, and thereby exerts substantial influence on the market
http://www.illegal-logging.info/sub_approach.php?approachId=1&subApproach_id=44 (20/06/07)

4. Support the creation of a 'debut' Forest Backed Bond

EcoSecuritisation unlocks a flow of long-term 'patient' capital for the economic development of tropical natural forestry. The mechanism allows operators and investors to exchange long-term revenue streams for long-term capital – in particular it targets cash flow for (as yet) underdeveloped markets such as forestry carbon.

Debt is the preferred means of finance for most private operators involved in tropical forestry, and also a well established route by which private investors boost equity returns. Where debt is sought, unlocking debt provision through EcoSecuritisation will by default create an incentive to undertake SFM and PES.

A pilot EcoSecuritisation should be undertaken in 2007, leading to the debut issue of a tropical Forest Backed Bond early in 2008. An independent vehicle should be created and funded in order to provide a clear focus for the management and marketing of the deal. The project should bring together key capital market participants – rating agencies, insurers, governments and so on - as a 'learn by doing' exercise.

The pilot should target forestry operators and investors in lower middle-income countries, where forest resources come under most strain from economic growth in China and elsewhere. In the selection of countries, heavy weighting should be given to the FLEGT process and the presence of current or proposed Voluntary Partnership Agreements.

A future flow structure should be employed, and utilise existing guarantee mechanisms where possible (for example, the Multilateral Investment Guarantee Agency (MIGA)).

Development of a pilot EcoSecuritisation should occur in conjunction with that of the reinsurance facility/fund, to allow for maximum cross-fertilization of ideas/benefits.

6 Appendices

6.1 Appendix 1 – Methodology

Component 1: Securitisation Techniques

What: Background research on securitisation and a survey of securitisation techniques that have been applied to forestry and related natural resources

Why: Bring the audience up to speed with 'where securitisation fits' in the financial spectrum. Illustrate examples of how, where and why securitisation that has been applied to forestry and other natural resources to date.

How: Discuss with peer group/industry contacts and undertake literature review. Identify any relevant deals undertaken, objectives, structures employed and outcomes. With this information (together with a better understanding of the asset itself) will aim to suggest and discuss the relative merits of a number of different structures. The work will be mostly desk-based research including key discussions with protagonists responsible for structuring deals.

Key output: Analysis of key securitisation structures used in this space, and a summary of (potential) issues related to securitisation of natural resources in the developing world.

Component 2: Forestry Assets / Social & Environmental Impacts

What: A review of managed forestry, focused on the developing world, to gain a 'snap shot' of the financial, environmental and social profile of different forestry types (natural growth through to fast growing plantations).

Why: Bring audience up to speed with the impact of different forestry types and management practices – ownership, scale, location, legal/regulatory environment, existing financial provision (bank debt, equity etc), commercial set-up (current/future revenue streams), key business drivers (e.g. financial gain, conservation etc), impacts/benefits (local and global) in each instance. This component will provide the basis for later analysis of forestry assets that might be attractive targets for securitisation (for both forester and investor).

How: Undertake a literature review and discuss with peer group/industry contacts based on an audience specific/contextual eco-securitisation 'concept brief' (see appendix). Gather potential projects from immediately available sources. Develop a set of research questions for project managers to gather appropriate information on key aspects including size, location, commercial profile and certification standards and ownership etc, in order to get an understanding of the asset base. This framework will be used to assess up to 12 projects to (hopefully) capture and reflect the range of sustainable forestry projects. This will be substantiated through semi-structured interviews

with 5 key players. Discuss the key characteristics defining social and environmental impact with semi-structured interviews with 5 key players.

Key output: An analysis of [approx. 12] forestry projects graded according to their overall profile/impact – we envisage a graphical/matrix depiction of projects positioned according to social, environmental and financial merit . An analysis of project owner/manager and government key concerns and requirements.

Component 3: Market for Forest-backed bonds

What: A review of the drivers, issues and trends in forestry investment, identifying any existing 'forest-backed' bonds. Review of demand/supply dynamics for long dated fixed-income securities, and the existing capacity of the market to deliver/structure and absorb a 'forest-backed' bond.

Why: Identify the key stakeholders and factors currently driving investment flows in developing world forestry (multi-lateral, local/development banks, private equity, and forestry agencies, insurance). Identify the investors most likely to purchase forest-backed bonds, and their motivation for doing so.

How: Undertake a literature review and discuss with peer group/industry contacts based on project website and an audience specific eco-securitisation 'concept brief'. Design a set of questions to gauge investor receptiveness to forestry as an asset class, and interest in the underlying concept. Taking the asset base and possible structures that could be employed, explore the level of interest/appetite amongst key players in the securitisation process. Review the literature on forestry investment, forestry investment mechanisms and demand for long dated securities. Identify key issues that will inform semi-structured interviews, identify and interview 5 candidates.

Key output: An analysis of the potential demand for forest-backed bonds, highlighting the key concerns and requirements from a legal and investor point of view.

Component 4: Opportunities for Eco-Securitisation

What: Analysis of potential trends in the use of securitisation in developing world forestry, likely outcomes for investment in natural growth forests, and subsequent objectives for eco-securitisation. This will be based around an analysis of potential (financial) structures for delivering these outcomes.

Why: To illustrate the validity/feasibility of eco-securitisation based on stated aims, previous experience (e.g. microfinance etc) and existing sentiment amongst key stakeholders / investors. Also identify potential/appropriate areas for public sector/development agency engagement.

How: Utilise existing in-house expertise, literature reviews and peer group/industry contacts (in particular legal) to build a picture of likely trends in forestry securitisation, and environmental and social outcomes. Taking the key requirements and outcomes of securitisation, we will explore the

possible social and environmental impacts of a successful deal on sustainable forestry. Review the literature regarding the impact of existing investment trends, and contrast these with potential impact of a securitisation. Identify key issues that will inform semi-structured interviews, identify and interview 5 candidates.

Draft basic 'term sheet/s' for suggested eco-securitisation structures, and subject these to peer group review to identify pros, cons and key challenges. Key output: An analysis of (existing) potential for the application of securitisation to developing world forestry. Draft concept/structure term sheet/s for eco-securitisation, and analysis of a peer group review.

6.2 Appendix 2 - Forestry Securitisations (detail)

A. Tornator Finance Plc, a Finnish forestry whole business securitisation.

Background:

Launched in April 2003 and backed by 594,400 hectares of forest land (pine, birch, spruce pulpwood and sawlogs), 18,400 hectares of unforested land, along with 4,400 contracts granting access to the land. Revenues are generated by the (a) sale of timber under i. a wood sale agreement with Stora Enso, and ii. sale of a further 100,000m³ of timber, (b) sale of land, (c) sale of soil and gravel & (d) sale of hunting rights to third parties. The assets are managed by Tornator Timberland Oy, a spin-off from Stora Enso, which is one of the world's largest producers of paper & board.

The Aim of the Deal:

The securitisation was intended to realise the value of Stora Enso's timber supply business in order to refinance some of the group's debt. The structure was chosen as a good alternative to a straight sale of the forestry business to a financial buyer: it was determined that the latter would not realise the full value of the business, since there are limited equity investors for forestry in Finland, other than Stora Enso's direct competitors (to whom it definitely did not want to sell), and any financial buyer would have demanded a much higher return & more control than a structured debt investor.

Structure, Note Characteristics & Credit Enhancement:

The notes were issued in three tranches totalling EUR370m:

a senior Class A tranche: rated 'A3'/'A', maturing after 19 years, and receiving a coupon of Euribor plus 90bp

two subordinated Class B tranches rated 'Baa2'/'BBB', maturing after 30 years: the Class B1 notes yield Euribor plus 240bp and the Class B2 yield 6.34%.

Credit enhancement for the notes is provided by a non-amortising cash reserve of EUR10m, fully funded when the deal closed, as well as a EUR40m revolving liquidity facility, designed to maintain cash flows in the event of a delay in realising an insurance claim, of which EUR9m is available for the benefit of the Class B notes and EUR31m for the Class A notes. Other structural protections include a minimum debt service coverage ratio (DSCR) of 1.2 times, below which the security would be enforced and all proceeds would be used to amortise the notes. Finally the outstanding amount of the secured notes as a proportion of the value of the asset security (loan-to-value ratio or 'LTV'), which was 56% when the deal closed, is capped at 75%, and land must be sold in the event that it exceeds this level in order to amortise the notes.

Governing Law:

The governing laws for the deal are

Finland for the 'true sale' of the assets to the SPV, and the security of the note holders over the assets

the UK for the remainder of the transaction documents, and Ireland for tax issues.

Monitoring Requirements:

Ongoing reporting requirements to monitor the deal include semi-annual reports detailing revenue, operating expenses, capital expenditures and EBITDA, as well as key cash flow statistics, the balances in all relevant accounts, a periodic company valuation taking account of land sales, details of all acquisitions & disposals of properties, any environmental claims, insurance coverage, and a description of any defaults.

Investors:

The deal was bought by 40 investors in 11 countries, with slightly over 50% sold in Scandinavia.

Why did the deal work?

Timber is a unique, low-maintenance & appreciating asset class, and this operating timber company was a suitable subject for a whole business securitisation for a number of reasons: the management team involved have a solid track record, the managed forests have historically low fire risk, demand for timber within Finland exceeds supply, & the company benefits from a binding long-term offtake agreement with an investment grade entity.

Transaction risks & their mitigants:

However there were a number of risks inherent to the transaction which had to be considered and mitigated. These included the volatility of wood prices, cyclical over 10 yr cycles (dropped 30-40% 1990-93), and the fact that the product is a commodity in a competitive sector, with roundwood prices currently trending downwards. To account for these risks plentiful historical data was used by investors & rating agencies to model conservative pricing scenarios when determining the necessary credit enhancement needed for the notes.

The deal is dependent on a single 10 yr wood off-take agreement with Stora Enso (rated 'BBB'/'Baa2'), and renewal risk after its expiry. This risk is mitigated by the fragmented nature of the timber market & the good location of Tornator forestlands, meaning alternative markets are accessible, and the fact that Stora Enso would need 3000 replacement contracts if it decided not to renew this one.

Finland's pro-creditor bankruptcy regime makes problems for the transaction when compared to the UK regime, and in the event of default the note trustee would not have the right to appoint an administrative receiver. This could lead to delays to the enforcement of the security & possible reduction of interest rate on the notes. However the fact that the notes make up over 80% of Tornator's total debt mitigates the risk, since the trustee can block any unwelcome decisions or court-ordered reorganisations. Tornator Oy & Tornator Forest Oy are functioning companies with operational debt, so other creditors could have claims on the securitised assets. This is mitigated since unsecured trade debt is capped at EUR1m.

Further risks include the limited market for the sale of Finnish forestland (one of the reasons securitisation was considered in the first place) in case the deal runs into trouble, regulatory risk from developing Finnish conservation policies and the chance of unexpected capital expenditure needs. There were no foreign exchange issues.

Factors determining if this structure could work elsewhere:

The jurisdiction would have to have to be highly rated – the rating of the transaction would be limited to the rating of the country itself.

The jurisdiction would need to provide for predictable scenarios in the event of a bankruptcy of the securitised company whereby the note-holders' security over the assets would not be challenged.

Any expected payment delays in the event of bankruptcy would need to be covered by liquidity facilities. More expensive where legal processes are lengthy or uncertain.

The securitised business should benefit from a strong business with barriers to entry

The securitised business should be straightforward – it should be possible to hand operations easily to a third party, to be continued without disruption, in the event that the sponsoring company goes bankrupt. Forestry operations requiring more skilled management, e.g. sustaining the ecosystem, multiple forest products, might be less suitable for whole business securitisations for this reason.

B. Arcel Finance Limited, a Brazilian future flow securitisation of wood pulp export receivables

Background:

Arcel Finance Limited, a Cayman Islands SPV, has issued 3 series of notes backed by existing and future export receivables of bleached eucalyptus kraft pulp (BEKP) from Brazil. The underlying receivables are originated by Aracruz Cellulose S.A. ('Aracruz', the world's largest producer of BEKP, currently rated 'Baa3'/'BBB-'), and constitute 95% of the company's total production.

The revenues from the wood pulp exports are deposited by clients into an offshore account.

The most recent note issuance amounted to US\$825m and was dated May 2004. There were previous issuances in 2002 and 2003. The deal achieved a rating 4 notches higher than that of local sovereign debt at the issuance date ('BB-').

The Aim of the Deal:

The transaction aims to raise money to reduce outstanding Aracruz debt & to fund an increase of production capacity as part of an ongoing expansion plan.

Structure, Note Characteristics & Credit Enhancement:

The 2004 note issuance amounts to US\$825m, is rated 'BBB' and has a term of 8 years. The 2002 and 2003 issuances were also assigned underlying ratings of 'BBB' (although the former was wrapped to 'AAA' by monoline insurer XL Capital), and have maturities of 7 & 8 yrs respectively.

Credit enhancement is provided by over-collateralisation and minimum debt service coverage levels. Various performance limits are in place which if breached will trigger the channelling of all revenues to amortise the notes:

Aracruz must be worth more than US\$1.5bn

Net debt / Capitalisation must be less than 0.6-1

Collections from the receivables must be more than 2.5 times the maximum debt service on the outstanding notes in any single period.

Monitoring Requirements:

Among other information, Aracruz is required to submit periodic reports detailing

its business value

financial ratios

collections from the receivables

performance ratio calculations

Investors:

All three note issuances were privately place, although the 2002 issuance was first wrapped to 'AAA' by XL Capital Insurance.

Why did the deal work?

Aracruz is a very strong company rated 'BBB-', above Brazil's country rating, largely thanks to its strong export business position, low-cost production capabilities, high-quality BEKP.

Aracruz exports almost 100% of its production to the US, Europe & Asia, through long term supply contracts with several large international tissue producers (c. 70% of sales, does not sell much on the spot market).

Securitised assets made up almost all of the originator's assets

Sales are denominated in US\$, matching the note payments.

Transaction risks & their mitigants:

The cyclical nature of the market pulp industry, mitigated by good historical data availability, enables price assumptions to be modelled.

Factors determining if this structure could work elsewhere:

Government support for the deal is important (although perhaps not essential): municipalities and government bodies can provide support for the deal, and potential investors are likely to require that the local Central Bank has provided explicit permission for the deal.

The securitised business should be important for the local economy in order to survive a local crisis.

Sponsors should be top-tier corporates or financial institutions with proven ability to prosper even in a difficult political and economic environment. This is the explicit requirement of certain international investors, including monoline insurers XL Capital & FSA. For example the exports of companies such as Aracruz have increased during periods of crisis in Brazil.

6.3 Appendix 3 – Forestry and the Carbon Markets

6.3.1 Forests & Carbon

Plants and trees play a vital role in the global carbon cycle, sequestering carbon dioxide from the atmosphere through the process of photosynthesis as they grow. Some of this carbon is transferred to the soil through roots and as leaves falls, leading the creation of relatively discrete 'pools' of carbon. When soil is disturbed, or when trees die and decay or get cut down, stored carbon eventually oxidizes and returns to the atmosphere. In total, across different carbon pools, global forest ecosystems are estimated to contain 4.5G tCO₂e⁵³.

The greatest proportion of carbon uptake occurs during the growth phase of trees. The rate of uptake is proportional to the rate of growth, which itself depends on multiple factors including tree species, location, and weather and silviculture practices/management regime.

These variations, coupled with need to ensure the environmental integrity of project based carbon credits, makes the methodologies for development of forestry based carbon projects considerably more complex than those for projects based on emission abatement through clean technology.

Theoretically carbon credits can be generated for reducing the rate of deforestation in natural, old growth forest (e.g. through introduction of sustainable management or conservation) and for planting new forests.

The general approach to carbon trading in forests therefore varies depending on the general objective of forest management:

Natural Forest

Natural forests are dynamic and highly complex ecosystems, through which CO₂ cycles on a continual basis. Discounting any major external natural and/or anthropogenic perturbations, the process is considered to be in balance over time⁵⁴ with roughly equal quantities of absorbed and emitted - the key significance of natural forests is their role is a vast global store, or 'sink', for carbon. In this context emissions occurring as a result of net deforestation are highly significant globally, accounting for more than 18% total emissions⁵⁵. Carbon credits generated in natural forestry are therefore based on actions that *avoided deforestation*.

⁵³ Prentice et al (2001)

⁵⁴ External influences cause variation in net uptake and loss of 1 to 2 Gt C over 2 to 3 years

⁵⁵ World Resources Institute

Plantation

Plantations are man made forests, and as such can be designed, developed and managed in a highly controlled fashion. Unless planted on ground recently occupied by natural forest⁵⁶, plantations add to the total size of the global forest estate, resulting in a net removal/sequestration of CO₂ from the atmosphere. Carbon credits generated in plantation forestry are based on actions that *sequester* carbon.

Conservation

Large tracts of natural forest considered to be of high conservation value have been set aside by governments around the world, and designated as Protected Areas. Without significant financial resource/incentives to address the underlying causes of deforestation in these areas, poorer countries face an uphill struggle to enforce and develop these protected areas. Carbon credits generated in conservation are therefore also based on actions that *avoid deforestation*.

6.3.2 Forestry Carbon as an Asset

The extent to which forestry-based carbon credits, whether voluntary or regulated, could be incorporated in a Forest Backed Bond will be influenced by the underlying security and quality of the cash flow they offer.

The key factors currently determining the market for carbon credits generated by these forests are -

Lack of Permanence

The lack of permanence associated with forestry, and subsequent temporary nature of any carbon reductions claimed, is a key concern for potential buyers of forestry based carbon credits⁵⁷. The CDM accommodates this by creating two varieties of non-permanent carbon credit: temporary Certified Emission Reductions (tCER) and long term Certified Emission Reduction (ICER). Non-permanent CERs support the environmental integrity of forestry carbon projects but are effectively a different class of credit from the point of view of a trader or compliance buyer.

An alternative approach applied in voluntary markets such as CCX, is 'self insurance'. This entails projects putting aside an additional buffer of forestry carbon over and above that used to back credits. The CCX methodology for forestry carbon projects stipulates a buffer size of 20% of total issued volume.

Third party insurance against loss of income from carbon credit generation is also possible by combing insurance against physical loss due to biotic (pests etc) and abiotic (wind, fire) perils, with more recent schemes that enable projects to insure against CDM related institutional risks, including failure or delay in project approval, certification and/or issuance of CERs (Swiss Re, 2006).

⁵⁶ Land not forested on or before 31st December, 1989

⁵⁷ http://www.climate-standards.org/news/news_april2006.html

Leakage

A key requirement in the design of forestry carbon projects is to ensure that emissions reduced or avoided within the project boundary result do not lead to an increase in emission elsewhere. Regulated markets catch this through rigorous assessment of initial project design. Voluntary projects for afforestation and reforestation are likely to benefit from the emergence of standards such as CCBA and VCU.

Discussions around use of avoided deforestation in regulated markets have centred on the use of national baselines, primarily because of difficulties with assessing leakage at project level. The treatment of leakage in voluntary projects dealing with avoided deforestation is therefore likely to come under close scrutiny.

Quality Assurance

Forestry carbon projects have been subject to a high degree of scrutiny from NGO and civil society players regarding permanence and perceived support for industrial plantations, which are perceived to have far lower developmental and biodiversity benefits than natural forest.

Following best practice in design of forestry projects is likely to increase the appeal of the credit to buyers, and therefore increase demand, and also reduce the risk of project failure (CATIE, 2007). There is evidence to suggest that 40% of potential buyers for forestry carbon credits will pay a premium for credits from projects certified to the Climate and Community Biodiversity Alliance Standard (CCBA)⁵⁸

Ownership & Transfer

A lack of clearly defined ownership over forestry carbon rights, in particular with regards to local communities, remains a key issue for the NGO community. Given that one of the key benefits of forestry carbon, especially in the voluntary market, has been social and developmental co-benefits this issue should be one of concern for both offset buyers and investors. Clear legal frameworks have emerged in a number of countries. Australia has led the way in enacting innovative legislation that grants separate title to land, timber and carbon.

⁵⁸ http://www.climate-standards.org/news/news_april2006.html

6.4 Appendix 4 – Characteristics of Selected SFM Projects

This section presents a list of Sustainable Forest Management projects assessed over the course of the project. Each project has a different operational profile and potential financial requirement. We identify key the assets in each project and attempt to qualify ownership/property rights around these assets.

Table 16: Sustainable Forest Management Projects

Project	Country	Type	Ownership	Size (ha)
Iwokrama	Guyana	Natural forest	people and government of Guyana	108,992
Scolet Te	Mexico	Natural forest mainly and small scale plantation	Smallholder ownership (plantations); Communal (natural forests)	500ha Plantation & 3,000ha natural forest
Floresteca	Brazil	Commercial Plantations	Forestry Management Company	23,500
Pacific Teak	Costa Rica	Plantation	Private funded	not known
Mata Atlantica	Brazil	Natural forest	Mixed (state owned and private owned)	12,675
Yunnan	China	Commercial plantation with some assisted natural regeneration	State owned	266,000
Futuro Forestal	Panama	Plantation		
New Forest Company	Uganda	Plantation	Government owned, Private leased	18,600
Model Sustainable Community Forest	Suriname	Plantation	Community owned	10,000
Precious Woods	Brazil	Natural Forest	tbc	tbc
Sappi	South Africa	Commercial plantation	Individuals, Tribal Authorities, communities.	16,975
SAVCOR	South Africa	Commercial plantation	tbc	tbc
Kilombero Valley Teak	Tanzania	Commercial plantation	tbc	tbc
Lignum Fund	Chile	Small grower scheme	tbc	tbc
Rift Valley Holdings	Mozambique	Tbc	tbc	tbc

Key issues and requirements

- 4.1. Legal aspect in respect of security and title will require much closer analysis.
- 4.2. The role of the management company/project sponsor is critical given the unusual nature of the schemes and their life spans. The availability of suitable replacements would need to be carefully looked into.

- 4.3. Historical information on timber market prices needs to be further investigated; in particular the link between timber price and inflation, as rating agencies typically find it hard to give credit to inflation in their analysis (unless it is swapped) while the returns from investment in timber seem to be closely influenced by inflation.
- 4.4. Project specific information on mortality rates and impact of other hazards.

In addition:

- (a) Consideration given to alternative land use values, especially if this is to be considered as a viable exit strategy.
- (b) Cash flows produced by carbon sequestration and it quantifies the amount in terms of number of tonnes.
- (c) These transactions are exposed to significant operational risk which will need to be minimised or neutralized. There are additional questions over consequences of project failure due to its complexity (e.g. Pro-natura) especially if reliant on other forms of financing. These would need to be satisfactorily subordinated to the securitisation.

6.5 Appendix 5 – Country Selection Assessment

The table below provides some initial observations on the country selection for a portfolio of forestry assets -

Table 17: Enabling factors - country selection examples

Country	Enabling factors
Argentina:	<ul style="list-style-type: none"> - globally competitive forestry industry thanks to diverse of climate & species, favourable ecological & climatic conditions allowing fast growth. - Much of the forestable area is not exploited.
Chile:	<ul style="list-style-type: none"> - country is investing in its forestry, might be a transaction-friendly target country? - it has a globally competitive timber industry: favourable tree-growing climate & soils, decent infrastructure, low costs, - timber exports make up 3% of GDP & 10% of exports, 2nd only to mining - Chilean politics are geared towards commerce & export. - Some of the country's highest-rated companies are timber companies. - Fundacion Chile & its subsidiary SIF were set up to encourage forestation of privately owned land.
Indonesia:	<ul style="list-style-type: none"> - There has been underinvestment in the Indonesian natural resources sector in recent years (observation in IndoCoal Export report).
South Africa:	<ul style="list-style-type: none"> - To date the securitisation market has been local, partly because the government requires a minimum % of the proceeds of international investment to be converted to Rand (source: FSA interview).
Turkey:	<ul style="list-style-type: none"> - Has outstanding debt with the IMF, but has issued future flow deals regardless of the IMF's generally negative view of this structure.
United States:	<ul style="list-style-type: none"> - ScoPac environmental controversy (see 'Pacific Lumber Case' and 'PL Violation Report 2004' in project site/resource library)

Box 29: Country Example, Bolivia - Case Study of Major Potential in Natural Tropical Forestry

Bolivia is the poorest country in South America, and with per capita GDP of \$940, over 34% of the population is estimated to live on less than two dollars per day. The country has approximately 53 million hectares of forest, of which a little over 10% were awarded in concessions as of 2002*. Most of Bolivia's harvestable forestlands are timber concessions granted on government lands, granted as 40-year leases with the option of renewal.

The Forestry Law of 1996 set the groundwork for improved access to forest resources for entities beyond the handful of large logging firms which had dominated the sector up to that point. The Superintendencia Forestal assumed responsibility for enforcing improved management practices amongst concessionaires, and by meeting national forestry laws and regulations, managers can be assured of a level of compliance with international certification standards set by the FSC. The Bolivian concession system has been an important factor in certification because ownership and title are clear; security of tenure is a crucial precondition for undertaking certification activities. Forestry Concessions are awarded in order for the land to be used for social benefit, although harvest levels considered appropriate to this end are not established.

Bolivia led the way amongst countries of the South in having the first national standard setting body under the FSC system, the CVF, and now has more FSC-certified forest than any other tropical forest nation, at over 2 million hectares in 2006, largely in national forests and representing c. 28% of the total managed forest area of the country. Of Bolivia's sixteen certified forest operations, thirteen are forest concessions, two are private properties, and one is indigenous communal land.

Bolivia has been the focus of a major initiative to promote improved forest management practices; BOLFOR I (first phase of the Sustainable Forest Management Project) commenced in 1994 as a joint initiative between the Bolivian Government and US-AID. BOLFOR II continues to function, and the implementing body is now The Nature Conservancy, a major international ENGO. Both BOLFOR and WWF's Global Forest Trade Network promote the expansion of markets for sustainably-produced Bolivian forest products such as timber and Brazil nuts. Bolivia continues to significantly underachieve its potential as a forest nation, due at least in part to a lack of appropriate investment in the sector.

The Bolivian Government has recently passed legislation to ensure that Federal lands are managed in as productive a fashion as required under the original terms of use when leased to concessionaires. The law promulgated in December 2006 states that any revision of existing concessions will be to the benefit of indigenous communities, in keeping with the prevailing direction of the Morales government. Observers in-country fear that without adequate investment and technical support, the utilization of forestlands handed over to communities may not be optimal, and may even lead to devaluing of the resource and land-use conversion in some cases. Meanwhile, (and contrary to the tendency in much of North America), companies are moving toward greater vertical integration to ensure their future access to supply of raw material. It is likely that new partnerships between community groups (including indigenous communities) and forestry companies will start to emerge, to reflect evolving circumstances in the forestry sector.

* *Who Owns the World's Forests? Forest Trends, 2002.*

6.6 Appendix 6 – Supplement to Business Models – Plantation Costs

Plantations can incur the following expenses:

Capital Costs:

Forestry operations either purchase land outright, or negotiate long leaseholds (> 50 years), over either the land itself or rights to the standing timber. This is a key component and one of the more variable inputs to the overall cost and therefore profitability of an operation (Brown 2000).

Governments, in their efforts to encourage investment in the forestry sector sometimes implicitly subsidise this cost by charging low royalties (e.g. Tanzania). Alternatively regulation governing water use and the environment may restrict or prolong the acquisition process (e.g. South Africa, PAMSA 2005). An attempt to model the price of land per hectare using Land Expectation Value (LEV) shows land prices to vary from under 100 USD per hectare in Mozambique to 2,000-3,000 USD in Brazil (World Bank 1999, in Brown 2000).

The costs of land preparation, the purchase of seedlings or cuttings, planting, fencing and road construction may be included as initial outlays. The cost of road construction may be a significant restriction on overall plantation profitability. Estimates of good rooted clones at USD 0.09 at a planting density of around 1,600 per ha for a short rotation Eucalyptus crop in a developing country context with low labour costs amount to around USD 160 per ha (Mike Howard, pers. comm.).

SilviCultural:

These costs vary according to species planted, rotation length, location, soil quality and include fertiliser, spraying and weed control, pruning and thinning, and can be adjusted during the project. For short rotation Eucalypts, most of the silvicultural costs are associated with fertilisers (170 USD per ha) and labour associated with weed control (170 USD per ha). The cost of fertilisers falls away in the case of a short rotation coppicing operation, where for e.g. in years 7 and 14 after harvesting, no fertiliser is applied. In year 21, the procedure of ground preparation begins again. Silvicultural costs in the case of sawlog pine or high value furniture lumber such teak are expected to be considerably higher.

Harvesting:

Harvesting costs include the cost of logging, the often very high cost of getting the logs to the road and the cost of transportation to mill. Felling costs and transportation to the road are estimated to be in the order of USD 8 per ton in the South African plantation context, while the long distance transportation costs may be estimated at USD 0.04 per tonne/km. In Panama, estimated harvesting and transport costs are estimated at around USD 38 per ton (including FSC costs). In the South African context, pulpwood is generally priced delivered at mill, i.e. transport must be included, while sawlogs are generally priced at the side of the road.

General Overheads:

These include insurance, certification and management costs, rates and levies and financing costs. One component of the cost of insurance is perceived fire risk, which interestingly depends on the tenure arrangement. Small holders and out growers are perceived as a higher risk category by the insurance industry than corporate forestry despite the fact that fire risk factors such as time to discovery, and disenfranchisement of neighbouring settlements are expected to be lower under these arrangements. Insurance costs aside, access to insurance can be a significant hurdle, since it may determine whether standing timber can be used as collateral in a commercial loan arrangement.

Certification costs vary from USD 0.2-1.7 per ha in a developing country context (Crossley and Points 1998), USD 0.2-3 per ha for assessment and 0.02-0.07 per ha for licensing and auditing in the USA (Mather 1999, in Pearce *et al.* 2003)

Financing costs refer to the financing charge on a commercial loan to a forestry organisation and are expressed relative to repurchase rate – or the rate at which commercial banks themselves may borrow. This rate varies with the credit quality of the borrower, but in the case of a small grower or private enterprise may be the prime rate (generally higher than the equivalent mortgage loan rate)

Table 18: Forest Costs in Natural Forests and Plantations

	Natural Forest Logging Operation	Plantation Forestry
Fixed Costs	Earth moving, road building (caterpillars), harvest equipment (skid trucks) and machinery. Concession fee.	Road building equipment, machinery for planting fertilising and thinning as well as harvesting
Variable Costs	Terrain or topography, labour, certification (per Ha), royalty payment, administration costs.	Seedlings, fertilizer, country- specific labour costs, certification (per Ha), administration costs.
Profitability after removing the effects of scale and fixed costs are most sensitive to	Topography influences the ease with which trees are identified and marked, found by harvesting teams, and extracted. Concession quality in terms of the market-price of valued species at time of harvest (note in contrast with plantations, time between the start of concession negotiations and value realisation is arguably short)	Topography influences road-building costs and the cost of transport to the roadside, country-specific labour costs (planting and siculture). The site-specific yield of the selected genetic stock (in terms of Mean Annual Increment). Market price for sawn logs or paper at the time of harvest (which ranges from 7 to 50 years from initial investment).

Tropical SFM inventory levels are typically low. High value woods are often derived from older low-density canopy species, requiring “tree-hunters” in their location and causing economic “wastage” and environmental impacts in their extraction. Even conventional loggers in the eastern Amazon for example “only” harvest 4-8 trees per ha, but in doing so, disturb soils and kill 10-40% of living biomass (Verissimo *et al* 1992). The key issue is not the contrast between conventional and reduced-impact

operations, but the difficulty faced by natural forest logging operations with potentially high inventory levels in marketing alternate species, so only a small proportion of the woody plant biomass/species diversity of tropical forests has any monetary value and finds its way to formal (local or international) markets. Given that the standing stock is dictated by the quality of the concession natural forest logging operations, the typical SFM operation distinguishes itself not necessarily by a reduction in the trees extracted (because replacement rates are generally too low to allow a sustained yield of any one species in any event) but by a reduction in the wastage of timber extracted and environmental impact caused. These reductions stem from pre-harvest inventories and workforce up-skilling, allowing road-building and harvesting to be planned and carried out more effectively.

6.7 Appendix 7 - Certification Standards and Monitoring

Background

In the 1980s, a number of Environmental NGOs were involved in the organization of market campaigns against the import to developed markets of products originating in poor forestry practices and the unsustainable extraction of tropical hardwoods from nations in the South. These campaigns were largely successful in their aims, but an unforeseen consequence of reducing market access for timber products was that this tended to devalue the forest resource in producer countries, and led to increased rates of deforestation, as forested lands were converted to other uses, largely oriented to other export markets. Thus the 'tarring of all with the same brush' had a net negative impact on the state of global forest conservation.

It was not long before the environmental impact of forest management in North America was also scrutinized. In recognition of the need to provide guarantees to consumers that forest products originate from well-managed forestlands, certification programs were initiated. The Rainforest Alliance's "Smart Wood Program" became the first formalized certification scheme in 1990 (Vallejo 1996). At the United Nations Conference on Environment and Development in Rio de Janeiro in 1992, governments adopted the principle of sustainable development, agreeing also to adopt some common principles of forest management. Since then there has been increasing emphasis on promoting sustainable forestry and identifying appropriate indicators of sustainable forest management (SFM). For example, attempts were made to set broad standards and identify indicators of sustainable forestry at the international level through the Helsinki and Montreal Processes, which involved European and primarily non-European countries, respectively (Carbale, Cashwell et al. 1995). At the same time, interest in certification as a means for promoting sustainable forestry increased and the criteria and indicators identified at sustainable forestry conferences are the basis for a number of certification programs.⁵⁹

Voluntary third-party certification schemes in the marketplace today require on-the-ground audit by independent experts against standards set through a broad consultative process, rather than testing against operational objectives set by managers themselves. While certification standards are typically focused on logging practices and environmental impacts in the first analysis, it has been acknowledged since certification emerged as a widely applied market mechanism since the early '90s that it is impossible to separate social and environmental factors out, as complementary aspects of any management system. So certification by credible third-party audit, while not representing a cast-iron guarantee of sustainable practices, does mean that operations are engaged on a process of continuous improvement measured against independently-established standards.

⁵⁹ THIS PARA: 'Forest Certification: Economic Issues and Welfare Implications', by M.K. Haener & M.K. Luckert, Dept. of Rural Economy, University of Alberta Canadian Public Policy – Analyse De Politiques, Vol. Xxiv Supplement/Numéro Spécial 2 1998

FSC is the world's fastest growing forest certification scheme, having increased by one third over the last year. In comparison, PEFC⁶⁰ grew by 5% over the same period of time⁶¹. In real numbers this equals a growth of 20 million hectares for FSC and 10 million hectares for PEFC. Meanwhile, FSC certificates have been issued in 73 countries, while PEFC has certificates in 22 countries.

FSC national and regional standards are developed by broad consultation, based on the universally applicable Principles & Criteria. A number of major financial institutions, such as HSBC, Citigroup, Bank of America, and ABN-AMRO, have adopted investment guidelines broadly based on FSC-based operations.

Coverage

According to the Annual Market Review for 2005-2006 published by the UN Economic Commission for Europe (UNECE) and the FAO⁶², approximately 7% of the world's forests (270 million hectares) are covered by third-party certification schemes. This represents significant progress, since the Forest Stewardship Council (FSC) only implemented the first third-party forest certification in 1993; the proportion of the global forest estate which is certified is expanding.

The Review also notes that while the original driver for certification was uncontrolled deforestation in the tropics, its adoption has been far more successful in the northern hemisphere, and in the developed than in the developing world. A requirement on the part of buyers for certification has been seen by some observers as another barrier to trade for poor producers in the South, with some justification.

In this regard, the FSC is spread more evenly geographically than the PEFC, with more than one third of its certified area outside EU/EFTA countries and North America, and in all newly certified tropical and sub-tropical forest areas, FSC has issued the first certificates. Over the last year Guyana, Laos, Cameroon, Mozambique, the Republic of Korea, Viet Nam, and most recently the Congo have joined the groups of countries with FSC certified forest areas.

⁶⁰ Program for the Endorsement of Forest Certification Systems

⁶¹ The CSA (Canadian Standards Association) has a significant area under certification, but only in Canada, hence is not considered here.

⁶² <https://unp.un.org>

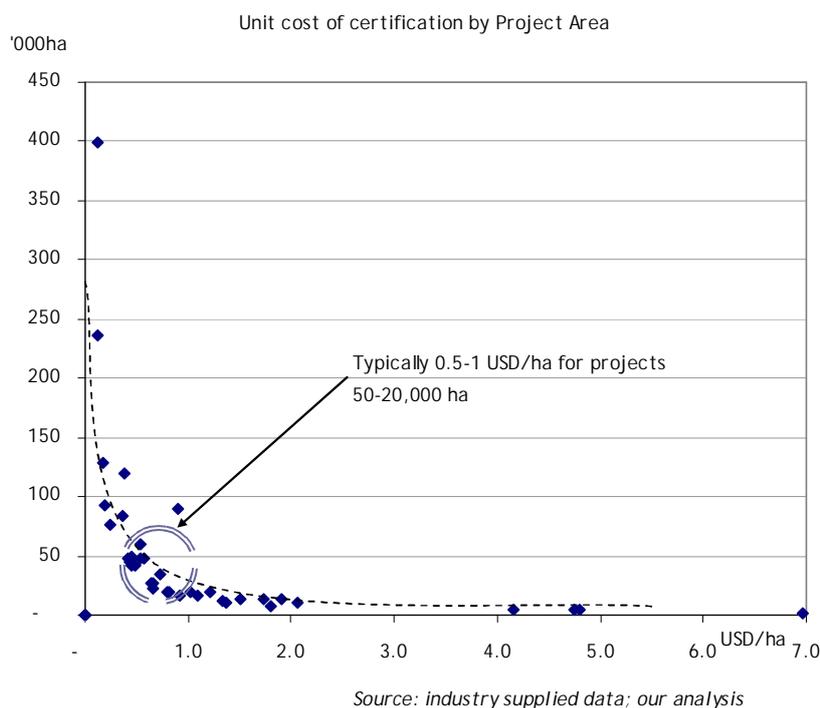


Figure 18: Unit cost of certification by forested area; range of countries. Source data provided by Responsible Forestry Solutions (RFS)

One major innovation within the FSC system has been the creation of the SLIMF (Small and Low Intensity Managed Forest) standard, designed to help reduce the cost of certification for those producers that meet the eligibility criteria, and lessen the barriers to getting certified, through reducing requirements in terms of landscape-level issues where these are not applicable, for example.

Since certification emerged as a tool for promoting better forest management in the early 1990s, a number of different voluntary schemes have arisen. The plethora of systems in existence has led to some confusion on the part of both producers and consumers as to the extent of differences between the competing approaches, and which is more 'valid' for the purposes of benchmarking management practices. In some geographic regions, only one of the larger schemes may be available – generally the FSC, in the case of many tropical producers (for example in much of the Americas). Elsewhere there may be several options for certification on offer; notably in North America and Western Europe, the two internationally operating umbrella systems for forest management certification, the FSC and the PEFC (Programme for the Endorsement of Forest Certification Schemes) are in evidence. Longer-standing Environmental Management System (EMS) based certification such as that delivered through the ISO14000 series is also available for the forestry sector.

In order to make sense of this situation, the World Bank/WWF Alliance for Forest Conservation and Sustainable Use (the 'Global Forest Alliance') developed a tool for assessing certification schemes and systems, the 'Questionnaire for Assessing the *Comprehensiveness of Certification Systems/Schemes* (QACC), tested in the European context in 2005, with input from both FSC and PEFC, as a means of

calibrating the tool for global application. The Alliance, which was created in 1997, has set a target of achieving 200 million hectares of production forests under independently certified sustainable management, and the QACC, now redesigned around existing structures such as ISO and reformulated as the Forest Certification Assessment Guide (FCAG) guides a variety of work undertaken by both the World Bank and WWF to meet this target.

It is noteworthy that while WWF is open to the acceptance of other certification schemes through the application of the FCAG, FSC is currently the only credible system WWF endorses as ensuring 'environmentally responsible, socially beneficial and economically viable management of forests'.⁶³

Meanwhile, alliances have also increasingly been formed between NGOs and natural resource companies that traditionally may have been at loggerheads with one another. While elements of the NGO community have maintained a line of vigorous and highly public denunciation of business practices they see as damaging to the environment and society in general, other entities have sought to find common ground in relationships that were previously antagonistic, and work with companies they consider to be leaders within their respective sectors in a spirit of positive engagement. Cases in point are to be found in Canada and elsewhere, for example the public commitments to FSC certification of their entire land base made in partnership with WWF by forestry companies Tembec Inc. and Domtar Inc.

The Impact of Certification

A key piece of work on the impact of certification around the world is the final report resulting from an extensive study process led by researchers at the Yale School of Forestry and Environmental Studies, on 'Forest Certification in Developing and Transitioning Countries'.⁶⁴ Case studies from Indonesia, Malaysia, Papua New Guinea, the Solomon Islands, Estonia, Latvia, Poland, Russia, Bolivia, Brazil, Guatemala, Mexico, Gabon, South Africa, Gabon, Uganda, and Zambia are included in the final report. Discussion focuses primarily on forest certification under the FSC system, but the wider context of national level schemes, some accredited by the PEFC, is also considered.

This study identified a range of positive impacts of certification, including

- (i) improved political relationships
- (ii) stimulus to the discussion of the nature of sustainable forest management
- (iii) improved pay and conditions for workers, especially in terms of safety procedures
- (iv) microeconomic benefits such as improved market access, better prices, more stable contracts, more favourable credit arrangements, improved production efficiency and enhanced public image
- (v) increased transparency
- (vi) environmental benefits, especially biodiversity protection
- (vii) increased attractiveness to investors

⁶³ http://www.panda.org/about_wwf/what_we_do/forests/our_solutions/responsible_forestry/certification/

⁶⁴ Cashore, Gale, Meidinger, Newsom, Eds., July 2006.

However, the study also highlighted the potential negative impact arising from concentration of the industry as a result of market advantage accruing to certified companies,

These benefits and the potential negative impacts are explored in more detail below.

Improved political relationships

The report authors provide an overview of the positive effects of certification in the countries listed above by drawing on conclusions from all the assembled case study material. One area of improvement resulting from certification initiatives is the impact on political relationships, with two phenomena emerging; both a more inclusive shift in policy discussions to include environmental, community, and indigenous peoples' interests, and also greater interaction between stakeholder groups with a more flexible stance on complex issues. A greater degree of pluralism is most evident in Latin America and Eastern Europe, with a shift from bilateral government-industry processes toward greater consideration of other actors. In the case of Mexico, national and state-level resources have been brought to bear in support of certification in the largely community-dominated forest sector (c.80% of Mexico's forests are in community hands⁶⁵). Where FSC certification has not been widely adopted, for example in the Asia-Pacific region, competitor schemes have at least been taken to task for their lack of wide stakeholder engagement, particularly in the case of Indonesia.

Stimulus to discussion on the nature of "sustainable ecosystem-based forest management"

The second and perhaps more significant dimension to this expansion in the forest policy network has been the stimulus provided to cross-sector debate around the very nature of "sustainable ecosystem-based forest management". This has led in some cases to a greater weighting of social and environmental concerns, with a realignment of some interest groups. Again, the case of Mexico is cited, with the change in government perspectives on the importance of indigenous communities and *ejidos*⁶⁶ with the arrival on the scene of forest certification, and a reappraisal of the contribution forestry can make to the national economy and society in general. The image of the forestry sector overall is reported to have improved elsewhere in Latin America with the advent of certification. In Bolivia, with over 2 million hectares now FSC-certified, credibility has increased, particularly of certified companies, while in Guatemala, with over half a million hectares certified, representatives of conservation groups and the industry have come together in previously unknown collaboration. An interesting point is that this shift in attitudes partly vindicates industry observers who have for a long time maintained that forestry, while not without significant impacts, is generally benign in comparison to the footprint of other activities, such as agriculture, mining, and infrastructure development.

⁶⁵ Bray, D. 2004. Los Bosques Comunitarios de México: Logros y desafíos. Consejo Civil Mexicano para la Silvicultura Sostenible. Ford Foundation. Mexico.

⁶⁶ Non-indigenous cooperatives established in the wake of the Mexican Revolution and throughout much of the 20th Century.

Improved pay and conditions for workers

Certification was found to have had consistent impacts on some social factors in forest management, taking all the case studies into account, including improved pay and conditions for workers, the development of community infrastructure, and the provision of training. An important social benefit has been increased attention to worker safety; in Guatemala, for example, Carrera et al report an increase in the use of safety equipment, the availability of first-aid kits in logging camps, and the provision of life insurance for workers.⁶⁷ More general benefits include greater transparency in the provision by certified entities of community infrastructure such as roads, schools, and clinics; in Gabon, Eba'a Atyi notes that while companies do commonly contribute to infrastructure developments 'forest certification has made the process more transparent and companies that have certificates are more open to showing records of their contributions to local development'. Reported downsides from other parts of the globe were an increased focus of male community members on timber production, at the cost of food crops (Solomon Islands), and concerns around reductions in harvest allocations affecting employment levels (Estonia).

Microeconomic benefits

Microeconomic benefits include improved market access, better prices, more stable contracts, favourable credit arrangements, improved production efficiency, and enhanced public image. Of these, market access is the most widespread finding; in Mexico, for example, charcoal producers have been able to access markets in the EU and U.S. as a result of becoming certified.⁶⁸ Guatemala has also seen an increase in market access, with a consequent rise in certified production between 1998 and 2003. In some regions examined, orders for certified product have gone unmet, as demand exceeds supply; this has been the case for global markets overall, and is like to be true for some time going forward. The picture concerning price premiums obtained for certified products is rather more complex, and appears to vary according to region. In Asia-Pacific, Muhtaman and Prasetyo report that Perum Perhutani in Indonesia received a 15% price premium on its timber when it was certified, and these observations on the existence of a price premium are substantiated by Wairiu for Solomon Islands and Bun and Bwang for Papua New Guinea. In Latin America, meanwhile, Quevedo cites a study by Sandoval indicating that better prices were not received, although this was contradicted by another study by Nebel et al. who found price premiums existed and varied between 5 and 51%. A more extensive scrutiny of margins on certified versus non-certified products would likely be required in order to gain a more comprehensive understanding of the extent to which certified producers can pass on their costs to customers.

Other effects of certification demonstrated by the case studies include an increased stability of contracts, allowing companies to engage in more forward planning and investment; and improved efficiency at the company level as a result of more intensive planning, monitoring, and management of forestry operations. Several authors also indicate that investing in certification has led to improved access to credit markets.

⁶⁷ In Cashore, Gale, Meidinger, Newsom, Eds., July 2006.

⁶⁸ Fonseca, Salvador Anta, in Cashore, Gale, Meidinger, Newsom, Eds., July 2006.

Increase in market transparency

Macroeconomic impacts could not be analysed in detail in the Yale study, given the limited scope of data available. Some observations could be made, however, on both upside and downside consequences of the introduction of certification. Changes have been known to include improved commitment to legal compliance, leading to increased (and punctual) payment of taxes; this was noted as the most important economic benefit of certification in Gabon by Eba'a Atyi. Another important contribution of certification has been a rise in market transparency, largely through the tracking mechanism newly available through the implementation of a 'chain of custody' allowing products to be traced back to source; this has proven helpful in addressing quality issues. A high degree of traceability also helps combat illegal logging, which is a serious issue in many countries around the world.

Increased attractiveness to investors

According to the Yale study, certification can also increase a company's attractiveness to investors resulting from more secure market access, improved management control, and lower perceived risk. May observes that private bankers in Brazil (ABN-AMRO/Banco Real and BASA) are offering investment credit to firms committed to certification. This last factor could be particularly significant if it renders forestry more attractive to capital in relation to other competing sectors. Offsetting some of the potential upside effects are the economic implications of moving toward ecosystem-based management of natural forests, at least in the short-term, where timber flows are concerned. These might include lower employment rates, increased demand over supply, potentially higher prices in the absence of imports, and over-capacity of mills, in the view of the report authors.

Environmental benefits

There appears to be broader agreement amongst case study authors as to the environmental benefits of certification, under the following categories; management planning and inventory, silviculture, biodiversity protection, and monitoring and compliance. Carrera et al cite the example of Guatemala, where improved management planning has resulted in more appropriate estimates of harvesting rates, adjustments to rotation length, and the logging of volumes more in line with local conditions. Moreover, 5-year plans have been introduced where none existed previously, preventing "high-grading" of stands, and Non-Timber Forest Products (NTFPs) were factored into management for the first time in the Petén region. Elsewhere, a similar focus on planning has been noted in Gabon, where a 30-40 year cutting cycle has been implemented as a result of research on growth, mortality, and logging damage, and also of impacts of road networks.⁶⁹ In terms of approaches to silviculture, improved management practices have been recorded in Indonesia, Estonia, Zambia, and in Asia-Pacific; in several countries in the latter region Reduced Impact Logging (RIL) has been introduced. Brazilian operations have also benefited from the combination of low rates of extraction combined with low-impact extraction methods to mitigate biodiversity loss, at least in one example cited by May. Initiatives to protect biodiversity have occurred in a number of case study sites,

⁶⁹ Eba'a Atyi, *ibid.*

including in Zambia (new reserved areas and wildlife corridors)⁷⁰, Guatemala (identification of threatened species, protection of seed trees, and habitat conservation measures), and Russia. In the last-named, certification applicants are required to identify and protect (as appropriate) High Conservation Value Forests (HCVFs) on their tenures, thus reducing the likelihood of biodiversity loss, as well as the protection of other values across the landscape.⁷¹

Ongoing monitoring and awareness-raising

Monitoring is a key element of a robust forest management system, as part of the cycle of continuous feedback between actions taken and the observation of their effects in order to modify future practices. Ham discusses how certification in South Africa has led to improved checks and balances, and the systemization of processes to ensure their consistent application. Monitoring has reportedly also improved in Malaysia, as state foresters are now required to record data on environmental impacts including areas lost or destroyed after logging, the number and length of logging roads and skid trails, and the area of log yards. Training and levels of awareness around conservation issues have also undergone change through the certification process in various locations around globe, from shifts in corporate-level policies to behavioural impacts on an operational level. In the community forestry sector, NGOs in Papua New Guinea, the Solomon Islands, Indonesia, and Mexico have engaged in activities to encourage local people to employ better forest management practices. Elsewhere, a greater awareness of broader forest values beyond simple timber production has been fostered, even in the context of plantation establishment and management. Ham underlines this point in the South African case study, where stakeholders reportedly have come to appreciate the diversity of values which plantations can represent.

A final important point to underline is that certification under any of the systems currently active worldwide tends to bring in its train a process of continual improvement, generally through the mechanism of conditions and 'Corrective Action Requests', or CARs, applied by certification bodies. A study produced in 2005 by Newsom and Hewitt of 129 certificates awarded in 21 countries by SmartWood, one of the most active FSC-accredited certification bodies, provides a breakdown of the changes applicants were requested to their operations as part of the certification process, and in line with applicable FSC standards. The geographical scope of this study includes Asia-Pacific, Eastern Europe, and Latin America, and areas of change include: social (conflict resolution with stakeholders, training and worker safety and wages), economic (management planning and operation efficiency and profitability), and environmental (protection of aquatic and riparian areas, high conservation forests, and threatened and endangered species). It would be interesting to observers of certification impacts to learn how rigorously these changes have been implemented, and to what effect in terms of impacts 'on the ground'.⁷²

⁷⁰ Njovu, *ibid.*

⁷¹ Tysiachniouk, *ibid.*

⁷² Newsom, Deanna N. and Daphne Hewitt. 2005. The Global Impacts of SmartWood Certification. Rainforest Alliance report. Available at www.rainforest-alliance.org.

Costs of certification

The most obvious downside to certification lies in increased costs to the producer, and several case studies attempt to quantify this increase. Shahwahid's results indicate that production costs for two entities varies between 15 and 50%.⁷³ This is obviously a very small sample size, and this range is clearly hardly a conclusive result, however what is more significant perhaps is the way the increase in costs is broken down in one of the two case studies used, pertaining to KPKKT. Just over 10% of the increase is ascribed to the forestry department, 20% to the concessionaire, and the remaining 70% to the harvesting contractor: '... increased forestry department result from incremental expenditures on supervision and monitoring of operations during tree marking, mapping and road design; for concessionaires, in terms of wages on supervision and monitoring; and for logging contractors, for wages, materials and machinery rental.'

Increased potential for concentration of the industry

In the case of Brazil, May raises the issue of increased potential for concentration of the industry created by the market advantages accruing to certified companies.⁷⁴ The specific impacts of concentration in the Brazilian case have occurred principally in the Atlantic Forest region, where the majority of plantations are located, rather than in the Arc of Deforestation, where deforestation pressures are affecting the southern and eastern fringes of the Amazon basin. Certification has thus likely had less impact in terms of slowing deforestation rates in natural forests – the national CERFLOR process initially focused only on plantations – than on tenure arrangements in Brazil's out-grower sector. Meanwhile, Ham, in South Africa, references the negative impacts of market trends toward certification on small-scale producers, due to the disproportionately high direct and indirect per-hectare costs of getting certified, and the absence of price premiums for certified product.

The impacts of certification could be considered negative in terms of social equity, if economies of scale tend to favour larger producers, as the evidence suggests. Meanwhile, the fact of industry concentration in the forest sector is considered by some observers to be a collateral effect of generally increased competition (in part attributable to certification) in other geographical regions beyond Brazil, and is certainly true of Latin America in general. Markopoulos claims that 'only the largest and most advanced enterprises will have the necessary financial resources, business experience and market linkages to exploit certification benefits'.⁷⁵ The author, moreover, lists some shortcomings of certification concerning the community forestry sector, including high costs, and lack of market access. Van Dam (2002) expresses similar concerns about certification's benefits to communities, citing amongst other factors the lack of fair trade markets and the dominance in the South of large companies with generally higher capacity than communities, plus the resources to pay for certification. In Van Dam's view, large timber companies do not really promote sustainable local development; this is certainly a potential cause for concern, in a region where the community forestry sector is significant.

⁷³ In Cashore, Gale, Meidinger, Newsom, Eds., July 2006.

⁷⁴ May, Peter, in Cashore, Gale, Meidinger, Newsom, Eds., July 2006.

⁷⁵ Markopoulos 2002.

Overall it would appear that certification has proved broadly positive for the forest-owners that have gone down that route, and for their stakeholders. However, the costs of certification and the concerns around the concentration of the industry resulting from competitive advantage to larger certified companies are areas of concern which will have to be considered in more detail when the nature of the portfolio is investigated in more detail. One important development is the FSC's Small and Low Intensity Managed Forests (SLIMF) programme, which is seeking to make certification more easily available to a different scale of operation.

6.8 Appendix 8 - Investors for Identified Transactions

Table 19: Investors for identified transactions

Investor	Note
Monoline insurers	(FSA, MBIA, AMBAC, FGIC, as well as CIFG, Radiant, Assured Guarantee & XL Capital) require investment grade deals, 2 ratings.
Social investors, Foundations, Ethical funds	likely targets to pick up subordinated & equity tranches of risk (the hardest tranches of the deal to place). Might require an ethical rating.
Banks	
Mutual Funds	
Pension funds	international and local to the country of issuance. International funds aim for a weighted average rating of 'AA' but are prepared to invest down to 'BBB'
Private placement	Arcel Finance Brazilian wood pulp export deal & Potential unrated microfinance deal
Investment conduits	e.g. Trust Company of the West (TCW) one of the largest for the energy & infrastructure sector.
CDOs of ABS	unpredictable demand, dependent on there being a CDO ramping up its portfolio when the deal goes to market.

- Market for Latin American 'BBB' paper: the universe of buyers for BBB structured paper backed by emerging market and Latin American assets in particular includes monoline insurers & is allegedly limited, so many deals can only be sold if wrapped⁷⁶
- Limited emerging market companies deemed attractive for investment: XL Capital's (monoline insurer) emerging market investment strategy is to concentrate on top tier corporates and financial institutions with a proven ability to prosper even in a difficult political and economic environment – for example the exports of companies such as Aracruz have increased during crisis periods in Brazil.
- Local structured bond markets: There are strong local markets for structured bonds in some emerging market countries, for example South Africa.
- Socially responsible investors in Australia: Australian investors were targeted by ABN AMRO for a recent socially responsible CDO (REEF, backed by 300 global companies with good ethics, rated 'AA', 5-year maturity). ABN AMRO commented that demand among certain investors to see social criteria built into investment products is increasing.
- Country choice: Monoline insurers stick to pre-approved countries when investing, normally investment-grade rated, or those with strong economies (see '*Meeting with FSA' for examples of acceptable countries*). Focus on countries where securitisations have been done in the past?
- Early involvement of key investors: Monoline insurers and some other investors require involvement at all stages of deal structuring, and should therefore be approached early with a deal.

⁷⁶ ISR article "Regional Outlook Latin America: Brazil / Wrappers dry up", November 2002

- Early importance of legal framework: For emerging market deals it was suggested (*'Meeting with FSA' document*) that legal feasibility should be confirmed before approaching any investors.
- Political risk insurance is accepted by investors as a way of achieving investment grade ratings in emerging market deals (see *Fitch report "PRI & SF"* and *"Meeting with FSA" document*)

Further interviews could be conducted to determine the varying interests of investors.

6.9 Appendix 9 – Glossary

Table 20: Securitisation glossary

DSCR:	Debt Service Coverage Ratio, i.e. [Free cash flows in a single period] / [Sum need to cover debt payment (interest and principal) in a single period]
LTV:	Loan-to-Value ratio of a secured loan or mortgage, i.e. [Loan principal outstanding] / [value of security e.g. Forest land]
RA:	Rating Agency
Borrower/Originator/ Sponsor/Seller:	The entity who initiates the securitisation - it owns the securitised assets and/or generates the securitised assets prior to selling them to the SPV in return for a part of the proceeds from the note issuance
SPV / Issuer:	Special Purpose Vehicle - set up specifically for the transaction, its sole purpose is to issue notes, use part of the proceeds to buy the transaction assets from the sponsor & to hold the assets. It is bankruptcy-remote from the sponsor, so that if the sponsor defaults there will be no effect on the status of the SPV.
Notes / Bonds / Debt issuance:	The entitlement to a share of the cash flows from the securitised assets, purchased by investors from the SPV
Rating:	Each rating scenario represents a level of economic stress on the transaction. 'B' is normally considered to be a base case scenario, although this varies by country and sector. 'AAA' is the most severe economic stress, and accordingly any notes rated 'AAA' should be able to survive an extremely severe environment of economic collapse.
Payment waterfall / Priority of Payments:	The order in which cash flows generated by the securitised assets are distributed each period to the interested parties, including note-holders, the transaction trustee, the originator, swap counterparties
Credit enhancement:	Structural protection for note-holders, so that shortfalls in the revenue stream from the assets does not affect the interest and principal payments on the notes. Can take the form of subordinated notes (the last to receive interest and principal payments in the payment waterfall), over-collateralisation (revenues due from the assets exceed the amount payable on the notes), a reserve fund or liquidity facility (used to make interest and principal payments if there is a shortfall), triggers which divert cash flows to note-holders upon the occurrence of certain events e.g. a minimum asset value, a minimum DSCR, the ratings downgrade of one of the parties to the transaction etc. These structural protections are the basis for the different ratings assigned to the notes, and are sufficient to protect the note-holders from stresses on the transaction equivalent to their respective rating.
MFI:	Microfinance Institution, lending micro-loans. Could be NGO, not for profit organisation, MAC, for profit.
ABCP:	Asset-backed commercial paper, an investment conduit that buys shares in assets & issues short-term high-grade paper.

	Quick description:	Examples of Transaction S:	When this structure is appropriate:	Benefits:	What is need to make it work:	Historical data & reporting requirements:
Future Flow Securitisations	Securitisation of future sales of commodity products for export. Revenues from sale are collected offshore & to service the note interest & principal payments before any amounts return to the country of the asset originator.	Arcel Finance, SIF Sociedad Inversora Forestal, Gazprom International, IndoCoal Exports, CSN Export Trust	Company located in a developing country generating large volumes of export receivables (commodities?) to strong markets	Raise financing at the 'going concern' rating of the seller, which could exceed the sovereign rating & company debt rating (reference transactions have achieved up to 4 rating notches above country rating for strategic businesses), since the structure protects cash flows from country risk.	Seller must have strong local rating, asset volume must be large, export market must be solid (diverse or highly-rated off-takers), possible to estimate volumes exported & prices for term of deal. Seller must have a good track record. 5-6x DSCR for commodities (no price hedge or supplier contract).	3 yrs + of historical receivables data, long term information on export prices/volumes, calculations of any performance ratios during the life of the deal, details of cash collections and asset performance during the life of the deal.
Trade Receivables Securitisations	Securitisation of invoices generated by provision of goods or services to clients by the originator, typically with payment terms of 30 days - 1 yr. The portfolio of securitised invoices is revolving over time (subject to performance triggers on the asset originator), and revenues from their settlement are received by an SPV & used to service the issued notes' interest & principal payments before being returned to the invoice originator. Not dissimilar from factoring; most deals get done through the ABCP market.	Fideicomiso Financiero Lartirigoyen 1	Strong company or companies (expected to remain solvent for term of deal, probably investment grade) with excellent historical data & reporting systems in a jurisdiction with securitisation law or equivalent, generating invoices from selling a product or service.	Issued notes can achieve a rating higher/lower risk/lower cost than the asset originator rating, since a default of the originator should not affect the ability of revenue from the assets repaying the notes.	Seller should ideally have a minimum of BB+ equivalent rating (mostly for fraud risk), be located in a creditor-friendly jurisdiction, must have a good reason to do the securitisation & incentives to maintain its performance. The market for the product must be stable. Data collection & reporting systems must be excellent, & historical data for 3 yrs+ must be available and representative of likely future performance. It should be possible for the collections on the receivables to be carried out by a third party in case the originator is no longer able to service the portfolio.	Detailed financials (for company credit assessment, since a term deal relies on the company's ability to generate more receivables), clear & consistent origination, credit & invoice servicing policies, comprehensive data systems, able to calculate & report dynamic credit enhancement requirements.
Whole Business Securitisations	The securitisation of the business & assets of an operating company.	Tornator Finance Plc, Scotia Pacific, UBS Brinson Forestal	Strong company with a straightforward business (not dependent on irreplaceable management expertise to generate revenues) in a creditor-friendly jurisdiction.	Like straightforward secured debt, except that 1st lien assignment of assets & extra structural protections (e.g. Liquidity support, hedging) allow issued notes can achieve a higher rating/lower risk/lower cost than secured loans.	Company should be operating in a sector with high barriers to entry, own tangible assets with long-term value, long-term sustainable revenues and profits, ideally subject to price/operational regulation.	Historic revenue & cost information demonstrating 3+ yrs of stable trading, detailed company financials, ongoing reporting of performance ratios
Collateralised Loan Obligations	A securitisation of a portfolio of individually credit-assessed loans.	TCW Global Project Fund, Microfinance Loan Securitisation, Essential Public Infrastructure Capital	When the underlying loans are diversified (by sector, country), & can be individually credit-assessed (or rated).	Can raise debt against a portfolio of loans at a rating higher than the underlying loan ratings, thanks to a portfolio diversification effect.	For securitisation of portfolios with < than a few hundred underlying borrowers, each loan needs an individual rating/credit assessment to determine its default probability & expected recover rate upon default. For portfolios containing a very large number of obligors (e.g. small or medium companies), and consistent & homogenous lending criteria with good historical performance data, historical defaults / recovery rates could be used as a base case to estimate expected loss. So the portfolio originator needs to have excellent data systems, well-defined & consistently-applied origination and loan servicing procedures, and 3+ years of historical data.	A way of assessing the credit quality of the underlying loan obligors: either through originator's credit assessment & origination system or through analysis of the underlying obligors' financials. Updated information on the underlying obligors throughout the life of the transaction, to maintain a current view of credit quality.
Asset-Backed Securities	The securitisation of consumer receivables, normally by a financial entity.	Blue Orchard??	For a company with a large pool of receivables (e.g. Leases, unsecured loans) extended to a highly diversified pool of obligors (normally individual consumers).	Can raise financing at a rating higher than that of the company.	Fairly standard homogenous assets with consistent origination and servicing protocols & good historical data. Good data systems and the ability to transfer asset servicing to a third party.	Historical and continuous reporting of Receipts, Delinquencies, Defaults, Recoveries & Prepayments for the underlying portfolio. Historical data should track the performance of pools of assets in 'cohorts', i.e. grouped by the date of origination, to demonstrate their performance over time.

6.10 Appendix 10 – References

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6.11 Appendix 11 – Contacts List

Table 21 - Contacts: people and organisations contacted during the project

<u>Contact</u>	<u>Organisation</u>	<u>Grouping</u>	<u>Contact</u>	<u>Interview</u>
Andrew Adjei-Yebaah	Ghana Ministry for Lands, Forests and Mines	Government	Y	
Mads Asprem	Tree Farms	Producer	Y	
Keith Alexander	Actis LLC	Investors	Y	Y
Colin Ayres	Home Depot (Timber Proc.)	Buyers	Y	
Ricardo Bayon	EcoSystem Marketplace	Media	Y	Y
Kent Becker	Moody's	Ratings	Y	
Sofie Beckham	IKEA	Buyers	Y	Y
Arnold Bercov	PPWC (Union)	Union	Y	
Alan Bernstein	SFM	Producer	Y	Y
Peter Besseau	IMFNS	NGO	Y	
Clark Binkley	IFIA	Advisor	Y	Y
Josh Bishop	IUCN	NGO	Y	Y
David Brand	New Forest	Advisor	Y	Y
Esteban Brenes	WWF US	NGO	Y	
Therese Brinkcate	WWF SA	NGO	Y	Y
Claude Brown	Clifford Chance	Law	Y	
Michael Brune	RAN	NGO	Y	
Chris Burchmore	Mondi	Producer	Y	Y
Richard Burrett	ABN Amro	Structured Finance	Y	
Adrian Carr	CSFB	Structured Finance	Y	
Peter Cashion	IFC	Structured Finance	Y	Y
Jose Castro Valdes	Fitch Ratings	Ratings	Y	
Mike Chadney	Henderson	Structured Finance	Y	Y
Julie Clark	DBSA	Structured Finance	Y	
Stuart Clenghan	Carbon Capital	Producer	Y	Y
Michael Conroy	Yale School of Forestry	Academia	Y	
Phil Cottle	Forest Re	Insurance	Y	Y
Simon Counsell	Rainforest Foundation	NGO	Y	Y
Andrew Crickmay	Crickmay & Associates SA	Advisor	Y	Y
Kathleen Currie	HSBC	Investors	Y	
Hugh Cutler	BGI	Investors	Y	Y

<u>Contact</u>	<u>Organisation</u>	<u>Grouping</u>	<u>Contact</u>	<u>Interview</u>
Sean De Cleene	African Institute of Corp Citizenship	NGO	Y	Y
Michael Deakin	Independent	Advisor	Y	Y
Gerhart Dieterle	IFC	Forest Finance	Y	
Richard Donovan	Smartwood	Certification	Y	
Kelly Droege	IWC	Investors	Y	Y
John Earhart	Global Environmental Fund	Investor	Y	N
Mike Edwards	Forestry SA	Producer	Y	Y
Nick Eisinger	Fitch Ratings	Ratings	Y	
Andreas Eke	Futuro Forestal	Producer	Y	Y
Dave Everard	Sappi	Producer	Y	Y
Jim Ford	Forest Ethics	NGO	Y	Y
Roger Frank	DW Markets	Investors	Y	Y
Hans Friederich	IUCN	NGO	Y	
Martin Gale	UPM Kymmene	Buyers	Y	
Barry Gamble	Fountain Forestry	Producer	Y	Y
Kent Gilges	The Nature Conservancy	NGO	Y	Y
Edward Glover	Iwokrama international	Producer	Y	Y
John Goldstein	Medley Partners	Investors	Y	Y
Steve Gretzinger	WWF GTFN Latin America	Advisor	Y	Y
Ted Gullison	Gullison Hardner Partners	Consultant	Y	
Julien Haarman	UNEP Finance Initiative	Government	Y	
Jan Heino	UN FAO	Government	Y	Y
Frank Hicks	Forest Trends BDF	Advisor	Y	Y
Ian Hook	Floresteca	Producer	Y	Y
Simon Howie	Investec SA	Investors	Y	Y
Emma Hunt	Mercer IC	Investors	Y	Y
Jack Hurd	The Nature Conservancy	NGO	Y	Y
Neil Judd	ProForest	Certification	Y	
Greg Kabance	Fitch Ratings	Ratings	Y	Y
David Kaimovitz	Ford Foundation	Foundation	Y	
Sachin Kapila	Shell	Advisor	Y	Y
Valerie Kapos	UNEP WCMC	Government	Y	
Alpesh Ladd	HSBC	Structured Finance	Y	Y
Natasha Landell-Mills	OTP	Investors	Y	
Xavier Lecacheur	UK Dfid	Government	Y	Y
Heiko Liedeker	FSC	Certification	Y	Y
Ken Luckhardt	CAW (Union) Int'l Dept.	Union	Y	
Scott MacLeod	Global Forest Products	Producer	Y	

<u>Contact</u>	<u>Organisation</u>	<u>Grouping</u>	<u>Contact</u>	<u>Interview</u>
Peter May	REBRAf	NGO	Y	
James Mayers	IIED	NGO	Y	Y
Shaun McCartney	Global Forest Products	Producer	Y	
Peter Mertz	Global Forest Partners	Producer	Y	
Craig Metrick	Mercer IC	Investors	Y	
Jacopo L Morenos	Carbon Capital	Producer	Y	Y
Linda Mossop	SAFCOL/DWAF	Producer	Y	Y
Pedro Moura Costa	EcoSecurities	Advisor	Y	
Justin Munday	Carbon Capital Markets	Structured Finance	Y	
Liza Murphy	Rainforest Alliance	NGO	Y	
Jose Rente Nascimento	IADB	Investors	Y	Y
Michael Nguyen	Financial Security Assurance Inc	Insurance	Y	Y
Sandra Odendahl	CIBC	Investor	Y	Y
Dwight O'Donnell	IFC	Forest Finance	Y	
Kyeretwie Opoku	ForestWatch Ghana	Law	Y	
Wolfgang Ortloff	Swiss Re	Insurance	Y	Y
Mike Packer	Timbermet	Buyers	Y	Y
Christine A. Pendzich	WWF US	NGO	Y	Y
Duncan Pollard	WWF International	NGO	Y	
Lawrence Pratt	INCAE	Academic	Y	Y
Daniel Press	Concensus Business Group	Structured Finance	Y	Y
Nick Pyatt	FRR	Advisor	Y	
Guy Renault	Pro Natura	NGO	Y	Y
Kenneth Richards	Indiana University	Academia	Y	
Robert Rickman	Independent	Advisor	Y	Y
Andy Roby	UK Timber Trade Federation	Buyers	Y	Y
Ole Sand	IFC	Forest Finance	Y	
Ted Scheidegger	Precious Woods	Producer	Y	Y
Bob Scholes	CRSI Carbon Research	Advisor	Y	Y
Yalmaz Siddiqui	Office Depot	Buyers	Y	
David Singh	Iwokrama International	Producer	Y	Y
John Spears	IFC	Forest Finance	Y	
Dietmar Stoian	CATIE	NGO	Y	
Brad Swanson	DW Markets	Structured Finance	Y	Y
Madeline Tan	Brown Rudnick	Law	Y	
Kerry Ten Kate	Forest Trends Bio Facility	Advisor	Y	Y

<u>Contact</u>	<u>Organisation</u>	<u>Grouping</u>	<u>Contact</u>	<u>Interview</u>
David Tepper	Carbon Capital Markets	Structured Finance	Y	Y
Richard Tipper	ECCM	Producer	Y	Y
Andrew Venter	Wildlands Trust	NGO	Y	Y
Annette Verschuren	Home Depot Canada	Buyers	Y	
Dirk Versveld	Independent	Advisor	Y	Y
Pedro Villani	ABN-Amro Brazil	Structured Finance	Y	
Bettina von Hagen	EcoTrust	NGO	Y	
Bob Walker	The Ethical Funds Company	Investors	Y	
Court Washburn	Hancock Natural Resources	Producers	Y	
Mark Webster	JP Morgan	Structured Finance	Y	Y
Chris Wells	ABN-Amro Brazil	Structured Finance	Y	
Andy White	Rights & Resources Initiative	NGO	Y	Y
Adrian Whiteman	UN FAO	Government	Y	
Martin Whittaker	Missionpoint Capital	Investors	Y	Y
Mark Wishnie	Yale School of Forestry	Academia	Y	
Michael Wolf	Hancock Natural Resources	Producers	Y	