

Forestry and the Climate Convention: 10-years of Evolution¹

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1) Introduction

During the last ten years, forestry-based carbon offsets have evolved from a theoretical idea towards being a market-based instrument for accomplishing the global environmental objectives of the United Nations Framework Convention on Climate Change (FCCC), signed in Rio in 1992 during the United Nations Conference on Environment and Development (UNCED). While we are still a long way from an organised market with prices defined according to supply and demand forces, the initial voluntary schemes and bartering transactions common in the early 90's have already given way to more sophisticated market mechanisms. If this trend continues, it seems very likely that forestry offsets will play a part in accomplishing the legally-binding emission reduction commitments agreed in 1997 in the Kyoto Protocol of the FCCC. It is estimated that, once fully operational, the international market for carbon projects, credits and allowances will reach tens of billions of dollars each year (World Bank 1997), a sizeable proportion of which could flow to developing countries if the trading regime is properly structured.

For countries rich in forest resources, altering non-sustainable land-use patterns is likely to be a prized greenhouse gas mitigation opportunity. Forestry carbon offsets encompass a range of project-level interventions, including direct preservation of existing forests, reforestation, and reduction of the negative impacts of forest management and harvesting (Moura-Costa 1996, Brown et al. 1996). There is also the possibility of increasing the production efficiency of swidden agricultural systems or the end-use efficiency of fuelwood resources, both of which help take pressure off of standing forests, with accompanying greenhouse gas (GHG) benefits. While the range of activities currently accepted for compliance with the Climate Convention targets is still the subject of negotiation, a series of parallel initiatives are arising based on a broader use of forestry as a GHG mitigation option.

Considering the wider perspective, forestry carbon offset projects can provide support for the other convention signed at UNCED -- the Convention on Biodiversity. While there are a variety of financial mechanisms being explored to support biodiversity conservation, initiatives like trust funds and pharmaceutical prospecting rights have yet to demonstrate that they are fully accepted by either policy-makers or the marketplace. Forestry-based carbon offsets -- whether they promote direct preservation, sustainable forestry practices or reforestation -- all have the potential to positively support the goals of the Biodiversity Convention.

This paper provides an overview of the evolution of the policy process, the market and the investment trends in carbon offsets and greenhouse gas (GHG) emission reductions.

A host of technical and non-technical terms have been used to describe carbon offsets including carbon credits, Emission Reduction Units (ERUs), and Certified Emission Reductions (CERs). Box 1 explains the technical differences between these terms. For the purposes of this report, carbon offsets, carbon credits and carbon offset projects are used as generic terms covering all the different technical formulations (including the outputs of those projects not explicitly related to international climate change policy).

2) Forestry and greenhouse gas sequestration

Carbon sequestration through forestry is based on two premises. First, carbon dioxide is an atmospheric gas that circulates globally and, consequently, efforts to remove greenhouse gases from the atmosphere will be equally effective whether they are based next to the source or on the other side of the globe. Second, green plants

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remove carbon dioxide from the atmosphere in the process of photosynthesis, using it to make sugars and other organic compounds used for growth and metabolism. Long-lived woody plants store carbon in wood and other tissues until they die and decompose, from which time the carbon in their wood may be released to the atmosphere as carbon dioxide, carbon monoxide, or methane, or it may be incorporated into the soil as organic matter.

Forestry-based carbon offset projects can be based on two different approaches: 1) active absorption² in new vegetation, and, 2) avoided emissions³ from existing vegetation (i.e., from decomposition). The first approach includes any activity that involves planting of new trees (afforestation, reforestation, agroforestry, etc.) or increasing growth rates of existing forest stands (e.g., silvicultural practices). The second approach can be accomplished through prevention or reduction of deforestation and land use change (e.g. through conservation projects), reduction in damage to existing forests (e.g., through uncontrolled logging, fire), etc. All methods have similar results in that they reduce the accumulation of GHGs in the atmosphere, but require different analytical tools for the evaluation of their merits as carbon offsets (i.e. whether they differ from an ongoing baseline) and for the calculation of their offset potential. The Kyoto Protocol, however, treats these activities differently, with active absorption seen more positively than sinks projects involving avoided emissions (see Section 8 for discussion). To date, a series of projects were developed using both methods, as shown in Table 1.

3) Early days: voluntary projects

The earliest forestry-based carbon offset project bear little resemblance to the market transaction systems that are evolving in several quarters today. The first company to express interest in compensating for its GHG emissions through the planting of trees was the American electricity company AES (Applied Energy Services), whose initial investment consisted of US\$ 2 million into an existing social agroforestry scheme in Guatemala, managed by CARE (Cooperative for Assistance and Relief Everywhere), an international poverty-relief NGO (Trexler et al. 1989; Faeth et al. 1994). This investment was followed by another US\$ 5 million on two other projects in South America, namely the establishment a Nature Conservancy reserve in Paraguay, and the Oxfam America-AES Amazon Program to protect threatened rainforests by helping indigenous Amazonians gain legal title to and manage the resources of 1.5 million ha of their traditional territories (Moura-Costa and Stuart, 1998). These initiatives were voluntary in nature, since there were no legislation requirements for polluters to reduce GHG emissions. Projects were established in anticipation of changes in environmental legislation, while capitalising on the public relations value of projects. AES claims that it never intended to “use” these offsets officially and that it was simply being a good global corporate citizen. This voluntary aspect was somewhat reflected in the assumed price paid for carbon sequestration, which averaged US\$ 0.20/tonne C, based upon the costs to the investor.

4) From Rio to Berlin (1992 –1995): first generation JI projects

In July 1992, representatives from 155 nations gathered in Rio de Janeiro for the United Nations Conference on Environment and Development (UNCED). At Rio, the United Nations Framework Convention on Climate Change (FCCC) was signed. This included a voluntary commitment by Annex 1 countries (industrialised countries) to reduce their emissions to the levels of 1990 by the year 2000 (Grubb et al. 1993). Embedded in FCCC was the concept of Joint Implementation (JI). At the initiative of Norway, the Convention approved – in principle -- activities between countries to collectively reduce GHG emissions or promote the absorption of atmospheric CO₂. The investing participants in these projects could presumably claim emission reduction “credits” for the activities financed. These credits could then be used to lower GHG-related liabilities (e.g. carbon taxes, emission caps, etc.) in their home countries. The overall rationale of JI is that the marginal costs of emission reduction or CO₂ sequestration can vary dramatically, and that such costs are generally lower in developing nations than industrialised countries. Although such crediting arrangements were not officially endorsed by the FCCC, this promise of potential transfers through JI led to a small flurry of activities in the forestry sector.

One of the first initiatives to be established was that of the Dutch Electricity Board (SEP), a consortium of five electricity companies in the Netherlands, through the creation of the Face (Forests Absorbing Carbon-dioxide Emissions) Foundation in the early 90's (Dijk et al. 1994). The mandate of the Face Foundation was to promote the planting of enough forests to absorb an amount of CO₂ equivalent to the emissions of a medium-sized coal-fired power plant (400 MW) during its 40-year life time (Stibbe et al. 1994, Face 1994, Verweij 1997). In this way, SEP would be able to build a new power plant in the Netherlands, with no net emissions to the global atmosphere. A multi-year budget of US\$ 180 million was allocated to Face, for the establishment of a portfolio of forestry projects in different parts of the world. The initial investment was a tropical rainforest rehabilitation programme in Sabah, Malaysia (Moura-Costa et al. 1996), followed by four more projects around the world (Verweij 1997): reforestation of degraded pasture land by small farmers in Ecuador (1992), rehabilitation of an acid-rain degraded park in the Czech Republic (1992), urban forestry in the Netherlands (1993), and rainforest rehabilitation in Uganda (1994).

Other forestry projects initiated at this time included the Innoprise-New England Power Reduced Impact Logging (RIL) project in Sabah, Malaysia (Putz and Pinard 1994; Moura-Costa and Tay 1996); the CARFIX project in Costa Rica (a precursor of the PFP project), established by Fundecor (a Costa Rican NGO, developed partially with USAID funding and supported by a group of Norwegian financiers); and the Rio Bravo Conservation and Management Area Carbon Sequestration Pilot Project, which combines land acquisition with a sustainable forestry programme to achieve carbon mitigation, financed by various US electric utilities.

The model of these transactions consisted of investor companies paying for the full costs of the carbon saving activities, in return for the promise of carbon credits generated as a result of these activities. This differed in part from the AES model, in which AES had a minority participation in the financing of broad environment/development projects, in return for a "claim" on total emission reductions. As such, it is exceedingly difficult to accurately ascertain the actual cost structure of reduced emissions under the AES sponsored projects.

In the post-Rio model, investing companies determined the direct costs of the carbon beneficial components of the project implementation, and directly claimed the resultant emission savings. The amount paid for carbon, therefore, almost invariably corresponded to marginal costs, accounted for through an open book approach that was requested for the competitive bidding process of project selection. While this led to some interesting comparisons of predicted costs, the actual price discovery model remained oblique, resembling a "barter" system. Often, parties would choose to implement projects based on a variety of negotiation points supplementary to actual supply and demand for emission reduction "credits", usually centred on a project's public relations appeal in either the host or buying country. For suppliers, there were few incentives for participation, as the maximum profit was capped by what the buyer would term "allowable" costs (as under the New England Power contract in Malaysia).

This still remained a long way from characterising CO₂ credits as a commodity, since buying parties were required to invest in the production process. Investment was far from passive – indeed, it required a buyers fairly full engagement to a project, from beginning to end. Consequently, there was virtually no liquidity associated with these investments or their resulting "carbon credits"; each was uniquely valuable to its own investor, and such values were virtually non-transferrable to other parties. Projects that were designed and formulated by consultants, academics and NGOs, who did all the ground work of identifying partners, infrastructure and training needs, and negotiation with host country authorities, as well as quantification and monitoring of carbon savings. Little indigenous capacity for undertaking these types of proposals emerged. Development costs, consequently, were comparatively high, though often supported by a variety of agencies like international aid groups, multilateral organisations, foundations and the like.

The difficulty from the buying side was that there continued to be a great deal of uncertainty regarding carbon sequestration credit transfer arrangements. Given that CO₂ emissions were not penalised companies wanted to

² also referred to as carbon fixation, sink creation, sink enhancement, etc.

³ also referred to as sink protection, pool protection, emissions reduction, etc.

be sure that their investments would be recognised under future regulatory regimes. While interim regulatory institutions were being established, they were not given the ability to accept or reject emissions credit aspects of projects, rather they could accept or reject them for inclusion in a national registry system. The first institution given a mandate to input such projects was the US Energy Information Administration, under Section 1605-b of the 1993 Energy Policy Act, and in late 1994 was followed by the United States Initiative on Joint Implementation (USIJI), a highly structured system of US government project evaluation for international projects (USIJI 1994).

The average price (usually equating costs) paid for carbon sequestration is estimated to be around US\$ 2.00/tonne C, a 10-fold increase from the prices paid in the previous phase.

5) AIJ Pilot Phase: more uncertainty (1995-1996)

Growing dissatisfaction among G77 countries led to more concrete opposition to the JI model (Stuart and Sekhran 1996, Stuart and Moura-Costa, 1998). Perceived problems included a feeling that JI was little more than a mechanism for industrialised countries to avoid addressing the real issues of reducing emissions at source, maintaining the economic advantage over developing countries. It was also felt that developing countries were in danger of transferring all their inexpensive GHG reduction opportunities to industrialised countries during this initial policy phase in which developing countries had no commitments to GHG emission reductions (and therefore during which such reduction were worthless at home). This brought forth older arguments regarding “terms of trade” which effectively critiques the unfairness of transactions where a commodity is only valuable to purchasing parties. Some developing country observers consistently referred to JI as “eco-colonialism”. Moreover, developing countries would find themselves at a strategic disadvantage -- if and when they were brought into the Climate Convention emissions limits process -- as their most advantageous emission reduction opportunities would have already been exported.

These fears were consistently exacerbated by the announced price of offset projects, in which the calculated volume of credits (to be nominally transferred) was based upon the marginal costs of the intervention, without any rents accruing to the supplier. Often, the total volume of credits was sought, even though the claiming party had supplied, at most, only marginal costs. This overt lack of profit potential provided no commercial incentive for developing countries to supply offsets and reinforced the notion that carbon offsets are “win-win” for industrial countries only. Considering the proposed and discussed carbon taxes suggested at the time, which ranged US\$25/tonne C and upward (Barrett 1991), the nominal prices being paid for emission reductions (less than US\$ 3/tonne of carbon) at the time seemed an unbeatable bargain.

In the First Conference of Parties (CoP 1) in Berlin, March of 1995, developing country dissatisfaction was voiced as a formal refusal of JI with crediting against objectives set by the Convention. Instead, a compromise was found in the form of a pilot phase, during which projects were called Activities Implemented Jointly (AIJ). During the AIJ Pilot Phase, projects were conducted with the objective to establish protocols and experiences, but without allowing carbon crediting between developed and developing countries. This was meant to simulate the process of JI, giving substantive information to decision-makers in formulating the final system for emission transaction between countries and private entities.

However, the absence of credit transfer substantially dulled the appetite for participation among private sector parties in particular. The direct statement from Berlin -- that current JI projects were not eligible for future crediting -- meant that these were unrecoverable costs. Because of this lack of real incentives for the private sector (which most observers believe must eventually drive the trading system), the results of the AIJ pilot phase were generally considered poorly representative of the full potential of JI.

In this new environment, where companies were faced with even more uncertainty about the potential value of projects for their respective balance sheets, a great reduction in the level of investment in JI/AIJ-type projects was observed (Figure 1).

While few investments took place during this phase, the supply of “potential projects” continued to increase, as more parties perceived this to be a new source of capital for sustainable environment/development projects. In this context, calls for proposals were organised by various organisations including the World Business Council for Sustainable Development and the USIJI, which gathered dozens of project proposals to be considered for investment in the future. Potential investors included the Edison Electric Institute, and the E7, a global association of mega-sized electric utilities. More JI/AIJ bodies were formed in many countries, including Canada, Netherlands, France, Germany, Switzerland, Norway, Australia and Japan. Several developing countries, including Costa Rica, Guatemala and Sri Lanka, developed domestic AIJ offices to regulate projects from the perspective of the host country.

Although few transactions occurred, there was a growing feeling that some form of JI with crediting would inevitably arise, if developed countries were to commit themselves firmly to real targets. This led to a great increase in the level of interest in the subject, which was manifested world-wide in many forms, capturing the imagination of many economists, policy analysts and scientists. Multiple journals and Internet sites devoted to nothing but joint implementation topics. Innumerable papers, monographs and books began being written on the subject during this period. A variety of consulting “experts” now worked with different clients, developing projects, products, positions, strategies and services. Various business enterprises got organised to look for investment opportunities and formulate lobby strategies.

Nonetheless, only three carbon offset forestry projects were established during this phase (extending from 1994 until the end of 1996). These were: the second phase of the Reduced Impact Logging Project of New England Power, now with other co-investors; the EcoLand forest protection project in Costa Rica (a similar concept to the PAP project), developed by a Costa Rican NGO and a US Consultancy, Trexler and Associates, with US\$1 million co-finance from Tenaska Inc.; and the Noel Kempff Climate Change Action Project in Bolivia, a forest conservation and management project developed by The Nature Conservancy and Fundacion Amigos de la Naturaleza, a Bolivian NGO, with funding from American Electric Power (in a later stage, this project also attracted funding from PacifiCorp and British Petroleum).

6) The run up to Kyoto (1997)

In the year preceding the Third Conference of Parties of the Climate Convention (CoP 3), to take place in Kyoto, December of 1997, there was great anticipation that some changes were imminent. Discussions during CoP 2, in Geneva in 1996, determined that binding commitments were going to be a central point in CoP 3. The consequences of these commitments were unknown but could be manifested in the form of carbon taxes, quotas, caps, etc., all of which would entail hard costs to industrialised economies.

In this phase of uncertainty, interesting moves have been observed in many sectors previously not involved in this field. Among electricity companies, there has been seen a preference for less carbon intensive energy sources, such as gas. Manne and Richels (1994) estimated that this business was already imputing a value of US\$17 per tonne of carbon. Several oil companies started to invest in a diversification of their energy matrix, pushing the flow of capital to the renewable energy industry. This can be illustrated by the rising of the solar energy sector and by specific investments such as British Petroleum’s (BP) commitment to 1 billion dollars to the solar industry. Shell created its Shell Renewable International division, in the fifth core component of the organisation, with an initial investment budget of US\$500 million for forestry, solar and biomass projects. Large car manufacturers, such as Toyota and Mercedes Benz, demonstrated numerous car models with lower GHG emissions, including fuel cell prototypes (Greenhouse Issues 1998). The International Automobile Association, the organisation responsible for Formula 1 competitions, decided to offset the GHG emissions of their events (Tipper 1997b, Greenhouse Issues 1997a and b). The insurance and re-insurance sectors took climate change into consideration, and formed a group under the auspices of the UNEP.

It became obvious that third-party certification was instrumental in the validation and credibility of these new transactions. The first international certification agency to offer a service of independent verification of carbon

offset projects was offered by the Swiss company Société Générale de Surveillance (Moura Costa et al. 1997, Moura Costa et al. 2000), and other auditing firms are already considering offering similar services.

Four new forestry projects were initiated in 1997. These included two large national carbon offset programs in Costa Rica, the Protected Areas Project (PAP) and the Private Forestry Project (PFP), a 13,000 ha community forestry project in Mexico, financed by the International Automobile Association (Tipper 1997a, Tipper and de Jong 1998); and a community forestry project for fuel-wood production in Burkina Faso, financed by the Government of Norway through the World Bank. The Costa Rican national programme launched a series of innovations in this sector: a) this was the first project/program developed by the supplier of offsets, rather than the purchaser; b) it was the first to attract finance through the sale of carbon denominated securities (CTOs – Certified Tradable Offsets); and it was the first to use independent verification (Trines 1998a) and insurance against low performance (Moura-Costa and Stuart 1998, Trines 1998b, SGS 1998).

7) The Kyoto protocol and the flexibility mechanisms

In December 1997, the Kyoto Protocol was conceived during the CoP 3 of the FCCC, attended by representatives of 170 countries. The most important aspect of the Kyoto Protocol is the adoption of binding commitments by 37 developed countries and economies in transition (collectively called the Annex 1 countries) to reduce their GHG emissions in an average of 5.2% below the year 1990 until the years 2008-2012 (Kyoto Protocol, 1997; web site <http://www.unced.de>). At the same time, the Protocol approves the use of 3 “flexibility mechanisms” for facilitating the achievement of these GHG emission reduction targets. These are:

- 1) Emission Trading, allowing the international transfer of assigned amounts (AAs) of GHG emissions between Annex 1 countries;
- 2) Joint Implementation, the creation of emissions reduction credits undertaken through transactional investment between industrial countries and/or companies of the Annex 1 (note that according to the new terminology, JI only includes participation of Annex 1 countries, which are OECD and the former Soviet block); and,
- 3) The Clean Development Mechanism (CDM), a new mechanism resembling JI, which allows for the creation of Certified Emission Reduction (CER) credits in developing countries, regulated by a newly formed central authority, the CDM Executive Board (the composition of the CDM is still to be defined in CoP 7, November 2001).

The Kyoto Protocol appeared to be a real truly international step in the GHG emissions mitigation arena. Overall, what emerged was what business-oriented climate activists have always hoped for: a compromise between substantial emissions reduction targets and a fluid market mechanism under which to achieve those emissions reduction requirements. The protocol will become legally binding ninety days after the fifty-fifth government ratifies it, assuming that those 55 countries account for at least 55 per cent of the emissions of the developed countries in 1990. As of October 2001, 84 countries have signed it and 40 already ratified.

The establishment of binding commitments has led to a more substantial demand for offsets. According to a study of the MIT/World Bank (Ellermann *et al.*, 1998), if these targets were accomplished through an unconstrained international emissions trading market, this would generate a demand for GHG Emission Reduction Units (ERUs) in the order of US\$ 20 billion a year, a substantial change from the previously voluntary demand of the pre-Kyoto phase. Sandor (1997) estimated that, for the US alone, the costs of reduction of GHG emissions to the levels 10% below 1990 is in the range of US\$ 32 billion a year, but if these targets were partially accomplished through GHG emissions trading, this would generate an American demand for GHG Emission Reduction Units in the order of US\$ 6 billion a year.

Another change in demand specification regards the quality of offsets. Following on the experience from Costa Rica and SGS, the Kyoto Protocol requires that all credits generated outside capped Annex 1 countries will have to be independently certified, creating a potentially high demand for this type of service. Currently, certification

services are already offered by other large companies such as Det Nordsk Veritas, Pricewaterhouse Coopers, Arthur Anderson and KPMG. Other sectors have also created specialised services to attend this nascent market, including insurance, monitoring and verification, project finance, financial services, consultancies, brokerage, banking, fund management, and stock analysts.

The endorsement of the emissions trading concept also led to an immediate response in the, still incipient, carbon market. One of the first steps was the attempt to create market mechanisms and supporting infrastructure to support the expected level of transactions. In the immediate post-Kyoto, this included the initiatives of the Sydney Futures Exchange on the development of an Australasian market in forward contracts for forestry-based carbon credits (subsequently discontinued), the GHG tradable permit trading mechanism co-ordinated by the UNCTAD (UNCTAD 1992, 1994, 1995); and the GHG emissions trading programme proposed by the International Petroleum Exchange (IPE 1998). Subsequently, this has evolved into the creation of the International Emissions Trading Association, alongside the Emissions Market Association; the Chicago Climate Exchange, and country-level emission trading systems such as in the UK and Denmark. Electronic emissions trading platforms have been created (e.g. CO2e.com), and specialised brokers became more active (for instance Cantor Fitzgerald, Natsource and Prebon Yamane).

During this phase it was observed a rise in emissions trading within Annex 1 countries, i.e., companies investing in internal emissions reductions and selling these to other companies. Remaining uncertainties related to the rules set by the Kyoto protocol, however, still prevented much investment in project-based activities, and most involved clean energy and energy efficiency, as opposed to forestry (see next section). A substantial amount of the projects were actually financed by public sector initiatives such as the World Bank Prototype Carbon Fund (launched in 1999 with initial capitalisation of about US\$ 130 million; JIQ 1997), and the Dutch ERUPT program (Emission Reduction Units Purchase Tender), which still have not invested in forestry during this phase.

8) Kyoto and forestry: a green light ?

Another important output of the Protocol was the signal that forestry activities were going to be considered valid options for accomplishing the emission reduction targets agreed in Kyoto. While the language of the Protocol was somewhat contradictory regarding what types of activities would be allowed and by what parties, it was finally clear that forestry sinks would be part of the equation.

Although Article 3.3 of the Kyoto Protocol specifically mentioned the role of afforestation, reforestation and deforestation (presumably, avoided deforestation) for reaching the targets agreed by Annex B countries, Article 12 on the CDM referred only to "emission reductions" with no mention of any specifically eligible activities. This vagueness of the Protocol allowed for a disturbingly broad scope for interpretation during the post-Kyoto phase, and totally opposite views have been put forward.

While certain land use activities (such as afforestation) were generally endorsed by both science and industry, others (such as soil-based agriculture absorption) were accused to defeat the "spirit" and credibility of Kyoto by allowing credits for projects that do not adequately sequester carbon in the long-term. Some of these objections were based on technical issues⁴, and some on a whole range of other arguments, from emotional issues to international trading (see Schlamadinger and Marland 1998, for discussion).

Countries that wanted forestry included argued that Article 12 implicitly refers to the activities listed in the main body of the Protocol text (Articles 3.3 and 3.4), while those that did not want forestry included argued that only fossil fuel based emission-reduction activities should be allowed. Even among those promoting forestry, a

⁴ It is interesting to note that most of these technical issues provide challenges of a similar nature to both energy and land use projects (Chomitz 200?), with the exception of the question of permanence. The probable treatment of permanence based on the 'Colombian proposal', however, would make the accounting for both types of projects compatible with each other (Moura-Costa, 2001), removing this barrier to the full inclusion of sinks in the Protocol.

further point of contention regarded the specific types of forestry activities which should be allowed, with some countries proposing only those activities listed in Article 3.3 (afforestation, reforestation and deforestation), and others promoting a much wider range of land use activities as in the spirit of Article 3.4 (“other activities”).

Since the CDM was initially proposed, many developing countries supported the inclusion of some types of land use activity. Latin American countries, and in particular Costa Rica, Argentina, and Bolivia, have been the most vociferous proponents of CDM forestry, though with the equally vocal exceptions of Peru and Brazil. Indeed this position was explicitly stated at CoP5, and enshrined in the so-called Cochabamba Declaration, from June 1999, at which the Ministers of Bolivia, Ecuador, Colombia and Brazil⁵, agreed on a common strategy regarding the CDM and Amazon Basin. This declaration included the following paragraphs: “(We) Recommend the inclusion of forestry projects within the CDM, including activities for forestation, re-forestation, restoration, and sustainable management of the natural forests.; and (We) Recommend the analysis of the inclusion of conservation of natural forests, with the requirement that this type of project not be eligible for implementation among Annex 1 countries.”

Asian countries, in general, had been less active on CDM issues, but Malaysia and Indonesia appeared to support the inclusion of forestry, while India and China were strongly against. Reasons for this opposition were essentially that India favours energy and technology transfer projects, with China opposing the use of any market-based instruments *per se*. African countries, on the other hand, changed from their generally sceptical position on carbon offset forestry (driven in part by their negotiating position’s heavy focus on capacity building and developmental assistance), to one of partial endorsement. At CoP5, the Africa Group stated its support for the inclusion of afforestation and reforestation in the CDM, as well as the preservation of wetlands. Uganda was a driving force behind this position, having already hosted two forestry-based carbon offset projects.

Industrialised countries were also divided on their views of forestry in the CDM. Within the EU bloc, for example, Holland was a relatively strong proponent (and indeed has led the way with carbon offset projects through the FACE Foundation), while Germany and the UK remained more cautious. The umbrella group of Japan, US, Canada, Australia, New Zealand, and Iceland, were all strongly in favour of a wide role for sinks in meeting the Kyoto commitments, the CDM included. Furthermore, the US pushed strongly for agriculture and particularly agricultural soils to be included under the open-ended Article 3.4. The US Government submission on the Kyoto Mechanisms during CoP 6 was strongly in favour of a “comprehensive package” approach, in which a wide range of sink mitigation activities were to be included.

Polemic also prevailed amongst the international NGO community. While some NGOs strongly favoured forestry’s inclusion in the CDM (e.g., The Nature Conservancy, Conservation International, Winrock Foundation, Union of Concerned Scientists, Environmental Defence Fund, World Resources Institute, etc.), other international NGOs were still quite uncertain and suspicious (e.g., WWF International, Greenpeace, Friends of the Earth, Sierra Club). Grass-roots organisations and local NGOs tended to support the inclusion of sinks in the CDM, and saw the CDM as a potential source of funding for their programmes (e.g., see Letter of Brasilia, 1998; see also the variety of NGOs involved in ongoing carbon offset projects, e.g., Tipper, 1998).

Contention over the inclusion of forestry in the CDM led delegates at the CoP4 to the FCCC in Buenos Aires, November 1998, to defer any decision until CoP6, in November 2000. At the same time, an international collaborative research network of forest scientists under the auspices of the IPCC (Intergovernmental Panel on Climate Change) was commissioned to prepare a Special Report on Land Use, Land Use Change and Forestry. The report’s objective was to provide policy makers with the necessary information to allow the Kyoto Protocol’s references to forestry to become operational, by reviewing the requirements and outcomes of

⁵ Brazil has traditionally opposed the inclusion of sinks in the CDM, particularly activities involving forest conservation. This position was strongly voiced by the Ministries of Science and Technology and External Relations, who traditionally represented Brazil in the negotiations. At a later stage, though, this subject attracted the interest of the Minister of Environment and the Amazon, who saw CDM as a possibility of funding for a series of his Ministry’s programs in the Amazon. This led him to sign the Cochabamba Declaration, although other parties in Brazil remained against the inclusion of sinks.

different policy options. Chapter 5 of the special report dealt with forestry projects, and was generally positive about the potential and feasibility of using this GHG mitigation option (IPCC 2000). In spite of the Special Report on LULUCF, polemic over sinks remained one of the central points of the negotiations, and eventually drove the process to a halt during CoP 6 (see below).

This environment of uncertainty has, no doubt, affected appetite for forestry-based GHG mitigation projects. While much has been accomplished in other sectors (particularly clean energy and energy efficiency projects), little was invested in CDM-type forestry projects during this period, and only during the first months after the Kyoto meeting. These included: the investment by British Petroleum in forestry-offset projects in Bolivia; and the development of a forestry conservation project in Brazil, by AES, Peugeot and The Nature Conservancy. All of these can be said to be 'no regret' investments, in which forest conservation was the ultimate goal, as opposed to carbon trading. In spite of its unprecedented level of sophistication, the Costa Rican national program did not attract any more investment, given that it was based on forest conservation, the most controversial of the activities.

The only more commercially-driven carbon forestry investments during this period took place in Australia. Being an Annex 1 country, Australia was not subject to all the risks and uncertainties related to the inclusion of sinks in the CDM, since afforestation activities were clearly included in their responsibilities. At the same time, the country is somewhat unique among those in the Annex 1, in regards to its ability to generate large amounts of forestry offsets from afforestation. This drove the New South Wales State Forests (NSWSF), a state organisation, to sell the carbon sequestration services of some of its plantations to Australian and Japanese power companies in late June 1998. Other forestry companies also realised that they had the capacity to attract carbon funding, with important implications for the financing of their operations, as illustrated by the prospectus-based forestry investment funds in Australia (for instance, Australia Plantation Timber, who also sold credits to the Japanese market).

9) Collapse at CoP 6, subsequent recovery and global recession

Disagreement over the inclusion of sinks, the extent of the use of flexibility instruments (as opposed to the use of domestic measures to reduce emissions), and mechanisms for compliance, have increasingly created a climate of discord, predominantly between the EU bloc and the Umbrella Group (US, Japan, Canada, Australia, New Zealand, and Iceland). While the former was strongly in favour of supplementary (the requirement that approximately 50% of a country's targets are met through domestic action), and the exclusion of sinks in the CDM, the Umbrella Group supported the unrestricted use of flexibility instruments and the inclusion of sinks, as originally proposed in the Kyoto Protocol. After a series of negotiation rounds, this has eventually led to an impasse during CoP 6 (in November 2000), which was suspended until July 2001.

In March 2001, the newly elected President Bush announced that his administration had reviewed the text of the Protocol and has decided that in its current form it did not meet the interests of the USA. This decision was heavily criticised throughout the world, particularly because of its unilateral form. Given that the US is responsible for about 36% of the emissions of Annex 1 countries, their non participation in the Kyoto process may considerably jeopardise the objectives of the Climate Convention.

It is uncertain what impact the US decision will have on the climate change process as a whole. One possibility is that there may be some renegotiation of the protocol, trying to accommodate some of the US requests with a view of having them re-joining the process. Given that the current terms of the protocol (see below) accommodates most of the points demanded by the US at CoP 6, it is not unlikely to see the US coming back. Another possibility is that a parallel climate change initiative is promoted by the US, with a high emphasis on the use of sinks, both domestically (exploring the potential for carbon storage in agricultural soils in the US), and internationally (with a focus on forest management and conservation projects in Latin America). Indeed, even in spite of Bush's announcement, a series of initiatives have been developed in the US for carbon trading, including the carbon purchase tenders backed by the states of Seattle and Massachusetts, and the newly formed Chicago Climate Exchange voluntary market.

In June 2001, CoP 6 Part II took place, and a new negotiation text was drafted. With relation to the use of flexibility mechanisms it states that these were to be considered supplemental to domestic action, but there is no required supplementarity targets (i.e. no specific percentage). This is somewhat closer to the US objectives. With relation to sinks, the key points in this document were:

- a) Afforestation and reforestation activities were accepted as valid project activities in the CDM;
- b) The future role of LULUCF projects in the CDM will be decided as part of the negotiations on the second commitment period. This includes a discussion on the inclusion of other activities, such as conservation;
- c) The implementation of LULUCF activities must contribute to the conservation of biodiversity and sustainable use of natural resources;
- d) The use of sinks is limited to about 20% of an investor country's target (1% out of the *ca.* 5% for each year of the first 5-year commitment period): "...for the first commitment period, the total of additions to and subtractions from the assigned amount of a Party resulting from eligible LULUCF activities under Articles 12, shall not exceed 1% of base year emissions of that Party, times five". This represents about 680 million tonnes CO₂ until the end of first commitment period (2012). Considering the average sequestration of about 300 t CO₂ per ha, this will require the establishment of at least 2 million ha of forests between now and the commitment period.

The next Conference of Parties will take place in November 2001 (CoP 7), and it is expected that a series of pending technical issues will be resolved.

Overall, the new text is positive with relation to the use of sinks, although forest conservation is not allowed to be funded directly through project mechanisms. It can be expected, though, that the development of other sink activities may have spill over effects on conservation, particularly taking into account point (c) above. At the same time, a couple of new financial mechanisms were proposed, which can be used for funding forest conservation activities, namely the Special Climate Change Fund of the Climate Convention, and the Kyoto Protocol Adaptation Fund, due to be financed from a proportion of the proceeds (possibly 2%) of project activities occurring under the Clean Development Mechanism (CDM).

Recent downturns of the global economy, following the terrorist incidents of September the 11th 2001, however, also need to be taken into account. It remains to be seen how the environment will score in such turbulent times.

10) Ways forward for the forestry sector

To date, several million ha of forests world-wide are under forest management regimes related to GHG mitigation funding. According to the IPCC (Brown et al. 1996), forestry has the potential of offsetting approximately 15% of the world's GHG emissions, a partial solution to the overall problem. If this investment trend continues, we may see a huge infusion of new capital into the forestry sector, which will have enormous importance in addressing some of the topical issues of sustainability and conservation of biodiversity.

For this to occur, however, it is important that the environmental benefits of any type of forestry activity (be it afforestation, reforestation or conservation) are ensured through the use of adequate sustainable forest management practices, such as those promoted by the existing forest certification schemes. If this is ensured, it could be expected that these investments would have a positive impact on the conservation of existing forest resources and biodiversity, even if indirectly. At the same time, it is also important that climate change objectives are combined with other environmental objectives, such as those of the biodiversity and desertification conventions, and perhaps extending the range of forestry activities currently included in the Protocol to a wider range.

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Table 1: Forestry-based carbon offset projects implemented to date. The list is comprehensive until 1997, but a series of initiatives have been conducted since then which have not necessarily been registered with official GHG regulatory bodies.

Project name	Date proposed/ Initiated	Carbon offset (1000 t C)	Area (ha)	Host Country	Investor country	Project description
AES – Care	1990	10,500	186,000	Guatemala	USA	Agroforestry
Face Malaysia	1992	4,250	25,000	Malaysia	Netherlands	Enrichment planting
Face-Kroknose	1992	3,080	16,000	Czech R.	Netherlands	Park rehabilitation
Face Netherlands	1992	885	5,000	Netherlands	Netherlands	Urban forestry
ICSB-NEP 1	1992	56	1,400	Malaysia	USA	Reduced Impact Logging
AES – Oxfam – Coica	1992	15,000	1,500,000	S. America	USA	Forest protection
AES – Nature Conservancy	1992	15,380	58,000	Paraguay	USA	Forest protection
Face-Profafor	1993	9,660	75,000	Ecuador	Netherlands	Small farmers plantation forestry
RUSAFOR-SAP	1993	79	450	Russia	USA	Plantation forestry
Face Uganda	1994	6,750	27,000	Uganda	Netherlands	Forest rehabilitation
Rio Bravo	1994	1,300	87,000	Belize	USA	Forest protection and management
Carfix	1994	2,000	91,000	Costa Rica	USA	Forest protection, and management
Ecoland/Tenaska	1995	350	2,500	Costa Rica	USA	Forest conservation
ICSB-NEP 2	1996	360	9,000	Malaysia	USA	Reduced Impact Logging
Noel Kempff M.	1996	14,000	1,000,000	Bolivia	UK/USA	Forest protection and management
Klinki forestry	1997	1,600	6,000	Costa Rica	USA	Reforestation with klinki
Burkina Faso	1997	67	300,000	Burkina Faso	Denmark	Fire wood community forestry
Scolel Te	1997	15	13,000	Mexico	UK/France	Community forestry
PAP OCIC	1997	18,000	570,000	Costa Rica	Norway, USA	Forest conservation
Norway-Costa Rica	1997	230	4,000	Costa Rica	Norway	Forest rehabilitation and conservation
Tesco "green petrol"	1998	n.a.	n.a.	Undefined	UK	Forestry
Green fleet initiative	1997	n.a.	n.a.	Australia	Australia	Reforestation
AES - Ilha Bananal	1998	n.a.	n.a.	Brazil	USA	Forest rehabilitation
NSW + Pacific Power + Delta Electricity	1998	69	1,041	Australia	Australia	Reforestation
Peugeot-ProNatura	1999	n.a.	n.a.	Brazil	France	Forest conservation and rehabilitation
TNC-Guaraqueçaba	2000	n.a.	n.a.	Brazil	USA	Forest conservation and rehabilitation
Australian Plantations Timber	1999	3,075	25,000	Australia	Japan, and others	Plantation forestry
World Bank Prototype Carbon Fund	1998	n.a.	n.a.	International	International	Renewable energy and forestry
Totals/average	-	106,706	4,003,191	-	-	-

n.a. = not available

Box 1: A Glossary of Terms related to Carbon Credits:

Since the early 1990's, a variety of terms have been used to refer to different project-level climate change mitigation mechanisms and their outputs. The meanings of these terms have changed gradually. Below are some of the definitions that have been used. Most bear some relation to stipulations of the UN Framework Convention on Climate Change (UNFCCC) signed in 1992, whose provisions are fleshed out by the Kyoto Protocol, signed in December 1997.

MECHANISMS (1) --- EARLY PRE-KYOTO DEFINITIONS

Joint Implementation (JI)

The concept of joint implementation (JI) was introduced by Norway into pre-UNCED negotiations in 1991. This was reflected in Article 4.2(a) of the UNFCCC which gives Annex I countries (see below) the option of contributing to the Convention's objectives by implementing policies and measures jointly with other countries. The investing participants in these projects could presumably claim emission reduction 'credits' for the activities financed, and these credits could then be used to lower greenhouse gas (GHG) related liabilities (e.g., carbon taxes, emission caps) in their home countries.

Activities Implemented Jointly (AIJ)

In the first Conference of the Parties (CoP 1) to the UNFCCC held in 1995 in Berlin, developing country dissatisfaction with the JI model was voiced as a formal refusal of JI with crediting against objectives set by the Convention (see text for full discussion). Instead, a compromise was found in the form of a pilot phase, during which projects were called Activities Implemented Jointly (AIJ). During the AIJ Pilot Phase, projects were conducted with the objective of establishing protocols and experiences, but without allowing carbon credit transfer between developed and developing countries. The AIJ Pilot Phase is to be continued at least until the year 2000.

MECHANISMS (2) --- POST-KYOTO DEFINITIONS

The Kyoto Protocol of the UNFCCC created three instruments, collectively known as the 'flexibility mechanisms', to facilitate accomplishment of the objectives of the Convention. A new terminology was adopted to refer to these mechanisms, as detailed below. Note that because of the Kyoto Protocol's distinction between projects carried out in the developed and developing world, some AIJ projects may be reclassified as CDM or JI projects.

Joint Implementation (JI)

Set out in Article 6 of the Protocol, JI refers to climate change mitigation projects implemented between two Annex 1 countries (see below). JI allows for the creation, acquisition and transfer of "emission reduction units" or ERUs.

The Clean Development Mechanism (CDM)

The CDM was established by Article 12 of the Protocol and refers to climate change mitigation projects undertaken between Annex 1 countries and non-Annex 1 countries (see below). This new mechanism, whilst resembling JI, has important points of difference. In particular, project investments must contribute to the sustainable development of the non-Annex 1 host country, and must also be independently certified. This latter requirement gives rise to the term "certified emissions reductions" or CERs, which describe the output of CDM projects, and which under the terms of Article 12 can be banked from the year 2000, eight years before the first commitment period (2008-2012).

Emissions Trading (ET) or QUELRO trading (Quantified Emission Limitation and Reduction Obligations trading)

Article 17 of the Protocol allows for emissions-capped Annex B countries to transfer among themselves portions of their assigned amounts (AAs) of GHG emissions. Under this mechanism, countries that emit less than they are allowed under the Protocol (their AAs) can sell surplus allowances to those countries that have surpassed their AAs. Such transfers do not necessarily have to be directly linked to emission reductions from specific projects.

WHICH COUNTRIES IN WHICH MECHANISMS?

Annex 1 countries

These are the 36 industrialised countries and economies in transition listed in Annex 1 of the UNFCCC. Their responsibilities under the Convention are various, and include a non-binding commitment to reducing their GHG emissions to 1990 levels by the year 2000.

Annex B countries

These are the 39 emissions-capped industrialised countries and economies in transition listed in Annex B of the Kyoto Protocol. Legally -binding emission reduction obligations for Annex B countries range from an 8% decrease (e.g., EC) to a 10% increase (Iceland) on 1990 levels by the first commitment period of the Protocol, 2008 – 2012.

Annex 1 or Annex B?

In practice, Annex 1 of the Convention and Annex B of the Protocol are used almost interchangeably. However, strictly speaking, it is the Annex 1 countries which can invest in JI/CDM projects as well as host JI projects, and non-Annex 1 countries which can host CDM projects, even though it is the Annex B countries which have the emission reduction obligations under the Protocol. Note that Belarussia and Turkey are listed in Annex 1 but not Annex B; and that Croatia, Liechtenstein, Monaco and Slovenia are listed in Annex B but not Annex 1.

PROJECT OUTPUTS

Carbon offsets – used in a variety of contexts, most commonly either to mean the output of carbon sequestration projects in the forestry sector, or more generally to refer to the output of any climate change mitigation project.

Carbon credits – as for carbon offsets, though with added connotations of (1) being used as 'credits' in companies' or countries' emission accounts to counter 'debits' i.e. emissions, and (2) being tradable, or at least fungible with the emission permit trading system.

ERUs (emission reduction units) – the technical term for the output of JI projects, as defined by the Kyoto Protocol.

CERs (certified emission reductions) – the technical term for the output of CDM projects, as defined by the Kyoto Protocol.

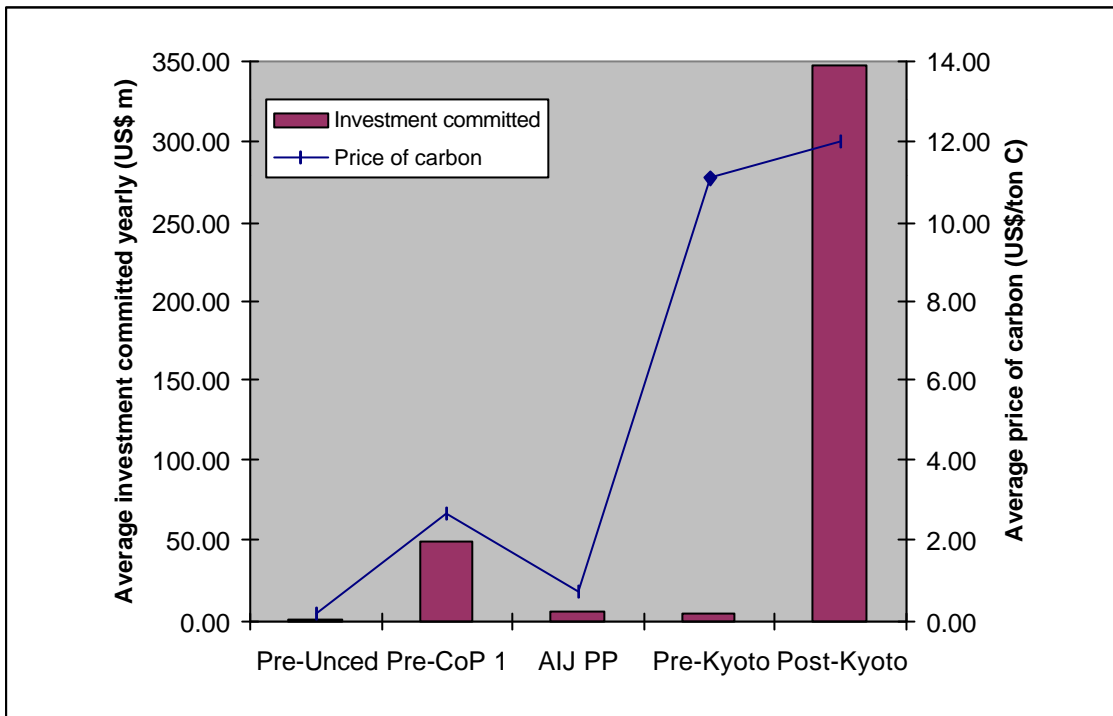


Figure 1 : Average investment committed yearly (US\$ millions, based on value of contracts signed) and price paid for carbon sequestration (US\$/tonne C) during different periods since 1989. Pre-UNCED = before 1992; Pre-CoP 1 = phase between UNCED and the 1st Conference of Parties to the FCCC, 1992 to 1995; AIJ PP = Activities Implemented Jointly Pilot Phase, from 1995 to 1996; Pre-Kyoto = 1997; Post-Kyoto = January to June 1998. Figures for the Post-Kyoto phase were based on non-official data, and were adjusted to give a proportional idea of a one-year contribution. Some figures were based on press announcements and bound to contain inaccuracies