Bringing forest carbon projects to the market

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Bringing forest carbon projects to the market

Where do forestry projects stand in carbon markets?

What trends can be anticipated?

How can forest carbon projects be financed and credits sold?

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Executive Summary

The objective of the Guidebook entitled "Bringing Forest Carbon Projects to the Market," is to instruct project developers and financial investors on how to develop and implement profitable forestry projects in the carbon markets.

Despite a rapid growth of the forest carbon sector, forest carbon credits represented only 5.3 MteqCO_2 in 2008, or 1% of carbon project transactions[1,2,3]. In value, this represented € 25 million out of a total market value of € 4,807 million. These numbers indicate the sector is as yet still under-exploited, notably in terms of its potential to mitigate climate change. In fact, terrestrial ecosystems absorb more than 30% global CO_2 emissions, of which approximately 20% result from changing land usage, mainly deforestation[4]. In addition, to coincide with increased absorption, forestry projects also provide excellent opportunities for significant social and environmental co-benefits. Given the urgency of climate change, the development of this potential associated with forestry carbon projects is essential and requires an analysis of the difficulties encountered previously to address.

Although forestry projects are relatively complex, technical and methodological barriers are beginning to fall: 16 methodologies for afforestation and reforestation (AR) have been approved for CDM, and several REDD[5] and IFM[6] methodologies have been validated or are in the process of validation according to voluntary standards. In light of these major advances, barriers to investment, in addition to technological barriers, are both important potential stumbling blocks to consider when explaining the very weak development of forest carbon projects. The Guidebook provides insight on the issues that have thus far limited the forest carbon market and contribute much

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1 Primary CDM and Voluntary Carbon Market, VCM

2 World Bank, 2009. State and trends of the carbon market 2009

3 Ecosystem Marketplace, 2009. State and trends of the voluntary carbon market 2009

4 IPCC, 2007. 2007 Outcomes of climate change: contribution of Working Groups I, II and III to the fourth Assessment Report by the intergovernmental group of experts on the evolution of climate

5 Reduced Emissions from Deforestation and forest Degradation

6 Improved Forest Management

needed credibility to the forestry sector by aiming to stimulate investment and a pipeline of bankable projects. The Guidebook illustrates best practices, success stories developers can emulate, and pitfalls that should be avoided, and also sheds light on the primary causes for underdevelopment of the forestry carbon sector to snowball the process.

The Guidebook presents the components of the forest carbon project cycle from an economics and finance perspective because these late stage considerations are often the most complicated part of bringing forestry projects to successful project completion. Specifically, it will instruct developers and investors on how to finance forest carbon projects and sell credits, including the factors to consider when registering a forestry project in the CDM or voluntary carbon market (VCM), instruct developers on how to manage forestry-specific risks, and provide an overview of the most recent state and the trends of the forestry carbon market. Each component of the Guidebook will be illustrated via 4-5 real-life Case Studies.

The Guidebook is available in English and Spanish, as well as French, and is being widely distributed internationally to stimulate replication of projects and to help develop the forest carbon sector. The carbon classes included are commercial and community afforestation and reforestation (AR), reducing emissions resulting from deforestation and forest degradation (REDD), and improved forest management (IFM). The Guidebook is available electronically on the website, www.unep.fr/energy/activities/forest_carbon. This Executive Summary presents the main results of the Guidebook.

- The slow takeoff of forestry projects under the CDM framework

Today[7], CDM forestry projects are restricted to AR and represent only 0.4% registered projects and 1.4% projects in the process of validation. This is due to several factors.

The first explanation focuses on the demand for credit. Methodological complexities, accounting (temporary credits), politics, and economics (fear of destabilizing the price surge of forest credits) of forestry projects have led the European system of emissions trading (EU-ETS[8]) to remain closed to forestry CDM credits. The lack of interest of large buyers of CERs[9] carries a major prejudice that limits demand for such credits in

7 1 October 2009. Source : UNEP/Risoe CDM pipeline

8 European-Union Emission Trading Scheme

9 Certified Emission Reduction

Annex I countries that are regulated by the Kyoto Protocol[10], in certain regional markets, and in the voluntary market.

From the supply side, the second cause concerns the delay of defining CDM forest modalities and procedures within the UNFCCC. This delay has resulted in a prejudice against forest projects in the regulated market that favors pre-2012 compliance credits (this is especially true for AR projects, since carbon sequestration in trees take lengthy periods of time). However, these legal and methodological barriers gradually become lower as forest projects are developed, and are reinforced through experience gained by developers and consultants. Today, although the development of projects remains complex, there is evidence that the technical obstacles to develop these projects are diminishing: 16 methodologies are already available, 8 projects have been registered, and 39 are candidates for validation, representing a pipeline of 13.9 $MtCO_2e$ before 2012.

- Maturation in the voluntary markets

Although forest credits still play a marginal role in the CDM, forests represented 7% of credit transactions in the voluntary market in 2008. The attraction of carbon buyers to forestry is due in part to a more diverse list of eligible forest activities in the VCM: AR, REDD, IFM, and carbon stocks associated with wood products. Furthermore, forest credits are often associated with a very positive image because of the ability of forests to mitigate climate change, which is readily understandable to the general public. In a market where the image of credits and projects is crucial, the socio-economic developmental co-benefits associated with these projects for rural populations (jobs created in agro-forestry, diversification of revenue sources, the fight against poverty, etc.) and the environmental benefits (fight against erosion, protection of water resources, biodiversity protection, etc.) are significant.

The quantities of forest credits transacted on the voluntary market continued their rise between 2007 and 2008 from 3.7 $MtCO_2e$ to 5 $MtCO_2e$, an increase of almost 135%. This sharp increase is explained primarily by the sector's growth within CCX[11]12 (+ 1.3 $MtCO_2e$) while the increase in the rest of the VCM has remained rather modest (+ 0.05 MtCO2e). The relative share of forestry projects in the OTC[12] market has been in sharp decline, from 50% before 2006, to 8% in 2007, and 7% in 2008.

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10 Note that a significant portion of these purchases were made by the World Bank BioCarbon Fund

11 Chicago Climate Exchange

12 Over the Counter

This lower market share can be explained by the maturation of the sector and by the emergence of quality standards[13]. In fact, as the voluntary markets gradually develop, many forestry projects have been questioned because of lack of transparency, especially regarding the methodologies and calculation methods employed. No standards had been established at that time to provide clarity for carbon offsetters, which could have contributed to undermine the image of forestry projects, leading actors to consolidate and/or diversify their portfolios with projects using other technologies, including those in the CDM, which have easier access to standards than forestry projects.

In the course of developing this Guidebook, a worldwide inventory of the forest carbon projects was completed[14]. The location, technology, standards followed, size, and volume of emissions reduced were assessed. The 434 projects that were identified show a clear trend towards standardization (61 projects have been registered and 75 are in the process of registering). This could enhance the future supply of high-quality forest projects and credits, and strengthen their place in the VCM. According to a recent study by Ecosecurities[15], the standardization of projects is the first criteria of investor choice when purchasing forest carbon credits. Finally, the average sale price of forest credits (1.7 €/teqCO_2 for CCX, 3 €/teqCO_2 for the CDM, and 4.7 €/teqCO_2 for the voluntary over-the-counter market) is comparable to the credits issued for other technologies.

Faced with long-held fears that a surge in volume of low-priced forestry credits will lead to a significant degradation of market prices, it is increasingly clear that the situation is semi-reversed. The strong demand for forestry credits is being strongly affected by the demand for high quality credits and an insufficient supply of projects of this type. The forest carbon market marks a phase of transition and consolidation, with the early, very rapid growth of the market giving way to the establishment of more professional VCM standards. However, by volume, the voluntary market is still very minor in relation to regulated markets, and only a real integration in regulatory markets will permit directing greater financial flows towards forestry and effectively fight against global warming.

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13 CCBs, CarbonFix, CCAR, CCX, Forest Sink Initiative, Gold Standard, GGAS, GHG friendly initiative, MDP, MOC, Plan Vivo, VER +, VCS, etc.

14 Update of the database of 178 projects under the study conducted by ONFi-CIRAD: Les marchés du carbone forestier, Gardette & Locatelli, 2007

15 Neeff et al., 2009. Forest carbon offsetting survey 2009, Ecosecurities

- How to finance forest carbon projects and sell the credits?

Carbon credits can remunerate the environmental services that forests provide. Although the carbon market can be an important source of revenue (although for many forestry projects this is typically only one line of support among others), it is not a source of funding. The barriers to investment are particularly numerous for forestry carbon projects pertaining to: large upfront investments, returns on investment after deferred lengths of time, high risks (e.g., political or country risk, permanent loans, etc.), and lack of market visibility and low voluntary market liquidity. Thus the financial indicators of these projects are generally less favorable than in other sectors, although forestry projects generally do generate greater social and environmental benefits.

Through the discussion of five Case Studies, the Guidebook provides detailed operational elements to project promoters and investors in the forest carbon project cycle, the steps needed to obtain financing for a project and sell carbon credits, the economy and associated risks, financial flows and sensitivity analysis of variables, different financial modalities, and the players involved with the market today (offsetters, funds, banks, public actors, industries, etc.).

Based on the various types of existing projects, there are three main types of financing associated with forest carbon projects. It is rare that a project would use only one of these sources whereas all three can be used simultaneously:

- A significant portion of funds allocated to forestry projects are provided from the voluntary offsetting of CO_2 emissions or, more generally, the politics of environmental philanthropy by business for forestry and climate change mitigation. Financing is achieved primarily through donations, payments in advance of carbon credits (ex-ante, which arguably qualifies as a form of debt), or loans at preferential rates. This funding is realized directly or through intermediaries, offsetters, brokers, and NGOs (international and local). Under this framework, the image of the projects is of paramount importance and the social, environmental, and the developmental benefits they provide are as significant as the overall quality of projects (e.g., compliance with standards);

- Bilateral and multilateral Official Development Assistance (ODA) and public local support mechanisms make significant contributions to the financing of forest carbon projects. Several initiatives involving significant volumes of financing[16] are now devoted to the forestry sector. The financial mechanisms

16 Over €4 billion

that are used include grants, preferential rate debt, pre-payment of credits to be generated, or guarantee funds to reduce the risk profile of projects. The "model" projects, which are highly replicable, are particularly valued for stimulating the launch of these mechanisms;

- "Classic" funding via debt or equity remains generally inaccessible to carbon forestry projects given the barriers to investment discussed earlier. However, many positive signals have been sent to regulated markets of late for the inclusion of incorporating forestry, and this has caused an explosion of investor interest, particularly for REDD projects. The rise in power of "green" and "ethical" investment funds is already materializing through dedicated investment vehicles. Most of these tools can finance projects in the form of equity. The eventual opening of the markets (especially in the U.S.) could lead to the proliferation of these initiatives and provide an important source of project financing. The evolution of this trend is therefore to be followed very closely.

Although the sale of credits is not usually a source of financing (except in the case of a pre-payment), it is nonetheless an important point of leverage for raising funds. The Guidebook describes how to define the ownership of carbon credits, how to contractualize with an ERPA[17], how to set the selling price, and how and what standard to choose for the different types of projects.

- A re-integration into the regulated markets after Kyoto? Through what modalities?

Because the size of voluntary markets is rather limited despite the magnitude of the challenges presented by climate change, negotiations being conducted to formulate a post-Kyoto agreement have now returned to the question of including forests in the heart of the global the post-Kyoto fight against climate change. Development of forestry projects in CDM and VCM over recent years shows that the methodological and technical barriers are indeed surmountable.

Papua New Guinea and Costa Rica proposed the inclusion of incentives to reduce tropical deforestation (REDD) during the 11th COP in Montreal in 2005. This request led to the start of a negotiating process marked by a very active participation of a combination of both countries in the North and South. After two years of negotiations, at the Bali COP 13, the Parties agreed to include the REDD forestry issue in the context of the post-2012 agreement, and established the "roadmap" to lead to an agreement in

17 Emission Reductions Purchase Agreement

Copenhagen. Currently, the main discussion points remain: what should be the scope of the mechanism (REDD, REDD+, REDD++)? How to define benchmarks to ensure additionality, and at what level should this occur (via a national approach or sub-national)? What type of incentivizing mechanism should be incorporated and in what timeframe (including the mode of financing)?

While many issues are still outstanding, discussions have been converging on a three-step approach to incorporating a post-2012 REDD+ framework:

- A preparatory phase aimed to develop a national REDD+ strategy through the processing of information and consultation of stakeholders. It is estimated that this preparation phase would require funding of around € 200 to 250 million[18]. Several countries have already begun this phase, particularly via the FCPF or UN-REDD;

- An intermediate phase: It allows the implementation of certain of the first measures included in the national REDD strategy, and that will be considered prior to participation in a mechanism that is based on payments for results. It is estimated that this intermediate phase would require funding on the order of € 1.2 to 2.25 billion[18];

- A final payment based on results: the country collects payments based on emission reductions that are reported, compared to a baseline reference scenario and incorporating a monitoring system and reliable and transparent accounting. A study performed by the Eliasch Review[19] approximated the cost to reduce deforestation by 50% by 2030 would require between between 11 to € 11 to € 22 billion per year.

Although the terms of private sector participation in these mechanisms (particularly for the intermediate and final phases) are still unknown, regulated markets are still sending positive signals that the market for forest credits will be greatly increased, as is the case with a potential future U.S. federal market (i.e., proposed bills by Waxman-Markey-Boxer and Kerry) and the EU ETS, which leaves a door open to forest credits in the energy-climate package.

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18 Report of the Informal Working Group on Interim Finance for REDD+ (IWG-IFR), October 27, 2009, discussion document

19 Eliash J., 2008. Climate change: Financing global forests, The Eliash Review

◆ Conclusion

While forestry projects have long been on the back-burner of climate change mitigation strategies, they can now take advantage of new opportunities. After a slow start in the CDM market by forestry projects, there is now a groundswell of movement in AR, and although financial obstacles indeed remain (markets are relatively closed to forestry, temporary credits, etc.), the voluntary markets have shown in many instances a preference for forestry credits. The VCM enables the development of innovative forestry projects that are exemplary in terms of environmental and social development co-benefits, and the quality of voluntary emission reductions can now be readily guaranteed by numerous accepted standards. Some projects have the added value of serving as effective alternatives in difficult institutional contexts and may serve as role models for the rest of the market. For example, REDD projects are already supported by "pilot" mechanisms such as Biocarbon Fund, Forest Carbon Partnership Facility (FCPF), the UNEP program CASCADe (UNEP, FFEM), and UN-REDD. A possible opening up of the carbon market to post-Kyoto credits enabling REDD and other forestry sectors not currently supported would drastically change the carbon forest market landscape, stimulating investment, and professionalizing this still nascent market.

The strength and success of these projects, and the role they will play in the future, are dependent upon collaboration between both public and private initiatives. In this sense, forest projects have a great role to play in the implementation and deployment of future climate policies. An application of policies at a project level seems possible and necessary. Towards this end, the participation of both the public and private sectors will be crucial to leverage the global response for climate change mitigation.

1. The fragile position of forestry projects in the carbon markets

How do forest projects benefit from the rapidly growing carbon market? Amongst these projects, which are eligible for carbon credits, and on which markets can these credits be traded? What projects already exist, what are the volumes traded and what trends are emerging? Based on a review of the forest carbon market in 2009, this introductory section explains the key issues accounting for the fragile position of forestry projects in the carbon economy.

1.1. The role of forests in climate change

Terrestrial ecosystems in general, and forest ecosystems in particular, have a crucial role in preserving the equilibrium of the Earth's climate. Worldwide, emissions of greenhouse gases (GHG) from land uses and the sectors referred to as Land Use, Land Use Change and Forestry (LULUCF1) amount to 17.4% of all GHG emissions, making this sector the third-largest source of GHG emissions - behind the energy sector (25.9%) and industry (19.4%), but ahead of agriculture (13.5%) and transport (13.1%).

These emissions mainly arise from deforestation in countries in the intertropical zone, especially Brazil, Indonesia, Malaysia, and the Democratic Republic of the Congo.

1 The term used in the IPCC guidelines for national GHG inventories (1996). A different term designating the same sector was defined in the updated IPCC report for 2006: Agriculture, Forestry and Other Land Uses, or AFOLU. However, LULUCF is still the official term used by the United Nations.

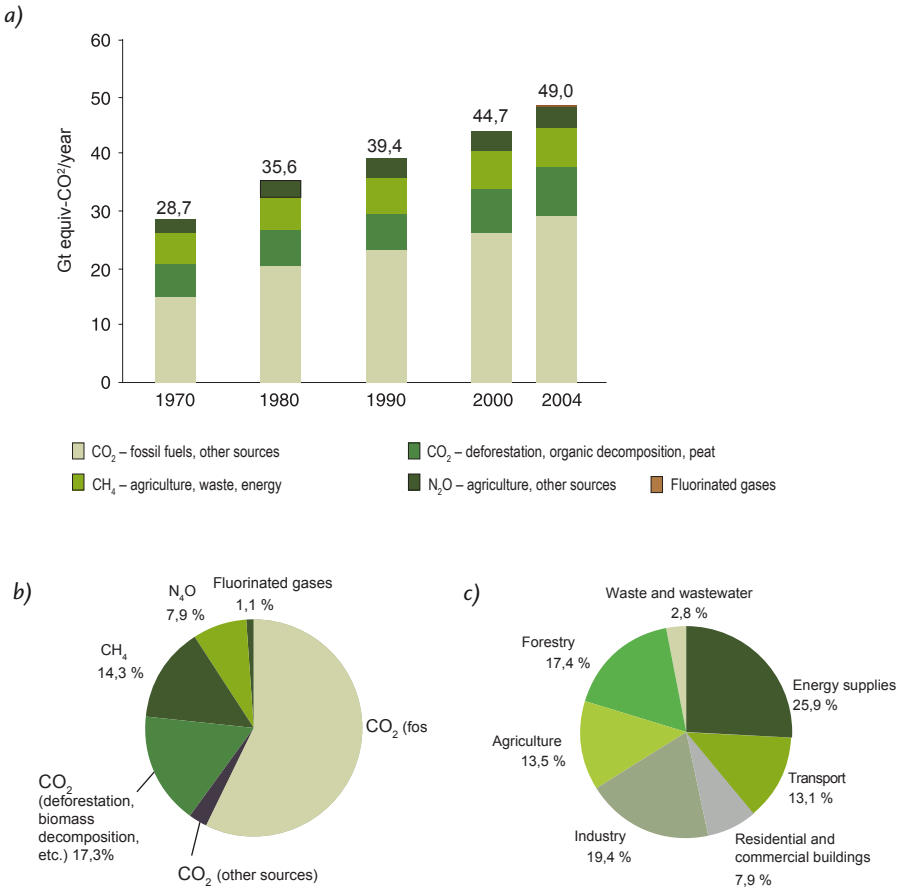

Figure 1: Worldwide GHG emissions from human activities (source: IPCC2)

Although deforestation contributes heavily to anthropogenic GHG emissions, forest ecosystems also help to combat climate change by absorbing large quantities of C02 through photosynthesis. This occurs because forest surface areas are increasing in the northern hemisphere, and the quantities of carbon stored in existing forests are also

2 IPCC, 2007. 2007 Climate Change Report: Contribution from Working Groups I, II and III to the fourth IPCC Assessment Report

increasing in both the North and the South. Across the globe, terrestrial ecosystems are absorbing nearly 2.6 GteqC per year, which is more than the total emissions from deforestation (1.6 GteqC per year). The overall "net" effect of forests is therefore positive, at about 1 GteqC a year (figure 2).

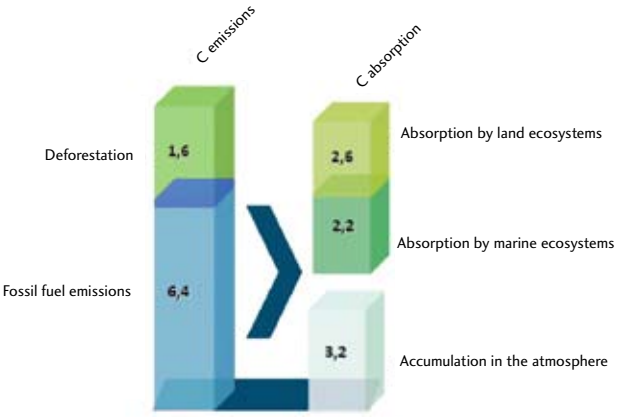

Figure 2: Overall annual carbon flows worldwide (emissions and absorption) in GteqC3. Terrestrial ecosystems (mainly forests) absorb more than 30% of global carbon emissions. 20% of these emissions are due to land-use change, mainly deforestation (Source: ONFI/IPCC)

Forests therefore affect climate in different ways. (i) When forests are growing (new growth and young forests), they absorb CO_2 from the atmosphere in large quantities and store it in the form of carbon chains in tree trunks, branches, and roots, as well as in soil and litter[4]. (ii) When forests are in equilibrium, their stores of carbon remain intact and the impact on climate change is relatively neutral (low emissions from natural mortality of certain individuals, low absorption by tree growth). (iii) When forests are felled and replaced by crops (e.g., oil palms in Indonesia, soya beans in Brazil, cash or subsistence crops in Africa) or grazing land (cattle ranching in Amazonian), the stored carbon is released into the atmosphere. Finally (iv), wood products may be used as a substitute for fossil fuels or energy intensive materials, thus avoiding GHG emissions when these products are from sustainably managed forests.

3 1 teqC = 44/12 teqCO_2

4 The IPCC Good Practice Guide sets out five carbon storage compartments in forests: aerial and subterranean biomass, soils, litter and dead wood

1.2. The different types of forest projects

Throughout the entire forestry and timber sector, different type projects can help to fight climate change and could, for this reason, claim carbon payments.

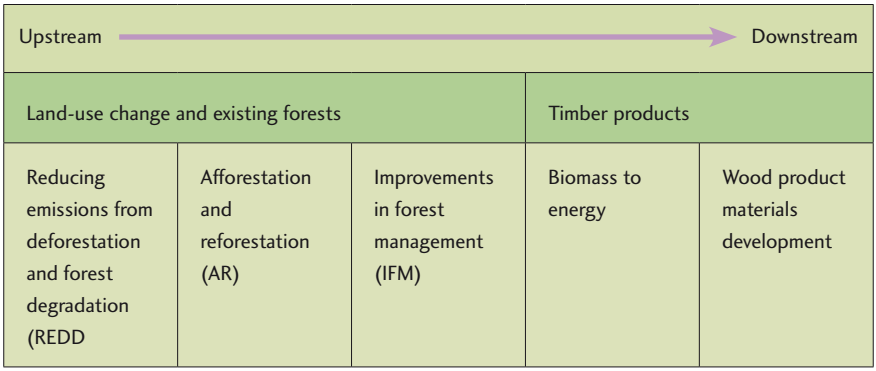

Figure 3: Types of forest project along the value chain

1.2.1. REDD PROJECTS (REDUCING EMISSIONS FROM DEFORESTATION AND FOREST DEGRADATION)

Deforestation results from human activities that convert forest land into non-forested land. Large quantities of GHG are emitted in the process as stored carbon is released into the atmosphere by combustion or decomposition[5]. For example, and on average, clearing one hectare of humid tropical forest to grow crops can produce emissions of 892 – 300 = 592 teqCO_2 (figure 4). The carbon may be released gradually if the amount of biomass regularly extracted from the forested area exceeds its capacity for biomass renewal. This is the case in particular when forests are unsustainably managed, in which case the term "forest degradation" is used, since the land use change occurs gradually.

5 And also CH_4 and N_2O when burned, particularly when combustion is incomplete

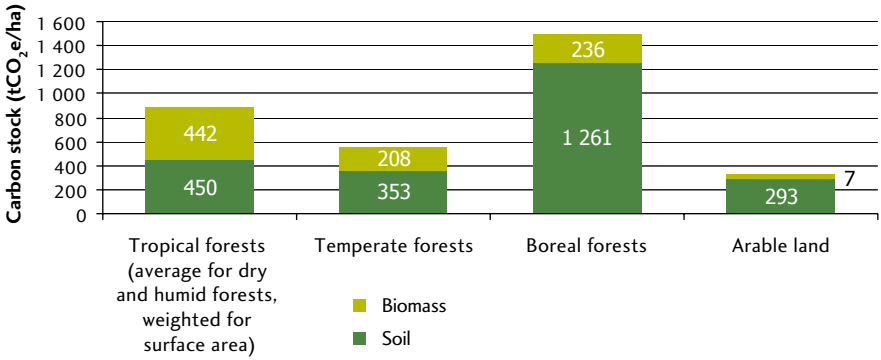

Figure 4: Carbon stocks per ha in different ecosystems (Source: CDC/IPCC6)

When calculating emissions from deforestation, how forests are actually defined in order to calculate their surface area is of considerable importance. Definitions can vary from one country to the next.

The United Nations Framework Convention on Climate Change (UNFCCC) defines a forest as an area covering at least 0.05 to 1 hectare and containing trees whose canopy covers more than 10 to 30% of that area (or an equivalent stand density) and which grow to a minimum height of 2 to 5 meters. Each host country must choose these three forest definition parameters, using these intervals. Country values for these parameters may be found on the UNFCCC web site or by contacting the Designated National Authorities (DNA) for the countries concerned7. (Source: ONFI)

REDD is described in terms of a "mosaic" when it is conducted in different places, as in the case of slash-and-burn farming. The term "frontier" is used when REDD occurs on a pioneer front, for example when lands are deforested for large-scale agriculture. To act against deforestation and forest degradation, these projects implement conservation activities (e.g., establishment of protected areas) or activities to counter the causes of these phenomena (reforestation, agricultural intensification, sustainable forest management, improvements in household energy efficiency, etc.). A recent study details the different kinds of activities implemented by REDD projects[8].

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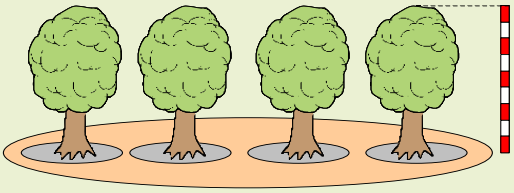
6 Bellassen V. et al., 2008. *Réduction des Emissions dues à la Déforestation et à la Dégradation des Forêts : Quelle Contribution de la Sectiondes Marchés du Carbone*? CDC

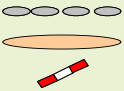
7 List of DNAs : http://cdm.unfccc.int/DNA/index.html

8 Calmel M. et al., 2010. REDD at project scale. Development and evaluation guide. ONFI, CEPAL, AFD

WHAT IS A FOREST?

The United Nations Framework Convention on Climate Change (UNFCCC) defines a forest as an area covering at least 0.05 to 1 hectare and containing trees whose canopy covers more than 10 to 30% of that area (or an equivalent stand density) and which grow to a minimum height of 2 to 5 meters. Each host country must choose these three forest definition parameters, using these intervals. Country values for these parameters may be found on the UNFCCC web site or by contacting the Designated National Authorities (DNA) for the countries concerned[1]. (Source: ONFI)





Couverture minimale par les houppiers (entre 10 et 30%)
Minimum canopy cover (10 – 30%)
Minimum forest surface area (0.05 – 1 ha)
Minimum mature tree height (2 – 5 meters)

1 List of DNAs : http://cdm.unfccc.int/DNA/index.html

1.2.2. AFFORESTATION AND REFORESTATION PROJECTS (AR)

Afforestation and reforestation involve converting "non-forest" into "forest". As well as developing traditional activities (ligneous products, for example), these projects also aim to increase the amount of carbon stored in forest biomass and soils.

According to the UNFCCC, the difference between afforestation and reforestation is the length of time during which the terrain contained no forest: over 50 years in the case of afforestation and less than 50 years in the case of reforestation.

AR projects may include:

- Commercial AR, often on a large scale and mainly targeted at the production of timber or non-timber forest products (rubber, etc.);
- Community and peasant AR, often on a small scale and providing goods and services to local communities;
- AR on degraded lands with the main aim of restoring and preserving soils; and
- Agroforestry AR, combining forestry and agricultural production.

1.2.3 IMPROVED FOREST MANAGEMENT PROJECTS (IFM)

These projects are implemented in "forests" that are intended to remain as such. The aim is to increase the stock of carbon within the area or to reduce emissions from forest activities and their impacts through better forestry practice. Examples include the following:

- Switching from conventional forest exploitation methods to low-impact or sustainable forest management;
- Establishing a previously logged forest as a conservation area; and
- Increasing the duration of rotations (i.e., the interval between felling operations in the same forest parcel).

1.2.4. PROJECTS CONCERNING USES OF TIMBER PRODUCTS

Timber products have an important role in fighting climate change. First of all, they lengthen the time during which carbon is stored in wood. Once a tree is felled, the carbon it contains remains locked in the marketed products for a certain amount of time, depending on the product in question. According to the Inter-Governmental Panel on Climate Change (IPCC), 1 m^3 of timber products will store an average of 1 tCO_2.

Using wood to manufacture alternative products also helps to reduce fossil fuel needs (this is referred to as the substitution effect). Manufacturing wood products often requires less energy than producing materials like aluminum, concrete, or cement.

Although a number of methodologies are being developed to undertake projects developing wood product materials, we did not identify any projects of this type in our study (Section 1.4). Furthermore, since timber product development projects follow very distinct and highly variable industrial logic, they will not be addressed in the rest of this guide.

1.2.5. BIOMASS ENERGY PROJECTS

Provided the resource is managed sustainably[9], using wood as a source of fuel is virtually carbon neutral: the quantities of CO_2 released by burning wood are offset by the absorption of CO_2 by growing forests. The biomass used as fuel replaces fossil fuels[10] and therefore avoids the corresponding CO_2 emissions. This energy substitution effect may consist of heat production (industrial or domestic) or combined heat and power production (CHP).

Although they are strongly linked to forests, biofuel projects raise issues that are specific to the industry, both technical and political, and will therefore not be addressed in the remainder of this document[11].

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9 These sustainability criteria are defined, for example, in CDM methodologies

10 Or, in some cases, biomass from non-renewable resources

11 Biofuel projects are very common under the CDM. Methodological and financial barriers to these projects are not the same as for REDD, AR and IFM projects.

1.3. How do forestry projects fit into the carbon markets?

1.3.1. BASICS OF THE CARBON MARKET

There is not one carbon market but several, each distinguished by different rules, types of assets traded, and types of players. There are two main categories: (i) legally binding carbon trading, which involves players with mandatory emission reduction targets under international agreements or national and local policies, and (ii) voluntary markets, which operate independently of mandatory emission reduction targets.

As shown in figure 5, carbon markets are usually organized around carbon credit supply and demand, under the oversight of supervisory bodies for regulated markets.

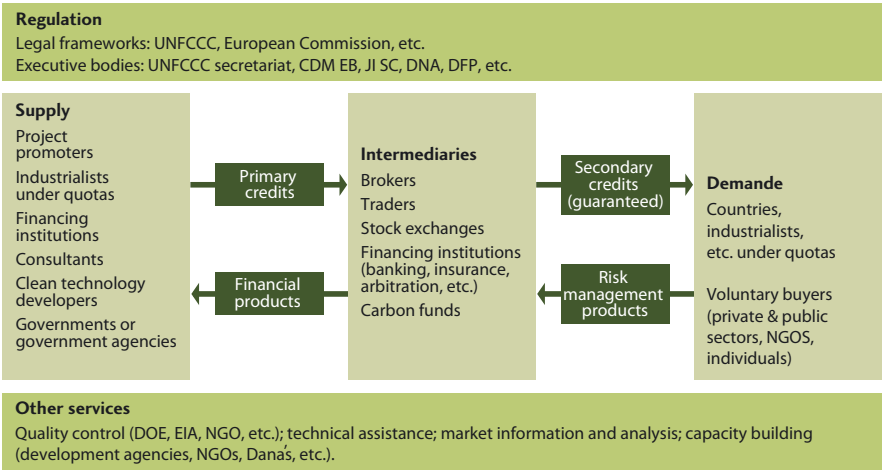

Figure 5: Organization of the carbon market. Transactions are of two types: trading in "primary" credits takes place before the credits are issued. These transactions involve risks related to the production of the credits. "Secondary" transactions involve credits already generated, and generally take place between intermediaries and end-users. (Source: World Bank12)

Since the very first transactions in carbon offsets, fuelled by Kyoto Protocol commitments, carbon markets have grown steadily and become increasingly

12 World Bank, 2009. State and Trends of the Carbon Market 2009

organized[13]. Rapidly increasing investment has fostered the emergence of new players in carbon finance, particularly intermediaries between project developers and end-users (carbon funds, brokers, marketplaces, etc.), who offer new products (hedging instruments, derivatives, delivery guarantees) and services (legal advice, market analyses, technical expertise).

Several carbon markets have become established since 2000. In 2009, the main operational markets were:

- The market between nations with commitments under the Kyoto Protocol;
- Regional markets: European Union Emissions Trading Scheme or EU-ETS, New Zealand Emissions Trading Scheme or NZ-ETS, New South Wales Greenhouse Gas Reduction Scheme or GGAS (Australia), and the Regional Greenhouse Gas Initiative or RGGI (USA); and
- The "voluntary market", with over-the-counter trading (OTC) between credit buyers and vendors, or through organized markets such as the Chicago Climate Exchange (CCX).

Other markets of this type are being developed in the United States (Western Climate Initiative or WCI, at federal level), and in Australia, Canada, and Japan.

1.3.2. FOREST CARBON PROJECTS IN REGULATED MARKETS

In "regulated markets", international agreements or national and local policies place a legal obligation on countries or economic players to reduce their GHG emissions, and allocate a quota of emissions that may be traded. An overall emissions target is set, and players must achieve this target either by reducing their emissions or by buying permits allowing them to release emissions over and above their binding targets. The choice depends on the costs of reducing emissions and the value of the emission permits (this is known as the "cap and trade" system).

13 According to the World Bank, in 2008, 4,811 MteqCO_2 were traded on the carbon markets, for a total amount of € 84 billion. Most of the trade was in quotas under the European EU-ETS (64%), secondary CDM credits (22%) and primary CDM credits (8%).

1.3.2.1 The Kyoto Protocol mechanisms

The Kyoto Protocol market sets out emission reduction targets for UNFCCC Annex 1 countries[14] having ratified the Protocol[15]. Over and above the reductions actually achieved, countries may use three mechanisms to reach their binding targets: (i) a mechanism for trade in quotas (Assigned Amount Units or AAU), or two project mechanisms: (ii) Joint Implementation (JI) for projects in Annex 1 countries I, and (iii) the Clean Development Mechanism (CDM) for projects in developing countries not listed in Annex I. Credits generated through the two latter mechanisms are called Emission Reduction Units (ERU) and Certified Emission Reductions (CER).

Despite the very important role of the LULUCF sector, its inclusion in the system was a subject of heated debate during negotiations over the Protocol. The decision to include absorption by forests in Annex 1 countries and emissions due to deforestation in non-Annex I countries (via the CDM) was highly controversial. Some objected on environmental grounds, seeing a possible loophole through which efforts to reduce emissions from fossil fuel burning could be avoided, given the very large potential of forests. Others were opposed on methodological grounds: scientific uncertainties, lack of available data, data that were not comparable between countries, and the risk of creating counter-incentives. The Kyoto Protocol demanded large-scale implementation of new and complex financial and regulatory instruments, resulting in very tough negotiations. Consequently, the participating countries did not wish to undermine the fragile edifice that had been constructed by introducing projects which, at the time, did not have sufficient maturity. Therefore, in the Kyoto Protocol context, forests only have a limited role in both Annex 1 countries (via Kyoto Protocol Articles 3.3 and 3.4) and non-Annex I countries (as the CDM is restricted to AR projects).

- The place of forests in Annex I countries involves a complex equation between absorption quotas and credits generated by JI projects

Forests in Annex I countries are taken into account via Articles 3.3 and 3.4 of the Kyoto Protocol and may, in this regard, generate “Removal Units” (RMU) that can be used by countries to reach their targets. However, the accounting rules for forests in these articles are so demanding that they have severely curbed the potential of forest carbon projects.

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14 List: http://unfccc.int/parties_and_observers/items/2704.php

15 And listed as such in Annex B of the Kyoto Protocol

In national GHG inventories, Article 3.3 includes land-use changes. Article 3.4 includes forest management (figure 6). It should be noted that while Article 3.3 is mandatory, Article 3.4 optional. Carbon sequestration in timber products was excluded from the Protocol.

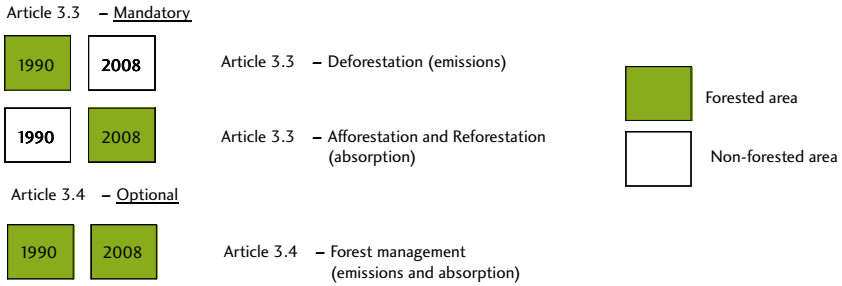

Figure 6: Forest carbon accounts under Articles 3.3 and 3.4 of the Kyoto Protocol for 2008 (source: ONFI)

Areas deforested, afforested and reforested between 2008 and 2012 are included under Article 3.3. Only emissions resulting from deforestation in 2008-2012 and sequestration resulting from AR in 2008-2012 are taken into account (referred to as "gross - net" accounting). Despite a surge in AR in Annex I countries, a positive result under Article 3.3 is difficult to achieve as deforestation releases emissions rapidly and in large quantities while sequestration through AR takes place more slowly.

Managed forests[16] were those most likely to generate a great many RMUs for some forested countries under Article 3.4. This sequestration is a consequence of the relative young age of many forests in industrialized countries, and the resulting high rate of carbon storage. Consequently, and to limit the potential loophole effect, forest carbon accounting is optional and subject to a ceiling (of about 10% of the potential), which considerably limits interest in this optional Article among the countries concerned[17].

16 Lands that were forested in 1990 and remained so in 2008-2012

17 For example, in 2007 for France, the result of Article 3.4 was 72 MteqCO_2 in carbon sequestration, amounting to 14% of national GHG emissions. The maximum authorised issue of RMUs in France is set at 3.2 MteqCO_2 (Source: CITEPA / UNFCCC)

Methods and procedures for JI projects have been developed recently, in particular because JI projects can only generate credits as of 2008 (start of the Kyoto Protocol period). The number of JI projects to date is fairly small (256 as against 5513 CDM projects[18]). The question of forest carbon projects in the JI context is even more complex. On the one hand, Articles 3.3 and 3.4 do not offer a very strong incentive. On the other hand, a great many questions remain as to possibilities for generating ERUs through forest carbon projects under the JI[19]. These obstacles largely account for the lack of interest from Annex 1 countries and potential buyers, as forest carbon projects cannot develop sufficiently under current rules[20]. Nevertheless, one JI project (in Romania) has been registered. At present, only New Zealand has established a mechanism enabling the private forest sector to acquire carbon credits under Articles 3.3 and 3.4.

The case of New Zealand

New Zealand is the first Annex 1 country to have provided legal mechanisms that allow private ownership of forest carbon credits under the Kyoto Protocol (October 2008).

Owners of forests established since 1989 may choose to register their forests for the New Zealand emissions trading system (NZ-ETS) or to request approval from the Permanent Forest Sink Initiative (PFSI). NZUs (under the NZ-ETS) or AAUs (under the PFSI) may then be issued to forest owners according to the carbon measured in their forests. However, if the project subsequently loses stored carbon, the NZUs or AAUs delivered must be reimbursed to the government[1]. The first transactions were registered in 2009 (figure 18).

1 For more details: http://www.maf.govt.nz/forestry/pfsi/

18 CDM and JI Pipeline, October 2009. UNEP Risoe Center

19 §§ 15a and 16 of Decision 13/CMP.1

20 Schlamadinger B. et al., 2007. Summary of the Workshop on LULUCF Activities under Joint Implementation (JI) and Green Investment Scheme (GIS)

◆ Forest carbon in non-Annex I countries: the slow uptake of the CDM AR

Forests in non-Annex I countries are taken into account through the CDM[21]. Only AR projects are eligible. Eligibility for the mechanism depends on numerous criteria, as described in the box below[22].

Eligibility criteria for CDM forest projects

In order to generate carbon credits through the CDM, projects must be audited by an external third-party (validation) and must demonstrate that they satisfy a certain number of the criteria described below. The project can then be registered by the CDM Executive Board (see Annex 2 for more details).

- Eligibility: only afforestation and reforestation activities are accepted for the forestry CDM (AR). To be eligible, an afforestation or reforestation project must demonstrate that the terrain contained no forest between 31 December 1989 and the project start date;

- Additionality: the CDM will only consider "emission reductions or sequestration that are additional to any that would occur without the certified project activity", meaning that if there were no carbon credits, the project would not have taken place. In order to demonstrate additionality, all CDM forest project methodologies are based on the same tool, which has been approved by the CDM Executive Board[1];

- Baseline scenario: projects must establish a baseline scenario that describes what would occur if the project did not take place. Only the difference between absorption from the project and the baseline level may be traded through carbon credits;

1 Additionality demonstration tool for CDM AR projects : http://cdm.unfccc.int/methodologies/ARmethodologies/approved_ar.html

21 The rules applying to the forestry CDM are set out in three of the main decisions of the Conference of the Parties: decision 17/CP7 adopted in Marrakech in 2001, decision 19/CP9 adopted in Milan in 2003, and decision 14/CP10 adopted in Buenos Aires in 2004

22 Rules and procedures are simplified for so-called "small-scale projects", which are those absorbing less than 16,000 tonnes of teqCO_2 per year

- Leakage: emissions resulting from the project outside its perimeter, known as "leakage", must be taken into account by projects;

- Non-permanence: the carbon stored in a forest or plantation does not remain there forever. It may be released into the atmosphere either as a result of human activities (logging, land-use change) or through natural causes (forest fires, disease). Therefore, 1 ton of carbon absorbed in a plantation will not correspond with 1 ton of carbon emissions from energy production, and will need to be associated with a duration. While credits from emission reductions through CDM energy projects are permanent, those generated by absorption in forest projects are temporary. Two types of credits have been defined in this context: "tCERs", or short-term CERs, and "lCERs", or long-term CERs;

- Monitoring: carbon sequestration through projects must be measurable and capable of being accurately monitored. Monitoring takes place during the accounting period (or crediting period) for emissions sequestered by the project, which may last for 30 years (single crediting period) or 20 years (renewable twice); and

- Methodologies: estimations of a baseline and a project scenario (including emissions and leakage) and establishment of the monitoring plan must be based on a methodology approved by the CDM Executive Board. By the end of 2009, 16 methodologies had received approval, including 10 for large-scale projects and six for small-scale projects. These methodologies are available on line from the UNFCCC web site[2] (see also Annex 1).

2 http://cdm.unfccc.int/methodologies/index.html

At present, CDM forest projects only make up a small proportion of projects and credits on the CDM market (figure 7).

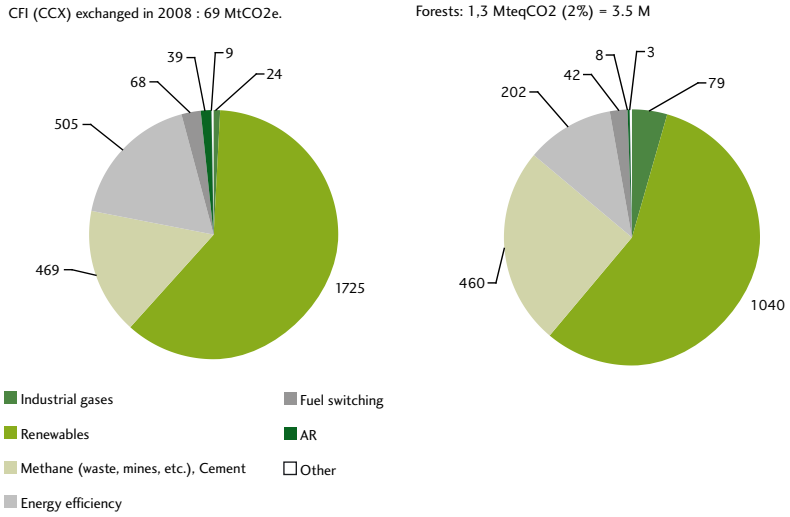

Figure 7: Forest carbon projects under the CDM. Forest projects account for 0.4% of all registered projects and 1.4% of projects under validation. 0.1 MteqCO_2 in CDM forest carbon credits were traded in 2008 as against an overall total of 389 MteqCO_2 in primary CDM credits. It should be noted that validation of five projects was completed with no subsequent request for registration (Source: UNEP[23]/World Bank[24])

Several reasons may serve to explain this slow pace of development. The first concerns the delay in defining rules for CDM forestry projects within the UNFCCC (figure 8). An initial methodology for the forestry sector was approved by the CDM Executive Board in late 2005, more than two years later than other sectors. The delay adversely affected forest carbon projects on the so-called "compliance" market, which centers on purchases of credits to achieve compliance before the end of the first Kyoto Protocol accounting period in 2012. Forest carbon projects, which need time before plantations grow sufficiently to generate significant quantities of credits, are therefore penalized. The first forest carbon project was only registered in 2006. Eight have now been registered by the CDM Executive Board.

23 CDM and JI Pipeline, October 2009. UNEP Risoe Center

24 World Bank, 2009. State and Trends of the Carbon Market 2009

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Decisions on rules and procedures									
Other sectors	X								
LULUCF sector	→		X						
Approved methodologies									
Other sectors	→		10	32	61	83	104	115	132
LULUCF sector	→				1	5	13	15	16
Registered projects in bracket : total number of AR projects applying for validation)									
Other sectors	→			2	143	586	1146	1723	1834
LULUCF sector	→					1 (4)	1 (13)	1 (36)	8 (52)

Figure 8: Implementation of CDM AR projects compared to other sectors (cumulative through 2009) (Source: ONFI)

CDM forest carbon projects involve more complex technologies than many other CDM projects (energy, industry, etc.), especially regarding methodology. They demand a great many measurements in the field, land eligibility must be demonstrated, and the boundaries of plantations on land parcels have to be defined. Furthermore, for forest carbon projects to be eligible, the DNAs have to select parameters to define forests and sustainable development criteria, which has not yet been done in several countries in the South. As projects are implemented, other problems may appear as well. These may include legal hurdles relating to the definition of forest ownership, and obstacles relating to actual and use rights, including customary rights, over forest lands or resources. These hurdles have caused investors to turn to other less costly CDM technologies involving more manageable risks.

Nevertheless, these technical, methodological and legal hurdles are diminishing as projects develop and as experience builds among project promoters and consultants. At present, although setting up these projects is still complex, the main obstacles

to their development no longer exist: 16 methodologies are now available as well as a number of official tools to aid project promoters in demonstrating project additionality, calculating carbon sequestration, and choosing the right methodology.

1.3.2.2. The European Emissions Trading System (EU-ETS)

We have now described the constraints weighing on the supply of CDM AR projects. One of the other main factors slowing the development of CDM forest projects is the limits of demand: notably, the European emissions trading system does not accept forest carbon credits. The EU-ETS is the Community system adopted to reduce emissions from the power sector and the main GHG emitting industries. This carbon market is currently the world's largest, both in value and volume, and also the largest source of demand in credits from CDM projects[25]. Excluding forest carbon credits from the market greatly restricts demand for credits of this type.

The problem arises primarily from (i) political factors. Some players have lobbied to exclude the forest sector, on the grounds that carbon sequestration can only be temporary and reversible. The argument emphasizes the system should focus on investments in high-emission power and industry sectors. The second reason (ii) has to do with accounting issues. Including temporary credits in the European registry system would create methodological complexities and fears that responsibilities would shift to the State if the companies concerned cease to exist and become unable to replace their company credits once their validity expires. Finally (iii), fears of an influx of forest carbon credits liable to destabilize the emerging market contributed to Europe's decision-makers choosing to exclude this type of project from the EU-ETS system.

1.3.2.3. Other regulated carbon markets

Other regulated markets are becoming established, some of which have now been operating for several years. One example is the Australian GGAS, which is open to afforestation and reforestation projects (but limited to national projects). In 2008, 0.2 MteqCO_2 in forest carbon credits were traded on this market[26]. In the US, many states have adopted policies to cap their GHG emissions, in conjunction with wider regional initiatives. In the North-East, with the RGGI, a cap-and-trade mechanism limits emissions from power plants for a period of six years. In the West, the WCI formed in

25 World Bank, 2009. State and Trends of the Carbon Market 2009

26 Ecosystem Marketplace, 2010. State of the Forest Carbon Markets 2009

2007 is aiming for a regional 15% reduction in GHG emissions from 2005 to 2020. A similar market mechanism is emerging in which forest projects are central to the strategy for project-driven carbon offsetting. Most of the initiatives developed under the regulated American markets include forestry projects, especially the RGGI and WCI at regional level, and the markets in the States of California, Oregon, and Alberta (Canada).

1.3.3. FOREST CARBON PROJECTS IN VOLUNTARY MARKETS

On voluntary markets, actors make voluntary emission reduction commitments and purchase emission reductions to "offset" (in full or in part) or "neutralize" their impacts on climate. This compensation may concern emissions from private individuals, businesses, events, and even mass-marketed products. In the US, private individuals or companies, event organizers, and suppliers have no obligation to act against climate change but decide to act for "ethical" or "green" image reasons, or in anticipation of forthcoming regulations (referred to "pre-compliance"). They purchase emission reductions (VERs - Voluntary Emission Reductions) on voluntary markets, which differ from regulated markets in that credits conform to private-sector standards that are generally more flexible than the rules and regulations applying to regulated markets, especially those for CDM and JI credits under the Kyoto Protocol.

Transactions are governed by contracts that are generally signed between project promoters and carbon credit customers (referred to as "over-the-counter" transactions or OTC). A great many intermediaries (called "offsetters") offer their services to calculate corporate and individual emissions and to offset these in part or in full by purchasing credits that are used to finance projects. In some cases, these markets may become organized around platforms such as the *Chicago Climate Exchange* (CCX).

In 2008, the CCX market traded nearly 56% of total volumes as against 44% for the OTC market[27]. In terms of the value of credits traded, the trend is reversed: 56% on the retail market as against 44% on the CCX market. Overall, larger quantities of credits are traded on the CCX, but at lower prices.

The activities eligible for these voluntary markets are far more varied than the AR projects eligible for the CDM. Forest projects of every kind may be eligible, especially REDD and IFM. As shown in figure 9, forestry features much more prominently on these markets than on CDM markets.

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27 Ecosystem Marketplace, 2009. State and Trends of the Voluntary Carbon Markets 2009

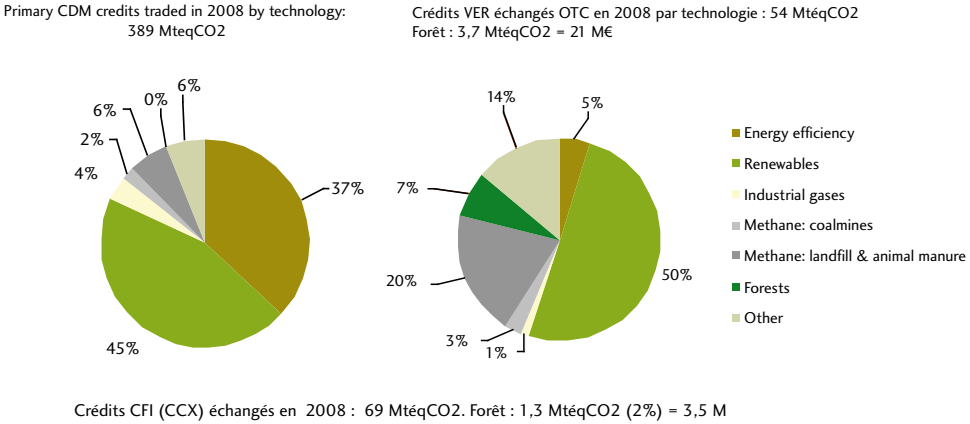

Figure 9: Trade in credits from forest projects on the voluntary market compared to CDM credits (2008). Forestry projects feature more prominently on the voluntary OTC market (7%) and CCX (2%) than CDM projects (0.1%). (Source: Ecosystem Marketplace)

This trend is principally due to the attraction of forest carbon projects for buyers. They are more attractive in terms of image[28] as their positive effects on climate change are more obvious or easily recognizable to the general public[29]. A recent study[30] confirms buyers' interest in these credits (figure 10), which bring socio-economic co-benefits to rural populations (jobs created in timber sectors, alternative livelihoods, poverty reduction) as well as environmental co-benefits (erosion control, protection of water resources, biodiversity), which buyers tend to value highly. Finally, on the voluntary market, competitive prices are not as acute an issue as on regulated markets.

28 Harris E., 2006. The voluntary Carbon Market: Current & Future Market Status, and Implications for Development Benefits; Working Paper, Round Table Discussion : Can Voluntary Carbon Offset Assist Development ?, IEDD

29 Taiyab N., 2006. Exploring the Market for Voluntary Carbon Offsets, IIED

30 Neeff T. et al., 2009. Forest Carbon Offsetting Survey 2009

A voluntary market project: REDD in the Juma Reserve (case study no. 1, see Annex)

The Juma project is a REDD project located on the pioneer frontier in the Brazilian Amazon. It is promoted by an NGO and has established an innovative system of payments for environmental services (PES) designed to encourage local communities to preserve existing forests. The project is registered on the voluntary market and financed by Marriott International under its environmental philanthropy scheme and by "forward sales" of credits to customers of the hotel chain.

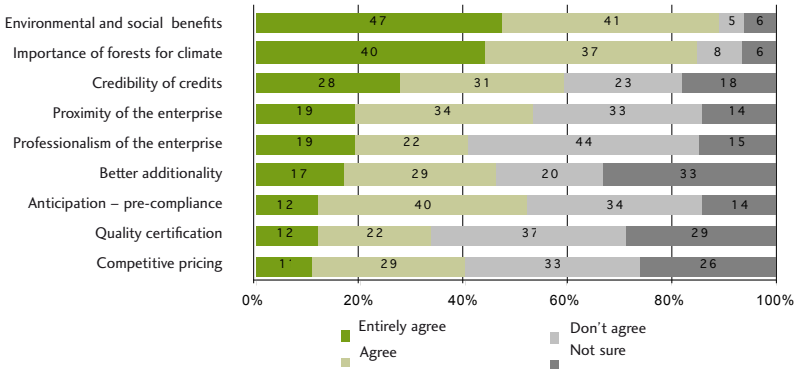

Figure 10: Advantages of forest carbon projects for credit buyers (Source: Ecosecurities)

Main forest quality standards on the voluntary market

- The VCS standard. In 2005, various partners, including IETA and WBCSD, decided to establish a standard for projects entering the voluntary market. Known as the Voluntary Carbon Standard or VCS, it is equally valid for AR, IFM, and REDD projects. It offers solutions to resolve the non-permanence problem, by reserving part of the credits generated by the project. The VCS aims to become a reference label for the voluntary market. At present, only one forest project has been officially registered as complying with the VCS1;

- The CCBs standard. The CCBA alliance of NGOs (TNC and Conservation International) and companies is receiving technical support from research centers to develop the Climate Community & Biodiversity Standard (CCBs). It is exclusively designed for forest projects and, above and beyond the carbon aspect, includes the social and economic benefits associated with projects. Unlike other standards, it certifies projects but does not issue credits2. A new standard for REDD + Social & Environmental Standards is being developed under the aegis of the CCBA3;

- The Carbon Fix Standard (CFS) was developed by German scientists specializing in forestry, environment and climate change. This label certifies AR forest projects and issues different types of credits, mainly ex-ante VERs4 (in other words, credits for future carbon absorption stemming from the project)5;

- The Chicago Climate Exchange (CCX), set up in 2003, is a voluntary market for trade in GHG units that operates in the same way as a stock market. Initially concerning only projects from countries which had not signed the Kyoto Protocol, in 2008, it expanded to GHG reduction projects anywhere in the world. Specifications are more flexible than for CDM projects, for example

1 http://www.v-c-s.org/

2 http://www.climate-standards.org/

3 http://www.climate-standards.org/REDD+/index.html

4 As opposed to ex-post credits generated after sequestration or effectively avoided GHG emissions

5 http://www.carbonfix.info/

regarding the demonstration of additionality. CCX protocols now accept AR, IFM, and REDD projects as well as projects concerning carbon storage in timber products[6];

- The Climate Action Registry (CAR), which developed from the California Climate Action Registry (CCAR), is an American national standards definition programme for carbon projects. Covering projects of several types, the CAR's Forest Project Protocol V3 addresses only North American projects[7]. The California Air Resources Board (CARB), which is now defining rules for a regulated market for the State of California, recently approved the CAR's forest projects protocol, a decision perceived as making a link between the compliance and voluntary markets;

- The Plan Vivo system is a set of standards applying to projects involving Payments for Environmental Services (PES) in developing countries. Project activities include afforestation and agroforestry, forest conservation, restoration, and avoided deforestation. They are implemented by small forest owners or communities on their own lands, or on lands over which they have cultivation rights. The standard was developed by the Edinburgh Centre for Carbon Management (ECCM), the University of Edinburgh, and El Colegio de la Frontera Sur (Ecosur) with financing from the UK Department for International Development. The standard issues ex-ante VER credits[8]; and

- Finally, the CDM may be used as a quality standard on voluntary markets. Other standards used on voluntary markets include those of the SGS and Tüv Süd auditing consultancies (VER +), standards of more regional scope (Greenhouse Friendly[9] in Australia, American Carbon Registry10) or the Social Carbon standard[11].

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6 http://www.chicagoclimatex.com/

7 http://www.climateregistry.org/

8 http://www.planvivo.org/

9 http://www.climatechange.gov.au/greenhousefriendly/

10 http://www.americancarbonregistry.org/

11 http://www.socialcarbon.org/

The quantities of forest credits traded on the voluntary market increased steadily from 2007 to 2008, from 3.7 to 5 Mteq$C0_2$, or nearly 135% (valued at 24.5 M€[31]). This high rate of increase stems mainly from growth on the CCX (from 0.04 to 1.3 Mteq$C0_2$), as compared to only a modest increase 0.05 Mteq$C0_2$ on the voluntary OTC market. Despite the relative growth, the relative share of forest carbon projects on the OTC markets is dropping rapidly, from 48% of all credits pre-2006 to 8.5% in 2007 and 7% in 2008.

This drop in market share is predominantly due to the increasing professionalism of the carbon sector, through quality standards. For example, with the development of the voluntary markets, a great many forest projects have been questioned on the grounds the lack of transparency, particularly regarding methodologies and the calculation methods used. No standards have been established to clarify matters for consumers, resulting in adverse effects for the image of forest carbon projects in general. This lack of confidence has prompted operators to consolidate and diversify their portfolios to take in projects using other technologies, which, like the CDM, have readier access to standards than forest projects.

On the CCX market, although forest projects had a relatively low market share in 2008 (2%), the sector has grown strongly (from 0.04 MteqCO_2 to 1.3 MteqCO_2). The fact that this is a well structured market (definition of protocols for the forestry sector, etc.) and the flexibility and simplicity of these protocols may account for the trend.

The forest carbon market is therefore in a consolidation phase which is reflected in the establishment of quality standards. These standards set out specific procedures for validation and certification drawing on the CDM approach. Several standards offer innovative solutions. For example, to resolve the issue of the permanence of forest carbon credits, some standards offer an insurance scheme that spreads the risk of non-permanence to an entire set of projects. The scheme operates by "reserving" a set number of generated credits in a "buffer". This allows projects to offer permanent carbon credits that are more attractive to buyers than the tCER and lCER credits that have to be replaced periodically.

31 We have used an exchange rate of 1€ = US$ 1.5 throughout the guide

	Markets			Project mechanisms						
				Kyoto		Voluntary offset				
	EU-ETS	CCX	GGAS	MDP	MOC	VCS	CAR	CFS	Plan Vivo	CCBs
REDD										
AR										
IFM										

Table A: Project eligibility for the main standards and markets

1.4. Forest projects around the world: the situation today

A great many forest projects are currently under way. In 2007, a study conducted by ONF International and CIRAD[32] identified 178 such projects worldwide from various sources. Since this study was completed, the total number of identified projects has increased to 434. The study consisted of the following two primary elements:

- A review of information provided by the different standards, actors, and markets was conducted to identify registered forest projects or candidates for registration. This analysis covered the following main standards, actors, and markets: CDM, JI, VCS, VER+, CCBs, CFS, American Carbon Registry, Plan Vivo, CCX, Greenhouse Friendly, PFSI, Oregon Standard, GGAS, RGGI, and CAR; and

- A review of projects proposed for the voluntary markets was drawn up from information supplied by 83 carbon offsetters worldwide; this information was cross-referenced with other available sources such as the databases run by existing forest projects (ONF International, BioCarbon Fund, Forest Carbon Portal, Carbon catalog, Winrock, etc.) and information supplied by DNAs in non-Annex 1 countries.

Only projects specifically setting out carbon objectives (calculation of $C0_2$ absorption, offsetting, or trade in credits associated with projects) were included. Projects including

32 Gardette Y. & Locatelli B., 2007. Les Marchés du Carbone Forestier. ONFI, CIRAD

several plantation sites but run by the same operator in the same area were considered as one and the same project to avoid overestimating the number of projects. However, a reforestation project in two different zones (two different countries or states) was counted as two projects. The administrative scale used was the State (United States, Australia, Canada, Brazil) or the region (main European countries).

The main criteria were as follows:

- **Project location** (continent, country, region, locality);
- **The technology** (AR, REDD, IFM);
- **The area covered** (in hectares); and
- The use of a **standard or label.** Forest projects were divided into three categories: (i) projects registered under a standard, (ii) candidate projects for a standard and in the process of registration, and (iii) projects that are not (or not yet) working towards standardization. In the remainder of this guide, project in categories (i) and (ii) may be grouped together as "seeking standardization".

This breakdown gives a unique overview of the supply of forest carbon projects identified in the ONF International / CIRAD study, and the projects' main present and future characteristics.

1.4.1. A STRONG MOVE TOWARDS STANDARDIZATION

Of the 178 projects listed in 2007, less than 20 were on the way to standardization (about 10%). Of the 434 projects listed today, 136 have been registered or have applied for registration (over 30%, see figures 11 and 12), a trend that reflects a strong push towards project standardization.1

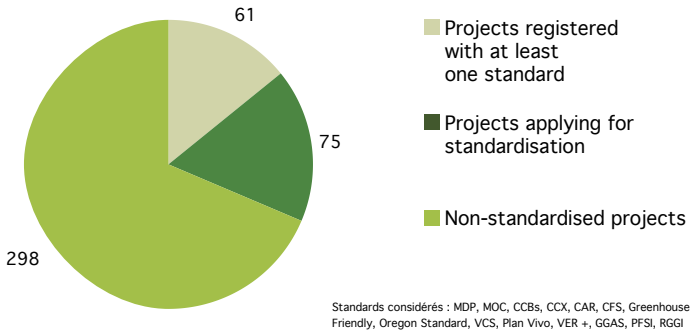

Figure 11: 31% (136 projects) are currently working towards standardization (Source: ONFI)

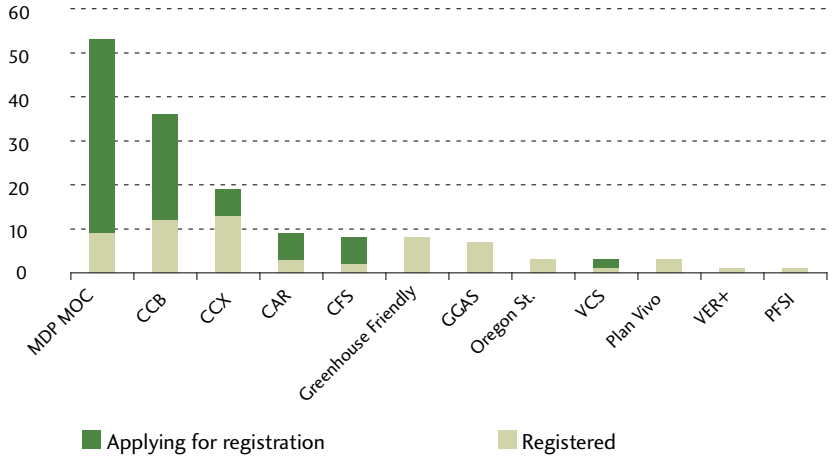

Figure 12: Breakdown of projects by type of standard (Source: ONFI)

Among the projects working towards standardization, almost 72% are looking to one of the three following standards: CDM or JI (35%), CCBs (24%), and CCX (13%). As the leading regulatory framework, the CDM/JI standard is the most frequently used. These standards include regional standards that cater for a particular market (CAR and Oregon Standard in the United States, Greenhouse Friendly and GGAS in Australia, PFSI in New Zealand) and international standards that may be applicable in any of the world's regions. The regional standards are not designed to apply in other regions, which explains their relatively lower share in numbers of projects.

It should be remembered that the data concerning the VCS standard are underestimated because the VCS site does not provide information on projects in the process of registration. Only validated projects are made public.

Finally, and in parallel with this push towards "standardization", there is still a substantial supply of projects that are not yet seeking standardization. These may be using internal quality criteria to avoid the large transaction costs associated with the different standards, especially when the projects are very small in size (figure 16). They may also be developed under the more general environmental philanthropy framework, which is less strict as to the carbon calculations for the credits generated (additionality, monitoring, etc.) but sometimes more innovative and more focused on environmental and social co-benefits.

1.4.2. A DIVERSE GEOGRAPHICAL DISTRIBUTION

The global distribution of forestry projects is presented in figure 13.

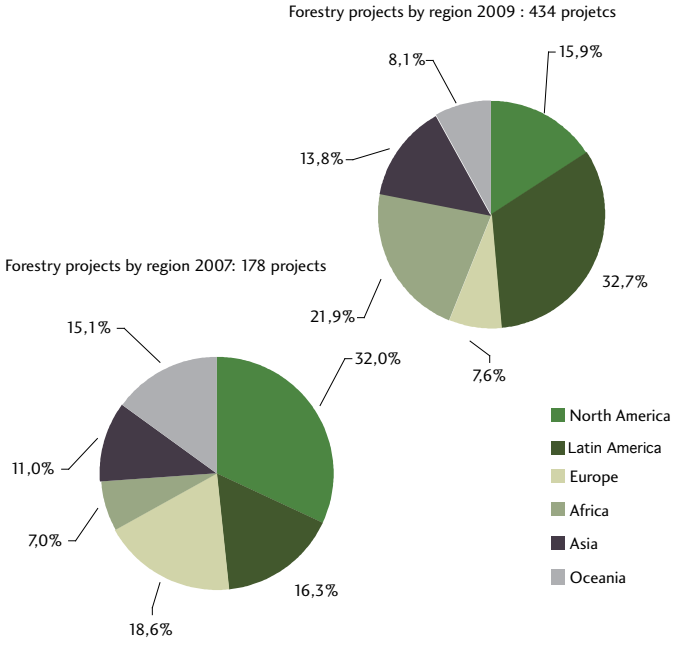

Figure 13: Distribution of forest projects by broad geographical region in 2007 and 2009 (Source: ONFI)

Latin America is the main supplier with almost 33% of all projects listed, with South America about 22% of the total, and Central America at 10%. In South America, 80% of the projects are situated in just four countries: Brazil (33%), Colombia (19%), Peru (14%), and Ecuador (14%). In Central America, they are more evenly distributed across the eight countries of the sub-region, which all have at least three projects. About 55% of the projects are in three countries: Mexico (26%), Costa Rica (16%), and Honduras (16%).

Africa comes in second place with almost 22% of the projects listed (95 projects in 22 countries). This is a great deal more than in 2007 when the share of African forest projects was estimated at just 7%. Three countries stand out: Kenya with 19%, Uganda with 14%, and Ethiopia with 13%.

North America comes next, with about 16% of all projects located in the United States (80%) and Canada (20%).

Asia has 14% of the projects in 10 countries. The two main countries are Indonesia (31%) and India (27%). China is in third place with 14% of projects. Oceania has 8% of the projects, almost exclusively in Australia, and Europe has 7.6%.

The most notable change compared to the data for 2007 is a more even balance between North and South: the relative share of projects based in the countries of the North has dropped substantially, whether in the United States (32 to 16%), Australia (15 to 8%) or Europe (19 to 7%), and in total from almost 65% of projects to only 32%. The relative share of projects based in the countries of the South has considerably increased from 35 to 68%. The trend is particularly clear in Latin America (16 to 33% of projects) and Africa (7 to 22%), and somewhat less notably in Asia (11 to 14%).

In the Annex I countries, the majority shares lie in the United States (13%) and Australia (8%). These countries are more dynamic on the voluntary markets, mainly because they had not ratified the Kyoto Protocol (although Australia did so in 2007), which left a lot of scope for developing voluntary offset projects[33]. The leading European country in terms of projects is the UK.

33 The overlap between national commitments under the Kyoto protocol and one entry projects can cause problems with double accounting of credits, as explained in Part 3.4.1.2 of this document

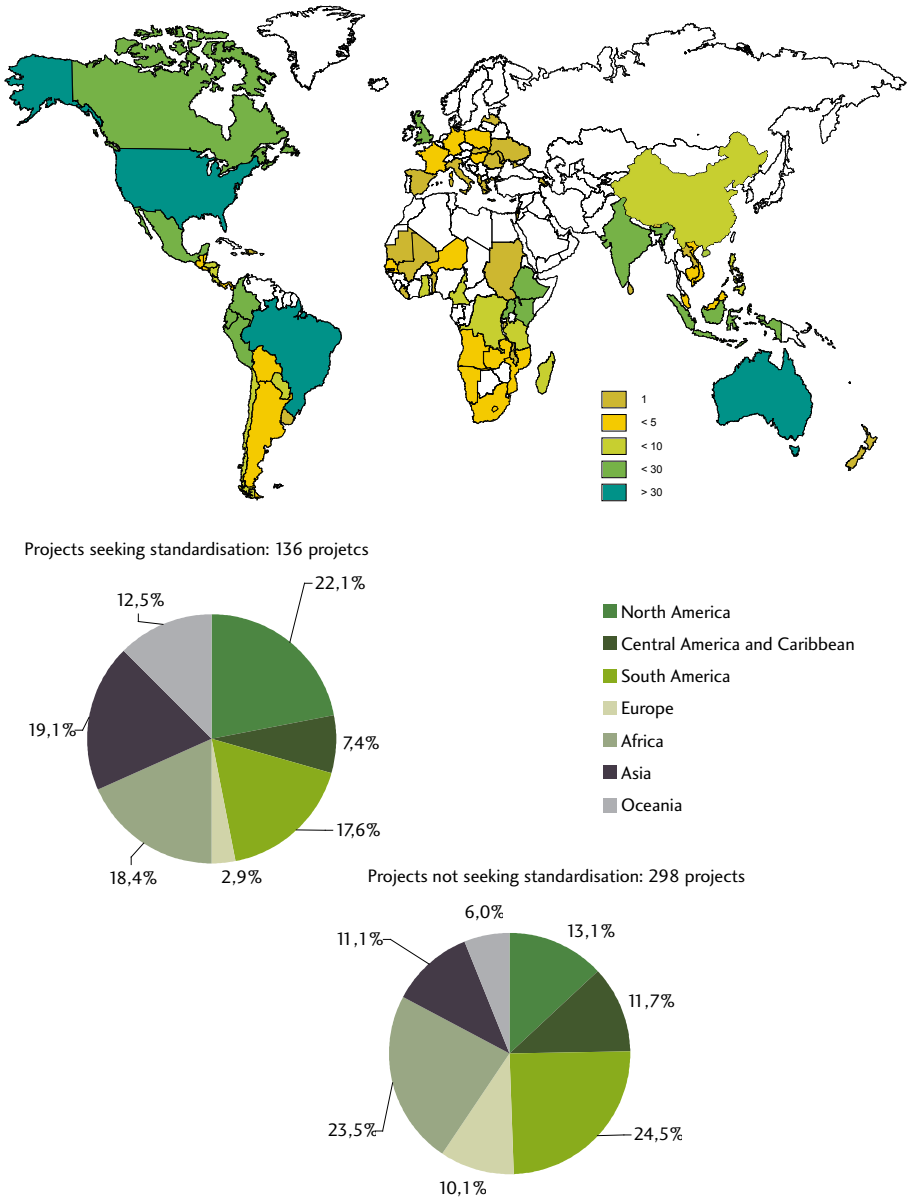

Figure 14: Distribution of forest projects across countries and broad geographical regions according to standards (Source: ONFI)

Where project types are concerned, most forestry projects around the world are still of the AR variety (81%). REDD topic areas have emerged only recently, which explains the small number of REDD projects so far. Forest management projects are also few in number (5%), and most are projects labeled under the American Climate Action Registry (CAR) standard. .

1.4.3. AR PROJECTS ARE IN THE MAJORITY

Where project types are concerned, most forestry projects around the world are still of the AR variety (81%). REDD topic areas have emerged only recently, which explains the small number of REDD projects so far. Forest management projects are also few in number (5%), and most are projects labeled under the American Climate Action Registry (CAR) standard.

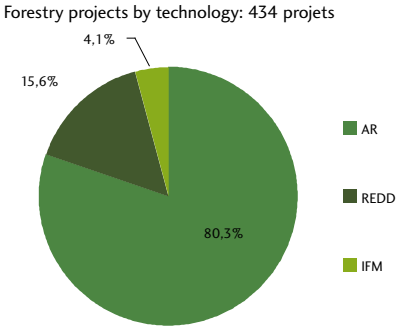

Figure 15: Forestry projects by technology type (Source: ONFI)

1.4.4. PROJECTS ARE OF VARIOUS SIZES DEPENDING ON TYPE AND STANDARD

To assess the size of projects, two sources of information are generally available: the credits generated by projects and the surface areas covered. We have decided here to use only data on surface areas, as they are more readily available and especially more accurate than data on the quantities of credits generated. This is because data on credit volumes are not easily comparable due to the variety of methodological approaches used by project developers.

We were able to collect data on surface areas for about 250 forestry projects (57.6% of the total), with an even distribution in percentage of projects with a standard / label (79 – 58%) and without (171 – 57.4%).

		Total area (ha)	Number	Average area (ha)
AR	Standards approach	255 981	68	3764
	No standard	300 302	132	2275
REDD	Standards approach	1 832 940	12	152 745
	No standard	6 605 853	38	173 838

Table B – Size of projects listed (Source: ONFI)

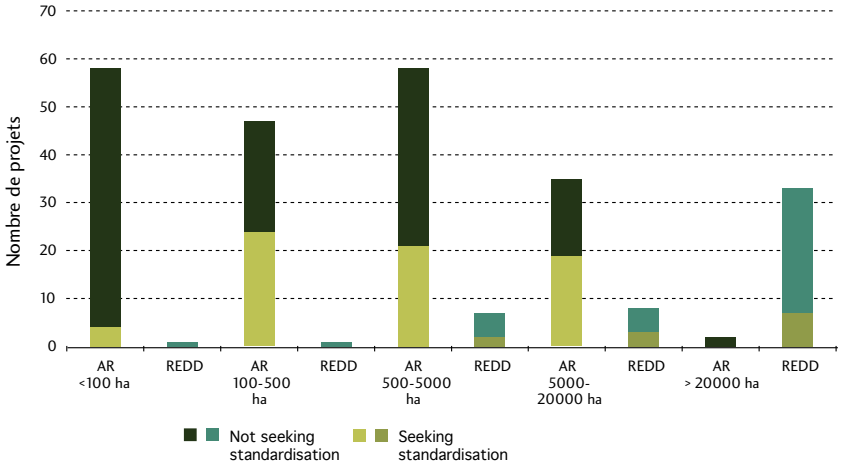

Figure 16: Size of projects listed by technology and standard used (Source: ONFI)

Almost 9 million ha covered by projects were listed. AR projects cover a total area of about 550,000 hectares (200 projects) while REDD projects cover 8.5 million ha (50 projects), which confirms the difference in scale between AR and REDD projects. 55 of the 59 projects covering less than 100 ha are not seeking standardization. These 55 projects amount to 32% of non-standardized projects.

1.4.5. AVERAGE TRADING PRICES ARE HIGHER THAN FOR OTHER TECHNOLOGIES

Concerning trading prices for carbon credits, a recent study[34] shows average prices for forest carbon credits at 1.7€/teqCO_2 on the CCX, 3€/teqCO_2 for the CDM and 4.7€/teqCO_2[35] on the voluntary OTC market (in 2008, figure 17). On the largest markets for forest carbon credits (OTC), the average price is higher than the average observed price on the market as a whole (3.4€/teqCO_2). There is also a significant price difference between AR projects (3.9€/teqCO_2) and REDD projects (7.6€/teqCO_2). Finally, prices observed on the OTC market vary widely (from 0.4 to 40€/teqCO_2), reflecting poor liquidity and an ensuing poor visibility of sale prices.

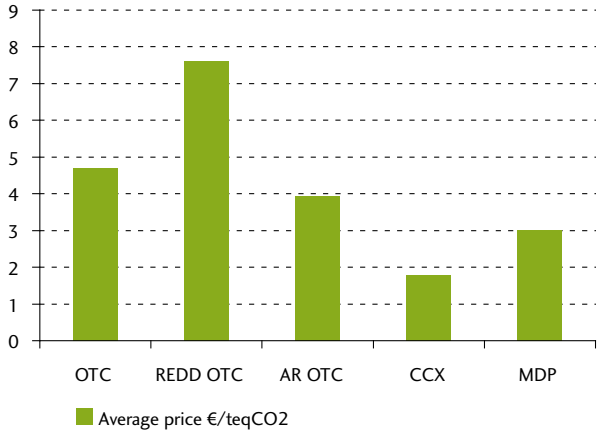

Figure 17: Credit sale prices according to markets and project types (Source: Ecosystem Marketplace)

34 Ecosystem Marketplace, 2010. State of the Forest Carbon Markets 2009

35 These prices reflect an average of primary and secondary credits. On the OTC market, 80% of transactions were for primary credits.

1.5. Conclusion

Compared to the fears that were voiced for a long time over the possibility of large volumes of low-cost forest carbon credits flooding the market and degrading price signals, it is now clear that what has happened is almost exactly the reverse. High demand for forest carbon credits has been strangled by their exclusion from the main regulated markets and by quality imperatives on the voluntary markets. The supply of standardized forest carbon credits at reasonable cost does not currently meet demand, although with the 136 projects now working towards standardization, there are grounds for optimism as to a consolidation of the role of forest projects on carbon markets. These two points are reflected in the moderate progress of forest carbon projects in 2007-2008 (figure 18), but also in sale prices for forest carbon credits that are fairly close to observed average prices. The forest carbon market is therefore in a phase of transition and consolidation. The chaotic euphoria of the early days is giving way to the establishment of standards that are placing the non-regulated market on a more professional footing.

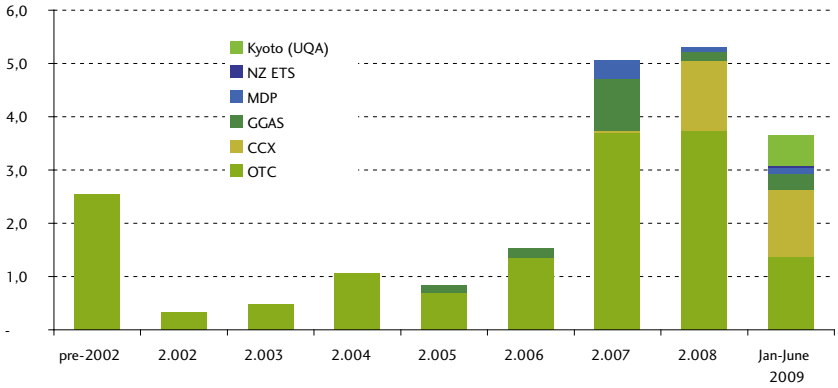

Figure 18: Trends in the forest carbon market, in MteqCO_2 (Source: Ecosystem Marketplace)

The forest carbon market was worth 25 M€ in 2008, with the vast majority of trade taking place on the voluntary market (24.5 M€). This has given a certain amount of visibility to forest projects despite their poor liquidity. Partial results indicate that, despite the current financial crisis, the market grew slightly in 2009 (figure 18) and remained stable in terms of prices.

However, this is still a niche market compared to the regulated markets, particularly the CDM (figure 19). Although methodological hurdles are being gradually overcome, investment barriers remain and are still a major obstacle to project development. Only when the sector is fully integrated into the regulated market system will large financial flows be directed to forests and to effective action against climate change.

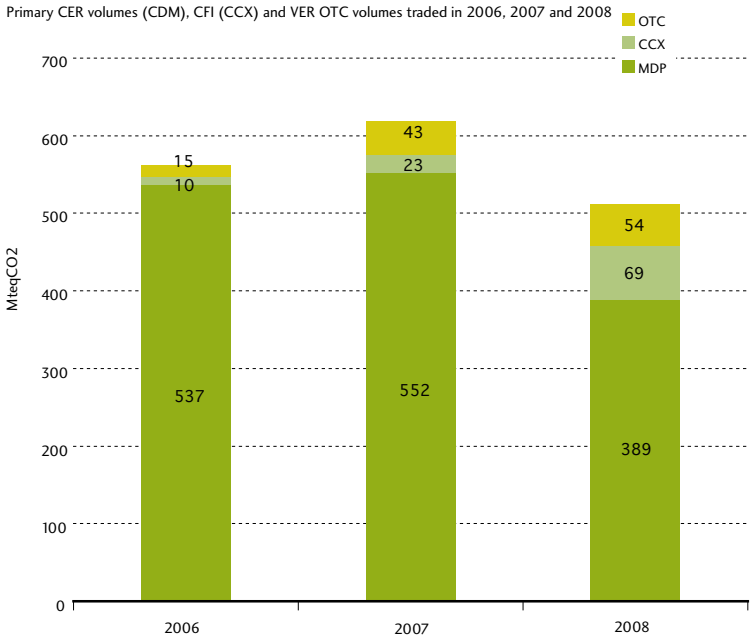

Figure 19: The voluntary market (470 M€) is growing fast but is still much smaller than the primary CDM market (4 346 M€)

2. Prospects for the forest carbon market after 2012

In the wake of the UNFCCC Conference (COP 15) in Copenhagen, the future of forestry projects within the carbon market remains uncertain. A great many political, institutional, economic, technical, and financial parameters are still undecided. Nevertheless, several regulated markets, including future Kyoto Protocol developments and a possible Federal quota system in the United States, are sending out positive signals as to the future of the forest carbon market. This section will review the negotiations now taking place as well as the broad trends that project promoters and investors may anticipate.

2.1. Forests in the post-Kyoto period: where will AR, IFM, and REDD projects stand?

2.1.1. FORESTRY RETURNS TO CENTRE STAGE FOR THE POST-KYOTO PERIOD

The latest reports from the IPCC[36] show that global warming is accelerating and that immediate action must be taken to stabilize atmospheric concentrations of GHGs at 450 ppm eqCO_2, the minimum required to prevent global warming of more than 2°C. Reaching this target will mean using the entire range of attenuation options offered by the different sectors of the economy. Furthermore, although emission reductions in industrialized countries are essential, they will not suffice. The contribution made by transitional and developing countries is crucial and will imply very large-scale technology transfers and financing from the developed countries.

Given this context, the inclusion of REDD projects in developing countries is a significant attenuation option that may generate large emission reductions at relatively low cost, as highlighted in the Stern Report on the economics of climate change[37]. Furthermore, REDD is expected to produce substantial co-benefits in terms of biodiversity protection and improved living standards for populations who depend on forest ecosystems.

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36 IPCC, 2007. 2007 climate change review: Contribution from working groups I, II and III to the Fourth IPCC Assessment Report

37 Stern N., 2007. Stern Report: the Economics of Climate Change

A great many points are still undecided in the REDD negotiations. Several issues relating to the environmental integrity of emission reductions to be attributed to the REDD mechanism are under discussion (scale and scope of the mechanism, baseline scenario, distribution of benefits, etc.). Moreover, implementation and financing rules and methods are yet to be established.

2.1.2. THE MAIN QUESTIONS RAISED BY THE INCLUSION OF REDD IN A FUTURE GLOBAL AGREEMENT ON CLIMATE

A great many points are still undecided in the REDD negotiations. Several issues relating to the environmental integrity of emission reductions to be attributed to the REDD mechanism are under discussion (scale and scope of the mechanism, baseline scenario, distribution of benefits, etc.). Moreover, implementation and financing rules and methods are yet to be established.

2.1.2.1. The basic issues

- **"Leakage" and the scale of the mechanism: making sure that the emission reductions achieved through REDD incentives in a given place are not simply shifted elsewhere.**

The "leakage" risk arises on two levels. Firstly, those responsible for deforestation could move their activities elsewhere if they are not offered more advantageous alternatives. Secondly, if REDD incentives reduce the supply of certain products (wood, agricultural and livestock products), pressures could be shifted elsewhere by market forces on the raw materials markets.

Before Copenhagen, most of the parties were in agreement that the future REDD mechanism should be implemented at a national scale to avoid the risk of emission sources shifting from one place to another in the same country. At Copenhagen, and under pressure from the United States, Indonesia, and Colombia in particular, the idea that REDD activities could also be sub-national gained ground and was reinforced.

Those in favor of a sub-national approach[38] argue that few countries, at present, have the capacity required to implement a national approach (national monitoring

38 The sub-regional scale may include States (in the case of federal countries), regions, départements, etc. but also "projects" as in the case of the CDM

of GHG emissions, etc.). Moreover, some countries do not have control over their entire territory because of persistent conflict or instability. A national approach would exclude them from the mechanism. Finally, a national approach may find it more difficult to attract the private-sector investments required to finance REDD, as most of the states concerned cannot provide guarantees that investors consider adequate.

Although no conclusions have yet been reached, a middle way has been put forward, known as the "nested approach", which would allow implementation of sub-national activities likely to generate credits during a transitional phase. These activities would aim to test pilot initiatives and gradually strengthen national capacities. After a certain period of time, or when these activities cover a certain proportion of the national territory, the country would be required to change to a national approach.

In order to avoid leakage from one country to another, participation in the future REDD mechanism would have to be on the largest possible scale, which implies establishing a system that is flexible enough and offers sufficient incentives for countries with very different national situations.

- **How to ensure that emission reductions are additional, in other words, how to guarantee that a drop in deforestation in a given country is really due to the additional efforts made thanks to incentives from the REDD mechanism, and would not have occurred without it.**

Guaranteeing additionality implies comparing actual observed emissions against a baseline level of emissions, which is the theoretical level of emissions that would have been released without the REDD mechanism. The issue lies in how the baseline level is determined, since deforestation is a complex process involving the interaction of many different economic, political, social, cultural, and biophysical factors[39], where changing trends are very difficult to forecast.

The dynamics of deforestation have been described by Rudel et al.[40] in terms of a forest transition process (figure 20). In the initial phase, deforestation is set in motion by increasing demand for agricultural raw materials and corresponding infrastructure development. The trend accelerates up to a maximum with the arrival of migrants and higher economic growth, then goes into reverse as forested lands for clearing become

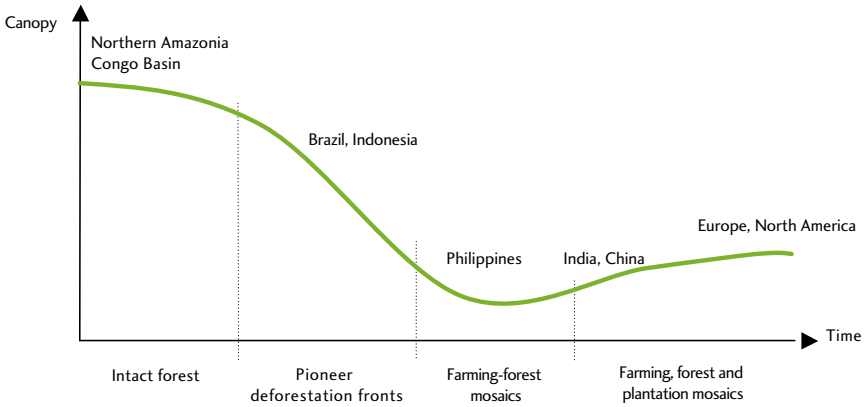
39 Geist H. & Lambin E., 2006. What Drives Tropical Deforestation? A Meta-analysis of Proximate and Underlying Causes of Deforestation Based on Subnational Case Study Evidence. LUCC Report Series

40 Rudel T.K. et al., 2005. Forest Transitions: Towards a Global Understanding of Land Use Change. Global Environmental Change 15 (1): 23-31

scarce, as employment opportunities develop outside the agricultural sector, and as demand for forest products and services increases and boosts planting and natural regrowth.

The world's intertropical regions are in different stages of this forest transition process: in Central Africa, it has barely begun; Brazil is experiencing intense deforestation; while in some Asian countries, forest cover is stabilizing (India) or increasing (China). In addition, different regions within the same country may be at different stages in the transition process (Indonesia and Brazil).

Figure 20: The forest transition process (Source: ONFI)



For countries currently experiencing forest transition, the baseline level could be a projection of historic trends, but countries not yet in this situation cannot use this approach as it would penalize them (since their historical rate of deforestation is low). They are therefore demanding the use of a projected baseline scenario that reflects the pressures likely to be exerted on their forest ecosystems by their future development trajectories.

In order to propose an equitable mechanism which is acceptable to the majority of countries, specific national circumstances have to be taken into consideration. Several methods were put forward unofficially during the negotiations but no specific direction has yet been adopted.

◆ **What should be the scope of the REDD mechanism?**

Although discussions originally focused on action against tropical deforestation, the potential scope of REDD was broadened to include other mitigation options in the forestry sector. The Bali Action Plan (2007) thus refers to reducing emissions from deforestation and forest degradation and to the role of conservation, sustainable forest management, and increasing stocks of forest carbon, which potentially includes AR (as a whole, this is referred to as REDD+ or REDD plus).

This is not a very precise formulation and appears to confuse expected results (emission reductions and carbon sequestration in forests) with the means to achieve them (forest conservation, sustainable forest management, AR, etc.) (figure 21). It reflects the push amongst these countries towards an agreement that includes the options most favorable to them. For example, those countries where the forest transition process has not yet begun are demanding the inclusion of forest degradation, and their efforts towards conservation and sustainable forest management. Those where the transition process has been completed are demanding recognition for their efforts in terms of AR.

	Initial situation	Actions	Carbon accounting	Scope of mechanism	Types of associated projects
↘	*Deforestation*	*Fighting deforestation: conservation, (re) afforestation, sustainable forestry management, agricultural intensification, etc.*	*Reducing emissions from deforestation*	*RED*	*REDD*
↘	*Forest with declining stocks (degradation)*	*Fighting degradation: conservation, (re) afforestation, sustainable forestry management, etc.*	*Reducing emissions from degradation within forests*	*REDD*	*REDD*
→↗	*Forest with stable or increasing stocks*	*Conservation, sustainable forestry management, etc.*	*Increasing stocks of forest carbon (sequestration)*	*REDD+*	*IFM*
→	*Non-forested zone*	*(Re)afforestation*	*Increasing stocks of forest carbon (sequestration)*	*REDD+ ?*	*AR*
→	*Agricultural zone*	*Improved soil management*	*Increasing stocks of agricultural carbon*	*REDD++*	*ALM*

Figure 21: The different proposals for the scope of the mechanism

Even though measuring and monitoring forest degradation is likely to be complex and costly given currently available technologies, and even though methods for including AR have not yet been clearly determined, the tendency at present seems to be in favor of taking forests as a whole into consideration through REDD+, which was the preferred scope at Copenhagen[41].

What remains to be decided is whether REDD+ should be managed by a single mechanism or through several separate instruments, for example, an instrument focusing on reducing emissions from deforestation (REDD), a separate instrument for (re)afforestation (AR), and another for forest management in the widest sense (IFM). It appears that stakeholders give preference to developing a single instrument.

41 http://unfccc.int/meetings/cop_15/items/5257.php

2.1.2.2. Implementing and financing the mechanism

- **Establishing REDD+ is likely to involve a 3-phase consolidation process, from payment for measurements to payment for results**

If a REDD+ mechanism is established, very few countries have the technical tools and policy framework required to take part. Radical reforms in terms of forest governance would probably be necessary for the REDD+ mechanism to work, and these will need to be undertaken before countries can participate in the mechanism. For these reasons, a consensus is emerging in favor of introducing the mechanism in three phases:

- Preparatory phase:

This phase would aim to develop a national REDD+ strategy through a process of information and consultation with stakeholders.

Based on analyses of the causes of deforestation and forest degradation, appropriate policies and measures would then be formulated. These would rely on an implementation framework setting out the national legislation applying to REDD+ and to carbon credits, the institutions responsible, the relevant inter-sectoral mechanisms, and the mechanisms for managing revenues generated by REDD+.

This preparatory phase would also be the right time to decide on the technical tools most suited to national circumstances to establish a baseline scenario and MRV systems for "monitoring, reporting, and verifying" GHG emissions associated with the forest sector. Financing needs for this preparatory phase are estimated at around 200 to 250 M€[42].

More than 40 countries have already begun the preparatory phase through various international initiatives launched after the adoption of the Bali Action Plan in December 2007.

42 Estimation for 43 countries deduced from the Report of the Informal Working Group on Interim Finance for REDD+ (IWG-IFR), October 2009. Discussion Document

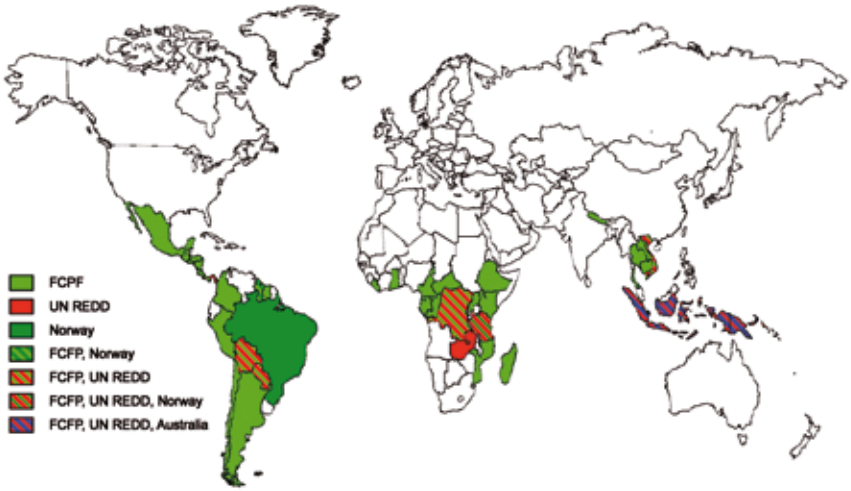


Figure 22: Countries having begun phase 1 of the REDD+ mechanism and main funding agencies (see 2.1.3) (Source: ONFI)

- Intermediate phase

This phase will enable implementation of the first measures included in the national REDD+ strategy and which are considered as a pre-requisite for participation in a mechanism based on payment for results. It will most likely involve policy or governance reforms concerning land titles and forest carbon rights, spatial planning, removal of counter-incentives (subsidies, taxation) that encourage deforestation and unsustainable forest management, improving and applying forest sector legislation, and institutional reforms in the broadest sense (definition of roles and responsibilities of government departments and interministerial coordination).

Pilot projects and programs will need to be developed in the zones most affected by deforestation, in order to test new technologies and incentives among local stakeholders.

This phase would also allow for implementation and gradual strengthening of the MRV system for GHGs, to improve the accuracy and reliability of land use change monitoring.

With more robust data on GHG emissions from the forestry sector, subsequent implementation of private initiatives and, finally, the first results (successes/failures, costs, negative impacts, co-benefits), the country would then have concrete information enabling it to commit to a baseline scenario. Financing needs for this intermediate phase are estimated at around 1.2 to 2.25 billion €[43].

Some of the more advanced countries would be in a position to start this intermediate phase much sooner than others. For example, Brazil, which has established a system for monitoring changes in forest cover across the Amazon Basin, launched its Amazonian Fund for this purpose. This fund collects international investments to finance action against deforestation. The general consensus of opinion is that most countries will not be ready to move into the final phase before 2020.

- Final phase based on payment for measured, reported, and verified results:

The country would then receive payments based on duly observed emission reductions compared to a baseline scenario, calculated through a reliable and transparent MRV system. Projects (REDD, IFM, AR, etc.) may then be developed in line with this accounting system.

Kindermann et al.[44] estimated that a 50% reduction in deforestation from 2005 to 2030 would generate 1,500 to 2,700 MteqCO_2/year, and require financing of 11.5 to 18.5 billion €/year. The studies conducted for the Eliasch review[45] concluded that the cost of reducing deforestation by 50% by 2030 would be in the range of 11.5 to 22 billion €/year.

43 Report of Informal Working Group on Interim Finance for REDD+ (IWG-IFR), October 2009. Discussion Document

44 Kindermann G. et al., 2008. Global Cost Estimates of Reducing Carbon Emissions through Avoided Deforestation. PNAS

45 Eliash J., 2008. Climate Change: Financing Global Forests. The Eliasch Review

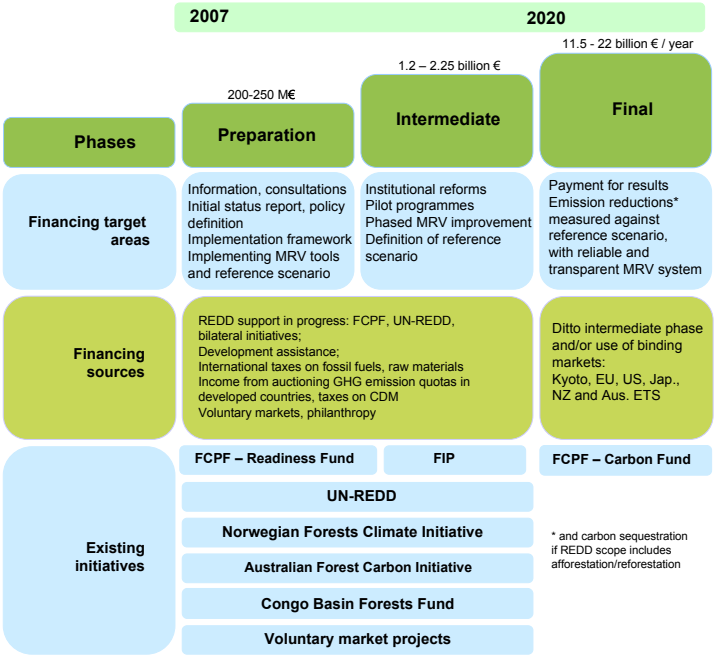


Figure 23: Establishment of the REDD+ mechanism in three phases (Source: ONFI)

The first two phases will require *ex-ante* financial support before results in terms of emission reductions can be evaluated. Financing instruments that draw mainly on public funds are therefore under consideration to finance these activities.

However, for the third phase, should the developed countries set up a fund to compensate countries that reduce emissions from deforestation? Or should these emission reductions be linked to market-based trading systems (EU-ETS, USA-ETS, etc.)?

The first solution obviously raises the question of how to finance such a fund. Several options are under consideration (a tax on carbon credits traded, income from auctioning allocated quotas, etc.). In the second case, credits generated by REDD+ activities would be directly fungible with carbon credits traded on compliance markets. This would enable States or private companies with emission quotas to comply with their commitments by using, in part, credits of this type (in accordance with a

system similar to the current CDM or JI). Linking REDD+ and the compliance markets will need to be associated with ambitious emission reduction targets to generate sufficiently high demand for credits.

Financing for the third REDD+ phase is therefore a key point in the current negotiations and no decisions have been made to date. A recent publication[46] elaborates further on the different financing options and their advantages and disadvantages.

2.1.3. WHAT INITIATIVES ARE ALREADY UNDER WAY?

In the wake of the Bali Action Plan and to facilitate a post-2012 agreement, several international initiatives have been launched to support countries in their preparations for REDD+:

- Norway, the United States, Japan, Australia, the United Kingdom, and France jointly announced in Copenhagen that they would provide 2.3 M€ to fast-track REDD+ (2010-2012);
- Besides the BioCarbon Fund (see Section 3.3.), the World Bank has established a Forest Carbon Partnership Fund (FCPF), which draws on two funding sources:
  - A Readiness Fund that aims to collect 123 M€ to support the development of national REDD strategies (phase 1) in 37 countries [47];
  - A Carbon Fund to purchase emission reductions from countries that have satisfied the conditions enabling them to begin phase 3 (33 M€ announced at the end of November 2009).
- Aside from the FCPF, the World Bank has launched the FIP (Forest Investment Program), a fund intended to finance the investments required from the forestry sector to prepare for REDD in some countries (phase 2). Contributions of 220

46 Global Canopy Programme, 2009. The Little Climate Finance Book: http://www.globalcanopy.org/main.php?m=117&sm=224&t=1

47 Argentina, Bolivia, Cameroon, Cambodia, RCA, Chile, Colombia, RDC, Rep. of the Congo, Costa Rica, Salvador, Equatorial Guinea, Ethiopia, Gabon, Ghana, Guatemala, Guyana, Honduras, Indonesia, Kenya, Laos, Liberia, Madagascar, Mexico, Mozambique, Nepal, Nicaragua, Panama, Papua New Guinea, Paraguay, Peru, Surinam, Tanzania, Thailand, Uganda, Vanuatu, Vietnam. http://www.forestcarbonpartnership.org/fcp/

M€ were announced at the end of November 2009;

- The UN-REDD programme, implemented by UNEP, UNDP, and FAO, has received 34.8 M€ to support 9 countries in their preparations[48]; and

- The Congo Basin Forest Fund (CBFF[49]), to which the UK and Norway have contributed 56 M€ each, is intended to support the development of private initiatives and projects for forest conservation and poverty reduction in the region.

Several important bilateral initiatives have also been launched:

- Norway's Forests and Climate Initiative, with 333 M€ per year for five years (a total of 1.6 billion €). Norway is thus contributing to multilateral funds for REDD+ (FCPF, FIP, UN-REDD), financing initiatives run by civil society organizations and research programs and supporting several bilateral programs:

  - Contribution of 80 M€ to the Amazonian Fund launched by Brazil to finance reductions in deforestation (Norway may increase its contribution to 660 M€ depending on results); and

  - Preparing Tanzania for REDD through a 56 M€ contribution dedicated to financing pilot activities.

Contribution of 2 M€ to Guyana for the implementation (phase 2) of its REDD+ strategy (Norway may increase its contribution to 166 M€ depending on results).

- Australia's Forest Carbon Initiative, with 107 M€. This includes contributions to multilateral funds for REDD (FCPF, FIP), support to civil society initiatives and research programs, and financing for several bilateral programs:

  - Forest Climate Partnership with Indonesia (21 M€);

  - Forest Climate Partnership with Papua New Guinea (1.6 M€); and

  - Capacity building program in the Asia-Pacific region (8.4 M€).

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48 Bolivia, RDC, Indonesia, Panama, Papua New Guinea, Paraguay, Tanzania, Vietnam, Zambia. In October 2009, 5 more countries joined the initiative (Argentina, Cambodia, Ecuador, Nepal, Sri Lanka) and Denmark announced a further contribution of 2 million US$. http://www.un-redd.org/

49 http://www.cbf-fund.org/

Aside from these funds dedicated to forest issues, there are also bilateral initiatives concerning climate change in general, that include forest/REDD components, such as Germany's International Climate Initiative.

Finally, and despite the uncertain outcome of recent UNFCCC negotiations, many projects were launched in the last few years to test innovative approaches and draw lessons from practical experience in the field. These projects are run either under the programs mentioned above or are geared to the voluntary markets.

It is clear that funds committing very significant amounts (over 4 billion €) are already financing the REDD+ mechanism. These are mainly public funds focusing for the moment on phases 1 and 2, and may still as yet be directed to benefit pilot project initiatives.

2.1.4. CONCLUSION: WHERE WILL AR, IFM, AND REDD PROJECTS STAND IN RELATION TO REDD+?

Where projects in the forestry sector will stand post-2012 is still uncertain. A consensus is building around the scope of the mechanism as REDD+. In terms of carbon compatibility, it would therefore include REDD and IFM projects. It is not yet clear whether the CDM AR mechanism would disappear into REDD+ or whether it would be reformed to become an incentive mechanism at the national scale, complementing the REDD+ mechanism.

At the national scale, emission reductions within a country's territory would be generated with reference to a baseline scenario adopted at national level, using an MRV system covering the entire territory. With this national accounting system, the State would be the beneficiary of the carbon credits generated and would be responsible for distributing the benefits between the stakeholders concerned in accordance with the rules established during the preparation phase. Activities at a sub-national or project scale could then be implemented:

- Within a pilot framework, to test hypotheses and orientations for a national policy (phase 2). These initiatives could be supported by the voluntary market or the initiatives described above; and

- Via a system for domestic projects supervised by the State (phase 3), as already established in some developed countries under policies for reducing GHG emissions. Remuneration for the projects could either come directly from the State,

or the State could hand over its credits to the projects (on similar lines to the JI mechanism).

With a sub-national approach, a similar system could be established on the scale of a region or state, but would probably be linked up with the national level later on ("nested approach").

Finally, a mechanism strictly on the project scale (similar to the CDM but broadened to include REDD and IFM) seems unlikely. An accounting system such as this (phase 3) would restrict market possibilities for voluntary offset projects as it could result in double accounting with the national inventory (as with Annex 1 countries at present).

For projects in phases 1 and 2 of the mechanism, recognition by the host country as one of the pilot projects in its national REDD+ strategy has become a very important point to support future claims of remuneration through a REDD+ system, assuming it is established in the future.

The Ankeniheny-Zahamena-Mantadia Corridor, an example of a pilot REDD+ project (AR and REDD) in Madagascar (case study nos. 2 and 3)

This project for the restoration of the Ankeniheny-Zahamena-Mantadia corridor is a CDM reforestation project covering several thousand hectares of public and private land and using the plantation of 120 indigenous tree species. It is promoted by the Malagasy Ministry for Environment, Water, and Forests and is mainly financed by the World Bank, which also purchases part of the credits via its BioCarbon Fund. This project also has a REDD conservation component aiming to protect 376,000 ha of indigenous forests. This component is mainly financed by the NGO Conservation International.

It should be noted that a change in forest carbon accounting rules in Annex 1 countries (especially Article 3.4) is being discussed and should be anticipated. This could affect possibilities of project realization in industrialized countries.

2.2. Bringing forest carbon projects into other carbon markets

In parallel with the negotiations under way on the future of the binding Kyoto market, the different carbon markets are sending out positive signals in favor of including forest carbon credits. Plans are being proposed that could serve as models for REDD+ phase 3 implementation. This is the case in particular with the creation of a US Federal emissions trading system. The draft proposals (Waxman-Markey and Kerry-Boxer) are still under discussion, but point to the creation of a very large market for forest carbon credits.

2.2.1. THE US FEDERAL "CAP-AND-TRADE" SYSTEM

Legislation introducing an emissions trading system in the US is currently under discussion in Congress, via two recent bills. The first[50], submitted by Democrat Congressmen Waxman and Markey, was accepted by the House of Representatives in June 2009. The second[51], introduced to the Senate by Congressmen Boxer and Kerry on 30 September 2009, is currently under debate.

According to the legislative provisions, 2 billion credits from projects may be used each year by companies under quotas. At most, one quarter or one half of these (depending on the bills proposed) may be linked to international projects.

Various forestry activities are specifically mentioned in the legislation, including AR and REDD projects and some types of sylvicultural management projects (IFM). To be recognized, these projects will have to comply with specific criteria concerning host countries[52].

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50 http://www.opencongress.org/bill/111-h2454/show

51 http://kerry.senate.gov/cleanenergyjobsandamericanpower/intro.cfm

52 (i) the country must have a bilateral or multilateral agreement with the US to promote REDD activities; (ii) the country must be "REDD- ready" (MRV system, etc.); (iii) the baseline scenario must be established at the national level and based on historical rates of deforestation over a minimum period of five years; (iv) national REDD activities must be in line with recognized forestry practices and promote local forest species; (v) local communities and indigenous peoples must be duly consulted before activities begin; (vi) income-sharing systems must include local communities and indigenous peoples as beneficiaries.

Until a country complies with these criteria, a "sub-national" or even a "project" approach in some situations would be possible over a 5 to 13-year period, depending on each case. Although the proposed legislation points to even higher demand for domestic and international forest carbon credits than on the European market, its chances of being accepted are still uncertain.

2.2.2. THE EU-ETS

The European emissions trading system is still reluctant to recognize forest carbon credits. The reasons for their exclusion from the EU-ETS market were explained in the first Section of this guide. However, proposals have been put forward by NGOs and scientists to extend the EU-ETS market to CDM forest credits[53,54]. The Energy Climate Package[55], which sets out the broad outlines of the third EU-ETS period (2012-2020), does not close the door on forest carbon credits, although maintaining this position will depend on an overall post-2012 agreement. Furthermore, for the 3rd commitment period, quotas are expected to be auctioned and no longer distributed free of charge. Part of the revenue from these auctions could be earmarked for REDD+ financing.

2.2.3. OTHER MARKETS

The post-Kyoto market, the US Federal market, and the EU-ETS open up fresh prospects for demand for forest carbon credits. Also to be noted is that several other regional or national markets mentioned in Section 1 (Australia, United States, New Zealand, Japan, etc.) have already opened up to forest carbon credits or are expected to do so.

The future position and importance of voluntary markets obviously depends on how the regulated markets evolve with respect to forest carbon credits. If they remain closed to these, the role of the voluntary market could, as is the case today, help

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53 Streck C., O'Sullivan R., 2006. Briefing Note: LULUCF Amendment to the EU ETS. Technical Workshop on «Using Forest Carbon Credits in the European Emission Trading Scheme», Brussels, March 29, 2006, Carbon Finance, BioCarbon Fund, www.carbonfinance.org

54 O'Sullivan R., Streck C., Janson-Smith T., Haskett J., Schlamadinger B., Niles J.O., 2006. Local and Global Benefits of Including LULUCF Credits in the EU ETS. Technical Workshop on «Using Forest Carbon Credits in the European Emission Trading Scheme», Brussels, March 29, 2006, Carbon Finance, BioCarbon Fund, www.carbonfinance.org

55 http://ec.europa.eu/environment/climat/climate_action.htm

to boost project development. However, because of the voluntary nature of the commitments made through this market, demand will remain relatively limited.

If the compliance markets open up to forest carbon credits, the voluntary markets will shrink but could still play a role, especially in the development of pilot projects until such time as the regulated markets open up. .

2.2.4. CONCLUSION

The forest carbon market is today mainly supported by the voluntary market and public financing, but may well find a new dimension (in terms of volume and value) in the future. Post-2012 changes in the three main regulatory mechanisms (Kyoto Protocol and the US and European quota systems) need to be closely monitored by project promoters and investors. Although forest carbon projects will probably have an important role in these markets, how they will be implemented and financed is still uncertain, even though the pointers described in Section 1 may help project promoters and investors to anticipate developments. Although COP 15 in Copenhagen did not produce a binding legal agreement, progress was made with two draft decisions, on REDD and LULUCF (in Annex I countries), which could be adopted at COP 16 in Cancun at the end of 2010. Finally, it should be noted that many funds and initiatives, particularly those with public financing, are already committing very significant amounts to the future of this sector.

3. Financing a forest carbon project and selling credits

Forest carbon projects are above all forestry projects (reforestation, conservation, agroforestry, etc.) performed under a mechanism for generating carbon credits (tCER, lCER, VER, etc.), for which carbon comprises one of their components. The carbon component of a project may be considered as a complementary activity which, for investors, implies additional development costs but also additional income from trading their carbon credits or transferring them to third parties (figure 24). Although generating carbon income is not usually the main purpose of a project, its impact on the internal rate of return (IRR) of each project can influence investment priorities or choices of associated technical options. Income from carbon credits may help to overcome the obstacles to investment that are inherent to forestry projects, especially in tropical zones.

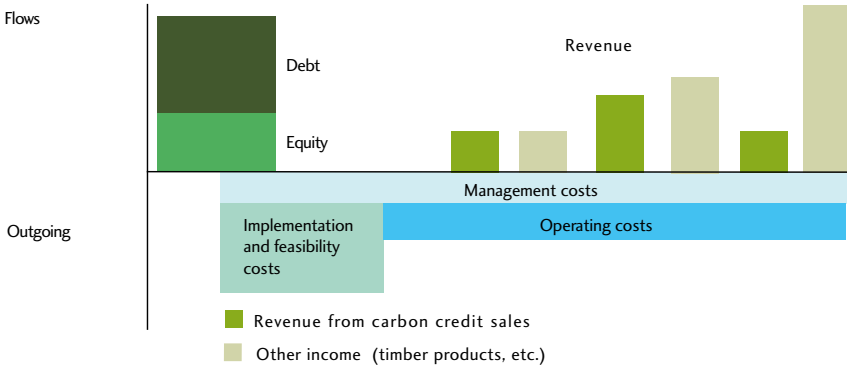
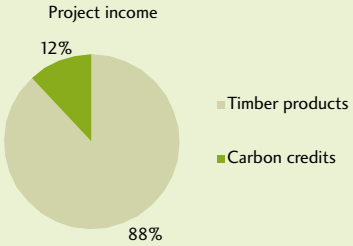


Figure 24: Example of financial flows for a reforestation project. The carbon component requires initial development costs but can generate additional income during the project's lifetime (Source: ONFI)

Project for commercial reforestation in Magdalena Bajo: production of construction timber and carbon credits (case study no. 4)



The commercial reforestation project in Magdalena Bajo covers 5,000 ha on the Caribbean coast of Colombia. The main goal of the plantation, carried out in partnership with livestock farmers, is to produce timber. It is financed by a public-private consortium of Colombian stakeholders (mainly from the timber industry). 88% of the income originates from selling timber and 12% is from carbon credits.

A project's capacity to secure funding depends on its profitability (expenses vs. income) and risk profile (see Sections 3.1 and 3.2.). The description of these two elements permits the development of a business plan that will, along with a number of other documents, be analyzed by potential investors. Several types of investors (private, public, philanthropic, etc.) may provide financing the project in accordance with provisions as described in Section 3.3. Sales of carbon credits are important as a way of leveraging finance. The provisions governing the sale of credits are described in the final Section of this guide (3.4).

Presenting a project to investors

Success in levying funds for a project will depend on the quality of the information provided to investors. The documents to be supplied usually include:

- The full business plan for the project (operating results, cash flow projection, sensitivity analysis, risk analysis, etc.)[1];
- Financial accounts of the project promoters and main partners;
- A statement of opportunity and/or a feasibility study;
- The permits and/or licenses required to develop the project (ownership of lands, credits, etc.);
- A description of the project; and
- Other relevant documents.

1 For more information, readers may refer, for example, to the guide available at: http://www.unctad.org/en/docs/iteiia5_en.pdf

3.1. Stakeholders and the project cycle

3.1.1. STAKEHOLDERS IN A FOREST CARBON PROJECT

The stakeholders involved in setting up a forest carbon project are usually as follows:

- **The project developer** or promoter may be the project owner or a project management support organization representing the project owner, and is responsible for operational project activities. The project developer is usually whoever owns, leases, or holds a title to a concession to the land (sometimes jointly through a cooperative), a local authority or national government, a logging company, an industrialist in the forest/timber sector, an NGO, or an association;

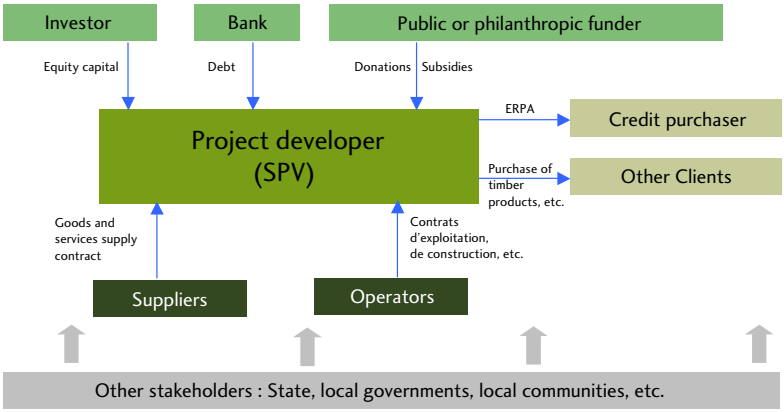


Figure 25: Several stakeholders are involved to varying degrees in setting up a project. Some may claim all or part of the carbon credits generated by the project (Source: ONFI/EY)

- **The project financiers**. This may be a single investor or a group of several within a finance structure. Additional project financing may be provided by banks (loans), public funds (subsidies, grants, etc.), or private sources (donations, charitable organizations, etc.);

- **Suppliers and operators.** These may be technical operators executing the project or consultants or experts assisting the project developer (technical assistance) on aspects that may be technical (forestry), legal, carbon-related (drafting of project documents, methodology, monitoring), social, environmental, etc.;

- **Clients:** buyers of carbon credits, timber products, etc.; and

- Other stakeholders also have a crucial role as well. *The public authorities*, in particular, define the legal and regulatory environment in which the project is to be implemented. Also, in some forestry projects, the role of *local communities*, which can sometimes depend on the ecosystem in question, is equally crucial.

3.1.2. THE CYCLE OF A FORESTRY PROJECT

There are three fundamental components in the development of these projects:

- The "technical" component (reforestation, forest management, etc.);
- The "carbon" component (generation of credits); and
- The "management" component, particularly financial management.

Each of these components has its own schedule and cycle (the carbon component cycle is described in detail in Annex 2), but the main stages are as follows:

3.1.2.1. Project identification and pre-feasibility

This is the stage that determines whether a project is worth undertaking, via an initial technical and financial analysis, an assessment of its eligibility with respect to carbon standards, and an initial quantification of the credits to be generated by the project. For AR projects, this can be done using the TARAM[56] (large-scale) and TARASM[57] (small-scale) toolkits, which are based on methodologies approved by the UNFCCC. For REDD projects, readers may refer to the guide described in Calmel et al[58].

This initial phase is formalized through a simplified business plan and a statement of opportunity, which may be in the form of a Project Idea Note (PIN**)**. Several models for the PIN and simplified business plan have been developed by the World Bank[59]. For REDD projects, a tool has also been developed by the CCBs and Social Carbon, known as the "REDD financial feasibility tool"[60]. The PIN is not mandatory but is nevertheless a useful preliminary document presenting the main project characteristics, and is often requested by investors and buyers of credits.

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56 http://wbcarbonfinance.org/Router.cfm?Page=DocLib&CatalogID=31252&zrzs=1

57 http://www.proyectoforma.com/Documentos/TARASM.zip

58 Calmel M. et al., 2010. REDD at project scale. Development and evaluation guide. ONFI, CEPAL, AFD

59 Model: http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT/EXTCARBONFINANCE/0,,contentMDK:21844289~pagePK:64168445~piPK:64168309~theSitePK:4125853,00.html

60 http://www.climate-standards.org/projects/redd.html

Drawing up these documents and securing investment will generate development costs that can range from a few thousand to tens of thousands of Euros. This phase can last from a few weeks to a few months

3.1.2.2. Feasibility

While the overall interest of the project is demonstrated in the pre-feasibility phase, the project developer may then draw up a document presenting the project (which may be in the form of a Project Design Document[61] or PDD), along with a detailed business plan. The PDD is the base document needed to register a project and must be based on an existing methodology (Annex 1). If no applicable methodology exists, the project promoter must develop a new one. Given the time required to complete the standardization process (figure 26), registration of a project with a standard may not become effective until the implementation or operational phase.

During this development phase, it may be useful to set up a pilot for the project, such as a plantation over a limited area for an AR project (a few hectares), in order to validate various technical assumptions (equipment, implementation costs, etc.), especially when innovating techniques are applied.

If the conclusions of the feasibility study are favorable, this phase should enable all of the documents required by investors to be drawn up and to raise the necessary funds for project implementation.

Drawing up these documents, securing investments, registering the project with a standards authority, and setting up a pilot can involve costs ranging from a few tens of thousands of Euros to several hundred thousand. This phase usually lasts several months and even years (for example if it includes setting up a pilot).

61 Model available at: http://cdm.unfccc.int/Reference/PDDs_Forms/PDDs/index.html

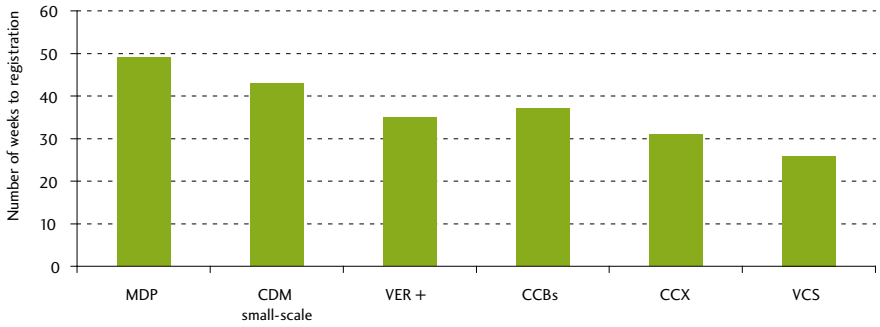

Figure 26 : Average time required to register a project with selected carbon standards (Source: CDC[62])

3.1.2.3. Implementation

The implementation phase corresponds to when project activities actually begin. In the case of an AR project, this will include securing or acquiring land titles, registering the project with the authorities (administrative and legal formalities), recruiting staff, followed by the more concrete phases of implementation (establishing nurseries or purchasing plants, preparing the terrain, planting, replenishment, etc.). In the case of an IFM or REDD project, they may include introducing conservation activities or alternative livelihood options. This phase is characterized by substantial needs for CAPEX financing (Construction Capital Expenditure).

CAPEX can be highly variable depending on the size and type of project. However, it may be considered that CAPEX for a forest carbon project is usually in the range of several hundreds of thousands of Euros to several million or even tens of millions (table C). Implementing forestry projects often takes several years.

62 Guigon P. et al., 2009. Voluntary Carbon Markets: What the Standards Say...

	Case 1: Juma	Case 2: AR Corridor	Case 3: REDD Corridor	Case 4: Magdalena Bajo	Case 5: Ibi Batéké
Technology	REDD	AR	REDD	AR	AR
Size	589 612 ha	591 ha	376 000 ha	5 000 ha	4 226 ha
teqCO_2 generated/ year	360 ktéqCO_2	9,3 ktéqCO_2	1500 ktéqCO_2	100 ktéqCO_2	54 ktéqCO_2
Total cost	16.5 M€	1.5 M€	8.5 M€	15.5 M€	2.9 M€
CAPEX		1 M€	1.5 M€	10 M€	1.5 M€
OPEX		0.5 M€	7 M€	5.5 M€	1.4 M€
% technical costs	75%	70%	NA	72%	52%
% carbon costs	9%	12%	NA	4%	4%
% management costs	16%	18%	NA	24%	44%
% carbon revenue over total revenue	100%	NA	100%	12%	50%

Table C: Economic structure of 5 case study examples

3.1.2.4. Operational phase

The operational phase involves costs for care and maintenance (e.g., forestry work in plantations), but also for monitoring, verification, and certification of the carbon credits generated by the project under a standards procedure. These are referred to as OPEX (Operational Capital Expenditures). This phase generates income from sales of carbon credits and other products. The income permits the reimbursement of costs incurred during the prefeasibility, feasibility, and construction phases (CAPEX), can cover OPEX costs, and can ultimately generate profits to be distributed between project stakeholders.

Like CAPEX, OPEX varies widely depending on the size and type of the project (table C). Even if the annual amounts required for project operation are less substantial

than those needed during the initial investment phase, expenditures continue over long periods (sometimes several decades) and may reach a total amount close to the initial investments. These, however, are usually covered by income from the project. A temporarily negative cash flow situation will require funding that will have to be covered by equity capital or short-term debt. The operational phase lasts throughout the project lifetime, usually several years or decades for forest projects.

3.1.2.5. Conclusion and recommendations

The technical component cycle, carbon component cycle, and management and finance cycle are closely linked. The successful completion usually depends on the project developer's ability to ensure consistency between these three fundamental components while running the project (table D). For example, forward sales of carbon credits can help to finance the project, as we shall see in detail below.

Phases	Technical component	Carbon component (modeled on CDM and main voluntary labels)	Management and finance component
Prefeasibility	Prefeasibility study	PIN	Simplified business plan
Feasibility	Feasibility study	PDD, validation by auditors, host country approval, registration with a standard	Detailed business plan, risk analysis, etc. to secure funds
Implementation	Start of activities		Contracts and management plan
Operations	Maintenance, operations	Monitoring of emission reductions, verification by auditors, issue of credits, sales and delivery of credits via an ERPA	Returns on investments via sales of products from the project. Management reports

Table D: Links between the different project components and main reporting documents

Two distinct financing needs appear during the project development cycle, first to cover the costs of the previous project phases (prefeasibility and feasibility), and secondly to cover the project's construction costs (CAPEX) and operating costs (OPEX).

In order to cover these costs, the project promoter must have a sufficiently accurate idea of the amounts involved and of how they can be reimbursed (income). The choices made by investors will largely depend on the confidence they have in the smooth running of the project. This is assessed through an analysis of the "risks" associated with the project. The next part of this guide provides operational details to help assess these three components.

3.2. Economics and risks of forest carbon projects

3.2.1. WHAT ARE THE COSTS OF FOREST CARBON PROJECTS?

There are three types of costs associated with forest carbon projects: technical costs, costs arising specifically from the carbon component, and costs arising from project management and oversight.

3.2.1.1 Technical costs

- AR projects

The costs arising from operational implementation of a project vary widely between projects, depending on their type and objectives. Some capital-intensive projects (like commercial plantations) may involve very high costs both at the time of plantation and during monitoring phases. The value of the plantations justifies their investment. Other plantations that generate more modest revenue (e.g., village plantations, fuel wood, or orchards) have smaller implementation costs that are comparable to the income they eventually generate. Finally, some projects may operate outside the logic of economics and may involve large investment costs and only modest direct income, if any. This is the case, for example, with reforestation to restore degraded lands or to control erosion, which requires large investments (e.g., soil rehabilitation or erosion-control activities).

Although costs vary widely between projects, their structure is fairly similar:

(i) An initial phase involving large investments in order to acquire or secure lands and to pay for the work required prior to establishing a plantation (production of seedlings, ground and soil preparation, planting, initial maintenance). Land is an important issue in all forestry projects and the costs of securing titles to the land

make up a large portion of investment. To reduce these initial costs, model contracts can be developed with the participation of landowners, in which the latter make their lands available in return for a fee, either as rent or participation in the project. Investment costs are usually in excess of 400€/ha. Forest plantations are established with long rotations of 15 to 60 years in tropical areas, except for some very short rotation species like Eucalyptus or Parica *(Schizolobium amazonicum)*, which can be harvested after less than 10 years of growth. In temperate zones, the cycle may last for more than a century. Success in plantation establishment depends a great deal on how it is directed in the early years, which explains why investments at the start of the project are so large.

(ii) An operational phase in which costs are lower: forestry operations become less frequent as plantations grow (e.g., fewer clearing operations and selective thinning). Although maintenance is less intensive, it still requires human resources and equipment (if only for surveillance of the plantations) deployed over long periods: the cumulative costs of this phase should therefore not be neglected as they can eventually – over 20 to 40 years – amount to more than the initial investment costs.

◆ The case of REDD projects

The costs of implementing REDD projects are highly dependent on national contexts and on the direct and indirect causes of deforestation in the relevant countries. The Stern Report[63] assesses the costs of reducing emissions from deforestation (based on calculations made for eight countries responsible for about 70% of emissions worldwide) at 0.7 to 1.3€ per teq$C0_2$. More recent assessments[64] based on models that take opportunity costs into account give a range of 1.3 to 3€ per teq$C0_2$. These relatively low costs of reducing emissions justify the opportunity of introducing an international REDD mechanism under the UNFCCC. These average figures, calculated at a macro-economic level, mask wide disparities between one country or project and another. Moreover, pilot experiences in recent years have shown that the actual costs of effectively fighting deforestation have usually been underestimated.

Economic approaches to cost calculations are mainly based on analyses of opportunity costs. The profile of a REDD project depends first of all on the nature of the deforesting agent(s). These agents are responsible for one or several destructive activities, which are exercised for various reasons that often have a profit motive. If a

63 Stern N., 2007. Stern Review : The Economics of Climate Change

64 Kindermann et al., 2008. Global Costs Estimates of Reducing Carbon Emissions Through Avoided Deforestation

REDD project is to curb deforestation effectively, it has to target its activities to the agents which are the root cause of deforestation, and develop activities that can offer viable alternatives to the destructive activities while fulfilling this goal. Depending on the target activity, the costs of implementing the project may be higher or lower.

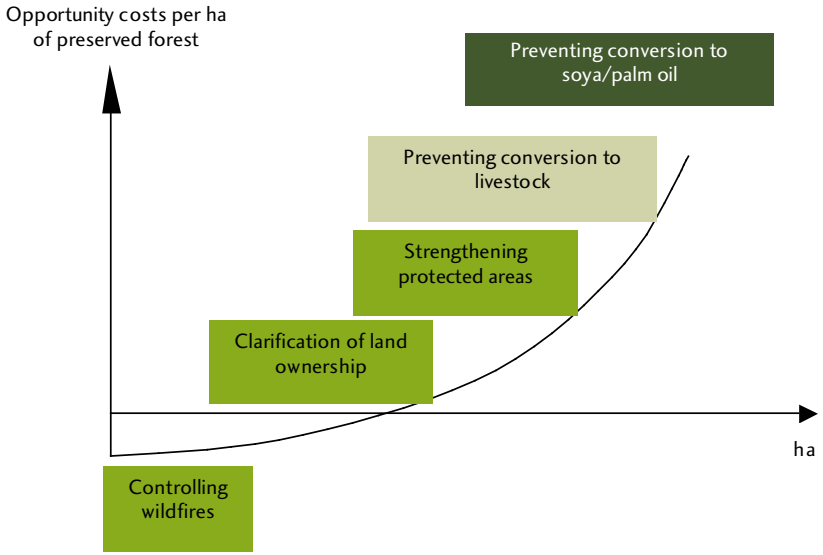

Figure 27: Schematic representation of the opportunity costs of preventing deforestation, according to the causes identified (Source: World Bank [65])

Figure 27 presents a schematic view of the costs associated with REDD. These costs are high if deforestation is caused by the establishment of high-yield industrial crops (soya beans in the Brazilian Amazon or oil palms in Indonesia). In this case, the gains arising from REDD projects will generally not be high enough to justify implementation of a project. By contrast, preventing land-use change due to extensive cattle ranching (Brazil) can indeed help to fight deforestation at a lower cost. Finally, some activities to reduce emissions from deforestation (such as the protection of certain forest stands, defining land ownership, or preventing wildfires) can also be implemented at relatively low cost.

65 Bosquet B., 2007. The Proposed Forest Carbon Partnership Facility (FCPF)

The cost differential between a project needing only payment for environmental services (PES) to compensate landowners for not exploiting their forests[66] (see case study no. 1), and a project that has to develop sustainable agroforestry systems that may need to employ over a thousand farmers who depend on forest ecosystems[67] can be as high as 1:100. This being so, there is no way of giving an average figure for the technical costs arising from the implementation of REDD projects. The illustration below shows a list of activities that may be implemented under REDD projects, each of which will have a different cost structure. It should be noted that for most of these projects, securing titles to lands (and especially for protective forests) make up a large proportion of the costs.

It should be noted, nevertheless, that for most of these projects, securing titles to lands (and especially for protective forests) make up a large proportion of the costs.

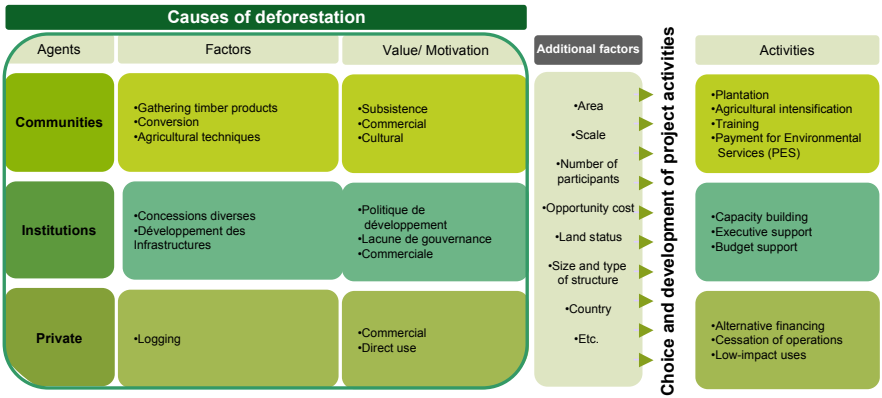

Figure 28: The cost of REDD projects depends on the type of activity introduced (Source: ONFI)

66 See PDD for the project on Reducing Carbon Emissions By Protecting A Native Forest in Tasmania, developed by REDD Forests, which can be downloaded from the CCBA site http://www.climate-standards.org/projects/files/tasmania/REDD_Forests_CCB_PDD_FINAL_071609.pdf

67 See Nhambita Community Carbon Project developed by Envirotrade and certified by Plan Vivo http://www.planvivo.org/fx.planvivo/scheme/mozambique.aspx

3.2.1.2. Carbon costs

Implementing the different phases of a carbon project involves transaction costs that are usually quite low compared to the income from sales of carbon credits generated by the project, except in the case of very small-scale projects. The average transaction costs observed under the CDM or voluntary standards are shown in table E. In the case studies, these costs vary from 120 k€ (project n°5, AR Ibi-Batéké) to 340 k€ (project n°1, REDD Juma), or 4 to 12 % of the overall project cost.

Phases	Products	CDM, main voluntary standards
Prefeasibility	PIN	5 – 15 k€
Feasibility and implementation	Development and validation of a new methodology (optional)	50 – 200 k€
	Definition of legal ownership of credits, drawing up purchasing contracts (ERPA)	5 – 40 k€
	PDD	20-80 k€ for AR and IFM 50–200 k€ for REDD[1]
	Validation of the PDD by an external third party (DOE)	20 – 50 k€
	Registration with a standard	CDM: no cost for small-scale projects, 0.068€/CER for the first 15ktCER and 0.137€/CER for the remainder
Operation	Monitoring of emissions reductions	10 to 20€ / ha on average for AR, 0.3 to 7€ / ha for REDD[2]
	Verification by an external third party (DOE)	20-50 k€ (periodically, e.g., every 5 years)
	Creation of a buffer stock (with standards where this is possible)	Reserving part of the credits to guarantee their permanence can entail substantial costs that are directly dependent on the size of the buffer and the credit sale price
	Issuing fees	2% of credits for the adaptation fund in the context of CDM

Table E: Average carbon transaction costs for standardized projects

It is important to remember the following elements:

- **The costs of developing a new methodology can be very significant,** and results are not guaranteed; this is an important risk to consider for projects. Project promoters are always advised to use an existing methodology. The methodologies developed under the CDM now cover a fairly wide range of possibilities. Several VCS methodologies for REDD and IFM projects are in the process of validation (Annex 1). It is also possible to submit adaptations of existing methodologies, a much simpler procedure than submitting an entirely new methodology;

- Like monitoring costs, **transaction costs are not particularly sensitive to the size of projects,** which penalizes small-scale projects. However, there are several possibilities for reducing unit transaction costs for small-scale projects, such as simplifying methodologies and procedures and "bundling" similar projects. Figure 29 shows that for a very small-scale project (5 kteq CO_2 per year) and a credit sale price of 3€, transaction costs can be as high as 3€, so that they are barely covered by carbon income; and

- **Costs may vary according to the standard used**. The previous example shows that unit transaction costs for different standards may vary from 1.5€ to 3€. Some standards (like VCS and VER+) may offer permanent credits via an insurance system (or "buffer") whereas the CDM issues temporary credits. Reserving a percentage of credits from the project entails a substantial additional cost (figure 29), but significantly increases the sale price of credits (see Section 3.4.1).

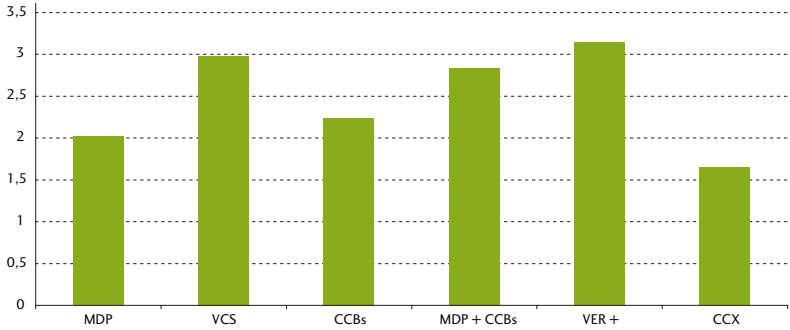

Figure 29: Carbon transaction costs for a small-scale AR project (5teqCO_2/year) with a sale price of 3€ per teqCO_2[68] (Source: CDC)

68 Guigon P. et al., 2009. Voluntary Carbon Markets: What the Standards Say... CDC

3.2.1.3. Management costs

Managing, financing, and conducting a project, as well as project communication, also entails costs that can be significant. In our case studies, these costs vary from 8 to 44% of the overall project cost. Financial costs will be dealt with in detail in further sections of this guidebook.

3.2.2. WHAT INCOME IS GENERATED BY FOREST CARBON PROJECTS?

Forest projects generate income in several ways: from timber products, non-timber forest products (game hunting, fruit, rubber, essential oils, etc.) and also from products derived from PES or social uses, such as carbon credits. Forest carbon projects often bring many social and environmental co-benefits (biodiversity protection, limiting soil erosion, aquifer protection, etc.), which may or may not receive remuneration.

3.2.2.1. Income from timber products

The primary function of forestry projects is to produce timber and generate value in timber products. Timber is felled and extracted from forests during logging operations. Timber harvests may be "intermediate" (trees felled before maturity) or "final" (mature trees). The income is therefore sporadic and depends on the forest rotation system applied.

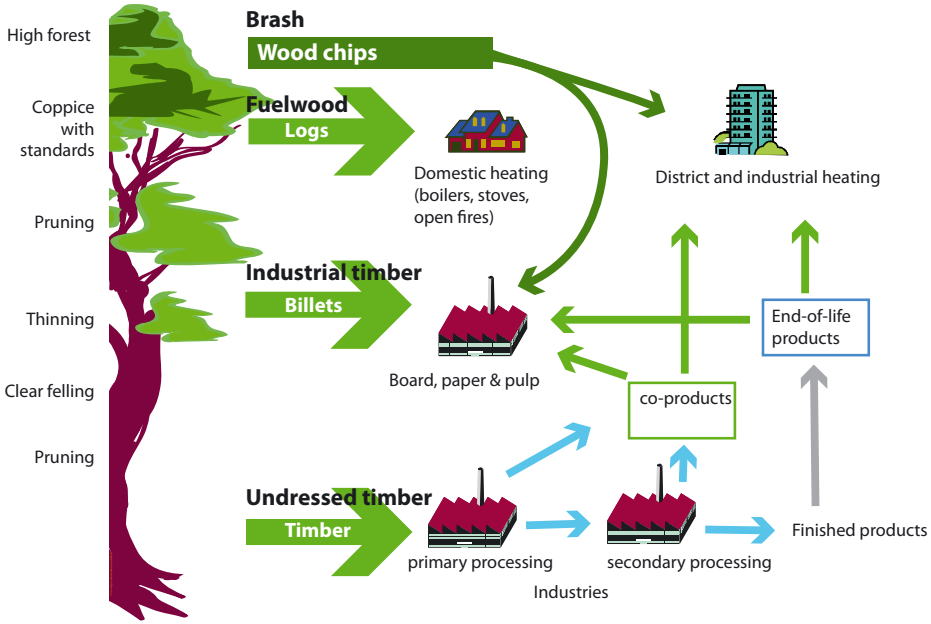

Figure 30: Simplified diagram of the different types of timber products and the timber chain

Timber gains value in several ways:

- Timber from large-diameter logs is usually processed in two successive operations to obtain finished products used in construction (roofing timbers, plywood, etc.) or furnishings. These timber products are of high economic value and high added value;
- Industrial timber is obtained from small diameter logs (young trees, thinnings, dedicated plantations, etc.). After felling, the logs go to palette manufacturers or for paper and board; and
- Fuelwood is produced from small diameter timber that cannot be processed for conventional supply chains. Depending on how it is processed, it may be in the form of firewood logs, wood chips, or wood pellets. These products have less economic value than conventional timber products.

Income will depend on the volume of the timber products obtained and their sale price. In intertropical zones, forest productivity ranges from a few m^3 to a few dozen m^3 per ha and per year. The sale price can vary from a few € to a few hundred € per m^3.

The sale price of timber products depends on a great many parameters, hence the wide price variations observed on timber markets. The annual report from the ITTO[69] (International Timber Trade Organization) gives some idea of prices, but they need to be validated at local level.

3.2.2.2. Income from land

As already mentioned, securing land titles is one of the keys to the success of a project. In some regions, furthermore, land prices can rise steeply. Project activities may also have an impact on land prices and become a source of income for the projects themselves.

3.2.2.3. Income from Non-Timber Forest Products (NTFP)

Non-Timber Forest Products (NTFP) are products of biological origin, other than wood, which are harvested from forests, woodlands, and isolated trees. NTFPs may be harvested from the wild or produced in forest plantations or agroforestry systems. They include food products and dietary additives, such as edible nuts, mushrooms, fruit, herbs, spices, condiments, and aromatic plants, but also food products of animal origin (game, insects, caterpillars, etc.). They also include fibers (used for construction, furnishings, clothing, and utensils), resins, gum, and plant and animal products used for medicinal, cosmetic, or cultural purposes. Examples include:

- Fruit trees: commercial plantations producing mangoes (*Mangifera indica*) or cashew nuts (*Anacardium occidentale*) are fairly common in tropical countries. Some crops like coffee or cocoa fall in this category;

- Rubber: latex production from rubber trees (*Hevea spp.*) was an extremely important industry in the Brazilian Amazon, employing *seringueiros* to extract latex in natural forests. Industrial rubber plantations are widespread in south-east Asia and Africa; and

69 http://www.itto.int/

- Agroforestry may be practiced in croplands of various kinds to produce wood and non-wood products (fruit, medicinal plants) and crops.

For more information, FAO has an online resource dedicated to this subject[70].

3.2.2.4. Climate Protection and Payment for Environmental Services

As indicated in Section 1, some types of forest projects can help to fight climate change by avoiding GHG emissions or by means of CO_2 sequestration. This effect, which is positive for the environment, may be at least in part compensated via the carbon markets. The sale price of these "carbon assets" depends on their quality (standards, etc.), as detailed further on in this guidebook. Carbon credits may be the only source of income for carbon forestry projects, but in general, they usually constitute only a part of a project's income.

In the different case studies, production of carbon credits ranges from 0.6 tCO_2/ha year (case study no. 1, REDD Juma) to 20 tCO_2/ha/year (case study no. 4, AR Magdalena Bajo).

3.2.2.5. Co-benefits of forest carbon projects

Forest carbon projects may generate numerous co-benefits, including:

- Significant and labor-intensive economic activity, mainly employing unskilled labor, which consequently improves incomes and living standards among local communities and helps to fight poverty in rural areas;

- Diversified reforestation (using indigenous species) and conservation projects help foster and/or conserve the biodiversity of flora and fauna; and

- Forest cover also helps protect soils and water resources.

Projects may receive direct payment for these benefits via PES systems, or they may be rewarded indirectly through sales of certain project assets such as carbon credits. It should be noted that in many cases, no financial value is attributed to these benefits.

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70 For more information: http://www.fao.org/forestry/nwfp/6388/fr/

3.2.2.6. Conclusion

Calculating costs and income over time should enable project promoters to draw up a "business plan", in other words to model cash flows, calculate financial indicators and conduct a sensitivity analysis that will identify the variables that are likely to affect the smooth running of the project. The latter information should also be used to analyze the risks associated with the project, which is essential to guide the investment choices of financial partners.

3.2.3. WHAT ARE THE RISKS ASSOCIATED WITH FOREST CARBON PROJECTS?

An investor's analysis of the risks involved in a carbon project (due diligence) generally looks into:

- The ownership of the carbon credits by the credit seller (see Section 3.4.); and
- The technical, financial, and administrative ability of the project promoter and its partners to carry out the project and deliver carbon credits and other products to match their proposal[71].

A great many risks are associated with these projects. One can distinguish "classic" risks that are inherent to forestry projects, and "carbon" risks. The main risks are detailed in the paragraphs below. Two studies[72,73] go into this subject in detail.

3.2.3.1 Classic risks

These risks are "internal" risks that depend on the project itself, the project promoter and partners, and "external" risks over which the project has no control. Examples include:

- Non-commercial risks, particularly those related to the political and institutional

71 Meridian Institute, 2009. Fostering Carbon Markets Investment in REDD

72 UNEP and Ecosecurities, 2007. Guidebook to Financing CDM Projects http://www.cd4cdm.org/Publications/FinanceCDMprojectsGuidebook.pdf

73 UNEP, 2001. Legal Issues Guidebook to the Clean Development Mechanism http://www.cd4cdm.org/Publications/CDM%20Legal%20Issues%20Guidebook.pdf

stability of the host country, and economic and monetary risks (inflation, devaluation of currency) liable to affect project participants;

- Risks associated with poor conduct of the project as such, or with technical or financial failures on the part of one or more project participants. This can be a matter of non-compliance with national regulations (e.g., logging permits cancelled for non-compliance with planning or environmental regulations); and

- Risks of non-compliance with contract terms, particularly regarding quantities delivered and conditions of delivery, payment of the agreed price or retraction by the buyer.

3.2.3.2. Risks specific to "forest carbon"

These are of several types and include:

- Risks associated with the "carbon instrument" under consideration, as such (rejection of the methodology proposed, failure to register with the standard because of non-compliance with applicable rules and procedures, etc.);

- Risks associated with the non-permanence of the project: natural and human causes can reduce the stock of carbon during the project lifetime. This type of risk applies to AR projects as well as IFM and REDD. The question of permanence can potentially involve the responsibility of project promoters and investors in the long term;

- Risks associated with the ownership of credits (see Section 3.4.2): land-holding regime, land-use rights, relevant legislation, etc.;

- REDD projects are particularly subject to leakage risks: a slower rate of deforestation within the project perimeter may accelerate deforestation outside the project area; and

- Market risks: the market for carbon in general and for forest carbon in particular lacks liquidity and is volatile and difficult to predict over the long term (Section 1). Trading prices for carbon credits, especially in the medium and long term, may vary significantly.

3.2.3.3. Conclusion and recommendations

All these risks are systematically assessed by credit buyers or investors. It is therefore crucial for the project promoter to give in-depth consideration to all project risks, so that negotiations with investors are conducted on a sound basis. Some standards, like the VCS, provide risk analysis matrices[74]. More sophisticated tools are also available for due diligence. Once a risk is established, there are three possible courses of action: (i) reducing the risks as much as possible; (ii) sharing the risk with the investor (see 3.4.3.), which will influence credit prices and investment costs and therefore entail a cost; and (iii) transferring the risk to a third party by means of insurance (e.g., ARIZ for the AFD[75], MILF for the World Bank[76]), which also entails a cost.

Risk of credit ownership	Letter of approval obtained by the host country DNA, letters recognizing carbon rights obtained by the different project participants, in particular by local communities within the project perimeter.
Finance risk	Strict definition of the perimeter and titles to the land can be obtained, or documents certifying the owner's agreement (authorizations, contracts).
Permanence risk	Several possible options: using temporary credits (CDM) or creating a reserve (VCS, Carbonfix, etc.); maintaining the plantation beyond the accounting period, extending reforestation beyond the project's geographical boundaries (insurance). Stakeholder and local community participation in project benefits is also a significant lever to guarantee the permanence of activities.
Technological risk	Setting up pilots, and signing long-term contracts with service providers, suppliers, and operators

Table F: Examples of risk mitigation measures

74 http://www.v-c-s.org/docs/Tool%20for%20AFOLU%20Non-Permanence%20Risk%20Analysis%20and%20Buffer%20Determination.pdf

75 http://www.cefeb.org/jahia/webdav/site/afd/users/administrateur/public/plaquettes/AFD_ARIZ_FR.pdf

76 http://www.miga.org/

3.3. Financing a forest carbon project

Forest carbon projects generate cash flows during their lifetime (distribution of income and expenditure over time). They may also generate positive externalities that are not necessarily remunerated as such. However, delivery of cash flow and positive externalities stemming from the project can be jeopardized by various risks.

Project development and implementation costs, operating income and expenditure, and the risks associated with the project (and therefore investor confidence) are three essential aspects that must all be well understood before funds can be levied.

Different actors may be involved in project financing (figure 31), including:

- A "Special Purpose Vehicle" (SPV);
- Local or international banks, which may finance projects through loans or equity capital;
- Private investors (loans or equity capital);
- Environmental philanthropy (donations, loans at preferential rates, etc.);
- Credit buyers who finance the project through forward payments (which may be considered as a form of debt); and
- Local or international public actors (subsidies, loans at preferential rates, etc.).

As we shall see in detail further on, each type of actor will follow its own investment logic in terms of the volume of costs taken on, returns on investment, and acceptance of risks.

After a description of the main financial characteristics of forest carbon projects, we will describe the main financing arrangements in use today.

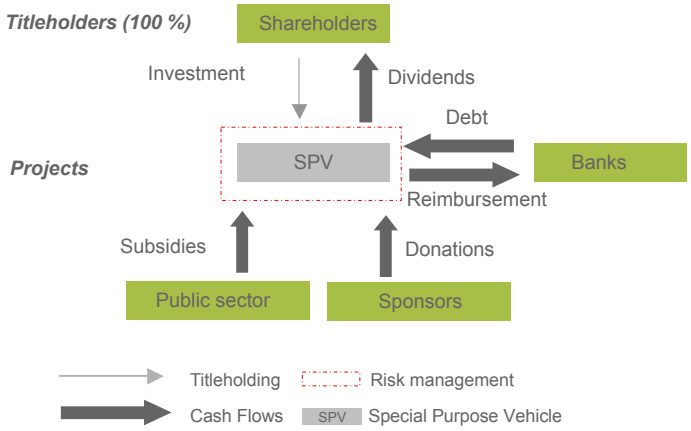

Figure 31: The different actors involved in project financing to "Source: ONFI / Ernst & Young)

3.3.1. WHAT ARE THE FINANCIAL CHARACTERISTICS OF THESE PROJECTS?

3.3.1.1. Brief summary of financial indicators

The use of financial indicators permit the characterization of investment projects. A Net Present Value (NPV), for example, is calculated by capitalizing the cash flows associated with an investment. The NPV is the sum of the cash flows (income and expenditures) associated with a project, which is capitalized, meaning that income and expenditure are compared over time (an income of X gained in one year will have more value than the same income gained in 10 years). The NPV calculation is therefore closely dependent on the discount rate applied, and will give a rate of return required for the investor given the risks involved in the investment. If an investment is risky, the investor will want to recover his outlay as quickly as possible ("time is money"). The discount rate applied will therefore be high, giving a lower NPV. Conversely, for a low-risk investment, a lower discount rate will be applied and the NPV will be higher.

The NPV is therefore the amount that will create the anticipated value of the return on investment. From a purely financial point of view, money can be invested whenever the NPV for the investment is positive and better than other investment options, since it will create value, and more so than others. The discount rates to be used for these projects depend on the type of investor and the project's risk profile. Central bank

rates (risk-free), market interest rates or financial market performance may be used to set minimum rates to which a percentage must be added according to the risks of the project.

Country	Central bank rates on 19/01/2010
United States	0.25%
Europe	1%
UK	0.5%
Japan	0.1%
Australia	3.75%
Mexico	4.5%
Brazil	8.75%
Indonesia	6.5%
Colombia	4%
China	3.33%

Table G: Examples of central bank rates

The Internal Rate of Return (IRR), as its name suggests, is the project's rate of return. If a project's IRR is higher than the rate of return required from the investment, taking investment risks into consideration, then the project, from the financial point of view, is worthwhile. Conversely, if its IRR is lower than the rate of return required from the investment, taking investment risks into consideration, then, again from the financial point of view, it is not worthwhile. The greater the risks of the project, the higher the IRR demanded by the investor will be. When the risks are smaller, investors will accept a lower IRR. Technically, the IRR is the value of the discount rate that will cancel out a project's NPV (NPV = 0). The two indicators (NPV and IRR) are therefore linked. Although these two indicators give a reasonable idea of the financial interest of a project, the IRR is a rate, and therefore does not reflect the overall value that a project may generate. It is therefore difficult to compare two projects on the basis of their IRR alone. The NPV, on the other hand, is a set value that reflects both the profitability of a project and its volume, and can be used as a basis for comparing several investment choices.

Other indicators can also give a good idea of the financial quality of the project, but the IRR and NPV are the most frequently used[77].

3.3.1.2. Some financial characteristics of forest carbon projects

Forest carbon projects often have the following characteristics:

- **Implementing a forest project usually demands a very large initial outlay**. This is particularly the case for (re)afforestation, which is costly in terms of acquiring titles to the land and establishing plantations (see case study nos. 4 and 5, for example). As we saw earlier, the cost of REDD projects is highly variable. In some types of REDD projects, like those that involve only conservation measures, CAPEX may be lower (see case study no. 3);

- Forest projects need a long time to generate their principal income, so that **returns on investments also take time**;

- Although **costs associated with the carbon component of projects are high,** they are modest compared to the overall investment costs. However, with smaller scale forestry projects, the leveraging effect of carbon credits may not be very great because of the complexity of setting up the carbon component and the cost of monitoring carbon sequestration or avoidance. The balance between project feasibility and additionality (required for compliance with numerous standards) is often rather subtle;

- **Carbon credits are one way of diversifying sources of project income.** Furthermore, they are often paid for in international currency (€ or $), which can be more reassuring for investors than other methods (such as timber products that are sometimes reimbursed in local currency) that are liable to be affected by high inflation. In the case of (re)afforestation projects, carbon credits are often generated a little earlier, which improves profitability, although carbon income is often very much lower than classic sources of forest income (timber, fruit, latex, etc.);

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77 Other financial indicators that can guide investment choices include: the time needed to recover the outlay, alternative options, rates of return, net value at risk, profitability index, etc. However, a recent study suggests that 75% of financial directors systematically use IRR and NPV to assess investments (Graham & Harvey).

- **The levels of risk associated with forest projects are very high**. Forest projects are long-term projects, and as we saw earlier, they are subject to a range of risks which are at once technical (natural hazards, etc.), financial (market volatility, lack of visibility and liquidity on the carbon market, especially for forest carbon, etc.), and institutional (projects in unstable host countries with rapidly changing legislation and a high incidence of corruption, etc.). For investors, these are major risks reflected in high interest rates for this type of project (and therefore a low NPV) and high IRR requirements**.** Consequently, their financial indicators (IRR, NPV) are usually less favorable than in other sectors; and

- **Forest projects generate additional social and environmental co-benefits,** which do not necessarily earn direct remuneration. However, some investors or public and private donors may place a value on these externalities and therefore provide financial support through public subsidies, donations, loans at preferential rates, etc. The "return on investments" will then be augmented by a new public policy or an improved image for the donor or sponsor. Public policies in the forest sector are particularly important. Forest projects may be carried out for inheritance reasons (tax exemptions, etc.) or by legal obligation (e.g., creating a conflict between plantation and mining activities, new infrastructure, etc.). These donations or subsidies can improve the project's financial indicators (IRR, NPV), as they generally do not require a return on investment. In forest projects in North and South America, aid of this type has been shown to increase project IRR by 3 to 7%[78].

These observations should serve to alert project promoters and help them to avoid risky choices. However, they should not discourage them. The study mentioned earlier, made in a pre-crisis context, showed that a well-managed forestry investment can generate an IRR of 10 to 20% (figure 32), and the carbon component can also significantly leverage investment. When forestry projects are relevant to territorial energy, social, or environmental policies, they may also receive substantial aid for the services they provide, which can contribute significantly to their profitability.

78 Cubbage F. et al., 2007. Timber Investment Returns for Selected Plantations and Native Forests in South America and the Southern United States, New Forests

IRR examples for plantations and natural forest

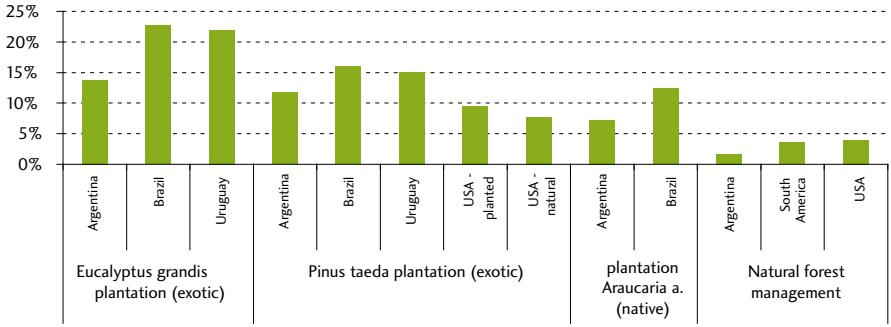


Figure 32: Examples of forestry project IRR in the US and South America (plantations and management of natural forests). The IRR for the most productive plantations (Eucalyptus) ranges from 13% to 23%. The IRR for natural forest management ranges from 2% to 4% (Source: Cubbage et al.)

3.3.2. WHAT ARE THE FORMS OF FINANCING ACCESSIBLE TO FORESTRY PROJECTS?

Different kinds of financing may be sought by project developers: loans, equity capital, donations, and subsidies. These types of financing involve different costs for the project developer (SPV). Aggregating the different costs will produce the cost of financing the project or "Weighted Average Cost of Capital" (WACC).

3.3.2.1. Loans

A loan or debt is a sum of money supplied by a third party to a project, person, or organization and which must be reimbursed, either during or at the end of the agreed term, plus interest accrued during the loan period. Once the project is set up, loans must be reimbursed before any other source of project financing (equity capital, etc.).

Most loans are provided by banks. Compared to equity capital investments, required rates of return on loans (interest rates) are often lower (as less risk is incurred). Consequently, loans are often the cheapest source of capital. On the other hand, the collateral required from project developers can be very high and may involve project

assets, which can include sales contracts for products generated by the project, and guarantees from the project promoter.

A form of debt: forward payments for carbon credits

In some projects, buyers may agree to pay in advance for the future delivery of products (such as carbon credits). This may be considered as a form of debt. These initial payments may be used to finance the project. The advantage of this kind of financing is that it can be reimbursed in kind rather than in cash. The disadvantage is that the buyer usually expects a substantial reduction in the sale price of credits, in consideration for the risk and the cost of the capital. Some carbon standards will accept these credits, which are then referred to as *ex-ante* credits.

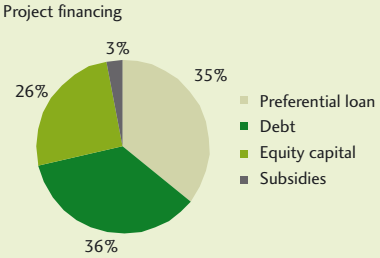
Although debt is an important and cheap source of financing, it is only appropriate for projects with a low risk profile, and therefore cannot be readily used for carbon forest projects. The interest rate is usually based on current market rates (central bank rates, table G) for the currency concerned, plus a margin that depends on the project's risk profile. Various tools exist (ARIZ at the AFD[79], MILF at the World Bank[80]) to provide project promoters with guarantees and thus facilitate access to this kind of financing.

Finally, government agencies or charities may offer mechanisms for loans at preferential rates.

79 http://www.cefeb.org/jahia/webdav/site/afd/users/administrateur/public/plaquettes/AFD_ARIZ_FR.pdf

80 http://www.miga.org/

Example of a debt-financed project: afforestation on the Batéké plateau (case study no. 5)



The Ibi Batéké project is an AR project covering 4,000 ha on the Batéké plateau near Kinshasa in the Democratic Republic of Congo. The project's goal is to produce fuelwood and agricultural crops (cassava in particular) through an agroforestry component. It is promoted by a private company and largely financed by a preferential loan mechanism financed through sponsorship by two European industrialists.

3.3.2.2. Equity capital

Equity capital is capital contributed by investors in consideration for participation in the SPV, and who thereby become project shareholders. Shareholders receive dividends from the project, after the other partners have been reimbursed. The risk is greater and anticipated shareholder yields are consequently higher than for lenders. The advantage of equity capital is that it does not need to be reimbursed during the first years of the project, thus releasing cash flow. The disadvantage is that given the higher risk, the cost of the capital is higher.

Equity capital can provide financing for projects with higher risk profiles where debt finance is not an option. Typically, providers of equity capital will only cover part of a project's total cost. Rates of return on equity capital improve with higher amounts of debt or subsidies in the project's financing structure (leveraging effect).

Project IRR, equity capital IRR, and the leveraging effect

The project's IRR reflects its economic rate of return and is based on all of the cash flows associated with the project, regardless of how they are financed. The IRR for equity capital takes the financing structure into account and reflects the financial rate of return for equity capital contributions. This IRR improves with the leveraging effect associated with the usually lower cost of debt financing, as this carries less risk. The leveraging effect is equal to the difference between the rate of return on equity capital and the project's economic rate of return. A positive difference means that debt financing has increased the rate of return of the project's equity capital; however, when the economic rate of return is lower than the cost of the debt, the leveraging effect works in reverse.

The main sources of equity capital are:

- The **project promoter** or its official sponsors;
- **Venture Capital**. Venture capital is usually invested (as a venture) in the start-up phase of project development. It is therefore high risk capital and demands high returns, which is obtained by taking shares in various enterprises, banking on their success. Typically, venture capital is invested in the range of 1 to 10 M€;
- **Private equity funds**. These are funds mainly managed by banks. A number of "forest", "green", or "ethical" funds have recently appeared, seeking to invest in forest carbon projects; and
- **Share issuance** by a stock market intermediary (securitization): project promoters may consider issuing shares on the market or issuing additional shares for a stock which is already listed. This option is not usually taken up for individual projects, but may be an option for new enterprises with a portfolio of similar projects to be developed. In the forestry sector, discussions are taking place on "Tropical rainforest bonds", which are in line with this approach.

3.3.2.3. Subsidies and donations

A subsidy is a sum of money granted by a third party to a project, person, or organization that contributes to the aims of the third-party. Subsidies are generally granted to projects with a marginal commercial role and do not need to be reimbursed (provided that the stated aim of the subsidy is achieved). However, in some cases, subsidies may be converted to loans or equity capital if the project is commercially successful. Subsidies are usually supplied by government organizations as a percentage of the total investment in the project.

In the forestry sector, there is also a large environmental philanthropy market. Private companies may have a philanthropy policy for investing in projects that generate social, environmental, economic, and cultural benefits. Forest carbon projects may receive financial donations or donations in kind, in particular through large international NGOs.

Capital costs for these two types of financing are low and often nil.

3.3.3. WHO FINANCES PROJECTS?

The various types of financing are supplied by different actors.

3.3.3.1. The project promoter

The project promoter himself, or the main project partners, very often invest in the project themselves using equity capital, especially for the initial phases (prefeasibility or feasibility). Public or private financing may cover these phases[81], but in the case of private investment, this may involve handing over a large share of equity and even loss of control over the project. In the forestry and timber industry, projects may be largely or entirely financed by the industrialists[82]. This is also the case in case study no. 5 for which the project promoter is financing part of the project through equity capital.

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81 For example, the French cooperation system, in order to boost exports, supports feasibility studies through the FASEP fund: http://www.ccinordisere.fr/Commun/documents/DOC_PATH_50_1079624604.pdf

82 On peut citer l'exemple connu du projet Plantar au Brésil de l'industriel de l'acièrie Vallourec : http://www.ccinordisere.fr/Commun/documents/DOC_PATH_50_1079624604.pdf

3.3.3.2. The private sector

Given the particular profile of forestry projects, very few currently have access to traditional sources of financing (loans or equity capital). However, three main trends and financing sources are emerging:

- In the last few years, the voluntary market has been helping to boost forest carbon projects through trade in the carbon credits they generate (Section 1). Although trading in credits is not a financing solution, signing an ERPA (see Section 3.4.4) can have a significant leveraging effect. Furthermore, forward sales of credits can provide financing for a project. Offsetting can occur directly between the project promoter and purchasers seeking to offset their emissions. However, a great many "offsetters" are now offering their services as intermediaries between projects and buyers seeking offsets. Offsetters may be "brokers" who do not buy credits directly but merely act as intermediaries between buyers and vendors, or they may be "traders", who buy credits themselves to sell them on (case study nos. 1 and 5);

- The environmental philanthropy sector offers an extension of the voluntary offset market. Private-sector participation also takes the form of donations or loans at preferential rates. These donations are often made through charitable intermediaries such as foundations or large international NGOs, as voluntary offsets or not. These organizations may then finance activities or projects involving the carbon market. Large NGOs and foundations that are particularly active in the forests/climate area include the Prince of Wales Rainforest Foundation, the Gordon & Betty Moore Foundation, the David & Lucile Packard Foundation, the William & Flora Hewlett foundation, the Clinton Climate Initiative, the Wildlife Conservation Society (WCS), the World Wide Fund for Nature (WWF), the Nature Conservancy (TNC), and Conservation International (CI); and

- The growing strength of "green" or "ethical" investment and the many positive signals in favor of including forest projects in regulated markets (Sections 1 and 2) are already finding practical applications through investment vehicles dedicated to the forest carbon sector. These may be funds collected from subscribers to invest in projects, usually in the form of equity capital. They may also be classic carbon funds set up to buy credits, particularly with a view to pre-compliance with future regulated markets. These include Equator Environmental, New Forests (and their Eco Product Fund), Canopy Capital, Carbon Conservation, Ecotrust, Carbon Planet Limited, Forest Systems, Ecosystem Restoration Associates, Carbon positive / Sunshine Technology, etc. Finally, many banks and classic carbon finance organizations are now looking into investments in the forestry sector

(Merrill Lynch, JP Morgan, BNP Paribas / Fortis, Société Générale / Orbéo, etc.). Possible market openings (especially in America) could lead to an increase in these initiatives and create an important source of financing for forestry projects, and the trend should therefore be closely monitored.

3.3.3.3 The public sector

The public sector plays a fundamental role in financing forestry projects on three levels. Firstly, it is often the only source of finance for some forestry activities that generate important social and environmental benefits. Secondly, it can encourage investment from the private sector through incentives such as subsidies, tax relief, and guaranteed loans. Finally, the public sector is responsible for establishing a framework and policies that are favorable to the "business environment" (appropriate legislation, local expert services, pilot projects, initial feedback from experience, etc.). Public financing or official development assistance can thus play an important role in the launch of forest carbon mechanisms.

- Official Development Assistance (ODA)

ODA has a very important role in the development of forest carbon projects, through capacity building programs in host countries, project financing solutions (e.g., loans, donations, and investments), purchases of credits via carbon funds, or guarantee funds giving projects access to loans.

As we described in Section 2, substantial sums are committed to bilateral cooperation for national programs and local capacity building, which may also support forest projects. The most active cooperation programs in this area include all those run by Norway, Germany (e.g., GTZ), the UK, the US (USAID), Australia, Denmark (Danida), and France (AFD).

In addition to the initiatives listed in Section 2, several multilateral instruments dedicated to the sector are described in table I.

Table H: Examples of offsetters proposing carbon forest projects to their clients

Forestry projects amongst others		Forestry projects only	
Atmos Clear - USA	Ebex 21 - Nouvelle Zélande - programme Carbon Zero	American Forest - USA	Green Fleet - Australie
Australian Carbon Traders - Australie	EcoAct - France	AusCarbonGroup - Australie	Greening Australia - Australie
Carbon Clear - Angleterre	Evolution Markets - USA	AusCarbon International - Australie	GreenO$_2$ - Uruguay
Carbon Footprint - Angleterre	First Climate - Suisse	Carbon Balance - Angleterre	Grow A Forest - Angleterre
Carbon Fund - USA	Good Planet - Action Carbone - France	Carbonica - Angleterre	Impatto Zero - Italie
Carbon Planet - Australie	Green Seat - Pays Bas	Carbon me - Angleterre	Men of The Trees - Australie
Carbon Pool - Australie	Max Ambiental - programme Carbono Neutro - Brésil	Climate Stewards -	ONF International - France
Cero CO_2 - Espagne	Natsource - USA	Conservation Fund - USA	PrimaKlima - Allemagne
Climate Neutral Group - Pays Bas	Orbéo - France	Conservation International - USA	Pure Planet - USA
Climate Neutral Network - USA	Origin Energy - Australie	CO_2 Australia - Australie ex Oil Mallee	Pur Projet - France
Climate Positive - Australie	South Pole - Suisse	Cool Earth - Angleterre	Reward Group - Australie
Climate Trust - USA	Sustainable Travel International - USA	Econeutral - Canada	SOS Mata Atlantica - Programa Florestas do Futuro - Brésil
C02 Balance -Angleterre	The Carbon Neutral Company - Angleterre	Elementree - Australie	The Green Initiative - Brésil
C02 Logic - Belgique	Trees & Water and People - USA	Enviro-trade - Angleterre	The Equilibrium Fund - USA
Easy Being Green - Australie	Zero Footprint Offsets - Canada	Face the Future - Face Foundation - Pays Bas	TIST - International Small Group Tree Planting Program - USA
Ecosecurities - Angleterre		Flying Forests - Angleterre	Tree Canada Foundation - Canada
		Forest Avenir - France	Trees4good - Angleterre
		Go Neutral - Jewish National Fund - USA	Treeflights - UK

Initiatives	Type of support
BioCarbon Fund (World Bank)	The BioCarbon Fund (BioCF) began operations in 2003. With an allocation of 60 M€, it purchases credits from forest projects and builds capacity among project promoters to boost the LULUCF sector on carbon markets. The BioCF is an investment fund: it operates on behalf of the investors contributing to it and for whom it signs contracts to purchase emission reductions. BioCF investors include several governments (Canada, Italy, France, etc.) and private corporations (Japanese in particular). The BioCF identifies projects and can offer to buy the emission reductions generated by projects, but does not directly invest in these projects. It may pre-finance some expenditures required to set up a project, which are then deducted from the payments made for emission reductions. The BioCF also provides projects with important methodological support. Projects interested in selling emission reductions to the BioCF have to undergo a selection process based on a simplified project presentation sheet. The BioCF opened a second tranche in 2007, and the project selection process had not been entirely completed. Emission reductions are purchased at a price usually in the range of 2.6 to 3€ per teqCO_2, up to 2017. Today, the BioCF is one of the only buyers of tCER forest carbon credits on the regulated Kyoto market (countries with binding commitments). Three of our case studies (nos. 2, 3, and 5) are supported by this mechanism.
CASCADe (UNEP / FFEM)	With its 1.3 M€, the CASCADe programme aims to develop CDM projects in sub-Saharan Africa in the forestry and biofuel sectors, via capacity building programs in the following countries: Benin, Cameroon, Democratic Republic of Congo, Gabon, Madagascar, Mali, and Senegal (case study no. 5 is one example).

Table I: Examples of multilateral initiatives

- Local public-sector support

Grant or financing support mechanisms are available in many cases from host countries for forest projects. Case study nos. 1 and 4 illustrate these systems in Brazil and Colombia.

3.3.4. CONCLUSION

Financing for forest projects may be levied through several public, private, or charitable mechanisms. Projects are rarely financed entirely through just one of these mechanisms. Nevertheless, some projects with substantial environmental and social externalities are more likely to find sources of finance through "environmental philanthropy" and the voluntary offset market. Highly profitable projects may consider "traditional" private financing (equity capital and loans), while demonstration projects or those meeting general interest criteria will find it easier to obtain public financing.

Case study	Philanthropy financing		Financing under mechanism launch scheme, public support	Traditional financing
	Voluntary offsetting	Environmental philanthropy		
No. 1: Juma	Offsetting by Marriott clients planned to extend Marriott financing	Marriott via a donation to launch the project	The government of Amazonas State provided support to the foundation and strengthened the legislative environment	
No. 2: AR Corridor		Conservation International is supporting project development through a donation	The project is largely financed by a grant from the World Bank, and the BioCF purchases some of the credits	
No. 3: REDD Corridor		The project is largely financed by Conservation International	The BioCF supports the project by buying part of the credits and developing a dedicated methodology. USAID also supported the launch of the project	
No. 4: PRC Magdalena Bajo			The project receives substantial public support through financing of part of the project by a Colombian public bank and the French Global Environment Fund (FGEF)	Most of the project is financed by private investment, especially from companies involved in the agroforestry sector
No. 5: Ibi Batéké	A large proportion of the credits is purchased by the Orbéo Carbon Fund and sold on through the voluntary market	Two major European industrial organizations are financing the project through preferential loans	A large proportion of the credits are purchased by the World Bank's BioCF. The project's technical component is supported by the UNEP CASCADe programme	Part of the project is financed by equity capital, mainly from the project promoter

Table J: Financing methods for the case study projects

The typology of existing projects (Section 1) and the amounts committed to the sector indicate that environmental philanthropy (whether through the voluntary offset market, direct donations or donations via NGOs) and public stakeholders have a fundamental role at present in financing forest carbon projects. The purely private sector (which seeks a return on its investments) is still small. However, the many positive signals from the regulated markets (Section 2) are boosting interest in the forestry sector among investors. If these signals are confirmed, the market may be expected to move onto a professional footing with better access to "traditional" financing.

3.4. Contracts (ERPA) and sales of carbon credits

Although they are not often a source of financing, contracts signed for carbon credit sales can guarantee future income from these sales. In this sense, they are important as a way of leveraging finance for projects. In the last part of this section, we will look in detail at conditions for selling these credits.

3.4.1. CHOOSING MARKETS AND STANDARDS

Labels indicating compliance of a forest carbon project with standards are a guarantee of project quality. According to a recent study[83], this guarantee is the main criterion used by investors when choosing to buy forest carbon credits (figure 33), ranking ahead of the project promoter's experience and credibility, the type of project, social and environmental benefits, and the credit sale price.

83 Neeff et al., 2009. Forest Carbon Offsetting Survey 2009

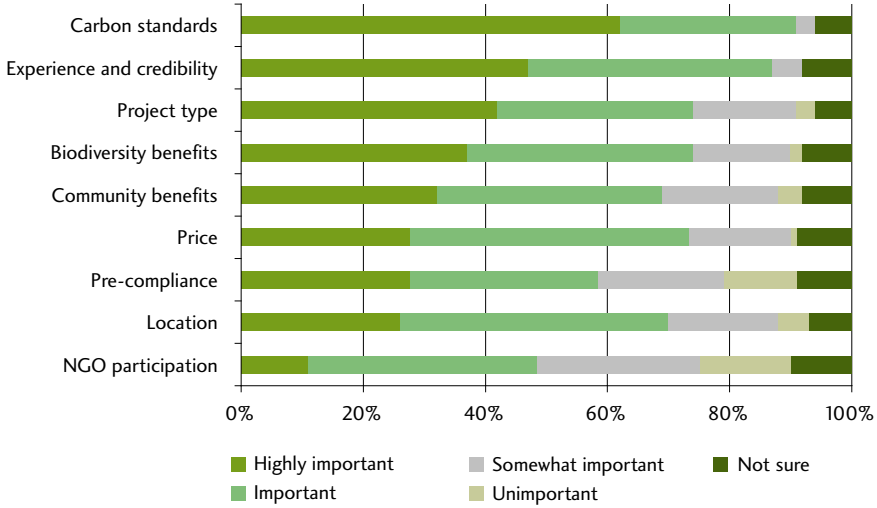

Figure 33: Criteria used by potential buyers in their choice of forest carbon credits

The different standards can be divided into two categories:

- Carbon" standards, which certify tons of CO_2 from projects according to quality criteria (measurability, additionality, etc.). These standards include:
  - "Regulated" standards defined under the Kyoto Protocol: CDM and JI; and
  - "Voluntary" standards, the main ones being the VCS, VER +, CarbonFix, Plan Vivo, and CCX[84].
- "Project" standards guaranteeing the quality of the project as a whole in accordance with various criteria (climate, biodiversity, and social in the case of CCBs), but which do not certify tons of CO_2 measured, so that guarantees to buyers are limited. These standards (CCBs, Social Carbon) are therefore often considered as additional to the above.

Forest carbon projects in general may comply with a carbon standard, a project

84 Standards focusing on a given geographic zone are not included here, e.g. CAR, GGAS, etc.

standard, or both or neither (cf. Section 1).

The choice of standard is based on the three following criteria, in order of importance:

- The size of the project and the opportunity of seeking compliance with the standard;
- Eligibility of the project for the different standards, and feasibility of the compliance procedure; and
- The commercial advantages of the different standards and of the project under consideration.

3.4.1.1 Size of the project

The standards procedure brings increased value to the project and guarantees its quality. However, standardization involves potentially significant transaction costs (to complete the application, perform audits, registration, etc.) as described in detail in Section 3.2. Moreover, although these costs vary with the size of the project, most of the initial costs are fixed. Transaction costs average out to a range of 100 to 300 k€, and sometimes more (especially if a new methodology has to be developed, if few projects of the same type already exist, etc.). Applying for both "carbon" and "project" standards will generate economies of scale (i.e., completion of a single audit for both types of standards, a single project document, etc.).

The potential volume of credits generated and the expected income must be higher than the transaction costs for the standard labeling to be interesting. During the prefeasibility phase, the project promoters should therefore make a cost-benefit analysis to answer this initial question.

For large projects, i.e., generating more than 30,000 tCO_2 a year, standardization is easily justified. For small projects generating less than 5,000 tCO_2 a year per 100 ha (cf. figures 16 and 29), the question needs serious consideration. For large projects, applying for both "carbon" and "project" standards can be worthwhile (and in some cases, even for three standards: regulated CDM carbon market, "voluntary offset", and "project"). The three together are a guarantee to buyers that the highest standards of quality are being met in generating carbon credits.

3.4.1.2. Project eligibility for the different standards

If the interest in complying with a standard is demonstrably worthwhile, the project should then be eligible. This eligibility will depend on its location, type of project, ownership of the land, and ownership history.

- Where will the project take place?

If the project is in an Annex I country, the project promoter may consider JI certification. If it is in a non-annex 1 country, the promoter may consider CDM certification.

In either case, the country in question must have ratified the Kyoto Protocol and have an operational DNA. Moreover, as we underlined in Section 1, the accounting rules for emissions in the forestry sector in Annex 1 countries are a serious hurdle to possibilities for conducting a forestry project under JI (with the exception of New Zealand, as described in Section 1). As JI only concerns 2008-2012, it will not be dealt with in the remainder of this guidebook due to the short time frame. In all cases, the competent authority of the host country must be contacted, and particularly the DNA if it has been established[85,86].

In Annex I countries, if a voluntary project is introduced, there may be a risk of double accounting with the national GHG inventory under the Kyoto Protocol in the host country. Some standards (like the VCS) have an explicit requirement to avoid double accounting (cancellation of Kyoto credits, exclusion from the inventory, etc.). The matter should be resolved by contacting the DNA.

Concerning the other standards, some may restrict the geographical area of eligibility. This is the case with the CCAR in the United States, GGAS in New South Wales (Australia), and Plan Vivo for rural areas in developing countries.

- What is the project type?

The second criterion is the type of project. Some may not be eligible at all, and will effectively not be able to generate carbon credits.

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85 http://unfccc.int/parties_and_observers/parties/non_annex_i/items/2833.php

86 http://cdm.unfccc.int/DNA/index.html

Table K shows project eligibility for the different standards.

Project types	Carbon standards		Project standards
	Regulated	Voluntary	
Afforestation and reforestation (AR)	MDP	VCS, VER +, Plan Vivo, CarbonFix, CCX, CCAR	CCBs, Social Carbon
Improved forest management (IFM)		VCS, Plan Vivo, CCX, CCAR	CCBs, Social Carbon
Reducing emissions from deforestation and forest degradation (REDD)		VCS, Plan Vivo, CCX, CCAR	CCBs, Social Carbon

Table K: Types of projects and choice of certification standards

It is important to realize that if the project is eligible for a standard, this does not mean that the project necessarily complies with the quality criteria for these standards, or that there is an existing methodology applying to the project. A pre-analysis of applicable methodologies is therefore recommended, as well as an analysis of the project's compliance with methodological criteria such as additionality. Most standards used the same criteria for these questions.

In the specific case of AR projects, the different standards increasingly require compliance with additional criteria concerning titles to land and the dates when deforestation occurred. For some standards, the date of deforestation must be earlier than December 31, 1989 (MDP, VER +, Plan Vivo, CCX), while for others, it must be earlier than 10 years before the date of the first project operations (VCS, CarbonFix). Furthermore, the CDM requires projects to have a title to at least 2/3 of the land.

3.4.1.3. How to choose between different standards

The project developer may have a choice between several "carbon" and "project" standards. A fundamental difference between different carbon standards is the way "permanence" is managed. The choice must then be based on the quality of the different standards and on interest in these among potential buyers.

- The permanence issue: permanent or temporary credits (tCER / lCER)?

To handle the issue of permanence under the CDM, a decision was made to create two specific credit units for CDM forest projects:

- A short-term or temporary CER (tCER), which is "a CER issued for an afforestation or reforestation project activity under the CDM … which expires at the end of the commitment period following the one during which it was issued"[87]. In practice these are units which are valid over one commitment period (5 years) and must be substituted by other units at the end of their period of use; and

- A long-term CER (lCER), which is "a CER issued for an afforestation or reforestation project activity under the CDM which expires at the end of the crediting period of the CDM afforestation or reafforestation project activity for which it was issued". For a forestry project, the crediting period may be of 20 years (renewable twice up to a maximum of 60 years) or one non-renewable period of 30 years. However, if at any time the underlying project can no longer demonstrate that carbon sequestration is ongoing, these credit units must be replaced prematurely.

Classic CERs issued for CDM energy projects have a lifetime which is considered permanent as they do not need to be replaced. This means that forest carbon credits (temporary or long term) will have a lower price than permanent credits (one tCER is worth about one third of the price of an equivalent permanent credit). Annex 3 describes one method for calculating the price of temporary credits, with a comparative table of choices between tCER and lCER credits.

Temporary credits are one way of handling the environmental problem associated with the non-permanence of credits, but they make the project promoter or the buyer of credits responsible for replacing these credits once they expire. This system could allow buyers to use these short-term and less expensive credits if they have cash flow difficulties, and replace them when the situation becomes more favorable. As explained in Annex 3, this latter point comes into play in particular when carbon credit prices are expected to remain stable or to decline. However, overall, the anticipated trend is rather the reverse (increasing prices for carbon credits). Responsibility for replacing the credits after expiration and expectations of higher carbon prices are the two main factors accounting for the limited interest in forest carbon credits among buyers. What is observed in practice is that virtually all projects have chosen tCER credits. Finally,

87 UNFCCC, decision 19/CP9

the BioCF and CAF (Corporacion Andina de Fomento) are the only large-scale buyers of temporary credits today, mainly on behalf of Annex 1 countries under Kyoto quotas.

To guarantee the permanence of forest carbon credits, several voluntary standards (including VCS, VER +, CarbonFix, etc.) have proposed a different system involving the establishment of an insurance system. Depending on the project's risk profile, a part of the credits generated by the projects are "reserved" in a "buffer". This buffer, made up of credits from projects anywhere in the world, provides a guarantee against carbon losses. The credits generated thus become as permanent as those generated by other types of projects. Sale prices for these credits are therefore comparable to other types and are often higher than for temporary credits such as tCERs and lCERs.

Credits are generated differently under temporary and permanent systems. For example, tCERs are generated on the basis of "stocks", while permanent credits (like Voluntary Carbon Units or VCUs) are generated on the basis of absorption "flows" (figure 34).

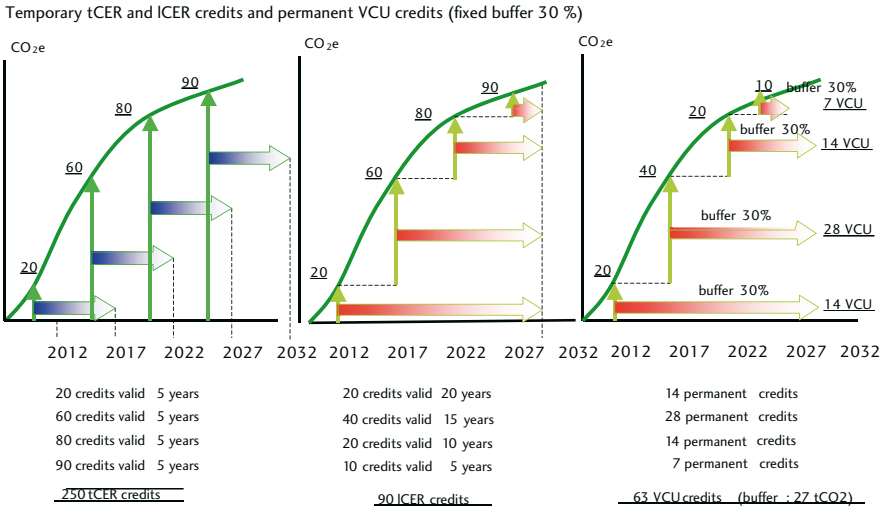

Figure 34: Generation of tCER, lCERs, and VCUs by a reforestation project. The price of a temporary credit of the tCER type is estimated at one third of the price of the permanent credit (Source: ONFI)

The direct consequence of the difference in the nature of the credits is that the

number of credits generated under a permanent standard is much lower. The effect is even more marked in plantations where large-scale thinning and intermediate felling occurs (which makes it impossible to include more than the overall average of carbon storage over the project's lifetime, so that the credit buffer will be large). This so-called peak effect means that permanent standards greatly reduce the number of credits that these projects can generate, while under the tCER system, virtually all stocks are taken into account. Permanent credits can therefore improve trading potential and increase sale prices, but will considerably restrict the number of credits generated. They are particularly relevant for conservation planting, where carbon releases are limited or accidental. In other cases, comparative modeling of the two systems will help to determine which is most appropriate.

- Characteristics of the different standards

If the project promoter has several options on standards to select, the final choice will depend above all on how much buyers may be attracted by different standards. The table below gives indications on how to choose between the different standards, based on the results of three studies on this subject discussed below.

Standard	Forestry Carbon Standards 2008[3]	The Forest Carbon Offsetting Survey 2009[4] (in % highly desirable and desirable for buyers of credits)	Review of forestry carbon standards 2009[5] (score out of 60, depending on different criteria)	Credit sale prices (delivered[6], all technologies)	Result
Carbon standards					
CDM	Not considered	First: 64%	Not considered	CDM is the most widely recognized	The CDM, created and supported by the UNFCCC, is the most widely recognized quality standard. However, its methodological complexities, transaction costs, and the lack of buyers for temporary credits (with the notable exception of the BioCF) restrict its use. To take advantage of its reputation, projects may apply for double CDM + VCS certification (or triple: MDP + VCS + CCBs).
VCS	Suitable for large-scale projects (> 10,000 ha)	Second: 60%	First: 55 out of 60	1.3 to 20€ (average 3.5€)	The VCS is similar to the CDM in many respects, but it is simpler, open to more technologies (REDD, etc.), supported by recognized organizations (IETA, WBCSD, etc.) and could become the main standard on the voluntary offset market. Fungibility with future regulated markets, such as the American market, is under consideration. This is the preferred standard among those aiming for pre-compliance. It offers a permanent credit solution through an insurance system, whose credibility relies on the players supporting it. It nevertheless has the same failings as the CDM, including complex implementation and high transaction costs. Few projects are registered at present.
VER +	Not considered	Third: 41%	Not considered	2.5 to 15.5€ (average 3.8€)	The VER + is similar in many respects to the CDM and VCS. Interest in this standard is likely to decline as the VCS matures.

Plan Vivo	Suitable for very small-scale projects (< 1,000 ha) with strong links to community forestry	11%	38 out of 60	3.5 to 7.5€ (average 3.7€)	The Plan Vivo standard is suited to some types of small-scale forest projects that are mainly intended to benefit rural communities. However, studies have highlighted the complexity of the project documents required (scientific approach) and the low quality requirements of some criteria.
Carbon Fix	Suitable for projects of intermediate size (1,000 to 10,000 ha)	Not considered	Third: 49 out of 60	9.5 to 16.5€ (average 12.3€)	The CarbonFix standard stands out for its simplicity, transparency, and the quality guarantee it brings to projects. It offers a permanent credit solution through an insurance system. It concerns only AR projects, of which several have been registered. The standard also offers credit certification before they are "physically" generated, referred to as *ex-ante* credits. However, this is considered as a form of forward credit trading, which is also possible with other standards.
CCX	Not considered	Not considered	37 out of 60	0.6 to 10€ (average 2.6€)	Quality requirements for the CCX standard are low (regarding several criteria: additionality, permanence, etc.) and it is therefore suited to projects that may not comply with these criteria. However, the very low trading prices for these credits are emphasized.
Project standards					
CCBs	To be secured in addition to "carbon" standards by projects covering more than 1,000 ha	30% (46% when combined with another standard)	Second: 51 out of 60	1.3 to 10€ (average 6€)	The CCBs standard is recognized for the social and environmental benefits of its forest projects. This gives an edge to projects that can be reflected in credit trading prices.
Social Carbon	Not considered	Not considered	Not considered	3.5 to 6.5€ (Average 5€)	The Social Carbon standard only concerns the social component, and may therefore be seen as offering less potential than the CCBs.

Table L – Characteristics and relative scoring of the different standards and recommendations

3.4.2. DEFINING THE OWNERSHIP OF CARBON CREDITS

The ownership of carbon credits is a major issue in several respects. First, only the owner or owners of these credits may legitimately sell them and thereby receive the resulting income directly. Ownership of the credits and how they are distributed between project contributors will guarantee the fairness and long-term viability of the project. This point is particularly crucial for forestry projects, which last for several decades and often involve a great many stakeholders.

Rights of indigenous and local communities

Indigenous populations and traditional communities can have a central role in forestry projects. Recognition of their rights to land and resources must be secured and protected to prevent alienation. After years of advocacy, this point was underlined during the Copenhagen negotiations (COP 15). It is therefore essential to investigate the rights of forest communities when defining the ownership of carbon credits. These populations may be involved as project participants (in monitoring for example) and may benefit directly from carbon payments. A letter of approval of the project from local communities will be an asset to the smooth running of the project.

Ownership is also one of the essential guarantees required by investors or buyers of carbon credits. No bank, investment fund, or offsetter can properly take the risk of financing an organization that may not be able to guarantee reimbursement of the loan, the payment of dividends, or the timely delivery of carbon credits because of an ownership dispute. This is the reason why, before negotiating any contract involving carbon credits, project promoters must be able to answer the question of to whom the carbon credits belong.

Ownership of carbon credits usually has to be determined by a lawyer, but project promoters should still bear the following points in mind.

Defining the ownership of carbon credits first of all requires an analysis of the legal definition of a carbon credit in the country concerned. The answer to this will then prompt two questions, as follows and in that order:

- Who has rights over the trees?
- Who contributes to the production of the carbon credits?

As we shall see in detail below, the answers to these questions will provide the lawyer with a set of indications from which to establish constructive ownership of the credits.

3.4.2.1. A prerequisite: what is the legal nature of carbon credits in the host country?

The first important point is the legal nature of the carbon credits, which will determine the rights and obligations of whoever has a claim to their ownership, and hence the possibility of transferring legal title to the buyer. The legal nature of the credits will be one of the indications that may be used to identify their owner(s), according to the rights and obligations attached to the production and ownership of the credits.

It should be remembered, first of all, that carbon credits are *sui generis* instruments - created either by instruments under international law (Kyoto Protocol, Marrakech Accords), or under voluntary private initiatives (VCS, etc.). However, neither of these defines the legal nature of carbon credits.

The legal nature of carbon credits is not defined by international law either, as this can only govern legal relationships between States. Neither Article 12 of the Kyoto Protocol nor the Marrakech Accords give any indication as to the legal nature of CERs, nor do they in any way resolve the question of ownership of these credits.

As for voluntary initiatives, these come under the private sector, which is not a substitute for legislative compliance. If they did come to be given some sort of legal character by arbitrary means, this would apply only to the stakeholders and could only be sanctioned through binding responsibilities set out agreements concluded between the buyer and the vendor.

Given that international law is relatively silent on this subject, the matter has to be referred to applicable national law, which may be the law applying to credit sale contracts or the laws of the host country where the project is being implemented. If no contract has been negotiated at the time when the project stakeholders raise the matter of legal characterization, then they will have to refer to national law in the project's host country.

While some countries, especially industrialized countries that purchase credits for Kyoto Protocol compliance purposes, have defined the legal nature of carbon credits through legislation[88], very few developing countries have done so to date.

If national laws in the project host country include a legal characterization of carbon credits, this must be applied. Otherwise, since carbon credits are *sui generis* instruments, the issue should be addressed by analogy with other existing instruments. For this purpose, readers should refer to the general principles of national law[89], and if applicable, to the national legislation or Code on civil law and/or to the law on obligations and/or on trade (assuming that the credit transaction amounts to a commercial act).

Sequestered carbon is generally considered as:

- The natural result of a biological process of storage in biomass: It may then be characterized as a "natural resource" and, depending on each case, be covered by legal protective measures as well as becoming public property. This is the case in New Zealand, for example, where the government has characterized carbon stored in existing plantations as a natural resource and considers that it belongs to the public domain; and

- The natural "fruit" of a tree, whether planted or not: Traditionally, any "fruit" is due to the owner of the asset that produces it (trees, in this case), in accordance with the right of enjoyment which is one of the three pillars of property law (*fructus*). This characterization is all the more important as, in some countries, the landowner is not necessarily the owner of the trees, and vice versa. For example, in Brazil, the Federal law on public forests, which has established a system of logging concessions, specifies that when these concessions are granted in return for payment, they do not concern the carbon, which remains the property of the Federal State. Therefore, in this particular case, the "fruit" that may be enjoyed by the concessionary does not include sequestered carbon.

In the CDM and voluntary markets, carbon credits are usually considered as "intangible goods" or "commodities", but also sometimes as a financial instrument

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88 As an example, the French legislature introduced a definition of CERs in Article L.229-22 of the French Environment Code

89 IUCN, "Legal Aspects in the Implementation of CDM Forestry Projects" (2005), IUCN Environmental Policy and Law Paper No. 59, available at http://data.iucn.org/dbtw-wpd/edocs/EPLP-059.pdf.

(when the transaction is effectively a forward contract) or even as a provision of services.

In forest carbon projects, and except in cases where the legal nature of carbon credits has been defined in law as in New Zealand, sequestered carbon is considered as a "fruit" of the forest. The credit certifying the sequestration of the carbon is obtained as a "good", in other words a thing (a title, in this case), in which real rights can exist and which may be privately owned. It can also be considered as "movable" property, since the sequestered carbon will eventually be released into the atmosphere and is not tied to the soil in perpetuity. Finally, again depending on applicable national law, it may be an intangible asset as it has no material reality as such and exists only through the effect of a legal construct.

This characterization is important because, if it stems from private law (and if the credits are not nationalized by the host country government), the carbon credits are susceptible to private ownership and it gives an indication of credit ownership.

If the law in the host country does not identify the owner(s) of the carbon credits but if it is possible, by analogy with other existing instruments, to characterize the asset in question as capable of being privately owned, one or more owners can then be determined on the basis of several criteria or indices.

In the more specific case of forest projects, two key questions must be answered to determine who owns the carbon credits: who has rights to trees and their fruit? and who contributes to the production of the carbon credits?

3.4.2.2. Who has rights to trees and their fruit?

As explained above, a fruit is the property of the owner of the asset which produces them (trees, in this case), in accordance with the right of enjoyment (*fructus*) which is one of the three pillars of property law. In some countries, particularly those whose legal traditions stem from Roman law, a presumption exists whereby ownership of the soil implies ownership of whatever lies above and below that soil. In this case, all or part of the sequestered carbon may therefore be claimed by the owner of land, depending on the contributions of other parties involved in the project.

On this basis, the potential owner(s) of the carbon credits generated by forestry projects are the following:

- The owner of the land;

- The person who enjoys real rights in the trees within the project perimeter. This may be a tenant, a concessionary, or whoever holds a right of usufruct; and

- The person holding rights of use within the project perimeter, usually a customary authority. This right may be conferred through a written contract, but may also be verbal. Rights of use are similar to rights of usufruct. However, it should be noted that the beneficiary has the right to use the fruits (of the trees), but can only demand as much use as may be required for his or her own use and those of his or her family. The problem is that the right of use is neither transferable nor subject to seizure, as the user may only have the benefit in kind of those fruits supplied by the terrain. Neither may the user lease them to a third party. The user cannot therefore obtain recognized ownership of these carbon credits, except as a consideration should the user relinquish his or her rights of use.

3.4.2.3. Who contributes to the production of these carbon credits?

The production of carbon credits is the result of a specific activity, such as the establishment of a plantation in the case of an AR project. The credits will first of all be the result of the project. If the project is eligible for the CDM, the presumed owner of the credits will usually be the public or private entity registered as a project participant in the PDD. If there are several entities, and in accordance with their respective contributions to the set-up of the project, they may agree to distribute the credits amongst themselves. Consideration must be given to (i) those linked or associated with the project (involved in setting it up), (ii) those with a legal or economic interest in the project (investors, lending institutions, rights holders) and, (iii) if applicable, those exercising real rights or, (iv) if applicable, use rights over movable and immovable assets, including lands, that can be considered as contributing to the "production" of the carbon credits, whether through the CDM or the voluntary market.

In the case of a forestry project, the following in particular may be considered as having recognized title to all or part of the credits:

- the person(s) making the land available to the project, in other words the owner of the land;

- the person(s) carrying out the activities or owning the trees or holding rights of usufruct;

- the person(s) financing the activities conducted;
- the person(s) managing the project and providing technical assistance; and
- the person(s) ensuring the permanence of carbon sequestration throughout the duration of the project.

Each party's contribution must be analyzed, an organization chart must be developed, and the contractual agreements between stakeholders must be verified with regard to their respective roles and responsibilities.

On this basis, and on the assumption that more than one person may claim ownership of the carbon credits, the stakeholders in the activity must decide how to distribute amongst themselves the credits to be generated by that activity (in percentages of the volume of carbon credits generated by the project, in percentages of the income generated by selling the carbon credits, etc.). If several owners are thus identified, it is often useful to provide for a marketing mechanism whereby one of them, or an *ad hoc* structure, is given responsibility for selling the credits on behalf of the vendors. In order to simplify the transaction, this mechanism may also provide for some stakeholders to relinquish their ownership rights, in return for due consideration in kind or in cash equivalent to the value of the credits that may have been sold via the project itself.

A possibility therefore exists to share and distribute ownership rights in carbon credits in proportion to the contributions provided or efforts made.

This analysis (rights over trees and contributions to the activity) should produce a set of indications whereby constructive ownership may be established, which is essential not only to apply for validation of the PDD but also to buy and sell carbon credits. Ownership of the credits by project participants or, if applicable, by those enabling the project to be developed (such as investors) is set out in an Emission Reduction Purchase Agreement (ERPA, see Section 3.4.3), thus avoiding ambiguity or dispute over the attribution of income from carbon credit sales. An ERPA also transfers the title for the credits to the buyer in return for payment of their sale price.

If a system of the REDD+ type, as discussed in Section 2, is established, this is likely to substantially change the way ownership of forest carbon credits is defined, in particular in possible future legislation. However, as REDD rules and regulations are still under discussion, such developments cannot be readily assessed at present.

Practical example: defining the ownership of carbon credits for the Magdalena Bajo project in Colombia (case study no. 4)

Given the absence of legal provisions addressing the ownership of carbon credits in Colombia's legislation, the different rights exercised over the land and the resources (plantations) to be established by the project were analyzed.

Concerning ownership of the land, all titles belong to the livestock farmers living on the project sites, who were therefore considered as the owners of the carbon credits, but not the exclusive owners.

At issue were the plantations in which the carbon would be sequestered, and which would be established thanks to project financing from the Cormagdalena enterprise, the State of Columbia (via a subsidy), a Colombian bank, and the farmers contributing their land and labor. The ONFI would also contribute finance for the project, particularly to cover the costs of project registration, monitoring, and marketing of the carbon credits.

Ownership of the credits was therefore divided among the different project stakeholders. A percentage of the credits would be allocated to the livestock farmers in return for their contributions. A further percentage would be handed to the financing institutions (the Corporation and the bank, who would receive a percentage of the income from timber sales), and a percentage to the ONFI. The percentages vary according to the contributions of each party. To avoid any dispute, formal agreements were drawn up between the stakeholders.

3.4.2.4. How should carbon credit ownership be addressed when setting up a project?

The owner(s) of the carbon credits must be identified at a very early stage, before validation in many cases, to facilitate financing of the project itself. This is because credits may be sold through forward transactions to generate additional financing, and also to satisfy the eligibility requirements of the CDM authorities (DNA and CDM Executive Board) and those of the voluntary market standards. In the case of the CDM, the project participants indicated in the PDD are presumed to be the owners of the carbon credits, recognized and accepted as such by the other parties involved in the project; likewise the "Project Owner" in the case of the VCS standard. In both cases, this is a simple presumption that may be overturned by any means, hence the need to enact recognition through an agreement (ERPA in particular) providing written proof of ownership.

In parallel, the various parties holding rights to carbon credits must settle contractual relationships amongst themselves, in particular to:

- Specify the contributions of the different parties (maintenance of plantations, fire patrols, payment of transaction costs, etc.), their responsibilities and remuneration (percentage of the volume of credits generated, percentage of the income generated by sales of carbon credits, etc.);
- Provide proof of recognition and acceptance by the different parties to the project and, if necessary, authorize their representation by one of their number or by a third party to trade carbon credits; and
- Set out the benefits accruing to those entitled to the usufruct and to use rights (capacity building and awareness raising, knowledge transfers, etc.) in return for having relinquished, even in part only, their real rights and use rights.

3.4.3. HOW SHOULD CONTRACT AGREEMENTS (ERPA) BE DRAWN UP AND CARBON CREDITS SOLD?

3.4.3.1. What is an ERPA?

Carbon credit transactions usually take place over the counter on the primary market,

well ahead of the project's development or implementation. It also generally occurs before the project is validated by a standard, thus providing project promoters with an additional source of financing or collateral for bank loans.

Any sale of carbon credits presupposes the existence of a legal relationship, which is effectively a contract for the purchase of certified emission reductions (Emission Reduction Purchase Agreement - ERPA). The purpose of ERPAs is to manage the relationship between the vendor and the buyer, and to set out the conditions governing this relationship, subject to the proper execution of the project itself.

Although standard contracts are now emerging (World Bank, national funds, International Emissions Trading Association, etc.), an ERPA is usually a long, complicated document written in a language that is not necessarily the vendor's or the buyer's (English is the language most commonly used). Their complexity also lies in the fact that negotiations concerning carbon credit sales require special expertise (on project mechanisms, on the carbon market and on legal developments on the international front), which neither the vendor nor the buyer may possess. This explains why intermediaries or legal advisers are frequently required. The CERSPA[90] initiative (www.cerspa.org) is useful in this respect, since it offers free access to a standard contract form which is both simple and easily adapted to different situations.

It is nevertheless important to realize that every contract is unique, even if it is negotiated on the basis of a standard contract. The contract relates to a specific project and takes its particular characteristics into account as well as any commercial and non-commercial risks arising specifically in the host country. On this point, it should be noted that contracts can differ widely depending on project characteristics, the activity concerned (especially for forestry projects), the type of credits (CDM, voluntary offsets, etc.), and the market where the transaction takes place (over-the-counter trading on a primary market, spot trading, bidding at auctions, etc.).

On the primary market, these negotiations are important in several respects, especially to take specific project features and the respective positions of the vendor and the buyer into consideration, to ensure that the respective risks are properly identified, and to keep a margin for maneuverability. Negotiations can take place in different ways (through a statement of intent prior to the agreement or by other means such as purchase option agreements, in order to guarantee both legal security and exclusive trading during a given period).

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90 Web site for the CERSPA initiative: www.cerspa.org

A contract presupposes an agreement over the object of the sale or the service provided, and on the price to be paid. In this case, the object is the transfer/acquisition of a given quantity of credits sold at a unit price, to be delivered on one or more agreed dates. The quantity of credits depends on several factors, which must all be specified in the contract, particularly the project lifetime, the accounting method and period, and any internal factors (according to the investment plan) and external factors (e.g., commercial and non-commercial risks) that may have an impact on the quantities anticipated in the project description.

3.4.3.2. Who are the contracting parties?

Since the object of the contract is to transfer or acquire carbon credits, the contracting parties are those who express the wish to sell and to buy. It is therefore absolutely essential to clearly identify the contracting parties in the contract itself, which must also stipulate guarantees as to their representation to ensure proper execution of their respective obligations, i.e., payment in the case of the buyer and delivery in the case of the vendor.

3.4.3.3. How should the risks involved in delivering the credits be limited?

Contracts negotiated on the primary market usually concern credits to be issued at a later date. Clauses should therefore be included to guarantee any risks liable to prevent credits from being issued. These risks are discussed in detail in Section 3.2.3.
In the event, risks do appear, the consequences may be as follows:

- The contract ceases to exist, pending fulfillment of a number of minimum conditions (conditions of contract validity);
- Breach of the contract and all undertakings made and fulfilled since it was signed (discharge of contract);
- Breach of the contract and all future undertakings (cancellation of contract); and
- Suspension of the contract pending settlement of a dispute (suspension of contract).

These consequences may incur financial penalties to be set out in the ERPA.

Some risks, especially of a political nature, may be described as “unforeseeable,

irresistible, and external", in which case they are considered as cases of *force majeure* as set out in the ERPA, and neither vendor nor buyer are liable.

Various other risks may be avoided through "conditions precedent" clauses. However, the parties to the contract may agree not to apply these conditions precedent to some clauses (penalties) whose purpose is to sanction a party that has not fulfilled its obligations. For example, if the project cannot be registered with a standard, the contract becomes void pertaining to the fulfillment of its object (i.e., the sale of credits), but penalties may apply to the vendor in order to redress any harm to the buyer.

The following conditions precedent are the most commonly encountered:

- Project participants must have obtained all necessary authorizations required by national law to carry out the project and its activities;
- All financing necessary to project development must be secured;
- Validation of the project by a designated operational entity and registration by the CDM Executive Board, or validation and verification by another operational entity;
- Project participants must have obtained authorization to participate in the CDM via written approval issued by the Designated National Authority of the "investing" country; and
- Letter of approval from the host country, etc.

3.4.3.4. How are conditions negotiated on delivery of the credits?

The time of delivery must be determined with care. Most contracts provide for credits to be delivered annually, but CDM and voluntary market rules allow the contracting parties to opt for shorter or longer periods, especially in the case of forest projects. To establish the place of delivery, the vendor and the buyer both have to have a personal account with a registry (official registry for the CDM, with an approved bank in the case of VCS, and often through a private registry for the voluntary market, etc.).

Besides the place of delivery, the question of redress in the event of any failure to deliver other than for reasons of *force majeure* is crucial to contract negotiations. In the event of failure to deliver, the vendor may be allowed to deliver replacement

carbon credits. It is important to realize that replacement credits must have the same validity for the buyer as the credits initially agreed upon.

3.4.3.5. What are the methods used to set prices?

We now come to the fundamental question of the price of credits and the related issue of how the buyer should pay.

The sale price of carbon credits depends on three parameters:

- Market prices;
- The quality of the project and the credits available for sale; and
- The risks associated with the delivery of credits.

In Section 1.4.5 (figure 17), we saw that forest carbon credits are mainly divided between the voluntary over-the-counter market, the voluntary CCX market, and the CDM. Current average prices are at around 4.7€/teqCO_2, 1.7€/teqCO_2, and 3€/teqCO_2, respectively[91].

These figures give an initial idea of how to set the sale value of credits depending on the market under consideration, especially for CDM and CCX. On the voluntary over-the-counter market, observed prices are highly variable, ranging from 0.4 to 40€/teqCO_2. This variability reflects the fact that on the voluntary market, buyer choice mainly depends on the quality and marketing value of projects, rather than on their search for low-cost emission reductions (figure 10). In this respect, it is interesting to note that 42% of buyers would be prepared to pay more than 6.6€ for forest carbon credits (figure 34). Credit sale prices can therefore vary with the quality of projects (use of recognized standards), the co-benefits they provide, their location, and any other points that are important to buyers. Finally, sale prices are also sensitive to the volume of credits sold.

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91 These average figures relate to the credit trading chain as a whole (i.e. primary and secondary). However, the majority of reported transactions are "primary", in other words, between the project developer and the first purchaser

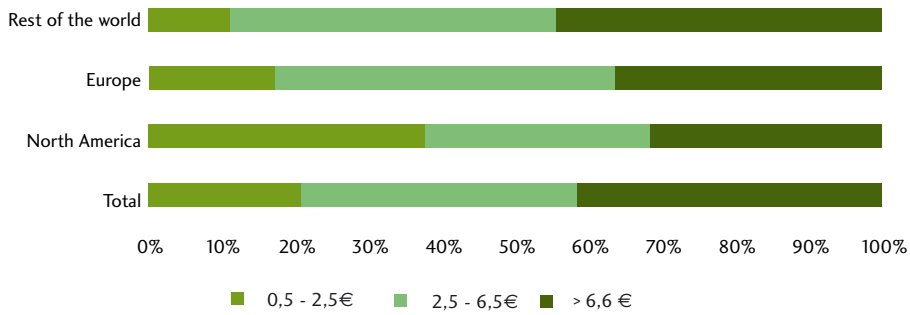


Figure 34: Acceptable sale prices for buyers of forest carbon credits (Source: Ecosecurities)

The first two points provide a basis for calculating the sale price of credits already generated (secondary credits). However, a great many transactions occur well ahead of their actual generation (primary credits). A discount is then applied according to the risks involved in the transaction for the investor (financing of some of the costs, permanence risk, etc.). As shown in figure 35, the risks decline as the project advances, until the price of the credits reaches the market value initially set.

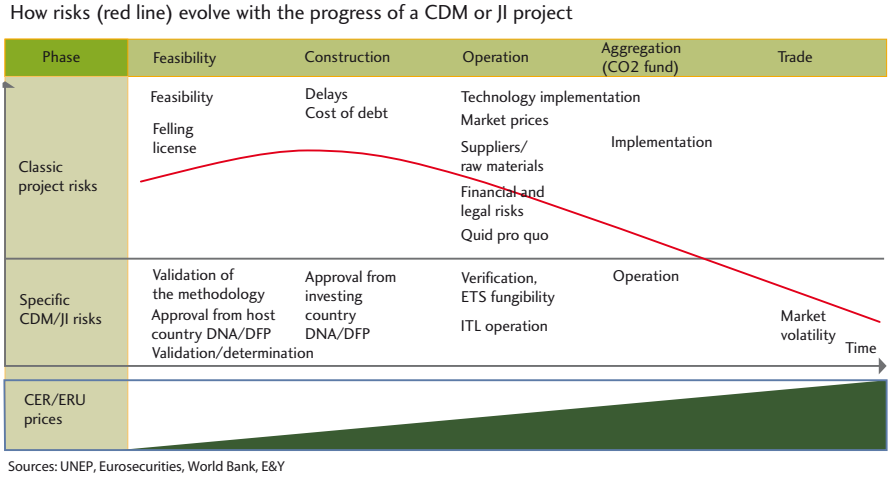


Figure 35: Credit prices depend on the stage reached in the project cycle (Sources: UNEP, Ecosecurities, World Bank, E&Y)

The parties may agree on the method to use to set prices, although the vendor is entitled to do so unilaterally in the case of auctions where the sale goes to the highest bidder. In over the counter sales, the most commonly used methods are as follows:

- **Fixed price**. The simplest approach is to set a fixed price per credit, which will remain the same throughout the duration of the contract. This approach is reassuring for both parties, but makes no allowance for inflation or market fluctuations. Provision may be made for inflation in a fixed price contract stipulating that the unit price will automatically increase by X% each year;

- **Indexed price**. This is calculated on the basis of a spot rate. A spot rate usually refers to other credits or, more frequently, to other emission reduction units such as prices for allowances under the EU ETS. Consequently, the unit price will fluctuate, changing with each annual payment. This method of calculation involves opportunities and risks for both vendor and buyer, depending on variations in the reference spot rate during the term of the contract. An indexed price simply means that neither the vendor nor the banks will be able to calculate their carbon income, or the value of the contract;

- **Fixed price combined with an indexed price**. Combining a fixed price with an indexed price gives a minimum guarantee and limits the impact of spot rate fluctuations on the unit price. The combination can also include a floor and ceiling price per unit, as explained below; and

- **Indexed price with floor and ceiling prices**. Giving a floor (minimum unit price) and a ceiling (maximum unit price) protects both vendor and buyer from the largest spot rate fluctuations and facilitates long-term planning.

In at least one country (China, for the CDM), market prices are regulated. Some local regulations may stipulate floor prices. Foreign exchange controls in some countries, although they may be favorable to the host country in the case of carbon transactions, may require compliance with certain procedures at the time of payment. The vendor should therefore refer to local regulations before setting a price or choosing a method for doing so.

3.4.3.6 How to sell the credits: directly or through an intermediary?

Credits from the project may be sold directly to the credit end-user (e.g., as part of an offsetting strategy) or through brokers and traders acting as intermediaries. The

choice will depend on the project promoter's capacities for marketing the credits to potential buyers. If these capacities are limited, it will be in the promoter's interests to use intermediaries to increase the chances of finding a buyer at the highest price. The costs of using an intermediary depend on the level of service offered (prospecting for buyers, support to negotiations, etc.) and the volume of credits involved. Remuneration usually ranges from a few % to 10% of the transaction. Companies offering these services include Evolution Markets, Ecosecurities, Camco, MGM International, First Climate, etc. The volume of forest carbon credits already sold by these intermediaries gives a good indication of their performance.

Annex 1: Applicable methodologies for forestry projects

Methodologies for large scale afforestation/reforestation approved by the CDM Executive Board						
Methodology	AR-AM0001	AR-AM0002	AR-AM0004	AR-AM0005	AR-AM0006	
Applicability						
Type of plantation			Plantation on agricultural land	Commercial or industrial plantation on grassland		
Relocation of activities	No relocation of activities	No relocation of activities	Possible relocation of activities		No relocation of activities	
Land	Degraded land	Lands are degraded or undergoing degradation	Lands are degraded or undergoing degradation	Grassland to remain grassland	Degraded land	
Regeneration	Establishment of saplings or seedlings		Assisted regeneration or establishment of saplings		Establishment of trees, shrub saplings, or seedlings	
Soil	No organic carbon emissions from the soil due to site preparation		No organic carbon emissions from the soil due to site preparation		Possible organic carbon emissions from the soil due to site preparation	
Irrigation			No irrigation	No irrigation		
Drainage			Little drainage and little soil disturbance	Little drainage and little soil disturbance		
Prior activities		Possible prior afforestation / reforestation	No prior or planned afforestation / reforestation	Possible prior afforestation / reforestation		

	AR-AM0007	AR-AM0008	AR-AM0009	AR-AM0010	AR-ACM0001	AR-ACM0002
	Plantation on agricultural land	Forest plantation for sustainable timber production		Plantation in a protected area		No relocation of activities
		No relocation of activities	No relocation of activities	No relocation of activities	No reduction in fuelwood availability	
	Agricultural or grazing land	Lands are degraded or undergoing degradation	Degraded grazing land	Unmanaged grassland in a protected area	Lands are degraded or undergoing degradation	Lands are degraded or undergoing degradation
				Establishment of trees, shrub saplings, or seedlings		
		No organic carbon emissions from the soil due to site preparation	No organic carbon emissions from the soil due to site preparation	No organic carbon emissions from the soil due to site preparation		No organic carbon emissions from the soil due to site preparation
	No irrigation		No irrigation	No irrigation	No irrigation	No irrigation
				No drainage	Limited drainage and soil disturbance on organic soils	
				Possible prior afforestation / reforestation		

Methodologies for large scale afforestation/reforestation approved by the CDM Executive Board						
Methodology	AR-AM0001	AR-AM0002	AR-AM0004	AR-AM0005	AR-AM0006	
Nitrogen fixing			Planting of nitrogen-fixing species possible but limited	Planting of nitrogen-fixing species possible but limited	Planting of nitrogen-fixing species possible	
Burning					No burning during preparation of the ground	
Fodder					Fodder production possible	
Tree cover						
Litter						
Degradation						
tCER / lCER						
Grazing	No grazing	No grazing	Grazing possible		No grazing	

	AR-AM0007	AR-AM0008	AR-AM0009	AR-AM0010	AR-ACM0001	AR-ACM0002
				Planting of nitrogen-fixing species possible but limited		
		Slash and burning only for non arboreal vegetation	No burning during preparation of the ground			
	Limited initial tree cover			Herbaceous layer stable or declining		
		Litter and deadwood left on site	Animal manure left on site	No harvesting of plantation timber or litter		
				Land has not been degraded for at least 20 years or non cultivated for at least 3 years land degradation in the previous 20 years (at a minimum) or no cultivation in the previous three years at least		
				Approach to permanence via tCER		
	Decline in farming and grazing	No grazing	Grazing and sylvopastoralism possible			

Methodologies for small-scale Afforestation/Reforestation approved by the CDM Executive Board				
Methodologies	**AR-AMS0001**	**AR-AMS0002**	**AR-AMS0003**	
Current version	**5**	**2**	**1**	
Applicability				
Type of plantation	Plantation in grassland or agricultural zone	Plantation along transport routes or in residential zones	Plantation in wetlands	
Land	Grassland or crops	Right-of-way along transport routes or residential zones	Degraded intertidal wetlands, degraded undrained peat bogs, degraded alluvial valleys on non-organic terrain, or seasonally flooded zones around water bodies	
Relocation	Relocation of crop areas < 50% of project area	Relocation of crop areas < 50% of project area	Pre-existing crop areas < 10% of project area	
Livestock	Relocated livestock < 50% of grazing capacity of project land		Relocated livestock must not cause leakage	
Soil	Soil disturbance due to project i2 10% of project area	Soil disturbance due to project i2 10% of project area	Soil disturbance due to project i2 10% of project area; on organic soils, soil disturbance is banned	
Initial cover			Wetlands where the dominant vegetation is made up of non eligible indigenous herbaceous species	

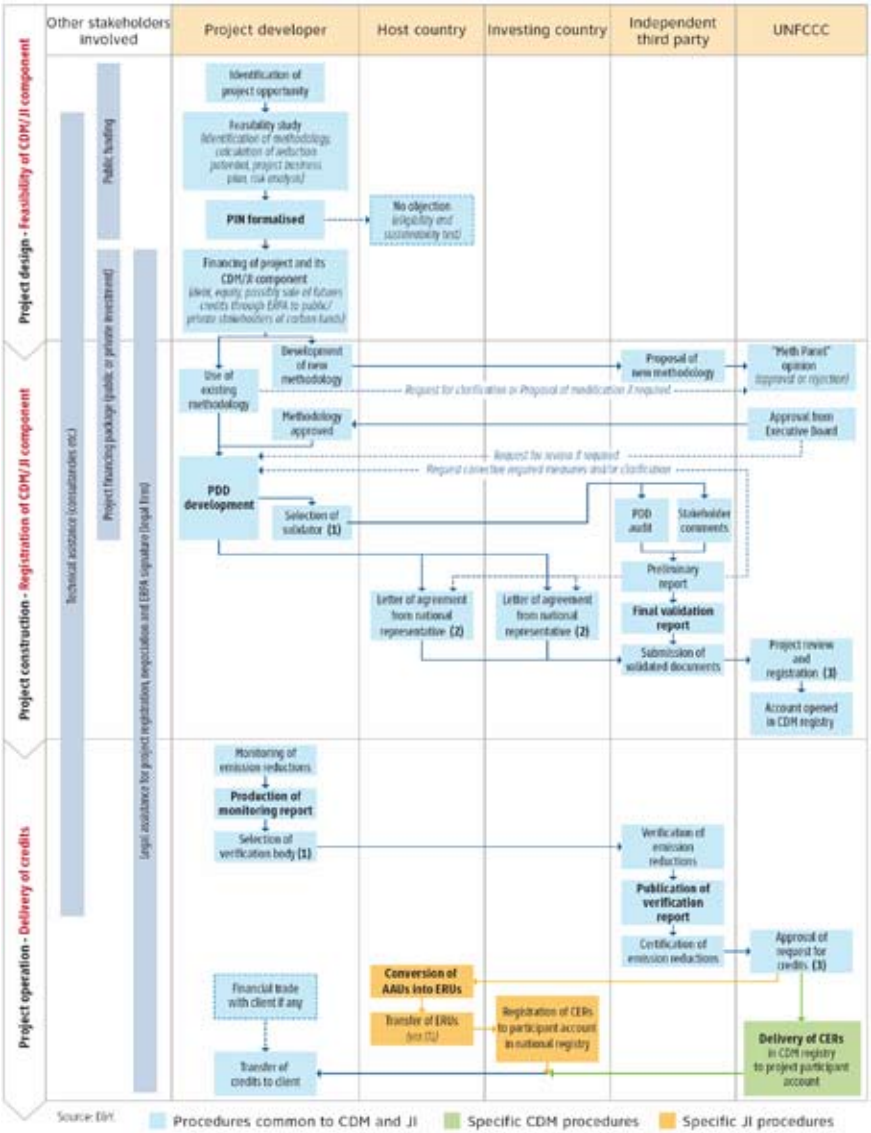
Several methodologies are in the process of validation for the VCS:

- Improved Forest Management through Extension of Rotation Age (IFM);
- Estimating GHG Emission Reductions from Planned Degradation (IFM);
- General Methodology for Quantifying the GHG Emission Reductions from the Production and Incorporation of Biochar in Agricultural and Forest Management Systems (Biochar);
- Afforestation/Reforestation of Agricultural Lands (AR);

	AR-AMS0004	AR-AMS0005	AR-AMS0006
	2	2	1
	Agroforestry plantation	Plantation on low potential land	Sylvopastoral plantation
	Grasslands	Sands dunes, bare soils, soils polluted or degraded by mining activities, highly alkaline or saline soils	Degraded agriculture and land, degraded grassland
	Relocated crop areas < 20% of project area		
	Limited initial tree cover		Limited initial tree cover

- REDD Methodology Modules (REDD);
- Baseline and Monitoring Methodology for Project Activities that Reduce Emissions from Deforestation on Degrading Land (REDD);
- Methodology for Estimating Reductions of GHG Emissions from Mosaic Deforestation (REDD); and
- Methodology for Estimating Reductions of GHG Emissions from Frontier Deforestation (REDD).

Annex 2: The CDM project cycle



Annex 3: tCER or lCER ?

For the price of a temporary credit (tCER) to be attractive, its price today plus the cost of a permanent credit in five years (tCERs) must be lower than the cost of a permanent credit today. In other words, it must satisfy the following: "the present cost of acquisition of a temporary unit (tCER or lCER) plus the cost of the future acquisition of the permanent unit must be lower than the present cost of acquisition of the final unit".

Several articles have expressed this equation in mathematical terms, for example as follows:

$T + C ((1 + i)^n / (1 + d)^n) < C$[92]

where T is the current price of the temporary credit and C the current price of the permanent credit. The future price of the permanent credit may be estimated by C x $((1 + i)^n / (1 + d)^n)$ where i is the rate of increase of the price of permanent carbon credits and d the the discount rate. The future value of the permanent credit is expressed by using the discount rate as the denominator, with n the number of years of validity of the credit.

This equation is also written as follows[93] :

$$\$tCER = \$CER_1 - \frac{\$CER_2}{(1+i)^{\text{durée de vie}}}$$

equivalent to:

$$\$tCER = \$CER_1 - SCER_1 \frac{(1+j)^{\text{durée de vie}}}{(1+i)^{\text{durée de vie}}}$$

Where j is the rate of variation of the price of the permanent credit and i is the discount rate.

92 Beird et al., 2004

93 Locatelli et Pedroni, 2004; Locatelli et Pedroni 2006

The table below compares the calculation of a temporary credit and a permanent credit, on the basis of the above equations, varying the two parameters of the equation, i.e., rates of variation of the permanent credit price (j) and the discount rate (i). We varied these two parameters in the range of 1 to 10%, and measured the price of the country credits by the difference between the discount rate and rate of variation (i – j). Temporary credits, because they eventually have to be replaced, can save time. In this situation, if the rate of price variation is high, or higher than the discount rate, it is not worthwhile for the buyer to acquire temporary credits as they will eventually have to be replaced with permanent credits at much higher prices.

Table: Value of temporary credits as a function of permanent credits

	Years of credit validity					
(i - j)	5	10	15	20	25	30
1%	4,6%	9,0%	13,3%	17,3%	21,1%	24,8%
2%	9,1%	17,3%	24,8%	31,6%	37,8%	43,4%
3%	13,3%	24,8%	34,7%	43,4%	50,9%	57,4%
4%	17,3%	31,6%	43,4%	53,2%	61,3%	68,0%
5%	21,1%	37,8%	50,9%	61,3%	69,4%	75,9%

The value given in the 1% box (1% difference between i and j) is calculated from the average of results for i - j (average of i=2 and j=1, i=3 and j=2, i=4 and j=3, etc.).

The calculation shows that the price of a tCER, which has a lifetime of five years, will be 4.6 to 21.1% of the price of a permanent credit, depending on the difference between the discount rate and the inflation rate (1 to 5%). In general, the larger the difference between the discount rate and the variation in permanent credit prices, the higher the value of the temporary credit. This means that using temporary credits is of interest in two situations:

- If the discount rate is very high for the operator – meaning that they will much prefer to pay less now (cash flow problems, uncertainties over the future); and
- If the buyer believes that carbon credit prices will rise only slightly (low j) or may even drop, they will prefer to pay for less expensive temporary credits now. Conversely, if the operator expects tension on the carbon market and a large rise in prices for permanent credits (high j), temporary credits will be far less attractive.

Prices for temporary credits can be estimated from prices for permanent credits (CER).

Based on a CER trading at 12.6€ (spot rate in July 2009), a tCER could be traded at 0.58 to 2.66€, with a 1 to 5% difference between i and j. The World Bank's BioCarbon Fund, the main buyer of forest carbon credits at present, is offering purchase prices of around 2.5 to 3.3€ per ton of CO_2 sequestered up to 2017. The World Bank's method of calculation thus takes into account one or two generations of tCERs at the price given.

Case study no. 1
Avoided deforestation in the Juma Reserve

Project ID	
Country	Brazil
Technology	REDD
Area and species	589,612 ha
State of progress	PDD completed, project validated by CCBs. Methodology in the process of validation with VCS. Operational
Project start date	3 July 2006
Project developer	Fundação Amazonas Sustentável (FAS)
Carbon auditor (PDD, etc.)	Fundação Amazonas Sustentável (FAS) and Instituto de Conservação e Desenvolvimento Sustentável do Amazonas (IDESAM)
Financing institutions	Marriott International and its clients
Carbon credits generated	3.6 MteqCO_2 by 2016, 189 MteqCO_2 credits by 2050
Accounting period	44 years (2006 – 2050)
Methodology	Methodology for Estimating Reductions of Greenhouse Gas Emissions from Frontier Deforestation (VCS validation in progress)
Standards	VCS and CCBs
Project costs (CAPEX & OPEX)	US$ 25M
Income and financing	Sale of 189 MteqCO_2. Marriott International made an initial donation of US$ 2M. Credits are offered to Marriott clients to offset their emissions
Project IRR, inflation, capitalization	5% capitalization for the cost calculation. Income is handed over to local communities, therefore no IRR

The REDD project in Juma, initiated by the Fundação Amazonas Sustentável (FAS) in partnership with the State Secretariat for the Environment and Sustainable Development, has established a protected area covering 589,612 ha. The reserve is located in Novo Aripuana municipality in the south-east of Amazonas State in Brazil, where deforestation is recognized as a serious threat. The creation and actual implementation of the reserve were only made possible by the Payment for Environmental Services system introduced by the Amazonas government. The programme, called Bolsa Floresta, is financed in partnership with Marriott International and generates financial compensation for local populations undertaking approaches to reduce emissions from deforestation. The activities conducted in the project zone are all based on participatory public consultations, with local populations involved throughout the project. The Juma reserve should ultimately generate 189,767,027 carbon credits. The income will serve to ensure that the dynamics of avoiding deforestation introduced by the Bolsa Floresta programme are self-sustaining. The government has provided support to a system for monitoring avoided emissions and has strengthened legislation. The project is generating significant co-benefits, especially for poverty reduction and biodiversity conservation.

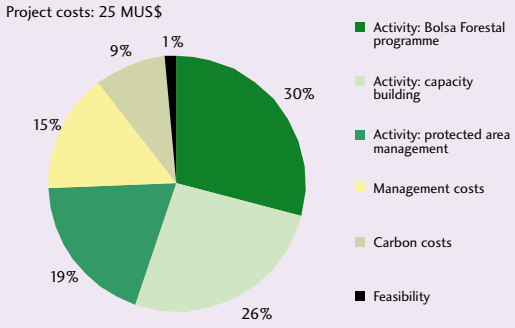
Economics of the project

Direct income from activities to create the Juma Reserve is derived from the production of carbon credits. The project's REDD component aims to obtain directly negotiable carbon units, and expects to generate about de 189 $MtCO_2e$ in tradable reductions by 2050. In parallel, the project will generate substantial co-benefits for poverty reduction and biodiversity conservation.

The carbon income is reinvested to finance the Bolsa Floresta programme, which has established four lines of compensation for local families and communities who comply with programme undertakings: Bolsa Floresta Family (BFF): US$ 300 per family per year for mothers; Bolsa Floresta Association (BFA): US$ 175 per family per year to strengthen organizations; Bolsa Floresta Social (BFS): US$ 175 per family per year to improve the living standards of local communities; Bolsa Floresta Income (BFI): US$ 175 per family per year for sustainable production.

Project activities and costs are as follows

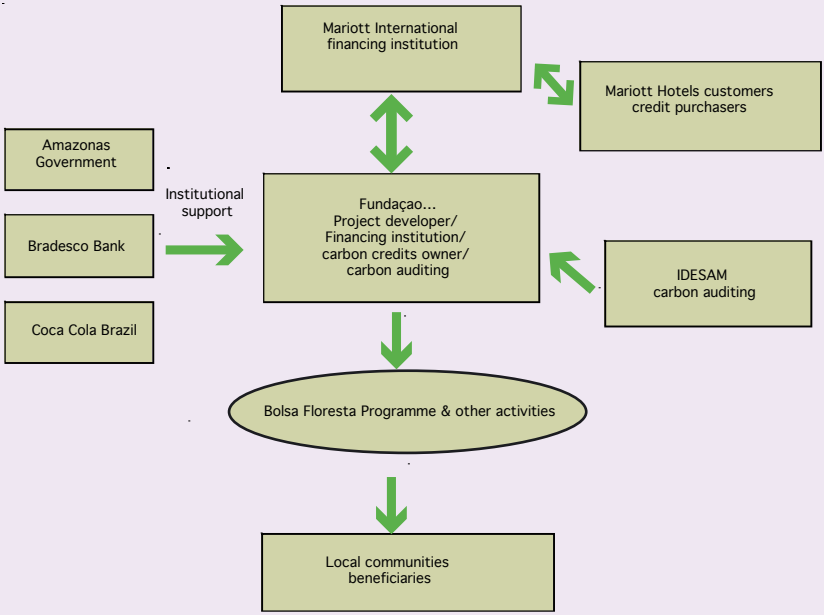
- Project preparation: US$ 0.3M (1.3%);
- Bolsa Floresta Programme: US$ 7.1M (29.2%);
- Community support programs: US$ 6.3M (26.1%);
- Project management and conduct: US$ 3.6M (15%)
- Protected area management and strengthened legislation: US$ 4.7M (19.2%); and
- Carbon transaction costs: US$ 2.3M (9.3%).



Project financing

Preparation of the project was entirely financed via the FAS Foundation by Marriott International, which has guaranteed financing for the first 4 years (US$ 2M). Marriott International offers a scheme to its clients to offset emissions from their stay ($1/day, or $32/t$CO_2$), and transfers the entire amount collected to the project.

Also to be noted is the role of the Amazonas State government, Bradesco Bank and Coca-Cola Brazil, which financed the FAS Foundation to set up the project.



Carbon credit sales

All the carbon credits generated by the Juma Reserve REDD project belong to the FAS. The credits are sold to clients of the Marriott hotel chain wishing to offset their stay. Marriott has undertaken to offer them the total volume of credits validated for the first accounting period (2006-2016). All proceeds are then reinvested in the Juma Reserve via the Bolsa Floresta programme.

Contact: Gabriel Ribenboim - gabriel.ribenboim@fas-amazonas.org

"Investors must work closely with the project developers to ensure that the project is designed and implemented in accordance with robust and reliable international standards capable of guaranteeing that the credits are measurable, reportable and verifiable. It is therefore very important that carbon credits also generate benefits for local people who cooperate and for biodiversity."

Case study no. 2
Ankeniheny-Zahamena Corridor in MADAGASCAR: AR component

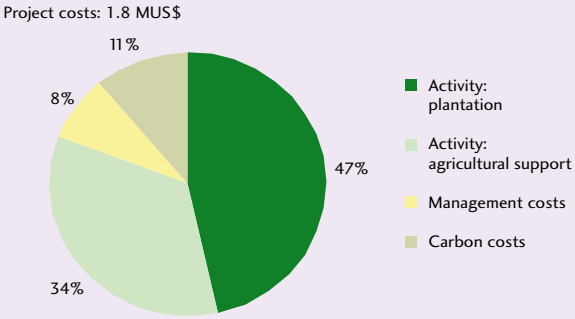
Project ID	
Country	Madagascar
Technology	Reforestation
Area and species	591 ha planted, 600 ha eligible for CDM, over 120 native species
State of progress	Operational phase under way, PDD being finalized
Project start date	2006
Project developer	Ministry for the Environment and Forests, with technical support from Conservation International
Carbon audit (PDD, etc.)	Conservation International
Financing institutions	World Bank (through PE3) and Conservation International
Carbon credits generated	280,000 tCO_2 in 30 years (in 591 ha), or 9 333 tCO_2/ year
Accounting period	30 years: 2009-2038
Methodology	AR-AMS0001
Standard	CDM
Investments costs (CAPEX)	1,600,300 US$
Operating costs (OPEX)	750,000 US$ (over 5 years)
Carbon income	ERPA signed with BioCF for 200,000 tCO_2
Non-carbon income	Support to agriculture
Project IRR, inflation, capitalization, financing	The project is entirely financed by donations and grants. Most of the income will go to local communities

Officially initiated by the Ministry for the Environment and Forests, this project aims to restore an ecological corridor to link up high-biodiversity forest fragments in the eastern portion of the country. Drawing on more than 10 years of experience in the region, Conservation International is leading the project. The Ankeniheny-Zahamena corridor, where the project activities are taking place, was chosen for the wealth of its biodiversity, numerous endemic species and its fragmented state, which is likely to undermine the future of its biodiversity. The project will be reforesting several thousand hectares using more than 120 native species on private and public lands with or without CDM eligibility. The project is implemented in partnership with different local NGOs (including the National Environmental Action Association and 7 other NGOs that are active in the project area), and regional and central government departments. Plantation activities are financed by the World Bank's 3rd Environment Programme. In 2009, plantation work was carried out in 975 ha. The 591 ha eligible for the CDM will generate 55,000 tons of CO_2 sequestration up to 2017 and more than 280,000 tons over 30 years. Carbon income will be handled by the Ministry for the Environment and Forests and distributed among landowners taking part in the initiative. Participants will also benefit from activities to support the adoption of new agricultural practices (including direct-seeding mulch-based cropping – DMC) financed by CI and implemented by the ANAE.

Economics of the project

Project expenditures are for:

- Plantation work (US$ 841,600);
- Project administration and management, technical assistance, operations and investments in training and technical and financial monitoring of local service providers (US$ 436,000);
- Carbon transaction costs (methodology, PDD, registration, etc.) (US$ 200,000); and
- Activities to support local agriculture: alternative methods, including DCM. (US$ 153,400);



The project generates income of two types:

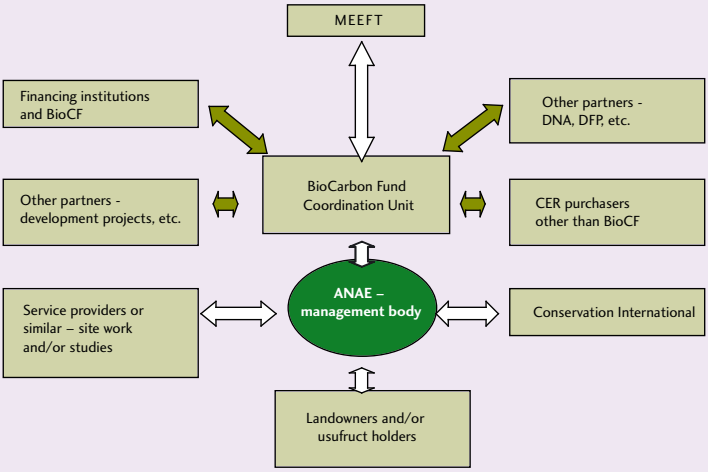
- from agricultural support activities; and
- from sales of carbon credits.

How is the income is to be distributed is still under discussion, but the majority share should go to those participating in plantation activities.

Project financing

The project has two financial partners:

- The World Bank through contributions to Environment Programme 3 (donations to developing countries). The grant amounts to US$ 1.5 million; and
- Conservation International is responsible for financing the first two years of the project and for support to agricultural activities.



Sales of carbon credits

The BioCF has signed an ERPA to purchase 200,000 tCO_2. The carbon income will be administrated by the Ministry for the Environment and Forests and distributed among landowners taking part in the initiative.

CDM funds under will be disbursed under agreements between the government and the landowners. The Memorandum of Understanding to be signed is currently under discussion.

The CDM standard was chosen for project validation because of its reputation.

Contact: Abdul Sheikh Abdullah, Ministry for the Environment and Forests (abdoulcheikh@hotmail.com), James Mackinnon, Conservation International (j.mackinnon@conservation.org). André Aquino, World Bank (adeaquino@worldbank.org)

CASE STUDY NO. 3

ANKENIHENY-ZAHAMENA CORRIDOR IN MADAGASCAR : REDD COMPONENT

Project ID	
Country	Madagascar
Technology	REDD, mosaic deforestation
Area and species	376,000 ha of forest in 3 eastern regions (Atsinanana, Analanjirofo, Alaotra Mangoro)
State of progress	PDD under way, management plan for the protected area completed, social and environment study under preparation
Project start date	2005: activities to establish the new Protected Area and temporary protection status
Project promoter	Ministry for the Environment, Water and Forests, with technical support from Conservation International
Carbon audit (PDD, etc.)	Conservation International, with technical support from the BioCF and Winrock
Financing institutions	Conservation International, USAID (Miaro Project)
Carbon credits generated	Under preparation. Initial estimations indicate a potential of 45 million tCO_2 over 30 years
Accounting period	30 years: 2009 – 2038
Methodology	Mosaic deforestation methodology developed by BioCF, in the process of validation through the VCS standard
Standard	VCS and CCBS
CAPEX	US$ 2.3M (since 2004)
OPEX	US$ 10.5M over 5 years (2010-2014)
Carbon income	Purchase of 430,000 VCU by BioCF
Non carbon income	Numerous co-benefits
Project IRR, inflation, capitalization, financing	Project financed by donations, subsidies and sales of credits

Officially initiated by the Ministry for the Environment and Forests, the project aims to reduce deforestation over a total area of about 376,000 ha forming the Ankeniheny – Zahamena Corridor (CAZ), by promoting alternatives to deforestation and supporting decentralized natural resources management. The Corridor is divided into 2 functional zones: i) a type VI IUCN protected area (International Union for Conservation of Nature) or natural resource reserve covering about 371,000 ha, a priority area for conservation of its natural wealth which was placed under temporary protection by the Malagasy government in December 2005; and ii) an area reserved for use by the 20 communities established within the Protected Area. At present, a number of stakeholders in the corridor are involved in establishing the Protected Area, including: (i) the Regional Environment and Forests Directorates (DREFTs) which is provisionally responsible for managing the Corridor, and (ii) Conservation International, which is providing technical and financial support to the process of creating the protected area, and to the establishment of the management body and its initial operations. Their support is tangibly reflected in the organization of awareness campaigns, public consultations and the joint definition of protected area boundaries, development of the management plan and capacity building and support for the community groups involved in implementing, and managing the introduction of alternative livelihood options.

Economics of the project

Project expenditures are for:

- Establishment of the protected area (US$ 2.3M);
- Activities to improve living standards (US$ 2M);
- Protected area surveillance and monitoring (US$ 1.5M);
- Environmental research and conservation (US$ 3.3M);
- Activities to secure permanent financing for the PA (US$ 2.3M); and
- Activities to integrate the PA into local community and regional dynamics (US$ 0.1M).

Direct income from conservation activities is derived from the production of carbon credits. Substantial co-benefits will also be generated by ecotourism, micro-projects, and the health sector, in particular through extension activities.

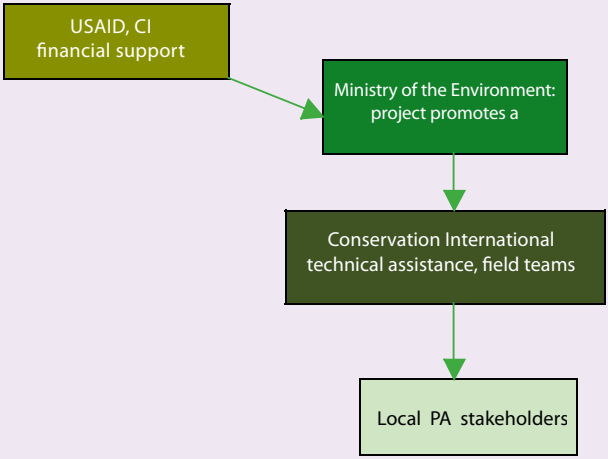
The communities themselves determine the amount of the benefits to be allocated in accordance with the opportunity cost of conservation. These benefits are nevertheless directed as a priority towards alternative livelihood options, especially agricultural production, fishing, and sustainable use of timber and non-timber forest products.

Project financing

The project has two financial partners:

- Conservation International, one of the official promoters for the establishment of the new protected area, provides technical and financial support and contributes to activity planning and implementation (US$ 1.8M); and
- USAID, via the Miaro project.

OPEX are expected to be covered by carbon credit sales.



Carbon credit sales

Ownership of the carbon credits is still under discussion. The BioCF has signed a contract with the Malagasy Ministry of the Environment and Forests to purchase 430,000 tCO_2 (VCU).

To facilitate sales of credits, auditing under the VCS and CCBs standards was chosen.

Contact: Abdoul Cheikh Abdallah, Ministry of the Environment and Forests (abdoulcheikh@hotmail.com), James Mackinnon, Conservation International (j.mackinnon@conservation.org). André Aquino, World Bank (adeaquino@worldbank.org)

"This project to reduce emissions from deforestation in the CAZ is one of the first of its kind in Africa. Its importance lies in the fact that it not only has enormous potential for replication within the country, but also serves as a pilot project to determine the potential of carbon income as a sustainable financing mechanism for the management of protected areas in Madagascar."

Case study no. 4
Commercial (re)afforestation in Magdalena Bajo

Project ID	
Country	Colombia
Technology	A/R, commercial (re)afforestation
Area and species	5,000 ha (including 4,000 ha already replanted) using gmelina, teak, and ceiba roja
State of progress	Operational phase, methodology adapted for the project (AR-AM 0007), PDD completed. CDM validation in progress, monitoring in progress
Project start date	2000
Project promoter	Cormagdalena
Carbon auditing (PDD, etc.)	ONF International
Financing institutions	Cormagdalena, Finagro, Faber Castell, Carbon positive, ONF International, landowners
Carbon credits generated	100,000 tCO_2/year and 3,000,000 tCO_2 (total)
Accounting period	30 years: 2000 – 2029
Methodology	AR-AM 0007 V3 (large-scale)
Standards	MDP, VCS
Investment costs (CAPEX)	10 M€
Operating costs (OPEX)	55% of total cost, i.e., 5.5 M
Carbon income	About 12%
Non-carbon income	About 88%
Project IRR, inflation, capitalization	IRR 15-18% (owners), inflation 12-15% (investors), capitalization: 5%
Financing	Owners: 18% (in kind); investors: 82%

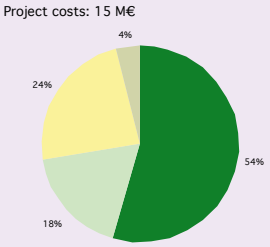
The Magdalena Bajo Commercial (Re)afforestation Project (PRC) was designed to protect soils against erosion and to produce high-quality construction timber. It was implemented on an initiative from a Colombian institution, Cormagdalena, which is responsible for navigation on Colombia's largest river, the Magdalena. The programme was initiated in 2000 and now covers 4,000 ha, mainly planted with teak, gmelina, and ceiba, with a further 1,000 ha planned in the next few years. The plantations are established on private lands by livestock farmers on the Atlantic Coast, including small landowners, and are financed through contracts signed by the owners, the Colombian public investors (Cormagdalena and Finagro Bank) and foreign private-sector investors (Carbon Positive, Faber-Castell and ONF International). ONFI provides technical support and is responsible for setting up and monitoring the project's carbon component.

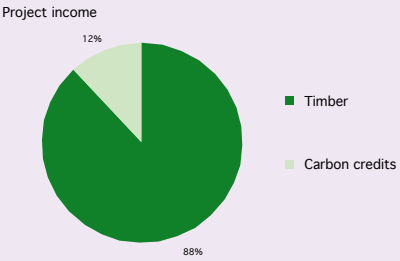
Economics of the project

The project generates income of two types:

- Income from timber products is of primary importance, accounting for about 88% of total project income. This calculation is based on timber prices per species and diameter class on the local market (2nd and 3rd thinnings), and on the national and international markets (final felling). Most of the income is from the latter; and

- Income from sales of carbon credits accounts for about 12% of total project income, based on a sale price of 3€/ tCER. Although carbon income is much lower than income from timber, it improves project cash flow by accruing at an earlier stage.





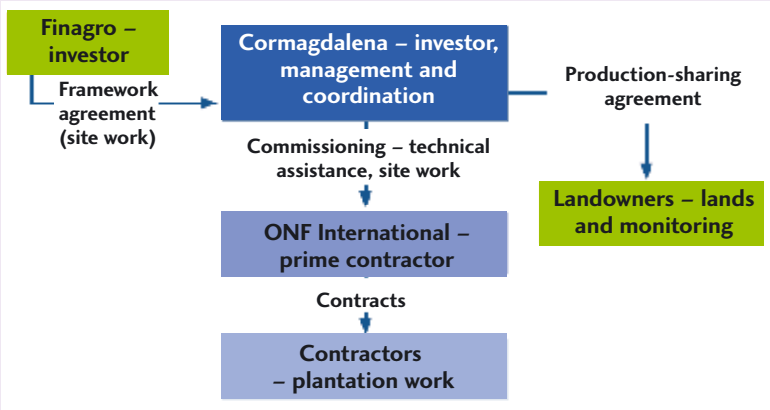
Project expenditures are for:

- Plantation work: 55%;
- Technical assistance and support to operations and investment in training, and technical and financial monitoring of local service providers: 24%;
- Costs to secure land titles: 18%; and
- Carbon transaction costs (methodology, PDD, registration, etc.): 4%;

Project financing

The project has five financial partners:

- Landowners provide their lands (contribution in kind) in return for 25% of the total income from timber products and carbon credit sales. The landowner share planned at the outset was therefore voluntarily increased in proportion to the actual value of their contributions (18%), in order to develop new (re)afforestation activities in the project zone.
- Initial investment was from public sources (CORMAGDALENA followed by FINAGRO) to launch the project in 2000-2006, and also to maintain the plantations established until final felling. As from 2008, private investors (Carbon Positive for by Faber Castell) gradually took over to extend the plantations with other landowners in the same zone, but with no change to the established rules of distribution.



ONFI, which has supported the project from the outset (set-up of the technical, organizational, financial, and carbon components), is financing the entire costs of the carbon component with equity capital in return for 35% of the credits.

Sales of carbon credits

Ownership of the carbon credits is divided between the project landowners and financing institutions in the same way as timber products, minus the 35% ONFI share.

The CDM standard was chosen for project validation because of its reputation. To facilitate credit sales, verification according to the VCS standard may be chosen.

Contact: Martin Perrier – ONF International, martin.perrier@onf.fr

"The carbon component should only be one component in the project as a whole. The project in itself should be robust and profitable, with carbon credits used to consolidate rather than to secure profitability. Financing, the quality of technical operators, monitoring and so on must be ensured in the same way as for any standard project. The carbon component has nevertheless enabled the project to achieve the scale it has today by encouraging new investors to join Cormagdalena. The carbon component has also greatly improved the image of the project".

Case study no. 5
Afforestation on the Batéké plateau – Ibi Batéké

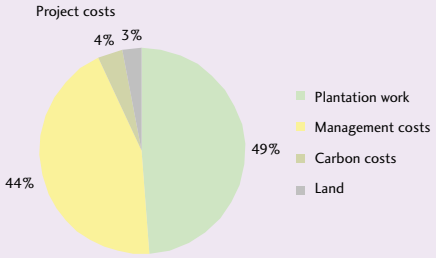
Project ID	
Country	Democratic Republic of the Congo
Technology	A/R, Afforestation for agroforestry
Area and species	4,226 ha of Eucalyptus, Acacia, Pine, and local species
State of progress	750 ha in operation phase, PDD completed, CDM validation in progress
Project start date	2008
Project promoter	Novacel
Carbon auditing (PDD, etc.)	ONF International
Financing institutions	Novacel, Umicore, Suez-Tractebel, French Global Environment Facility (FGEF), Profinaf Invest, and private funds
Carbon credits generated	54,000 tCO_2/year and 1,600,000 tCO_2 (total)
Accounting period	30 years: 2008 – 2037
Methodology	AR-AMC 0001 V3 (large-scale)
Standard	MDP, VCS
Investment costs (CAPEX)	1.5 M€ (estimate)
Operating costs (OPEX)	1.4 M€ (estimate)
Carbon income	50% (1.48 M€) – estimate
Non-carbon income	50% (1.48 M€) – estimate
Project IRR, inflation, capitalization	29% with carbon 5% without carbon 18% capitalization
Financing	25% equity capital, 70% long-term loans, 5% public subsidies

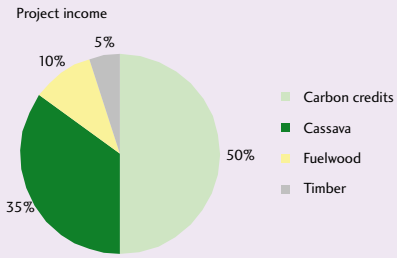
The Ibi Batéké afforestation project aims to restore lands damaged by wildfires, by means of agroforestry and forestry plantations producing fuelwood and construction timber. Besides supplying the 810 million inhabitants of Kinshasa's catchment area with cassava crops, charcoal, service wood, and eventually, construction timber, the project should help to reduce deforestation and degradation of the country's forests. Locally, it will employ more than 400 people in plantation work and in processing and marketing agricultural produce. The project was initiated and is being undertaken by the Congolese company Novacel, which has the title to the land. Novacel has been investing since the mid-1980s in the "Ibi Village" zone through agroforestry activities and education and awareness-raising amongst the inhabitants. After initial agroforestry trials that began in 2001, the project moved into its operational phase in 2008. More than 750 ha of acacia have already been planted. The project is the fruit of a partnership between Novacel, Umicore, and Suez-Tractebel, and is supported by technical expertise from ONFI. Novacel has signed two contracts for carbon credit sales, one with Orbéo and one with the World Bank's BioCF.

Economics of the project

The project generates income of four types:

- from fuelwood production, accounting for 10% of total project income (0.30 M€);
- from the construction timber production, accounting for 5% of total project income (0.15 M€);
- from cassava production, accounting for 35% of total project income (1 M€); and
- from carbon credit sales, accounting for 50% of total project income (1.5 M€).





Project expenditures are for:

- Equipment (0.41 M€): 14%;
- Plantation work (1.04 M€): 35%;
- Overall project management (administration, communication, etc.) (1.3 M€): 44%;
- Land leases (0.09 M€): 3%; and
- Carbon transaction costs (methodology, PDD, registration, verification, monitoring) (0.11 M€): 4%.

Project financing

The project has five financial partners:

- Umicore and Suez cover 35% of costs through a long-term preferential loan with a 5-year grace period;
- Two private institutions cover another 35% through a long-term loan with a 5-year grace period;
- the French Global Environment Facility (FGEF), through UNEP's CASCADe programme, has provided a grant of 74,000 € (100,000 USD) to cover part of the carbon transaction costs (5%); and
- Profinaf Invest has opened a low-interest line of credit representing 25% of total financing, with a capital conversion option.

Sales of carbon credits

Novacel has been recognized as the owner of the carbon credits. The BioCarbon Fund and Orbéo are also contributing to the project and will receive 500,000 tCER each by 2017. Purchasing contracts (ERPA) for the project's carbon credits were signed with Novacel in the 1st half of 2009 for the tCERs generated in the first 10 years of the project.

The BioCarbon Fund has set the CDM standard as mandatory for project validation. VCS certification is also under consideration to facilitate credit trading (Orbéo).

Contact: Olivier Mushiete – Director General of Novacel - info@novacel.cd

"Integrating carbon credits into our strategy at Novacel, which is an African family-owned agroforestry company, has had the outstanding advantage of bringing us to a global market generating currency that can be directly reinvested in practical local activities. Agroforestry alone, because of its low financial returns and long-term results, does not hold much attraction for conventional investors, but when linked with proceeds from carbon and timber sales, agroforestry can be a key factor of success. The lack of a reference market and the poor liquidity of forest carbon credits, aggravated by the lack of traditional banking networks (for access to loans), were the main obstacles in setting up the financial package for the Ibi Batéké carbon sink. Today, the first practical results in the field have demonstrated the promoter's management capacities and ability to handle the risks inherent to the implementation of an integrated activity in a rural area. Trust is gradually building between the different parties and investors and models are being refined, holding out prospects for extending and replicating the initial prototype."

Glossary

Acronym	French	Acronym	English
AFD	Agence Française de Développement		French Development Agency
AND	Autorité Nationale Désignée	DNA	Designated National Authority
APD	Aide Publique au Développement	ODA	Official Development Assistance
AR	Boisement et reboisement	AR	Afforestation and Reforestation
BioCF			BioCarbon Fund
CAREV	Contrat d'Achat de Réductions d'Emissions Vérifiées	ERPA	Emission Reduction Purchase Agreement
CBFF			Congo Basin Forest Fund
CCBs			Climate, Community and Biodiversity standards
UNFCCC	Convention-Cadre des Nations Unies sur les Changements Climatiques	UNFCCC	United Nations Framework Convention on Climate Change
CCX			Chicago Climate Exchange
CCAR			Californian Climate Action Registry
CE MDP	Conseil exécutif du mécanisme pour un développement propre	CDM EB	Executive Board of the Clean Development Mechanism
CFI			Carbon Financial Instrument
CFS			CarbonFix Standard
CP	Conférence des parties	COP	Conference of the Parties
CS MOC	Comité de supervision de la MOC	JI SC	JI Supervisory Committee
DDP	Document Descriptif de Projet	PDD	Project Design Document
EIA	Entité Indépendante Accréditée	AIE	Accredited Independent Entities
EOD	Entité Opérationnelle Désignée	DOE	Designated Operational Entity
EUA	Quota européen dans le cadre du SCEQE	EUA	European Union Allowance
FAO	Organisation des Nations unies pour l'alimentation et l'agriculture	FAO	Food and Agriculture Organization
FCPF			Forest Carbon Partnership Facility
FFEM	Fonds Français pour l'Environnement Mondial		French Global Environmental Fund

FIP			Forest Investment Program
GHG	Gaz à effet de serre	GHG	Greenhouse Gas
GFA	Gestion Forestière Améliorée	IFM	Improved Forest Management
GGAS			Greenhouse Gas Abatement Scheme
IPCC	Groupe d'Experts Intergouvernemental sur l'Evolution du Climat	IPCC	Intergovernmental Panel on Climate Change
IETA			International Emissions Trading Association
LoA	Lettre Officielle d'Agrément	LoA	Letter of Agreement
lURCE	Unité de Réduction Certifiée durables	lCER	Long-Term Certified Emission Reduction
MDP	Mécanisme pour un Développement Propre	CDM	Clean Development Mechanism
MOC	Mise en Œuvre Conjointe	JI	Joint Implementation
MRV	Mesure, Rapportage et Vérification	MRV	Monitoring, Report and Verification
NIP	Note d'Identification du Projet	PIN	Project Identification Note
NZU			New Zealand Unit
PFD	Point Focal Désigné	DFP	Designated Focal Point
PNAQ	Plan National d'Allocation des Quotas	NAP	National Allocation Plan
PFNL	Produit Forestier Non Ligneux	NWFP	Non Wood Forest Products
PFSI			Permanent Forest Sink Initiative
PNUD	Programme des Nations Unies pour le Développement	UNDP	United Nations Development Program
PNUE	Programme des Nations Unies pour l'Environnement	UNEP	United Nations Environment Program
PSE	Paiement pour Services Environnementaux	PES	Payment for Environmental Services
	Projet à petite échelle	SSP	Small Scale Project
REDD	Réduction des Emissions dues à la Déforestation et la Dégradation	REDD	Reduced Emission from Deforestation and Degradation
RGGI			Regional Greenhouse Gas Initiative
SCEQE	Système Communautaire d'Echange de Quotas d'Emissions	EU – ETS	European Emissions Trading Scheme
	Suivi des réductions d'emissions		Monitoring

$teqCO_2$	Tonne équivalent CO_2	$teqCO_2$	Tonne equivalent CO_2
TRI	Taux de Rentabilité Interne	IRR	Investment Return Rate
tURCE	Unité de Réduction Certifiée temporaires	tCER	Temporary Certified Emission Reduction
UA	Unité d'Absorption	RMU	Removal Unit
UQA	Unité de Quantité Attribuée	AAU	Assigned Amount Unit
URCE	Unité de Réduction Certifiée des Emissions	CER	Certified Emission Reduction
URE	Unité de Réduction des Emissions	ERU	Emission Reduction Unit
UTCF	Utilisation des Terres, Changement d'usage des sols et Foresterie	AFOLU	Agriculture, Forestry and Other Land Uses (previously LULUCF : Land Use, Land Use Change and Forestry)
VAN	Valeur Actualisée Net	NPV	Net Present Value
	Unité de Réduction des Emissions Volontaire / Vérifiée	VER	Voluntary / Verified Emission Reduction
VCS			Voluntary Carbon Standard
VCU			Voluntary Carbon Unit
	Unité de Réduction des Emissions Volontaire / Vérifiée	VER	Voluntary / Verified Emission Reduction
WBCSD			World Business Council for Sustainable Development
WCI			Western Climate Initiative

1 Developing the baseline scenario and acquiring accurate satellite data can entail very high costs, although available 3-D satellite data can substantially reduce these.

2 Calmel M. et al., 2010. REDD at project scale. Development and evaluation guide. ONFI, CEPAL, AFD

3 Merger E., 2008. Forestry Carbon Standard, University of Canterbury

4 Neeff et al., 2009. Forest Carbon Offsetting survey 2009

5 Lopes P., 2009. Review of Forestry Carbon Standards, Imperial College of London

6 Ecosystem Marketplace, 2009. State and Trends of the Voluntary Carbon Market 2009, Ecosystem Marketplace