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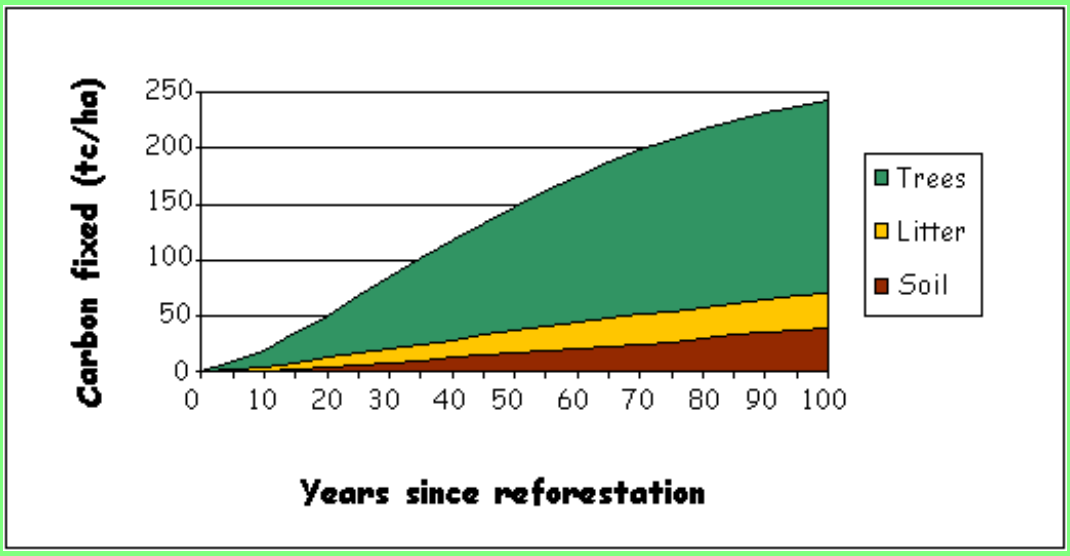
Carbon Dioxide Offset Investment in the Asia-Pacific Forestry Sector: Opportunities and Constraints



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Foreword

Since the industrial revolution, atmospheric concentrations of greenhouse gases, especially carbon dioxide, have increased considerably as a result of fossil fuel use and deforestation. This has significantly raised the threat of rapid increases of global temperatures. As concern over this prospect has grown, various options have emerged for mitigating the problems and threats associated with climate change. Debates over the options for decreasing greenhouse gas emissions have been particularly intense, and have frequently been characterized by a lack of understanding by many of the parties involved.

Storing carbon in trees and forests is one option for offsetting the gases released by fossil fuel burning, and for mitigating the potential effects of global warming. Under the Kyoto Protocol negotiated in December 1997, recognition is given to this option. Countries that have agreed to specific greenhouse gas emission limits will be eligible to receive credit for certain domestic forestry and land-use activities that increase the storage of carbon in sinks. Moreover, under the Kyoto Protocol, countries will be able to earn emission reduction credits by carrying out collaborative carbon-storage activities in other countries. These credits, in turn, can be used to "offset" greenhouse gas emissions in their home countries to partially meet emission reduction commitments.

Numerous issues related to the new international negotiations and agreements remain unclear, however. Many questions remain over the economics, politics, and mechanisms under which the new agreements will be implemented. Nonetheless, it is apparent that forestry could play a significant role in the global strategy for mitigating the threat of global climate change. For industrialized countries, and the world in total, opportunities exist for efficient and low-cost approaches to reduce carbon emissions. For developing countries, opportunities exist for increased investment in forestry, transfers of technology, expanded rural employment, and enhanced environmental development. These opportunities are currently clouded, however, by uncertainty over future developments in the field, lack of information and knowledge, and mistrust between developed and developing countries.

FAO/RAP prepared this publication in an effort to increase understanding of the issues, opportunities, and constraints for forestry-related carbon-offset projects in the Asia-Pacific Region, and to enhance awareness of options for effectively developing such projects. It addresses concerns and perceptions from the perspectives of both developed and developing countries. Insights are provided into past and current carbon-offset initiatives, and recommendations are offered for future action in the Asia-Pacific Region. FAO/RAP is pleased to advance the debate and understanding of the issues related to forestry carbon offsets through this publication.

Soetatwo Hadiwigeno
Assistant Director-General and
Regional Representative of FAO

Foreword

Carbon dioxide offsets by investments in the forestry sector is a viable proposal. In fact, the global climate will benefit twice if the investments are directed to plantations that supply wood energy. First, by initial carbon sequestration when the trees are growing, and second, by avoiding emissions when the trees are used as a source of wood energy on a sustainable basis. The second effect reflects common practice in Asia.

In Asia, about 2 billion people use fuels from wood or other biomass for their daily cooking needs. Most of these fuels are indeed, used on a sustainable basis. (Contrary to widespread belief, woodfuel use is not a general cause for deforestation!) The beneficial implications for the global atmosphere can be estimated in terms of avoided emissions. If households used a fossil fuel like coal instead of wood, about 560,000 kton of carbon dioxide per year would be emitted into the atmosphere. In terms of money, this means that annually some US$ 20-30 billion for offsetting carbon dioxide is being avoided by current practices of woodfuel use amongst relatively poor households in Asia.

It is recommended to develop wood energy in Asia further by modern applications, not only for increased carbon dioxide savings, but also for pursuing national interests like creating employment, managing the local environment, and reducing current accounts deficits.

The Regional Wood Energy Development Programme in Asia links sixteen countries and is part of FAO's programme to jointly work with the member countries for the stated objectives.

W.S. Hulscher,
Chief Technical Adviser,
Regional Wood Energy Development Programme in Asia

List of Abbreviations

AGBM	Ad Hoc Group on the Berlin Mandate
AJI	Activities Implemented Jointly
AOSIS	Alliance of Small Island States
APEC	Asia-Pacific Economic Cooperation
APHI	Association of Indonesian Forest Concession Holders
CDM	Clean Development Mechanism
CFC	Chlorofluorcarbon
CIFOR	Center for International Forestry Research
CJII	Canadian Joint Implementation Initiative
COP	Conference of the Parties
CROJI	Costa Rica's Office for Joint Implementation
CTO	Certifiable Tradable Offsets
EAC	Environmental Auditing Committee
EEI	Edison Electric Institute
ERC	Emission Reduction Credit
EU	European Union
FACE	Forests Absorbing CO_2 Emissions
FCCC	Framework Convention on Climate Change
FONAFIFO	Costa Rican National Forestry Financing Fund
FPL	Fiji Pine Limited
FSC	Forest Stewardship Council
GHG	Greenhouse gas
GIS	Geographic Information System
INE	Instituto National Ecologica
IPCC	Intergovernmental Panel on Climate Change
ITTO	International Timber Trade Organization
JI	Joint Implementation
MITI	Ministry of International Trade and Industry
MOP	Meeting of the Parties
NEES	New England Power Company
NGO	Non-governmental Organization
OECD	Organization for Economic Co-operation and Development
PFP	Private Forestry Project
PPP	Pilot Project Program
QELRO	Quantified Emission Limitations and Reduction Objectives
RBCMA	Rio Bravo Conservation and Management Area
RIL	Reduced Impact Logging
TEI	Thailand Environment Institute
TNC	The Nature Conservancy
UFCMP	Utility Forest Carbon Management Program
UNCED	United Nations Conference on Environment and Development
USAID	United States Agency for International Development
USCSP	United States Country Study Program
USIJI	United States Initiative on Joint Implementation
VCR	Voluntary Challenge and Registry
WBCSD	World Business Council for Sustainable Development
WEPCO	Wisconsin Electric Power Company

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1. INTRODUCTION

Growing concern about the effects of climate change has led to increasing research, policy initiatives, and development of innovative programs and projects around the world. These activities have focused on developing a better understanding of the environmental, economic, and social risks associated with climate change. Developing policy, program and project measures that reduce human-induced greenhouse gas (GHG) emissions (i.e., CO_2, N_20 and chlorofluorocarbons [CFCs]) are of particular interest. Opportunities to reduce GHG emissions exist in the energy, transportation, agriculture, and forestry sectors of the global economy. These opportunities vary regionally and nationally, depending on a number of environmental, economic, and social variables.

International negotiations through the United Nations Framework Convention on Climate Change (FCCC) have led to the establishment of Quantified Emission Limitations and Reduction Objectives (QELRO) for industrialized countries – most notably the United States, European Union and Japan. QELRO are to be achieved through both domestic and international actions using an emerging international trading system for GHG emissions. One international approach available to these countries has been tested for several years: to offset their industrial emissions, parties in industrialized countries have invested in low-cost carbon dioxide mitigation projects in developing countries that reduce, avoid, or sequester GHG emissions. In this paper "carbon offset" project activities are generally referred to as certified Emission Reduction Credits (ERC). Engaging in ERC projects has been voluntary in nature with no actual credit received for the emissions reduced, avoided, or sequestered, but in the near future ERC projects will be a major mechanism for developed countries to achieve their legally binding QELRO.

Profitable ERC project opportunities have been identified in the energy, transportation, and forestry sectors. The pilot phase for Activities Implemented Jointly (AIJ) provides a framework for countries to both experiment and gain experience with ERC projects on a voluntary basis. Many governmental and private sector programs now promote ERC pilot projects. As of October 1997, about 40 projects are officially recognized by the FCCC. This number is likely to grow significantly. Many projects focus on the forestry sector, as opportunities in this sector are of low cost relative to other sectors. Thus, they are often termed "no-regrets" projects since they tend to be compatible with other important environmental, economic, and social priorities.

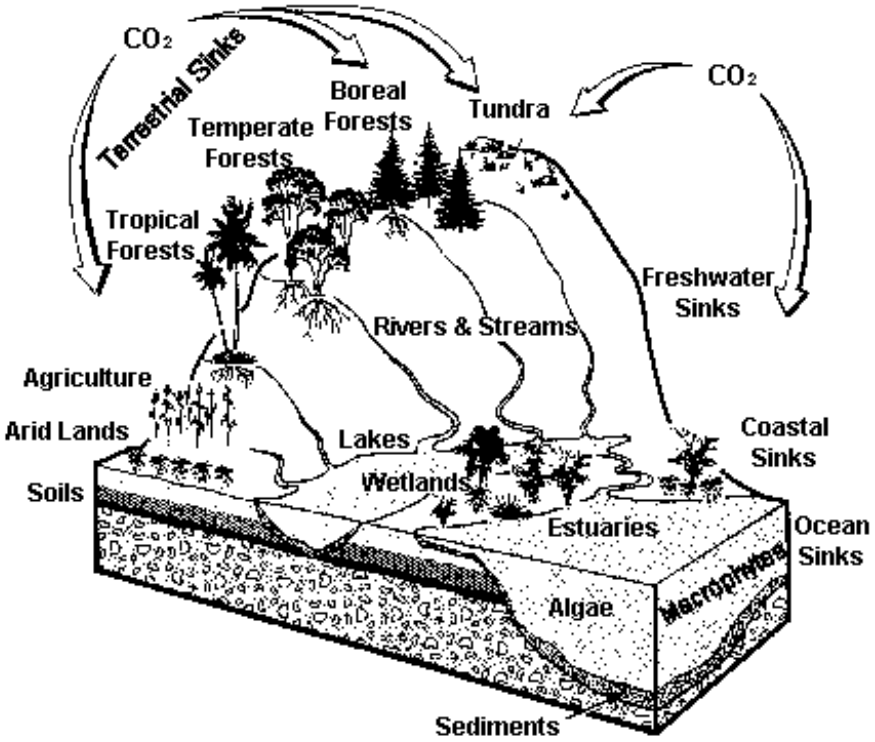
Just as businesses often locate manufacturing facilities in developing countries to lower costs and increase profit margins, developed countries see a comparative advantage in developing and investing in forestry sector ERC projects in developing countries. The comparative advantage is generally related to low-cost land and labor and greater biomass growth rates of tropical forests (sequestration and storage) versus that of countries in temperate and boreal regions. On the other hand, distance, business culture differences, and other technical and social challenges in some Asia-Pacific countries increase investment risks and transaction costs.

An important issue worth noting is that GHG emission levels of developing countries will soon surpass developed countries. ERC project activities financed by developed countries represent investment that ultimately helps directly and indirectly reduce national level emissions of developing countries. ERC projects, by definition, should contribute to sustainable economic development and be

endorsed by governments of both developing and developed countries. Thus, the host country government acceptance or approval provision of ERC projects provides for developing country government oversight of ERC investment in their country – presumably ensuring that the investment is consistent with their national development priorities. This report focuses on opportunities and constraints in forest sector ERC projects in the Asia-Pacific Region. The following sections explore opportunities for developing such carbon dioxide emission offset projects in the Region. Subsequent sections provide background on the international policy framework for ERC (or GHG mitigation) mechanisms, namely Joint Implementation (JI), Activities Implemented Jointly and the emerging Clean Development Mechanism (CDM).

1.1 The Asia-Pacific Region

The Asia-Pacific Region is one of the world's most significant for studying climate change and potential strategies to address it. The Region contains many island nations and vast coastal regions where rising sea levels can have a significant impact. Its countries contain major portions of the world's remaining natural tropical forests, plus the majority of the world's population. The Region's forests are not only extensive terrestrial sinks of GHGs, but also major reservoirs of global biological diversity. Understandably, most countries in the Region feel both vulnerable to and threatened by possible climate change.



The forests of the Asia-Pacific Region are not the only carbon sinks but their value is enhanced due to their role in global biodiversity conservation

Arguably, all socio-economic levels within the Region have benefited from the growing liberalization of the world economy. Investment by developed countries is generally credited for the Region's unprecedented economic growth. ERC project investment in a most basic sense offers an opportunity for investment in climate friendly projects and the emerging market value of carbon dioxide. Such ERC investments can be viewed as an innovative form of investment fueling sustainable development.

Historically, developed countries have been responsible for most GHG emissions and, therefore, bear much of the responsibility for the problems associated with climate change. However, the Asia-Pacific Region is projected to become one of the world's largest contributors of GHG emissions. China, for example, the world's most populous country, recently became the second largest emitter of GHG, replacing the European Union. China, India, and Indonesia are currently among the top ten countries in GHG emissions. Their emissions, relative to other nations, are expected to grow significantly unless major preventive steps are taken (WRI, 1994). China alone accounts for 9.9% of total global emissions, followed by India (3.7%) and Indonesia (1.9%). New technologies and strategies for reducing GHG emissions from these countries are, therefore, critical. The challenge is to enable countries to pursue sustainable development goals while promoting energy efficient technologies and conservation of carbon sinks (forests), thereby minimizing further increases in GHG emissions.

1.2 The United Nations Framework Convention on Climate Change (FCCC)

The FCCC, which opened for signature during the 1992 United Nations Conference on Environment and Development (UNCED) held at Rio de Janeiro, Brazil, was designed as a first step in dealing with the threat of anthropogenic climate change. The main objective of the Convention is to stabilize atmospheric GHG concentrations at a level that would prevent dangerous anthropogenic interference with the climate system.

The FCCC contains a wide range of provisions. Under Article 4.1, all Parties are obligated to prepare national inventories of emissions by sources and removals by sinks of certain GHGs (see also FCCC Article 12 regarding communicating and reporting methodology) and undertake measures to mitigate climate change. Article 4.1 also requires all Parties to cooperate in controlling, reducing, or preventing anthropogenic emissions of GHGs not controlled by the Montreal Protocol [on Substances that Deplete the Ozone Layer]. Article 4.2 requires industrialized country Parties and other Parties listed in FCCC Annex I[1], which comprises those countries that were members of the Organization for Economic Co-operation and Development (OECD) at the time of adoption, some Eastern European countries, and some of the countries that were part of the former Soviet Union, to adopt policies and take measures to limit anthropogenic emissions of GHGs and protect and enhance sinks. Under Article 4.2, Annex I

[1] The original Annex I countries are: Australia, Austria, Belarus, Belgium, Bulgaria, Canada, Czechoslovakia, Denmark, the European Community, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, the Russian Federation, Spain, Sweden, Switzerland, Turkey, Ukraine, the United Kingdom, and the United States of America. Since the FCCC opened for signature, additional countries have joined the OECD and there is no consensus among the FCCC Parties as to whether some of these new OECD members should become Annex I countries. This is particularly true of newly industrialized countries such as Mexico and South Korea.

countries must also report periodically on the policies adopted and measures taken "with the aim of returning individually or jointly to their 1990 levels these anthropogenic emissions of carbon dioxide and other greenhouse gases not controlled by the Montreal Protocol." The FCCC explicitly recognizes that countries have "common but differentiated responsibilities." Hence, all of the Parties to the FCCC have obligations to fulfill in terms of reporting, communications, and general actions, but only Annex I countries are subject to an aspirational "aim" of returning national emissions to 1990 levels by the year 2000.

Despite the fanfare attending the completion of the FCCC, the Convention was but the first step on a much longer road toward ameliorating global climate change. The Intergovernmental Panel on Climate Change (IPCC) had "calculated with confidence", that to stabilize atmospheric concentrations of long-lived GHGs at 1990 levels, it would be necessary to reduce current levels of emissions from human activities by 60%; yet Article 4.2 of the FCCC, which delineates the key obligations of industrialized countries with respect to climate change and establishes a reduction "aim," contains no binding emission targets or timetables.

In recognition of the preliminary nature of the commitments, FCCC Article 4.2 calls for a review of the adequacy of commitments at the FCCC's first Conference of the Parties to the Convention (COP). COP-1[2] was held in Berlin in April 1995. At that meeting, the Parties decided that existing commitments were inadequate to meet the Convention's ultimate objective for three reasons:

1. national projections of GHG emissions indicated that most Annex I countries were not on track to meet the Convention's emissions aim for the year 2000;
2. the Convention contained no provision relating to GHG emissions for the period after 2000; and
3. Parties recognized that stabilizing GHG emissions at 1990 levels would not be sufficient to stabilize atmospheric GHG concentrations.

Consequently, in a decision known in popular parlance as the "Berlin Mandate," a process was established to strengthen the FCCC's commitments for Annex I Parties through a protocol or other legal instrument with the goal of establishing Quantified Emissions Limitation and Reduction Objectives (QELROs or "targets") for the post-2000 time-frame, and of elaborating policies and measures relating to emissions reductions. A new body, the Ad Hoc Group on the Berlin Mandate (AGBM), was established to negotiate the new legal instrument, with a view to its adoption in 1997 at COP-3. The AGBM met eight times from 1995 through 1997 to discuss and develop the overall framework and specific provisions for the new legal instrument. It produced a draft text to serve as the basis for negotiations among high-level officials of the Parties to the FCCC at COP-3 in Kyoto, Japan. Thus, the stage was set for adoption of the Kyoto Protocol.

Of significance to the development of the Protocol and to its prospects for adoption by the Parties to the FCCC, was the decision in the Berlin Mandate at COP-1 that no new commitments would be negotiated for developing countries as part of the process adopted by the Parties through the Mandate. In general, the view of many developing countries, even before the negotiation of the FCCC, has been that it is the responsibility of the industrialized countries to adopt significant measures to reduce their GHG emissions before the developing countries should

[2] COPs are identified by adding a number at the end, so that the first COP is denominated COP-1.

potentially place their economic development at risk by adopting similar measures. This view stems largely from the fact that the industrialized countries, due to their economic development, historically were the largest GHG emitters and thus, in the view of developing countries, are responsible for the problems associated with climate change. This perspective is reflected in the Berlin Mandate, which, as noted above, expressly precludes the introduction of new commitments for developing countries as part of the process adopted by the Parties in the Mandate. However, the Berlin Mandate did call for the Parties to "advance the implementation of existing commitments under [FCCC] Article 4.1," commitments which apply to all FCCC Parties. This was another focus of negotiations and analytic efforts leading up to the Kyoto Protocol.

1.2.1 The 1997 Kyoto Protocol

The Kyoto Protocol contains several defining features. It provides for legally-binding emissions targets for Annex I countries, based on a five-year commitment period. It allows Parties flexibility with respect to national implementation of their commitments. It also provides flexibility in the international context by providing for the use of emissions trading and other market-based mechanisms, including cooperative projects between developed and developing countries. In addition, it takes a comprehensive approach by covering both GHG emissions and sequestration by sinks, and by including not only CO_2, methane and N_2O, but also the three synthetic GHGs. These and other important features are explained below.

The Kyoto Protocol contains substantive commitments in all three areas specified by the Berlin Mandate: binding emission limitation and reduction targets (i.e., QELROs) for industrialized countries; a requirement for industrialized countries to implement or further elaborate appropriate policies and measures to meet their QELROs as established by Article 3 of the Protocol; and provisions that reaffirm and seek to advance the implementation of certain commitments that pertain to all FCCC Parties. In addition, the Protocol contains several new mechanisms to provide for transboundary trading by Annex I countries of emission allowances and credits arising from QELROs.

1.2.2 Policy Framework for Joint Implementation, Activities Implemented Jointly and the Clean Development Mechanism

Article 4.2 of the FCCC provides that Parties may "individually or jointly" implement policies and measures aimed at reducing GHG emissions to 1990 levels by the year 2000. In response to broad equity and developing country concerns about the potential impact of JI projects on development, the COP-1 criteria require that all pilot JI projects:

1. support national development priorities;
2. be approved by both the host and investor country governments;
3. bring about real, measurable climate change benefits that would not have occurred without these projects;
4. be implemented with additional resources beyond normal official development assistance flows; and most importantly
5. not receive any carbon credits for emission reductions during the pilot phase.

The Convention, however, contains no further guidance on how such cooperation might occur. This omission led to debate as to whether the FCCC allows Annex I countries and developing countries to generate ERCs through "joint implementation". Many Annex I countries view JI through emission reduction projects in developing countries as a cost-effective way to reduce global emissions, while promoting the transfer of climate-friendly technology, if credit for reductions is provided to the Annex I country. Other countries, primarily developing countries, fear that industrialized countries would use JI as a way to avoid taking domestic action to reduce GHG emissions. The developing countries also fear that JI would allow industrialized countries to buy up all of the relatively cheap and easy emission reductions available in developing countries, so that when the developing countries take on emission reduction targets, only the more difficult and expensive reductions would remain for attaining their targets.

Unable to resolve the dispute over credit for JI with developing countries, the FCCC Parties established at COP-1 a pilot-phase of "Activities Implemented Jointly" (AIJ), to gain experience in cooperative projects to reduce emissions. The pilot phase allows Annex I Parties to invest in emission reduction projects in non-Annex I countries, but does not allow Annex I countries to take ERC credit for such projects. The Parties agreed to make a decision by the end of the year 2000 on whether to continue or terminate the pilot phase and on whether ERC may be provided for such projects.

Debate over JI continued during the negotiation of the Kyoto Protocol. Several Annex I countries, including the United States, proposed ending the pilot phase of AIJ and authorizing credit from JI with developing countries in the Protocol. China and many of the Group of 77 – representing the developing countries – vehemently opposed this proposal. The EU supported JI with credit among Annex I countries, but insisted on waiting for completion of the pilot phase of AIJ to take a decision on developing country participation in JI for credit.

Another component of the debate was the differing views on emission reduction cooperation among Annex I countries. The United States, New Zealand and other non-EU Annex I countries proposed a broad system to allow Annex I countries to trade portions of their assigned amounts.[3] The proposed "emissions trading" system would require countries, as part of their national monitoring and reporting systems, to track and report country-to-country emissions transfers, which would be recorded by the FCCC Secretariat. Private sector participation would be allowed, but would be overseen by the Parties themselves, not by the Secretariat or any other international body. The EU opposed this formulation, in favor of a project-based JI system among Annex I Parties only.

Under the EU proposal, Annex I countries could only trade credit for emission reductions generated from specific projects. The proposed system would require international certification and tracking of each individual project and resulting trade, with one exception: trade within the EU bubble. Many non-EU Parties argued that the EU's internal burden-sharing arrangement was, in fact, a form of internal, EU target-based emissions trading, and that all Annex I countries should be provided with the same opportunity. The EU countered that the

[3] Target-based emissions trading of assigned amounts deals with transfers of portions of overall budgets from one country to another and therefore differs from JI, which is based on specific projects. While JI could produce transferable credits, emissions trading allows transfers in actual assigned amounts based on targets. Under target-based trading, each Party is responsible for ensuring that the tons of emissions that it has sold are "good." Each Party also must ensure that its emissions are less than its assigned amount, adjusted for trading transactions, at the end of the commitment period. Under a JI system, the emission reductions generated are certified prior to sale.

burden-sharing is necessary due to, and is strictly a product of, the EU member states' unique economic cooperation.

Ultimately, four distinct mechanisms reflecting the competing proposals on transboundary emission reduction cooperation were included in the Protocol. Project-based transfer of credits, or ERC, among Annex I countries, is authorized by Article 6 and accounted for in Article 3.10 and 3.11. Through these provisions the Annex I countries and private-sector participants would be able to invest in emission reduction projects in the territory of any other Annex I country and to apply ERCs for such projects toward their national emission targets. As a precondition for acquiring credit for an emission reduction through such project-based ERC, Parties must be in compliance with the measurement and reporting requirements of the Protocol. The Article does not contain rules or guidelines for the certification and tracking of projects or for attaining credit for emission reductions generated by such projects, but these may be further elaborated by the meeting of the parties (MOP).

In comparison to project-based trading under Article 6, future development of a target-based emissions trading system is authorized by Article 17 and accounted for in Article 3.10 and 3.11. Despite a difficult, lengthy debate the Parties were not able to agree in Kyoto on the specific mechanism or rules for target-based emissions trading; therefore, the language of these Articles does not provide much detail on the type of target-based trading system contemplated by the Parties. Instead, the Protocol simply authorizes Annex B countries to participate in emission trading with each other and use such trading to meet emission target commitments under Article 3. It also directs the COP (under the FCCC) to develop the rules and modalities for emission trading (e.g., concerning accounting, verification, and reporting of trades). If the COP does not agree on modalities and guidelines for emissions trading, Annex I countries might be able do that on a bilateral or multilateral basis. Finally, the Protocol specifies that such trading shall be "supplemental to domestic actions" to meet emission target commitments. The COP, rather than the MOP, was tasked with the duty of defining the rules and modalities of trading prior to entry into force of the Protocol.

Authorization of the EU burden-sharing arrangement is contained in Article 4. Early in the negotiations, as a concession to other Annex I countries which viewed the burden-sharing arrangement as providing a special advantage to EU member states, the EU proposed language which would allow other Annex I Parties the option to "bubble" (i.e., meet their commitments individually or jointly). Article 4 allows Annex I Parties, including Annex I Parties acting within the framework of a regional economic integration organization, to agree to jointly fulfill their Article 3 commitments.

A fourth mechanism for international cooperation on emission reductions is authorized by Article 12 and accounted for in Article 3.12. This mechanism reflects the evolution of a concept first proposed by Brazil as a non-compliance mechanism – the "Clean Development Mechanism" (CDM). The CDM concept received full G-77/China support and is viewed as distinct from JI in the following: CDM projects can be developed by the developing country itself and the CDM guidelines would be uniform among nations (multilateral), whereas JI is unilateral. Under the CDM, Annex I Parties may invest in emission reduction projects in developing countries and may apply some portion of the reductions generated by these projects toward meeting their emission target under Article 3.

In return, a share of the proceeds from projects will be used to finance adaptation to climate change in particularly vulnerable developing countries, as well as to cover the administrative expenses of the mechanism. The CDM will be supervised by an executive board and subject to the guidance of the MOP, which will develop rules and guidelines for operation of the CDM, and designate operational entities to certify and track projects. Certified emission reductions obtained as early as the year 2000 may be used to assist in achieving compliance in the first commitment period. Hence, under the CDM, Annex I countries may be able to generate ERCs applicable to their QELROs by investing in projects in developing countries that meet certain requirements.

1.2.3 The Future of the Protocol and Emission Reduction Credits (ERC)

The Kyoto Protocol has the capacity to move its Parties further along toward a regime that more adequately addresses the problem of global climate change. The development of binding targets and timetables for Annex I countries begins to address the main shortfall of the FCCC. It remains to be seen, however, the extent to which the Parties will be able to develop the various market mechanisms needed to realize the full potential for cost-effective ERC systems, such as emission trading and the CDM.

In the near term, further action on elaboration of the Kyoto Protocol is likely to focus primarily on the rules and guidelines for emissions trading and other market-based mechanisms in preparation for COP-4 in November 1998 at Buenos Aires, Argentina; although Decision L.7, through which the Parties participating in COP-3 adopted the Protocol, lays out additional topics for discussion at COP-4. The rules and guidelines for emissions trading might include mechanisms for verifying and tracking emission trades, and accountability and consequences for violating trading rules. Similar considerations might be considered in the development of the modalities and procedures for the CDM.

It will also be important to involve developing countries more closely in efforts to combat climate change. As indicated above, this is necessary because of the volume of GHG emissions expected from developing countries in the future, particularly from large economies such as those of China, India, and Brazil. It is also critical from a political perspective as the United States and others want greater developing country involvement.

1.2.4 The Kyoto Protocol and the Forestry Sector

Article 3.3 of the Kyoto Protocol mentions that net changes from deforestation, reforestation, and afforestation will be included in Annex I national emissions inventories. Articles 6 and 12 contain broader language providing support for ERC project activities, including the range of forest sector activities.

Article 3.3 language has generally been regarded as complicated, resulting in different interpretations. Some analysts contend that the apparent omissions of forest management and especially conservation mean that they would not qualify as ERC activities in the future. Others contend that forest management and conservation are encompassed in the terminology – deforestation, reforestation, and afforestation. Article 6 mentions that projects can be developed in “any sector of the economy” which could encompass conservation and forest management. Article 12 pertains to non-Annex I countries and defines the CDM. Its language regarding ERC seems to be even broader than that of Article 6.

In summary, there are three important points to recognize: 1) sinks are definitely included in the Protocol, although forest management and conservation are not specifically mentioned; 2) forest management seems to have broader support than conservation for inclusion in Protocol ERC activities; and 3) the Protocol provides for credit for ERC project activities. Much debate and interpretation will occur over the coming months, especially relating to the inclusion or omission of conservation and forest management. A June, 1998 FCCC meeting in Bonn, Germany and the November 1998 COP-4 meeting will provide fora for both Annex I and non-Annex I countries to address these issues and define the scope and nature of an ERC project regime.

1.3 Investment Patterns and Cost of CO_2

The concept of ERC project credit, which was lacking prior to Kyoto, is the driving force or incentive for investing in ERC activities. By agreeing to crediting and emissions trading, Parties to the Kyoto Protocol have done much to increase investor interest in the value of carbon dioxide and offsets of emissions. The immediate effect of the policy uncertainty (regarding forestry and general ERC activities) on investment is unclear, but investor interest has clearly increased since Kyoto and the market is developing.

Several dozen carbon offset projects have already been developed throughout the world, some of which are discussed in later sections of this report. Investment capital has so far generally come from developed country governments and private sector companies, primarily in the electric utility industry. Most projects have been in the forestry and energy sectors, and have been undertaken only as pilot projects. This is consistent, however, with the basic purpose of AIJ, as its purpose is to demonstrate the various valid approaches and proven efficiencies of such projects, while also identifying potential problems. The costs of these early carbon offset projects in the forestry sector have been estimated at between US$ 0.50 and US$ 2.00 per ton of CO_2 (Dixon *et al*., 1993). Some of these estimates, however, are considered “soft”, as most participating investors have leveraged support from other organizations, such as environmental and development advocacy groups, whose inputs are generally not accounted for in total GHG costs.

Another way to estimate the potential costs for carbon offset projects is to examine existing or projected regulatory costs for GHG emissions. Though there are no current US taxes on GHG emissions, Manne and Richels (1994) estimated that uncertainty over future GHGs regulations in the US has influenced electric utilities’ decisions to the equivalent of a carbon tax of US $4.75 per ton of CO_2. Several other countries, and some state jurisdictions in the US, have already imposed or are considering taxes on energy consumption based on carbon content. Scandinavian countries have already imposed such energy taxes – based on carbon emissions – on both industry and personal consumption. For industry consumption, these taxes currently range from US$ 3.93 to US$ 10.39 per ton of carbon (OECD, 1994). Future projections for the cost of CO_2 emission taxes vary significantly, depending on the policy objectives and level of GHG reductions, as well as parallel policy incentives for developing alternative energy technologies. Two recent analyses estimated the following costs per ton of carbon[4]:

[4] These cost estimates are for tons of carbon; to obtain equivalent cost estimates for CO_2, divide these figures by 3.67.

- The International Energy Agency estimated that for developed countries (i.e., OECD), a tax of US$ 72 per ton of carbon would be required to lower emissions by the year 2050 to 12% below 1990 levels.
- The US Congressional Budget Office estimated that a tax of US$ 28 per ton of carbon would be required to stabilize US emissions at 1990 levels, reflecting the official US commitment to date.

1.4 Opportunities for Tangible Benefits in the Asia-Pacific Region

A major benefit developing countries could obtain through a properly structured international emission reduction system is access to foreign capital investment and new, superior technologies. Many developing countries seek greater foreign investment to improve their infrastructure. Development of such emission reduction measures can provide a mechanism for directing such investment to areas where it is most needed. In addition, many countries are seeking ways to improve their obsolete or inefficient technologies and see developed country investment as a means of obtaining state of the art technologies. Introduction of new technologies through such investment in energy efficiency or alternative energy sources could allow countries to reduce energy, especially oil imports, which in turn could free some foreign exchange plus provide additional funds for development programs.

ERC projects in the forestry sector could, for instance, provide biomass as an inexpensive and purely local source of alternative fuels. Forestry projects could provide many environmental benefits: reducing soil erosion, protecting watersheds, enhancing water quality, and conserving biodiversity, while at the same time creating or maintaining valuable carbon sinks. The following opportunities are adapted from a paper presented at a 1997 AIJ workshop in India.

Increased Investment in Priority Sectors

Because the FCCC criteria specifically requires host country government approval for international ERC projects, countries have an opportunity to direct new private capital flows into priority sectors of their economies. Thus, pilot projects could contribute to forestry sector investments that host governments deem desirable. These investments carry certain advantages over both joint ventures and foreign direct investment as the economic, social, and environmental benefits are an integral part of the project, not merely incidental effects.

In contrast, the viability of joint ventures is based primarily on the financial returns of the project within the host country. The global environmental benefits, if any, are purely by-products. For ERC projects, the contribution to GHG abatement is explicit and closely monitored. The economic return usually includes incentives provided by the host and investor country governments. A future trading system for carbon credits could also be included in the project's value. Projects that benefit the global environment can move forward even if they would not be financially attractive. Although joint venture projects do not necessarily provide these other benefits and are probably difficult, or nearly impossible to develop, they could well provide a more direct, less politically charged approach to obtaining foreign investment on acceptable terms.

Technology Transfer

ERC project principles require parties to report the transfer of environmentally sound technologies and know-how to developing countries. This framework, along with government approval of projects, can insure that state-of-the-art technologies are brought to countries in the Region. In the forestry sector reduced impact logging, intensive plantation management, conservation through social forestry, and biomass energy systems are only a few of the technologies that could be transferred through ERC projects.

Reduced Petroleum Imports

ERC projects that promote renewable energy sources, industrial and power generation efficiency, and fuel efficiency in transportation, can ease the burden of petroleum imports and free funds for critical development needs. Though the costs of some alternative energy sources are higher than coal thermal plants or diesel generators, most renewable technologies, such as biomass energy, are in the long run highly competitive.

Employment Generation

ERC investment can also assist countries in creating new jobs for their underemployed and growing workforces. Promoting renewable and decentralized power generation technologies, which are more labor and less capital intensive, can create new jobs. In the forestry and agricultural sectors, new jobs can be created through the development of sustainable management practices. Examples of more labor-intensive technologies include wind power and biomass energy production. New power generation plants can support small-scale rural industries, food and wood processing, and traditional crafts, just to name a few. Access to power also increases irrigation potential, thus raising crop yields, agricultural employment, and off-farm benefits.

Social and Infrastructure Benefits

ERC projects in the energy sector, especially those using decentralized technologies, in turn increase local food supplies and employment opportunities. Projects promoting sustainable forest management and the more efficient use of fuelwood – energy-efficient cookstoves, for instance – effectively enhance local access to fuel and, thus, encourage enterprises based on non-timber forest products. This would also protect valuable GHG sinks.

Institutional Capacity

A major barrier to moving forward with ERC projects in most developing countries is the lack of institutional capacity to design, execute, and monitor projects. That only a few pilot phase AIJ projects have emerged in the Region highlights the need for capacity building. Foreign investment, while it may provide capital, does not necessarily contribute to local skills. On the contrary, many projects have relied heavily on foreign equipment, consultants, technical expertise, and monitoring – all highly expensive. In the long run, this perpetuates dependence on outside experts, clearly inconsistent with sustainable development. Reporting guidelines during the pilot phase require project participants to assess the degree to which they strengthen host country capacity. Such projects, therefore, should provide opportunities for training and assistance in project

planning and development, technology assessments, marketing, project evaluation, communications and outreach, and, of course, policy analysis. Capacity building strategies should be directed to organizations at the local, state and national levels. This is rarely the case.

Local Environmental Benefits

Population growth, rapid urbanization, plus the development of heavy industry, and unsustainable agriculture and forestry practices have had serious adverse environmental impacts in many countries in the Region. Throughout the developing world, it is the poor who suffer most from air and water pollution, erosion, and other environmental problems. In many cases, government policy may exacerbate problems rather than solve them. International regimes, such as ERC, therefore, should focus on providing local environmental benefits and on promoting sustainable livelihoods, which do not degrade the environment. AIJ pilot phase criteria require projects to report on the local social and environmental benefits provided to host countries, beyond the benefits of GHG mitigation alone.

2. PERSPECTIVES AND RESPONSES

The success of ERC projects depends upon structuring projects to meet the objectives and expectations of all parties involved. In creating a framework for ERC projects, it is critical to consider the expectations of:

- the developing countries which will host such projects;
- the developed countries from which the investors will come; and
- the investors themselves, who will generally be private sector organizations responsible for substantial GHG emissions.

Over the past decade, initiatives to address climate change have emerged from international fora, national governments, and the private-sector. These initiatives and the responses to them are discussed in the following sections, presenting varying perspectives on ERC projects from both developed and developing countries.

2.1 Developing Countries

As noted earlier, developing countries do not have explicit commitments under the FCCC to reduce their GHG emissions, nor are they likely to have any in the foreseeable future. However, emission trading and ERC projects have a significant impact on developing countries. Developing countries have been active in defining the scope and structure of ERC projects. Developed countries see investment in such projects as a way of meeting their emissions reduction commitments in the most cost-effective way. Developing countries generally view such projects as a low-cost emissions reduction opportunity for developed countries, and some have been particularly sensitive to the concept.

For developing countries, different regions of the world have responded differently to prospects for initiating ERC projects. Latin America has benefited the most from ERC project investment. Among developing countries, Costa Rica has formulated the most sophisticated approach to developing such projects. The success of Costa Rica’s approach created interest in other countries of Central and

South America, such as Mexico, Belize, and Bolivia. In other regions, the Russian Federation created an internal process for reviewing forestry sector ERC proposals, while countries in Eastern Europe, such as Hungary and the Czech Republic, are developing promising ERC initiatives.

Developing countries in Asia and the Pacific may see ERC projects as a potential means of helping to meet national development priorities, but they have been more reluctant than countries in other regions to pursue ERC opportunities. A number of countries have exhibited a wait-and-see attitude and seem skeptical as to its success. Others, such as India, have supported a pilot phase for AIJ, arguing that time is needed to experiment with the concept and insure that ERC projects will work for the benefit of developing countries. Generally, the active support of developing countries has been lacking, which has contributed to a limited number of ERC projects in the Asia-Pacific Region.

2.1.1 The Asia-Pacific Region

Several countries of the Asia-Pacific Region lead developing country resistance to ERC projects and international trading. This has created difficulties for potential ERC project developers in the Region, especially as there is limited knowledge and enthusiasm for such projects within host country governments. The Asia-Pacific Region has generally been less receptive to ERC projects largely due to political tensions such as:

- Developing countries want to see progress by the developed countries in reducing their GHG emissions at home. They want developed countries to face up to the policy and economic realities of reducing their own energy consumption before calling on poorer nations to do so.
- Developing countries maintain they have a right to develop their natural resources and advance their national economies in a manner similar to what most developed countries used in the past to fuel their own economic development. Some countries question why developing countries should bear the brunt of global responsibility to reduce GHG emissions now when it is their opportunity to use their natural resources in ways that meet the demands of their growing populations.
- The current ERC framework will allow investors in developed countries to purchase the lowest-cost GHG credits from the developing countries, forcing the latter to invest more of their own resources in more expensive GHG reduction activities to meet their own future obligations.

The varying support for ERC projects around the world can probably be attributed to the stage of economic development and concern over ERC projects as a form of developed-country eco-imperialism. Eco-imperialism has become a concern to developing country governments, industry and NGOs only over the last decade. ERC projects are thus viewed by some as another ploy whereby developed countries dictate or control forestry (and energy) resources in a developing country. Countries with rapidly developing economies, mostly in Southeast Asia, but also including a few Latin American countries (Brazil, Venezuela), have expressed limited support. Lesser-developed countries of the Asia-Pacific Region are more receptive, although the position of regional leaders (e.g., Malaysia) affects their positions. The difference between lesser and more

developed countries of the Region is that the less developed countries are more dependent on international assistance, such as ERC project investment. Another reason is that more industrialized developing countries anticipate increasing emissions from their continued rapid economic development and are reluctant to engage in activities that might reduce their economic growth.

Geography also plays a part. Latin America is closest to the United States where the initial ERC concept, JI, first became operational. US-based NGOs and the private companies that first advanced ERC projects were most active in the Latin American Region. Thus, since the inception of the ERC project concept, awareness of the concept has been greatest in Latin America.

The response to ERC projects in the Asia-Pacific Region – which in different situations might be interpreted as opposition, disinterest, or caution – results in limited understanding, or even confusion, among governmental officials and non-governmental representatives. In a number of countries, it is therefore difficult to determine the government's position because officials in various ministries disagree or are uncertain about the costs and benefits of ERC projects in general.

As developing countries in the Region begin to recognize potential benefits resistance seems to be waning. India and the Philippines recently released their criteria for AIJ projects. Other countries seem set to follow. ERC projects are increasingly viewed as a way for developing countries to meet their national development and environment priorities while contributing to their economic, social, and institutional development. These benefits, in turn, can provide the basis and the funding for broader objectives, such as better health care, education, and human development – but only if the ERC system is ultimately restructured to make these far-reaching potential benefits both possible and visible.

2.1.2 Costa Rica and Central America

As mentioned earlier, Latin America has been a leader in developing ERC programs. Costa Rica is widely seen as the most innovative leader in promoting ERC projects. It has had the greatest success of all developing countries in getting projects approved through international programs and in obtaining their funding. Costa Rica's success is generally attributed to early recognition by the nation's political leadership that ERC investment holds tremendous potential for attracting foreign capital to support development activities consistent with Costa Rica's own environment priorities. This small country has, therefore, created its own internal research, development, and financial institutional mechanisms to promote ERC projects. Its leadership and success, moreover, have spilled significantly over to other countries in Central and South America. Mexico, Belize, and Bolivia, have all benefited from Costa Rica's experience and now encourage and assist project developers in attracting outside investment.

In July 1994, the Ministry of Natural Resources, Energy and Mines established the Costa Rica Office for Joint Implementation (CROJI) for facilitating and promoting the participation of Costa Rican private companies in GHG mitigation activities (Van der Gaast, 1996). In October 1994, the Costa Rican government, for instance, was the first nation to sign a bilateral JI agreement, in this case with the United States.

Costa Rica already has eight United States Initiative on Joint Implementation (USIJI) approved projects, four of which are in the forestry sector. These projects include several forestry activities: preservation, sustainable

forest management, reforestation, and agroforestry. A new forestry law passed in March 1996, created a specific framework for attracting ERC investments to forestry sector projects. It provides for a Costa Rican National Forestry Financing Fund (FONAFIFO) to assist with project development and to administer funds for small-scale reforestation and forest management projects (Tattenbach, 1996).

CROJI has developed a Carbon Fund to oversee carbon-offset projects. Similar to a mutual fund approach, the Carbon Fund protects investors against risks associated with projects by allowing them to purchase portions of the Fund's overall GHG reductions. The Fund also helps investors reduce transaction costs for development of individual projects, plus ensures the credibility of GHG reductions through rigorous, non-partisan, third party verification. The Fund serves as an intermediary between project developers and ERC investors by creating Certifiable Tradable Offsets (CTOs)[5] for purchase by investors.

CROJI issues CTOs through two separate JI initiatives: A Protected Areas Project (PAP), which focuses on preserving biological resources through land purchases and aimed at consolidating Costa Rica's system of National Parks and Biological Reserves. It also includes a Private Forestry Project (PFP) for compensating landowners for conservation, reforestation, and sustainable management efforts (Tattenbach, 1996). FONAFIFO developed a revolving fund, starting with a small carbon tax providing funds for launching several PFP projects. Project developers will assign GHG reductions to the Carbon Fund, which will then be sold as CTOs to interested ERC investors. CTO revenues will then be recycled into additional PFP projects, thus creating more such projects.

Costa Rica's innovative leadership and success in promoting JI projects appears to have had a significant impact on all of Latin America. Other countries have now developed their own ERC proposals and seek to develop domestic frameworks enabling them to better compete in attracting foreign capital. The Mexican government, for example, recently convened a workshop to bring ERC project developers together to share lessons on how to develop such projects, and how to explore ways to support the development and marketing of ERC projects.

The Mexican government has demonstrated its interest in ERC investment through establishing a focal point for JI/AIJ within the Instituto National Ecologica (INE), and three committees to review potential projects and to address methodological issues related to both forestry and the energy sector. The forestry sector's priority is significant as the first two Mexican-approved projects are in this very sector. At an April 1997 workshop in Chiapas, a government official noted that forestry sector opportunities provide an important short-term "window" for JI initiatives that could help the Mexican government meet sustainable development objectives while providing environmental priorities leading to substantial GHG reduction benefits. In the long term, however, he stated that investments in energy efficiency and alternative energy sources will be necessary.

A 1997 workshop in Chiapas, Mexico explored some of the innovative mechanisms used in the Scolel Te project (see Section 4.3.2): using a credit union as an intermediary between investors seeking GHG reductions and farmers

[5] CROJI (1996) describes a CTO as "… a specific number of units of GHG emissions reduced or sequestered in which all phases of the JI project in the host country have already been completed and in which the *without project* baseline has been certified by both the home and host countries. The home country verification would certify that the offsets are of high enough quality to allow them to count against national and firm level GHG reduction commitments, if such crediting is permitted under the FCCC."

engaged in forestry and agroforestry to ensure GHG reductions. Workshop participants also discussed national means for developing acceptable methodologies for quantifying forestry sector GHG reductions, while creating a viable portfolio of ERC projects, such as Costa Rica's Carbon Fund. Investments in Mexico would thus become less risky and more cost-effective for investors.

2.2 Developed Countries

As noted earlier, developed countries are urged by the FCCC to take the lead in designing and applying strategies for reducing global GHG emissions based on their commitments under the FCCC to reduce national emissions. Such commitments have generally not been met and the Kyoto Protocol has increased pressure to meet QELROs. In general ERC projects have focused on:

- Developing cooperative and mutually beneficial methods for reducing GHG emissions on a global scale and to take advantage of cost-effective opportunities in developing countries.
- Promoting sustainable development in developing countries through technology transfer and increased foreign investment.
- Encouraging increased private-sector investment and technology transfer from developed to developing countries.
- Developing pilot projects and evaluation methods through which the international community can learn and understand acceptable criteria for joint implementation.

Developing country ERC projects interest developed countries because any carbon dioxide offset in developing countries should be cheaper. They also, in effect, represent an additional form of international development assistance – which has generally seen significant reductions in recent years. Developed countries' concerns center on the reliability and credibility of projects in developing countries where it is often difficult to implement and monitor projects. This is especially true of land use projects where technical, financial, institutional, and policy barriers are common. Forestry sector ERC projects, therefore, are sometimes viewed as risky ventures needing contractual safeguards, such as strict monitoring and verification mechanisms.

Significant investment opportunity exists for cost-effective ERC projects worldwide. In response to this opportunity, a number of domestic ERC programs have now emerged, driven by both the governmental and private sectors:

- Development advocates who recognize the need for ERC investment in promoting sustainability and technology transfer (Owang and Karani, 1994; Rose and Tietenberg, 1994).
- Economists and diplomats who recognize the efficiency potential of ERCs (Jones, 1994).
- Host countries that wish to target foreign investment and technology for sustainable development priorities (Sughandy, 1996; Stowall, 1996).
- Private companies that see ERC projects as a means to protect shareholder value against policy uncertainty, as well as low-cost opportunity for highly visible entry in emerging markets under the banner of environmental sensitivity (Malin, 1996; Lafstedt *et al*., 1996).

Currently, at least ten developed countries, including the United States, the Netherlands, Canada, Germany, Australia and Japan have developed or declared their intention to develop mechanisms to review and approve international investment proposals to reduce GHG emissions (Stuart and Sekhran, 1996). To date, these national programs have led to several projects with an estimated capitalization of US$ 40 million. Much of this investment has funded projects in Latin America. The number of such projects is expected to grow as more countries become interested.

The Netherlands, one of the most experienced countries in carbon offsetting, has opted for a different track and has developed a "JI Simulation" program to review selected sustainable development initiatives supported by the Netherlands Development Assistance programs, modeled on ERC potential. A few of the more prominent programs adopted are briefly discussed below.

2.2.1 The United States

The USIJI is a US inter-agency panel, chaired by the Environmental Protection Agency and the Department of Energy, with further membership drawn from the Department of State, the Treasury, the Departments of Agriculture, Interior, and Commerce, plus the United States Agency for International Development (USAID). The USIJI was developed under the 1993 US Climate Change Action Plan and is the first US attempt to forge program encouraging voluntary private sector ERC initiatives. The USIJI acts both as an auditor of ongoing projects and as an evaluator of proposed projects.

The USIJI has had six evaluation rounds since 1994, during which 28 projects were approved. About half these are in the forestry sector. Most projects are in Latin America and Eastern Europe. Of the six forestry interventions, preservation, reforestation, reduced impact logging and biomass energy are all represented. Twelve of the 28 projects are fully or partially funded. Interest from investors, however, seems to have increased since Kyoto.

2.2.2 The Netherlands

The Dutch Electricity Board (S.E.P.) instigated one of the earliest forestry carbon offset programs, the Forests Absorbing CO_2 Emissions (FACE) initiative, with the expressed goal of financing 150,000 hectares of varied reforestation activities over the coming twenty years. The initial impetus behind FACE's creation was S.E.P.'s desire to demonstrate that the proposed EU carbon tax would not be the most effective or reliable way to lower overall carbon emissions. The tightening of standards for sulfur and nitrogen oxide emissions, to reduce acid rain precursors in the Netherlands, had already forced coal-reliant Dutch utilities to make significant investments in cutting edge scrubber technologies. Currently, 90% of Dutch electricity is generated by burning fossil fuel, and S.E.P. admits that it will be decades before the industry can convert to a system, which produces lower CO_2 emissions (Stuart and Sekhran, 1996). The FACE Foundation has already launched afforestation activities in the Netherlands, Central Europe, South East Asia, and Central America.

The Dutch government has developed an ERC modeling initiative: the Pilot Project Program (PPP). The PPP amounts to a testing regime for developing organizational models, GHG reduction calculation methodologies and criteria for

identifying suitable projects. PPP participants are selected from ongoing Dutch bilateral aid projects with characteristics, which could be suitable candidates for future ERC investment. To participate in the PPP modeling process, host governments must agree to the status of "early experience." They do not, however, need to formally endorse ERC principles at this time.

Presently, the PPP initiative is modeling eight projects. They include three FACE Foundation forestry projects (in Ecuador, Uganda, and the Czech Republic), a landfill methane extraction project in Moscow, a horticultural efficiency project in Western Siberia, and a municipal energy efficiency project in Hungary. Additional projects include compressed natural gas retrofitting for buses in Hungary and a micro-hydro project for Bhutan.

2.2.3 Australia

In late 1994, Australia initiated a Pilot JI Program for the South Pacific. The program concerns enhanced measures, all undertaken in cooperation with the South Pacific Forum Secretariat Energy Division. Two further projects are in the final stages of contractual negotiations; a photovoltaic installation in Fiji and a demand-side management program in the Solomon Islands. The Australian Department of Environment funded both as models to explore various ERC issues, including baselines, intergovernmental affairs, and crediting. This pilot program is unlikely to be expanded as it depends totally on internal departmental funding.

Australia is also developing a larger ERC program, along the lines of the USIJI. Unlike the South Pacific initiative, projects will not be directly government funded. The aim is to encourage Australian companies to direct capital towards projects which are both profitable and GHG beneficial. The plan will include efforts to develop bilateral agreements with the Asia-Pacific Economic Cooperation (APEC) and South Pacific countries, the development and implementation of cooperative projects with other countries, initiatives to enhance the export of Australian technologies and services with greenhouse benefits, and greenhouse specific development assistance to countries in the Asia-Pacific Region.

2.2.4 Canada

The Canadian government has initiated a Canadian Joint Implementation Initiative (CJII). Emission reductions are registered within an internal Canadian system, the Voluntary Challenge and Registry (VCR) under Canada's Ministry of Natural Resources. Initiated in February 1995, by November 1995, VCR had registered over 475 participants. Now, 50% of the forestry, pulp and paper industries, 100% of all refiners, 95% of electric utility and chemical industries, 88% of natural gas distribution companies, and 60% of the mining industries participate in the VCR (Stuart and Sekhran, 1996).

The CJII is a sub-program within the VCR. The stated objectives of CJII are to contribute to global efforts to reduce net emissions of GHG through voluntary partnerships between Canadian and foreign entities and to encourage private sector initiatives in developing technologies for building such capacities in other countries. It will test and evaluate methodologies for initiating JI to gain early and practical experience for longer-term JI programs both domestically and internationally. The pilot projects hope to: 1) achieve cost-effective GHG emission reductions; 2) be sustainable over the long term; 3) have social, environmental and economic benefits; and 4) improve energy efficiency in other countries as well.

2.2.5 Japan

Japanese ERC initiatives began in late 1995. The lead agencies for these initiatives are the Environmental Agency (EA) and the Ministry of International Trade and Industry (MITI). They are similar to the Dutch PPP in emphasizing monitoring and evaluating existing assistance projects to improve energy efficiency. Project proposals are eventually expected to broaden in sope and include forestry and renewable energy proposals with members of the Alliance of Small Island States (AOSIS) (Matsuo, 1996). One of the Japanese program's aims is to create an extensive project portfolio for monitoring and certification protocols. In the Japanese ERC program, each ministry or agency is only responsible for assessing the projects submitted to it.

The guidelines include stipulations for a Japanese ERC project, providing the following conditions be met: the project's effectiveness in reducing carbon dioxide emissions must be assessable; the recipient country must agree; and the project must accept environmental assessment and no increase in CO_2 can be allowed once the project is underway. The Ministry of Agriculture, Forestry and Fisheries has also approved six forestry projects based on community reforestation. Four of the projects are in Southeast Asia. One is in Central Asia and the other in East Africa. These are all sponsored by NGOs with one exception – one funded by the commercial Sumitomo Forestry Group. This project involves a development in a large forestry plantation.

2.3 Private Sector Initiatives

Private sector investors in ERC projects respond to both international market-based opportunities and the possibility of regulatory approaches to reducing GHG emissions. For companies with significant GHG emissions, it is logical to seek low-cost investment opportunities in developing countries through which they can voluntarily offset their emissions. One investment approach for companies is to "bundle" projected GHG emissions with investments that will offset those emissions. Such an approach provides at once recognition, while lowering emissions. It would also demonstrate the credibility of a market-based approach. Company investments in ERC projects can also provide market access in rapidly developing economies, thus providing additional opportunities for businesses.

Private sector investors are also responding to the expectations, and fears, of regulatory frameworks, which might be imposed. Company response, therefore, is based on a strategy that could prevent such a framework from being arbitrarily imposed. It might well take advantage of investment opportunities below the anticipated regulatory costs. The private sector has also developed initiatives to promote ERC projects. Beyond individual corporate investments in carbon offset projects, there are four major private sector initiatives which promise to identify private investment opportunities.

2.3.1 Edison Electric Institute

The Edison Electric Institute (EEI) is the US utility trade association for investor-owned (private) utilities. It has a combined annual revenue of US$ 170 billion (Stuart and Sekhran, 1996). In voluntary cooperation with the US Department of Energy, EEI is coordinating the US electricity industry's GHG emissions reduction efforts as a part of the US Climate Challenge Program. Individual

utilities sign commitments of intent with the Department of Energy for reducing emissions by either a given percentage or a gross amount. By the end of 1995, 113 commitments had been signed representing annual reductions of 47 million metric tons of carbon equivalent by the year 2000 (Stuart and Sekhran, 1996).

EEI has separately developed five individual initiatives in different sectors. One is the Utility Forest Carbon Management Program (UFCMP). The UFCMP developed criteria, plus a process, to review proposed carbon offset projects in the forestry sector. One year later it issued a request for proposals to hundreds of individuals and organizations. Thirty-two proposals, from the US, Central America, South America, and Asia were reviewed by the UFCMP committees (Kinsman *et al.*, 1996).

A non-profit corporation, the UtiliTree Carbon Company, was established by forty of the UFCMP's 55 utilities to sponsor these selected projects. UtiliTree was initially capitalized at US $2.4 million, with a range of contributions from US $10,000 to $25,000 (Energy Information Administration, 1996).

2.3.2 The World Business Council for Sustainable Development (WBCSD)

The WBCSD supports proactive business involvement in improving environmental efficiency. The WBCSD includes several of the world's largest multinationals. Through its WBCSD's working group on climate and energy, it has launched a project to promote GHG mitigation projects. A project entitled "International Business Action on Climate Change," intends to facilitate credible and effective international business actions, implement relative GHG mitigation, achieve a portfolio of projects in various location, and employ technology to reduce, avoid, and sequester GHGs. It is both an ambitious and promising endeavor.

2.3.3 E-7 Network For Expertise

The E-7 is a non-profit international group of eight of the world's largest electric utilities and includes major utilities from France, Germany, and Italy, Tokyo Electric and Kansai Electric of Japan, Ontario Hydro and Hydro Quebec of Canada, and Southern California Edison of the US. E-7 provides assistance for GHG mitigation under its "E-7 Network of Expertise for Global Environment" and its working group on "Greenhouse Gases and Joint Implementation".

The E-7 focuses ERC programs on providing in-kind services to the energy sector in developing countries. E-7 is not, however, committed to directly investing in formal mitigation projects. It currently participates in three ERC projects: in Indonesia, Jordan and Zimbabwe. In Indonesia, the E-7 contributes in-kind services, and plans to participate in local infrastructure development for renewable energy systems. In Jordan, it assists the Jordan Electricity Authority in increasing the efficiency of older thermal stations. E-7 is also involved in micro hydro projects in Zimbabwe.

3. OPPORTUNITIES AND CONSTRAINTS IN THE ASIA-PACIFIC FORESTRY SECTOR

Forest ecosystems are highly important in the development of climate change mitigation strategies as they can both be sources and sinks of GHGs. Currently the world's forests are estimated to be a net carbon source, primarily because of deforestation and forest degradation in the tropics. Temperate and boreal forests are both carbon sinks, because many are recovering from past natural and human disturbances and are actively managed.

There are basically three categories of forest management activities that qualify as ERC projects. These are management for conservation, management for storage, and management for substitution. The opportunities for employing these vary from country to country, based on natural resource and climatic as well as social, economic and political characteristics (IPCC, 1996).

- *Management for conservation*, that is to say to prevent emissions. The goal of conservation management is to maintain and improve existing carbon pools in forests through controlling deforestation, protecting forest reserves, changing harvesting regimes, and mitigating other anthropogenic disturbances such as fire and pest outbreaks. Urban tree planting and maintenance also enter here as the primary carbon benefit is to reduce emissions through energy conservation. As noted earlier, the Kyoto Protocol has raised concern about whether conservation type projects qualify as ERCs.
- *Management for storage* (short-term measures over the next 50 years of so). Storage management expands the storage of carbon in forest ecosystems by increasing the area and/or carbon density of natural and plantation forests, while increasing storage of durable wood products.
- *Management for substitution* (long-term measures). The goal of substitution management is to increase the transfer of forest biomass carbon into products (e.g., construction materials and biofuels), rather than using fossil-fuel-based energy products, cement-based products, and other building materials.

The primary objective of these forest management activities is to foster carbon conservation and sequestration in forests. It is, however, but one of a variety of objectives for forest management that must be balanced with other objectives. Other objectives include sustainable development, industrial wood and fuel production, traditional forest uses, protection of natural resources (e.g., biodiversity, water, and soil), plus recreation, and the rehabilitation of degraded lands. Fortunately, most forestry sector actions that promote carbon conservation and sequestration make good social, economic, and ecological sense, even in the absence of climate change considerations.

In the process of identifying forestry opportunities, countries need to examine existing priorities documented in national forestry plans, and explore priorities in plans and programs from other sectors overlapping with forestry. These include agriculture, energy, and environment. Specifically, forestry mitigation measures must be considered in relation to: *national forestry and land-use plans*, which would establish geographic priorities for various types of land use as well as land ownership patterns; *national environmental plans*, which

might establish priorities such as creating a system of forest reserves for biodiversity protection or restoring forests in critical watersheds; *economic development plans*, which usually set goals for industrial wood production through sustainable forest management activities; or *national energy plans*, which identify priority opportunities for biomass energy production through fast-growing forest plantations (USCSP, 1996).

Biodiversity protection and conservation form an international policy objective given special emphasis in discussions on forestry sector GHG mitigation measures. Fortunately, conservation strategies for protecting biodiversity are usually consistent with forest management activities for promoting carbon storage. For example:

- Protected area strategies in both mature and secondary forests conserve existing carbon pools in forests while also protecting habitats for biodiversity purposes.
- Reforestation can be used in landscapes with fragmented forest areas to create corridors between those areas, both creating new carbon sinks and critical habitats for fauna and flora.
- Although the establishment of plantations may be less socially and politically desirable than protected area strategies, plantations can increase local biodiversity through re-establishment of native species in the understorey when they are established on highly degraded lands subject to no further management (IPCC, 1996).

3.1 Forestry Opportunities in the Asia-Pacific Region

The forestry opportunities identified above have possible applications in the Asia-Pacific Region, and may qualify as potential ERC projects. Projects associated with conservation/preservation, rehabilitation/reforestation, and improved forest management and reduced impact logging (RIL) seem to have gained the greatest interest in the region.

3.1.1 Forest Conservation/Preservation

The world's remaining primary forests, both tropical and temperate, represent huge banks of sequestered carbon. Protection of forests that otherwise would be degraded presents an opportunity to immediately impact carbon flows. The avoidance and mitigation of carbon releases from these banks provide the quickest way to slow the accumulation of carbon dioxide in the atmosphere (TEI, 1995). Reforestation and rehabilitation activities have a substantially slower impact, while RIL falls somewhere in between.

Forest conservation for carbon sequestration purposes basically takes two forms: direct and indirect. Direct interventions require the "locking up" of land resources into natural parks or preserves. Indirect conservation covers a wider range of strategies. These include increasing agricultural productivity, presumably lowering the need for slash-and-burn cropping, plus the development of local agroforestry-forestry to meet fuelwood needs.

Protecting natural forests can prevent emissions of up to 300 tons per hectare

Proposals to prevent deforestation are often complex and controversial, since they have direct effects on the determinants of a particular region's poverty, population, and economic growth (TEI, 1995). Economic development and growth patterns that create pressures to cut or convert existing forests often stem from government policies. As such, the potential use of ERC proposals that challenge or seek to change such policies are often perceived, in developing countries, as either patronizing or as an affront to national sovereignty. This perception has limited the use of "debt for nature swaps" as a conservation tool. It has also created an awareness among potential investors that ERC project proposals which would "lock up" natural resources are likely to meet significant resistance by host country governments and local communities. Too few people are yet convinced that such strategies are valid over the long term.

Projecting the baseline of GHG emissions is more difficult in preservation-based ERC projects. Deforestation and forest degradation have a wide range of causes, including shifting agriculture, permanent land clearing for grazing, infrastructure development, and industrial timber extraction. Each requires different analytic tools to determine projected GHG releases to use as a baseline. This situation is further complicated when the makeup of the local forest resource is considered. Basically, project developers must establish:

1) the carbon content of the forest;
2) the area of standing forest ultimately to be protected through financial intervention;
3) the type of degradation avoided; and
4) the local carbon coefficient for that particular type of forest degradation.

Despite these difficulties, direct forest conservation activities form an integral part of several robust ERC projects. Proposals incorporating conservation activities should not automatically be dismissed as unworkable. Conservation can be an important component of projects with multiple environmental and developmental agendas. Due to the immediate GHG benefits from conservation, its inclusion can dramatically increase the GHG cost-competitiveness of an investment package. This framework is quite similar to the basic outlines of several USIJI projects, such as the Rio Bravo project in Belize (see 3.2.1).

3.1.2 Forest Rehabilitation and Reforestation

In areas substantially affected by conventional industrial logging, the use of enrichment planting techniques may be appropriate. Failure to apply some type of treatment will likely cause regeneration of lower-value pioneer species. It will also cause decreasing carbon sequestration while increasing the risks of forest fire and agricultural conversion. However, little economic incentive yet exists for forest rehabilitation due to short duration concessions and unenforced legislation.

Converting grasslands to forests is another option for sequestering carbon. However, ambitious plans receive frequently insufficient funds and large areas of grassland remain underutilized

ERC investment can help pay for such rehabilitation, which can take many forms. For example, there is an ongoing carbon offset-driven rehabilitation project in Sabah, Malaysia, planting high value dipterocarps and fruit trees in areas of logging disturbance. Other proposals suggest using rattan as part of the rehabilitation effort. While low in biomass and carbon value, the economic activity generated by rattan would likely take pressure off potential forest conversion areas. Lastly, the ongoing research regarding grasslands rehabilitation clearly has applicability to ERC financing.

In the Asia-Pacific Region vast areas of historically forested *Imperata* grassland exist that offer promising opportunities for reforestation. Significant research has taught us much about how to convert such grasslands to productive forestland. A number of projects, or even a regional program, could conceivably be designed to convert these areas to forests.

Restoring degraded forests can increase carbon storage by about 120 tons per hectare

3.1.3 Improved Forest Management/Reduced Impact Logging

As an alternative to locking up forests in strict conservation regimes or restricting industrial logging, there is increasing interest in using carbon offset financing to carry out more environmentally sound forest management, particularly when related to harvesting in the tropics. Conventional tropical logging practices release much GHGs through the rapid decay of trees, other vegetation, and soils damaged or disturbed during logging operations. Research by Putz and Pinard (1995) suggests that conventional tropical logging operations damage up to 70% of the residual trees in logging "coupes" or harvest areas.

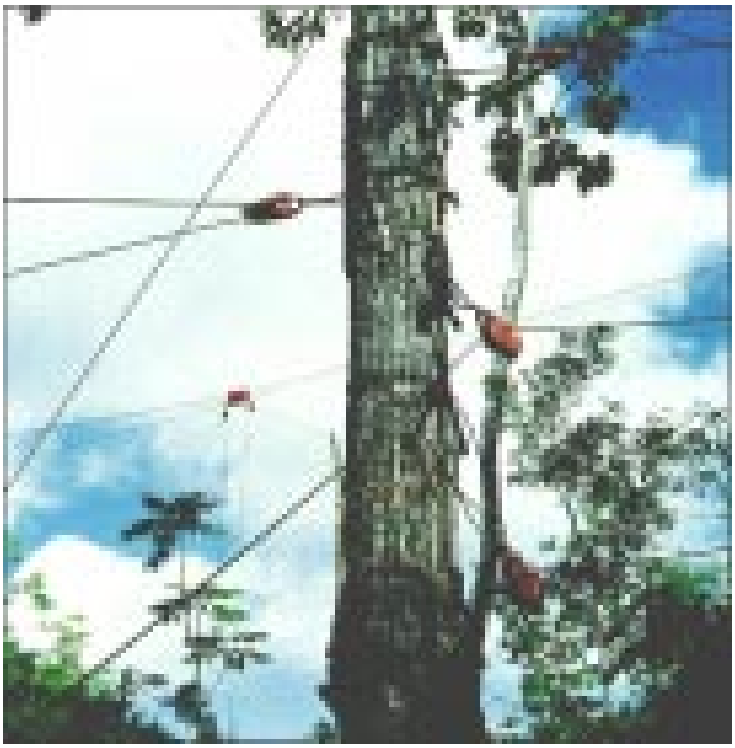
RIL is an integrated forest treatment to reduce the incidental damage and soil displacement which accompany most industrial logging. Applying RIL techniques lessens the immediate releases of CO_2 and methane from the decay of dead biomass and soil carbon. Over the long term, RIL-treated forests could also regenerate more quickly after selective logging. This, in turn, contributes to the overall GHG benefits generated by RIL.

Compared to reforestation/rehabilitation opportunities, RIL is an attractive carbon offset option because approximately half of the eventual GHG benefits are realized over the first few years. In addition, RIL maintains many biodiversity values, reduces fire risks, and protects topsoils. A basic attraction of RIL, however, particularly for governments seeking both economic and environmental improvements, is that forests continue to provide economic potential through timber production.

Conventional logging operations can release substantial amounts of carbon

While RIL has positive effects on the value of future forest resources, the average concessionaire receives no downstream economic benefits from undertaking such costs during the lifetime of their logging contract. Thus, there is no immediate incentive to utilize such techniques. However, for governments looking for ways to maintain the long-term viability of forest resources, while also gaining the economic benefits of logging, ERC RIL offers a viable model. In an ERC RIL scenario, investor funds help cover the costs for both training and incremental implementation for a variety of site specific techniques. These techniques, as practiced in a Sabah, Malaysia, pilot program, include the following (Chan and Garcia, 1998):

- climber and liana cutting;
- improved design of roads and skid trails;
- pre-selection and marking of marketable timber;
- directional felling;
- improved road construction;
- pre-planning of skid trails;
- improved skidding and lower skid trail density;
- removal of stream obstructions and drainage of skid trails;
- rehabilitation of landings; and
- maintenance of riparian buffer strips.



Improved forest management and reduced impact logging techniques such as cable yarding has gained much interest as carbon offset options

As with any ERC project, RIL requires both commitment and capacity from project personnel. RIL techniques are cost intensive. They must be taught and, if paid for with carbon offset money, their implementation must be closely monitored. Though RIL increases long-term resource values by improving the forest's regenerative capacity, this positive effect will likely create little monetary incentives for forest concessionaires to invest in RIL. This is largely due to the uncertainty that concession holders, whose rights to the concession do not extend as long as a typical 60-100 year timber-rotation, will be able to obtain the benefits associated with RIL's incremental investment. This is slowly changing due to increasing public and consumer demands for products derived from sustainably managed forests. Currently, however, there is both need and opportunity to identify other investors to help cover the incremental costs of RIL techniques. Lastly, RIL timber should be able to meet the most stringent guidelines for sustainably produced timber. As the industry prepares to deal with more substantive production guidelines under the ITTO 2000 initiative, this quality performance is an additional secondary output, which should not be overlooked.

3.1.4 Commercial Plantations and Community Forestry

Large-scale, monoculture plantations to sequester atmospheric carbon is a concept that has been computer simulated under a variety of scenarios. The lack of comprehensive emission reduction policies has meant that there are no economic incentives to implement such "carbon farm" plantations. There are no examples of carbon-dedicated plantations, or even commercial forest plantations with ERC components built in. But as GHG emission regulations become more stringent, traditional forest management players with plantation experience will design more sophisticated investments, with integrated greenhouse sequestration options.

Extensive areas of degraded and low productivity lands are available for reforestation

Plantations of various scales could play a larger role as GHG regulations become more stringent. It is now generally recognized that the wood industry must increase its reliance on planted forests to meet the demand for fiber. Studies indicate that current plantation operations meet only a fraction of projected needs. Projections indicate there may be insufficient investment to relieve future market pressures on dwindling primary forests.

Commercial plantation developments are difficult to classify within the ERC context because they are responses to market forces for wood fiber. Many ERC national programs, such as USIJI, discourage monoculture plantations because of the negative effects of single species plantations versus the obvious biodiversity benefits of ecological restoration and conservation projects. The economic challenges of plantations, which generally do not achieve a positive cash flow for 5-10 years, however, as yet inhibits wider-scale implementation. The high capital costs and delayed returns leads to favoring the monoculture of high-yielding species, short rotations, and minimal-cost policies, all of which are usually environmentally problematic.

Plantations could play a larger role as greenhouse gas emission regulations become more stringent

By including ERC finance to supplement capital flows, commercial forestry plantations should overcome some of these biases. ERC investments can, theoretically, make lower growth areas financially viable, or at least make it possible to choose longer rotations of more mixed species plantation, thus replacing a portion of the monoculture of the eucalyptus, pines, acacias and teak that predominate plantation investments in the tropics today (FAO, 1992). Since the overall investments in an ERC plantation project could be quite large and equity-driven, it is possible that the ERC project participant might become a joint venture partner in such a project, claiming a portion of downstream revenue as well as GHG benefits (Jones, 1996).

To meet sustainable development priorities and to address existing land tenure issues in some countries, community forestry options can be structured to provide GHG benefits as a by-product. In most situations involving communities, forestry projects must be structured to fit the cultural and institutional framework, while providing direct economic benefits to the local people. Alternative forestry projects include improved forest management, plantations, and more productive agroforestry systems. Because of the land tenure systems in most communities, the scale of projects and potential for GHG benefits will generally be less attractive to investors if their primary objective is to obtain low-cost carbon. If, however, developing and demonstrating innovative approaches to ERC projects is a goal, community-based projects should be quite attractive.

Even small-scale plantations such as these teak stands in Laos may play a role in carbon offset schemes

3.1.5 Biomass Energy/Fuelwood

Using wood and other types of biomass for fuel can slow the buildup of carbon dioxide in the atmosphere. Assuming wood used for fuel is replaced by new forest growth, a carbon cycle is created and there is no net increase in the amount of carbon dioxide released. To the extent that woody biomass replaced by new growth is substituted for fossil fuels, there is a net reduction in the amount of carbon dioxide emitted into the atmosphere as the carbon in the displaced fossil fuel remains in storage (Rinebolt 1996).

Of particular note for the Asia-Pacific Region, wood waste of sawmills can constitute as much as 50% of all raw timber that enters a mill. Typically, this waste is burned, used for landfill, or dumped in rivers or the ocean. Sawmills in the Region typically use diesel generation systems – that are often subsidized by governments – to supply their on-site captive electrical power because most milling operations are in remote locations with no local power grid. The timber processing industry requires reliable power, so that even when grid connections are available, a plant must have full backup capability. Yet the wood waste, already available at the site and essentially free, represents a potential power source, not only for the wood products industry but also for adjacent rural communities.

For example, a 1987 USAID funded feasibility study of the potential for such systems in Indonesia concluded that: 1) Wood waste currently produced at Indonesian sawmills and plywood plants is sufficient to power 1,000 MW in small-scale biomass power plants; and 2) even with a 50% subsidy of diesel fuel, small integrated standardized wood waste-fired power plants would be economically attractive. Based on a survey of 21 plywood plant owners, the 1987 study concluded that many owners are interested in small-scale wood-waste biomass burners. However, to make investment decisions, they require authoritative information for these units, including: installed capital costs, projected operation and maintenance costs, maintenance requirements relative to present operations, after tax rate of return on equity, financial payback time, and equipment performance and plant life. A 1994 update of the 1987 study suggested that the situation in Indonesia was increasingly favorable for waste-wood power systems. It states: In the six years since this study was conducted, diesel price subsidies have decreased substantially and the Government of Indonesia, now a net importer of diesel fuel, is actively supporting environmentally sustainable means to decreasing diesel fuel use.

A number of countries are exploring biomass energy projects for their national climate change action plans, and as possible ERC proposals. In some, the key interest is to provide a new and renewable energy source; in others, it is to substitute woody biomass for fossil fuels, particularly coal. One of the major challenges to successfully developing and carrying out a biomass energy project is the need for close coordination between the energy and forestry sectors in particular countries.

3.1.6 Urban Forestry

Urban forestry has emerged in recent years as a powerful tool for urban planning and for improving the quality of life in metropolitan areas. The carbon benefits of urban forestry stem not only from sequestration in woody biomass, but even more

so from energy conservation through shading. Assessment and planning tools now exist that inform local policy makers and citizens about their urban ecosystem and how to improve urban environmental quality through strategic tree planting. Geographic information system (GIS) models quantify existing benefits from vegetative cover and project the costs and benefits associated with different future scenarios. Current models can assess the following environmental parameters in urban areas:

- *Storm Water Control*: Trees reduce the amount and flow of storm water in urban areas and thus reduce the need for management infrastructure.
- *Ambient Temperature Control* can mitigate the heat island effect that drives urban temperatures up to 12 degrees higher than surrounding areas.
- *Energy Conservation*: By lowering temperatures and strategically shading buildings with vegetation, less energy is needed for air-conditioning.
- *Carbon Sequestration*: The ecosystem analysis can measure and predict carbon sequestration in urban trees.
- *Air Quality*: Urban trees filter pollutants as part of their transpiration process, and lower temperatures also reduce smog.

The carbon benefits of urban forestry stem not only from sequestration in woody biomass, but even more so from energy conservation through shading

To date, there have been few urban forestry projects in the Region associated with GHG mitigation or carbon offsets. There has, however, been a growing interest in the new technologies of urban forestry which help existing cities to alleviate urban pressures and the planning of new cities with rapidly growing populations and economies. To structure an urban forestry project as an ERC project, however, it is critical to focus on the energy conservation benefits obtainable through strategic tree planting.

3.2 Forestry Examples from Other Regions

This section discusses two forestry ERC projects from Latin America, developed as AIJ projects. Both received approval through the USIJI. These projects are successful examples of efforts to develop new initiatives in the forestry sector. Countries in the Asia-Pacific Region could replicate elements of these efforts.

3.2.1 Rio Bravo (Belize)

The Rio Bravo Conservation and Management Area (RBCMA) Carbon Sequestration Pilot Project, located in north-west Belize, Central America, combines land acquisition and a sustainable forestry program to achieve carbon mitigation. The Wisconsin Electric Power Company (WEPCO) and other US utility companies, plus The Nature Conservancy (TNC), are the US participants in this project. The host country partner is the Program for Belize (PfB).

The project has two components: *Component A* involves the purchase of a parcel of endangered forestland, thereby expanding RBCMA's existing protected forest areas. *Component B* involves the development of a sustainable forest management program to increase the level and rate of carbon sequestered within a portion of the RBCMA, including the purchased parcel. The remaining RBCMA lands will be left undisturbed as controls, as well as for conservation and research purposes. Once sustainable forest management practices prove successful, the participants plan to extend the project beyond the present RBCMA boundaries. The project’s objective is to demonstrate an optimal balance between cost-effective carbon dioxide sequestration, economically sustainable forest yield, and environmental protection. The sustainable development component is central to ensuring that this objective is achieved on a long-term basis.

The RBCMA project was developed from the outset in cooperation with an electric utility, WEPCO. After screening more than twenty potential projects being planned by TNC's Latin American and Caribbean partner organizations, WEPCO and TNC agreed that the Rio Bravo was the most promising. Together they approached PfB to sign a Memorandum of Understanding "to develop a joint proposal for a pilot carbon sequestration project" for submission to the USIJI. On October 17, 1994, in response to the Rio Bravo Pilot Project, the Government of Belize ratified the FCCC, and issued a letter to US Undersecretary of State Tim Wirth endorsing the project and the concept of carbon offset trading (USIJI, 1995).

In addition to GHG benefits, the project will generate a number of other benefits. These include the protection of biodiversity and wildlife habitat, improvements in soil stability, water and air quality, the creation of local jobs, and long-term improvements in the local economy through the development of non-timber forest product industries.

3.2.2 Scolel Té (Mexico)

The Scolel Té project is a pilot-level demonstration of sustainable forestry combined with agroforestry (tree/crop system). It covers management practices in nine indigenous Mayan communities, in the humid lowlands and drier hill forest-croplands of northeast Chiapas. About 2,400 hectares of individual and communal farmlands have been identified by the villagers themselves as suitable for improved practices to be funded through the farmers' own rural agricultural credit union. Plans call for a 3-year start-up phase, followed by 27 years of social, economic, environmental, and carbon benefits. If fully funded and implemented, these should total 230,000 metric tons of carbon. Scolel Té seeks to develop a model for delivering technical assistance from the project coalition, plus income from investors seeking potential GHG reduction benefits, thus increasing farmers' carbon sequestration. Through its strong research and monitoring components, it is also drawing up protocols for the administration, monitoring, and evaluation of larger-scale land-use sequestration programs for low-productivity lands in southern Mexico. Project activities should help conserve biodiversity, and reduce human migration to the critical Lacandon forest frontier affected by deforestation. Several project strategies exist to sequester carbon:

- Tree plantations can be established on pastures, increasing carbon storage by approximately 120 tons per hectare;
- Agroforestry projects will intersperse timber and fruit trees with annual and perennial crops, sequestering about 70 tons per hectare;
- Restoring degraded forests can increase storage by about 120 tons per hectare, and protecting threatened forests can prevent emissions of up to 300 tons per hectare.

Organizational partners in the Scolel Té project include the University of Edinburgh, Union de Credito Pajal, El Colegio de la Frontera Sur, Counterpart International, American Forests, and Econergy International. These organizations play complementary roles in the development, marketing, and implementation of the project. The project has been particularly innovative in designing and testing mechanisms to facilitate investor dollars for carbon benefits and such funds will be distributed to farmers committed to improved management regimes for their lands.

3.3 Forestry Examples in the Asia-Pacific Region

There are few examples of forestry sector carbon offset projects in this region. So far, only one has been approved by USIJI – a RIL project in Indonesia. Besides the Indonesian project, at least four other forestry sector proposals have been submitted to USIJI from the South Pacific. Two proposals came from Fiji, one from the Solomon Islands, and the other from Papua New Guinea (PNG). All these proposals are viable in their own right, and also provide examples for other efforts. In addition, there are two forestry projects in the Region being carried out through an ERC approach: a forest rehabilitation project in Sabah, Malaysia, supported by the FACE Foundation; and a RIL project in Sabah, supported by New England Electric Systems (NEES).

A major barrier to such projects in the Region has been the lack of host country support for ERC concepts. Without host country endorsement, there is little chance a project will be approved by an international program such as USIJI.

Without such approval, there is an even smaller chance that a project will receive investments. To date, the Indonesian RIL proposal and a PNG proposal have been the only ones to receive host country approval. Another challenge for such projects is the difficulty in calculating carbon emission baselines. The PNG project, for example, had to hire an outside consultant from Australia to establish some estimation parameters for a baseline. Still another challenge relates to the level of commitment of project developers to fully develop these proposals as carbon offsets. The basic problem is that implementer groups are reluctant to provide scarce resources and energy for such proposals unless convinced that investors can be found. On the other hand, investors are only attracted to solid project proposals with credible, committed project developers and implementer groups, with proven marketing ability. A final issue for individual countries is regional politics, which further delay ERC activities. This makes it difficult for individual countries – even if enthusiastic about ERC projects – to break from regional positions.

3.3.1 Indonesia: Reduced Impact Logging

The Indonesia Reduced Impact Logging Project is the first forestry sector proposal in the Asia-Pacific Region to receive approval from the USIJI. As such, it succeeded in overcoming a number of challenges. In many respects, this project replicates the Sabah, Malaysia, RIL project (see 3.3.3) and is especially interesting as it represents a "South-South" technology transfer, reflecting the training and transfer of RIL techniques between Malaysia and Indonesia.

The project will use RIL techniques to reduce GHG emissions associated with logging practices in East Kalimantan, Indonesia. RIL will be introduced on 600 hectares within the Kiani Lestari (private) and Inhutani II (parastatal) logging concessions in East Kalimantan. These lowland dipterocarp rain forests have not been previously harvested. Nor are they densely populated. The project will include guidelines and procedures for RIL techniques, on-site training in directional felling, and other RIL techniques. It is estimated that logging damage to the remaining biomass can be reduced by as much as 50% through pre-cutting vines, directional felling, and planned extraction of timber on properly constructed skid rails. Project developers believe this project will generate savings of 56,400 tons of carbon over its projected 40-year period.

Concessionaires in Indonesia fully understand that their harvesting standards must improve considerably to meet the ITTO 2000 guidelines. The project will allow private concessionaires to gain further experience in sustainable forest management. Without outside financing for lower impact logging, however, the incentive to expend resources on improved management is minimal. A carbon investment would provide training as well as pay for various RIL activities such as better planning, mapping, road construction and so on. The project also has public relations value both for the concessionaire and potential investors. Project developers hope the experience will clearly demonstrate that RIL makes good economic sense.

Organizational partners in the project include COPEC, Counterpart International, the Center for International Forestry Research (CIFOR), the Association of Indonesian Forest Concession Holders (APHI), and the Kiani Lestari and Inhutani II concessionaires.

3.3.2 Malaysia: Tropical Forest Rehabilitation

The Forests Absorbing $C0_2$ Emissions (FACE) Foundation focuses on reforestation in the tropics, Eastern Europe and Holland with 85% of its capital committed to tropical projects. In Sabah, Malaysia, FACE is currently funding a tropical forest rehabilitation project (Innoprise-FACE Foundation Rainforest Rehabilitation Project) involving enrichment planting with indigenous dipterocarp species on 5,000 hectares of logged-over land to help restore the forests' original structure. This area may be extended to cover 25,000 hectares. The rights to the downstream timber belong to Innoprise Corporation, the concessionaire, and the carbon benefits belong to FACE. When Innoprise harvests trees, it is obliged to use RIL techniques to maintain the integrity of the carbon pool.

3.3.3 Malaysia: Reduced Impact Logging

A rolling contractual relationship between the Massachusetts-based New England Power (NEP), and Innoprise Corporation in Sabah, a Malaysian timber concern, is interesting, as it is the first project to be renegotiated for continuance beyond the experimental phase. While NEP is still substantially involved, the project's expansion is now officially sponsored through the EEI's Utility Forest Carbon Management Program.

NEP/EEI have agreed to pay for the assessed incremental cost in implementing RIL on an allocated portion of the concession's annual harvest area. The pilot stage of this project lasted three years and covered a test area of 1400 hectares. The calculated GHG benefit results were sufficiently positive to warrant extending the contract between NEP and the concession for up to 9000 hectares of RIL over the coming three years. For 1996, NEP placed the project into the EEI Utilitree consortium, which will pay for performing RIL on 1000 hectares. The approximate cost, based upon GHG savings, is around US$ 1.40 per ton of CO_2.

The project is notable because of the innovative monitoring, evaluation, reporting and verification system. An interesting component of the NEP-Innoprise system is the independent Environmental Auditing Committee (EAC), which "grades" the concession on adherence to RIL techniques. This helps guarantee NEP-EEI that the performance contracting they are paying for is true to agreed specifications.

Innoprise is a subsidiary of the Sabah Foundation, created by the Sabah state government and charged with promoting the sustainable development of the state. Thus, Innoprise is different from other private concessions operating in Sabah in that it has more of a social and sustainable development mission. Innoprise was more receptive to introducing RIL techniques on their concession because of that very mission. The concession, the state government, and indeed the investor, have all reaped significant public relations benefits. Adequate financing has allowed the concession to test the RIL concept in a relatively small area. More importantly the ERC investment has led to impressive improvements in the logging standards throughout the concession.

3.3.4 Fiji: Community Forestry Pine Plantations and Sustainable Forest Management

Fiji Pine Ltd. (FPL) and the Department of Energy collectively submitted a proposal to expand FPL's community forestry extension program of planting small pine plantations. The project, traditionally financed through a combination of

Fijian government funds and external funding, uses Fiji Pine's capital resources. The USIJI submission proposed approximately 400 hectares of distributed plantings every year. Since the initial proposal, the proponents have decided to upscale the proposal to approximately 1,000 hectares a year to accomplish more economies of scale and to make the project more attractive to potential additional investors. If formal governmental approval can be received, this proposal will eventually be recast for further investment review.

Also in Fiji, the Native Land Trust Board (NLTB) has recognized that carbon offset funding could be used for preservation of the Sovi Basin, on Viti Levu. Sovi Basin is an enclosed amphitheater formation of approximately 20,000 hectares of forests at the center of a logging dispute for nearly twenty years. Local landowners have at times appeared willing to forego logging the Basin, if they can be guaranteed a comparable stream of income from alternative sources. While there are a number of possibilities in this regard – including eco-tourism – a trust fund based on the carbon content of Sovi Basin could be an innovative carbon offset project. The ERC component of this project remains "on hold" while negotiations between landowners and NLTB continue.

3.3.5 Solomon Islands: Natural Forest Management

The UNDP/FAO South Pacific Forestry Development Program and the Solomon Islands' Department of Forestry proposed that a carbon offset funding component be built into a proposed natural forest management program. This project was designed to implement RIL and to quantify the GHG savings in typical Melanesian forests. As a forest management proposal, this project was advanced. It has floundered as a carbon offset project, because of difficulties in identifying the official ERC project or FCCC point of contact within the government.

3.3.6 Papua New Guinea: Integrated Conservation and Development

The PNG Department of Environment and Conservation, in conjunction with the GEF-supported Biodiversity Conservation and Resource Management Program, put forth a proposal for carbon offset financing as part of an Integrated Conservation and Development Program in Lak, New Ireland. This proposal combined elements of preservation, forest rehabilitation, plantations and low impact logging of primary forests, as well as some value-added timber processing not formally part of the carbon offset prospectus. This is by far the most sophisticated South Pacific USIJI submission to date and seemed likely to have achieved both acceptance and even investment, had on-the-ground difficulties not forced the project proponents to re-evaluate their position and choose to withdraw support. Stuart and Sekhran (1996) describe and discuss the project in a recent UNDP publication.

3.3.7 Vanuatu

The Department of Forestry of the Republic of Vanuatu has expressed interest in ERC, mainly because its government views them as a promising source of funding. The Forest Department, accordingly, has proposed five ERC project ideas. Progress toward fully developing the proposals for submission to USIJI has been slow for two reasons: first, designing a proposal requires substantial resources, currently unavailable; and, second, the government has yet to establish a point of contact and position for ERC project related activities.

4. EMERGING PROSPECTS AND CHALLENGES FOR ERC PROJECTS IN THE ASIA-PACIFIC REGION

Governments, private industry, and NGOs in the Asia-Pacific Region are presently showing an increasing receptivity toward ERC projects. To gain more experience, some governments have expressed interest in supporting the development of ERC pilot projects. They are particularly interested in learning whether they can actually provide the local development and environmental benefits that most developing countries want. Information gained from experience with ERCs – the ultimate purpose of AIJ – is helping to determine the next steps toward the creation of a more formalized international system for trading GHG emission credits. This new openness toward ERC projects does not suggest, however, that governmental concerns on such issues as commitments by developed countries to reduce their own GHG emissions and eco-colonialism will easily be overcome. It does suggest that these countries are more willing than before to explore ERC opportunities and to experiment with pilot projects. Many countries will likely want to develop their own domestic programs first to ensure they can guide pilot ERC projects to meet their own national priorities.

As general interest in ERC projects grows, a couple of challenges are emerging specific to the forestry sector. First, as ERC proposals in the forestry sector receive substantial attention, NGOs are likely to raise eco-colonialism concerns. The intense interest of domestic and international NGOs in the forestry sector – particularly in the Region's tropical rainforests – requires careful consideration. This, in turn, could make forestry projects more complex and problematic than projects in other sectors. Second, proponents of energy sector projects are promoting energy efficiency and renewable energy projects as mechanisms to gain not only CO_2 credits, but returns on investments as well.

4.1 Increasing Receptivity toward ERC Projects in the Region

Indonesia's approval, in January 1997, of the Region's first forestry sector USIJI proposal indicates a policy shift toward ERC projects, both in that country and probably the Region as a whole. Further indications were apparent in India recently when the Government of India approved several ERC projects, including a fruit tree plantation project submitted to USIJI. Other countries as diverse as The Philippines, Vietnam, Thailand, and Sri Lanka, made public statements in support of ERC projects recently.

All these countries have recognized the opportunities in their forestry sectors, consistent with the potential benefits discussed above. Often, however, their principal focus was on forest conservation/preservation and reforestation/rehabilitation. For example, in a paper, entitled "Expectations and Opportunities for AIJ Projects in Sri Lanka", presented at the New Delhi conference, Sri Lankan officials recognized the opportunities through ERC for local entrepreneurs to partner with foreign investors. Partnerships would help fund forestry activities which otherwise might not be undertaken as they were financially unattractive. The paper cited, especially, reforestation of low productivity lands; conservation of natural forests; conservation of forest soils; harvesting with minimum disturbance of degraded agriculture land to improve soil carbon content; management of plantations and forests to optimize sequestration; and training of forest officers in preventing and controlling forest fires.

The paper also discussed opportunities for timber utilization or increased use of wood products as substitutes for concrete in construction: "Hence, replacing concrete structures with timber could achieve a double saving, reducing CO_2 during cement manufacture and sequestering carbon in the timber. While these projects by themselves may not appear to be economically viable, ERC investments could convert them into viable projects."

In his opening address at the Delhi meeting, Dr. S. Venugopalachari, India's Minister of State for Power and Non-Conventional Energy Sources, called it the "first conference on AIJ for developing countries," and noted that the forestry sector was an important area for AIJ activities in India. "Forests offer an ideal opportunity for investments and direct mitigation initiatives," he said. He also noted other social and environmental benefits of forestry projects.

The New Delhi conference focused on developing country ERC project perspectives and included many participants from the Asia-Pacific Region, plus representatives from developed country programs and private investors interested in promoting ERC projects in the Region. The conference statement, endorsed by all participants, outlines the ERC concept by recognizing the need for "urgent action to accelerate implementation of agreements already reached by Parties [under the FCCC] and for evolution of cooperative mechanisms at the international level to encourage development activities that also serve to mitigate climate change."

It also noted the relatively small number of ERC projects, about 40, since inception of the pilot phase and the need for more experience and empirical information as the basis for rational decisions on how, or even whether, to move forward beyond the pilot phase. The statement suggested, however, that there is a "growing optimism and interest in testing AIJ through partnerships on the ground." This was based on the increasing number of ERC projects in various parts of the developing world, a trend also evident in the Asia-Pacific Region.

Among the nine conclusions reached at the Delhi conference, two were particularly stressed:

- Far more AIJ projects are needed during the pilot phase, in different sectors and countries, to provide for the post pilot phase regime; and
- Developing countries should establish policy frameworks that give them a proactive edge in establishing national AIJ programs and in developing project proposals.

4.2 Forestry Sector Challenges

Interest in ERC projects in the Asia-Pacific Region is growing, including the forestry sector. The forestry sector ERC projects, however, face challenges not related to this region alone.

4.2.1 NGO Environmental Concerns

As noted above, early discussions on FCCC characterized forestry sector ERC projects as relatively low-cost, no regrets activities – such as reforestation, improved forest management, and forest conservation – that provide environmental, economic, and social benefits which make sense regardless of their GHG benefits. Recently some NGOs have raised issues worth noting.

Developing countries and environmental NGOs are concerned over issues related to eco-colonialism. They point out that developed countries seek to offset their own GHG emissions by simply investing in forestry activities in developing countries, thus essentially locking up forests as carbon sinks and restricting their use for development purposes, and deriving low-cost GHG benefits for themselves alone. Other concerns addressed were potential "leakage", or the possibility that GHG impacts addressed by a project, such as deforestation, are transferred somewhere else, beyond the project's boundary. Another concern is based on one of the aspects that makes forestry projects attractive as ERC projects – their ability to integrate economic, environmental, and social benefits. This ability to integrate has become a focal point of the environmental NGOs because of a history of exploitation of forest resources under sustainable forestry experiments that attempted to address broad concerns but yet failed.

A central NGO concern is that ERC projects – despite declared intentions to improve the global environment while providing environmental and economic benefits to local people – will become just another failed experiment and mechanism for further degradation of the environment. These NGOs support the careful preparation of principles and methodologies for ERC in the forestry sector that focus on sustainable forest management and build on guidelines already developed by the International Tropical Timber Organization (ITTO) and the Forest Stewardship Council (FSC). NGOs also are strongly concerned about the rights of indigenous people and the need to ensure that they receive a fair share of project benefits. These concerns make it more difficult to develop projects in the forestry sector relative to other sectors. However, these issues are not specific to ERC projects.

It is important that developing countries develop ERC project criteria that are consistent with the economic, social and environmental parameters of their national development priorities and plans. As mentioned earlier, ERC projects, by definition, require approval from the developing country government, presumably ensuring that any ERC project would be socially responsible, environmentally sustainable and economically viable.

4.2.2 Bias Toward Energy Sector Proposals

Another emerging challenge for forestry projects in the Asia-Pacific Region, as well as elsewhere, is the bias toward developing energy sector projects. Attention of both governmental officials and private-sector investors on potential ERC projects seems mainly to focus on the energy sector, as this is where the largest current and future policy issues related to GHG emissions are invariably located. Advocates for forestry sector projects continue to stress the opportunity for low-cost, no regrets actions. Yet there is a need to go further and to address the comparative advantages of forestry projects relative to energy sector projects. One way to do this is to differentiate between forestry and energy sector projects in terms of time frame, scale, cost, and other benefits, and then to discuss how projects in the two sectors are compatible from a policy perspective. Officials in Mexico, for example, discuss how there are significant low-cost opportunities for project development and investment in the forestry sector, which could sequester or reduce significant GHG emissions, while also providing other social and environmental benefits. Such projects could be carried out in the short term while the policy framework and necessary technologies for larger actions in the energy sector are put in place.

5. RECOMMENDATIONS FOR FOREST SECTOR ERC INVESTMENT IN THE ASIA-PACIFIC REGION

This report has already mentioned most of the major issues and challenges facing forestry sector ERC project opportunities in the Asia-Pacific Region. Some of these challenges are common to all ERC projects across all sectors, while some relate more directly to projects within the Asia-Pacific Region. Others are specific to the forestry sector. This final section presents recommendations on these issues.

5.1 Creating an International Framework for ERC

Project developers and others promoting the advancement of the ERC concept appear to be at a turning point. Many potential investors, project developers, and host countries are reluctant to participate at this time and have adopted a "wait and see" attitude. The Kyoto agreement indeed moved Parties toward an operational ERC network. However, it is important that follow-up meetings in Bonn and Buenos Aires clarify the policy and market framework for ERC projects. A major issue needing clarification is when credit will be granted and whether credit will be granted for projects initiated prior to 2000. Investors seek an international framework that will provide credible methodologies for quantifying GHG credits and a market system for valuing and trading credits. In the short term, some countries are exploring initiatives to develop consistent approaches for quantifying and valuing credits for ERC projects within specific sectors, such as the forestry sector in Mexico. Eventually, however, all such approaches will have to be reconciled among various countries and between different sectors.

Developing countries in the Asia-Pacific Region are becoming more receptive to ERC projects primarily because they believe it enhances opportunities for increased foreign capital being directed toward their own development priorities. A number of countries are now considering steps, such as domestic programs, to increase their own capacity to promote or facilitate project development. These programs provide for transparent and consistent processes for both advocates and opponents of ERC projects.

Two key policy issues to be addressed for establishing an international framework relate to: 1) commitments by developed and developing countries to reduce GHG emissions; and 2) sharing and pricing carbon credits. Developed countries, as noted earlier, have agreed to legally binding commitments. These commitments will have important implications for ERC projects. The sharing and pricing of carbon credits is a complex issue that will likely be dealt with on a project-by-project basis. Some developing countries seem reluctant to share credit, while others are willing to accept the investment and part with at least some of the credit. Similar to sharing credits, negotiating prices for carbon credits on a project-by-project basis also may not be fair to developing countries. Again, they feel investors will hold a stronger hand when host countries are in need of capital and technology. Developed countries also have greater capacity and expertise for analyzing projects. An interesting perspective is held by Dr. Jyoti Parikh of the Indira Gandhi Institute for Development Research. He uses the analogy of a monopoly versus a free market system when describing the current ERC situation. When there is only one buyer, then they only have to pay for the seller's incremental cost of abatement (e.g., the cost of afforestation). All the economic "surplus," or advantage, between what the buyer would be willing to pay and what

the seller would be willing to accept, favors the buyer. In a free market system, buyers all pay the same market price, regardless of the seller's marginal cost. Thus, the economic surplus is shared between buyers and sellers. But without such an international market for carbon credits, how can the Parties to the FCCC ensure that benefits are shared fairly between investor and host countries? Minimum prices for carbon credits – either set internationally or in a given host country – might be useful until a market system is developed.

5.2 Building Policy and Institutional Frameworks in Developing Countries

Several countries in the Asia-Pacific Region recognize they must develop domestic strategies and actively respond to opportunities presented by the Kyoto Protocol. Host country officials, therefore, are examining questions such as: What role should government, the private sector, and NGOs play in an ERC system? What should be the responsibilities of each of these parties? Are additional incentives needed to encourage private sector participation in ERC? Issues negotiated at the international level will, of course, play a significant role in setting such strategies. But there are also initiatives that countries must determine for themselves.

5.2.1 Domestic Policies and Institutions

By definition, ERC projects require approval or endorsement by the developing country. Thus, governments are the gatekeepers of ERC project activity in their country. Presumably, these governments can shape ERC project activities to target specific sectors or priorities within sectors and thereby diffuse any sensitivity to issues such as eco-colonialism. In many developing countries in the Region, there is a lack of clear government policy on ERC projects that hampers development of projects. It is unclear, for example, whether governments with their various ministries are supportive of ERC projects or not. Generally, clear guidelines for project submissions or criteria for project evaluation do not exist in developing countries. An institution with clear ERC project criteria and process for reviewing projects is needed. More often than not, little is in place to encourage interested parties in developing projects. On the contrary, too often, contradictory signals and confusing barriers scare off potential project developers. Governments must respond to these negative concerns to become involved in ERC project activities. And they must also involve private sector organizations, industry, and NGOs.

One as yet unanswered question is: Who should participate in developing the domestic policy framework for ERC projects? At the governmental level, ministries such as the agriculture, forestry, energy, commerce, transportation, and finance ministries should be involved. Each of these ministries need to participate in developing an ERC system – not necessarily in the day-to-day activities – but in developing a coherent system for ERC projects, coordinated across the national economy. Because ERC projects are a way to bring private sector investment into sustainable development, industry should also play a significant part in establishing the system, both in setting national criteria and in evaluating and monitoring actual projects. Private sector businesses should not only be consulted, they should be interwoven into developing the ERC system. Their experience and concern is not merely helpful but essential.

NGOs also must play a vital role, not only in terms of their expertise, but by representing the needs of the people, particularly the poor and disenfranchised. Many NGOs, domestic and international, have experience with ERC projects. They can also play key roles in monitoring and evaluating ERC projects, particularly as to their social, institutional, and environmental benefits and as to what exactly these projects are expected to provide at the local level.

5.2.2 Domestic ERC Task Force and Program

As mentioned previously, some countries have been slow to react to ERC issues. Often this can be attributed to a lack of interest or awareness, either on the part of an agency or a single individual within an agency. Regardless of one's perspective, ERC is an opportunity that deserves serious consideration and debate among several agencies within the government in general. Designating a focal point for ERC project activities is an important first step toward providing a rational mechanism for such debate and consideration.

A "task force" approach, representing various interests and disciplines is one possible approach. In general, government agencies will probably take the lead in establishing such task forces. In some instances, however, private organizations – either industry or NGO – could provide leadership, since they too have critical roles in an ERC system. Whichever type of organization is primarily responsible for leading the effort to develop the system, however, there is need for clear targets and objective and mutually agreeable assessment tools to judge whether an ERC program is succeeding. Monitoring of ERC projects is an additional critical element. Although governments are ultimately responsible for reporting ERC results to the international community, NGOs can assist in monitoring the domestic benefits provided by individual projects and in verifying the results reported.

Significant funding is, of course, required to organize such national task forces and to develop an effective domestic program for ERC activities. Developed countries have agreed to fund incremental costs that developing countries incur in complying with the FCCC. The GEF has placed strong emphasis on institutional capacity building; it seems that an ERC project task force is the best type of institution that developed countries would support, either through the GEF or other funding mechanisms.

A critical element for any domestic ERC program – and a major task of a national task force – is to develop criteria for evaluating project proposals. These criteria should be designed to help screen the development of ERC projects in a host country. They should recognize the development benefits and concerns of projects, and demonstrate flexibility in encouraging a wide range of project types and experiences.

Another key objective of a national task force would be to agree on acceptable methodologies for estimating and monitoring the reduction in GHG emissions from ERC projects in various sectors. A pitfall in the forestry sector has been the lack of fair, uniform, and accepted methodologies. A common concern here is how to estimate emission baselines and how to assess the GHG benefits of different types of forestry projects, particularly the more complex projects involving integrated land-use activities.

Any solidly designed domestic ERC program should also be attentive to investors' concerns about the risks and credibility of carbon credits associated with projects. It is important, therefore, to consider creating a national framework and mechanisms that facilitate foreign investment in new initiatives, such as the framework earlier described, in Costa Rica. The establishment of a national framework, perhaps with specific sectoral programs, should help position a country favorably as investors explore options among numerous countries.

5.2.3 Sectoral ERC Workshops

Although some government agencies, private industry groups and NGOs are well acquainted with ERC, there are many trade associations, NGOs, and government agencies which are not. Moreover, the opportunities for ERC projects, and how to implement them, varies significantly by sector. Domestic ERC programs, therefore, should always have a strong sectoral focus. A key activity for this focus could be sectoral workshops to heighten awareness and knowledge about ERC and to help build the capacity of domestic organizations to first design and then actually carry out ERC projects. Such workshops could also assist in establishing goals for a particular sector, approach international donors and investor groups, and set the framework for tracking progress. The principle should be to devolve ERC project planning, development, and marketing within a specific sector, while freeing the national task force to oversee and coordinate the various sectors.

Ideally, sectoral workshops should include foreign industry representatives and experts in project development, plus domestic industry, NGOs, and government. A forestry sector workshop would thus not only assist in attracting potential foreign investors. It would also allow such foreign representatives to better understand the cultural differences within the Region and the different business practices with which they would have to deal.

5.2.4 Building Awareness and Understanding of ERC Concepts

Although developing countries in the Asia-Pacific Region are now more open than previously to ERC projects, there is still a great need for more awareness and understanding of climate change issues and opportunities. At the country level, understanding is generally limited to government agencies already involved in FCCC activities. Other government agencies, perhaps from the environment and energy sectors, or NGOs and private groups that could be instrumental in project development, are relatively unaware of the ERC dialogue. A paper by the Indonesian NGO, LATIN, states that public awareness of climate change and ERC issues must be increased, and that "discussion on climate change and specifically AIJ have been minimal... even the academicians of forestry, agriculture and land use are not aware enough of these issues." There is a great need in developing countries for public education, outreach, and communication activities to broaden awareness and encourage discussion of these issues and programs.

In response to the perceived bias in favor of energy sector projects, advocates of forestry ERC initiatives need to develop better information and communication strategies on forestry opportunities. These strategies should address technical and social concerns about complex forestry projects, and clarify the advantages of ERC projects in this sector relative to the energy sector.

Finally, the need for public education and understanding on ERC projects is also great in developed countries. To build stronger support for programs in developed countries, potential project developers, investors, and the public at large must become more knowledgeable about ERC concepts. Except for the few companies that have shown a strong interest in ERC projects, potential investors in the private sector have a quite limited understanding of the international policy framework, concepts, and opportunities.

5.2.5 Estimating the Project Opportunities in the Region

As mentioned earlier, significant opportunities exist in the Asia-Pacific Region for forest conservation, reforestation/rehabilitation, improved forest management, plantations, biomass energy/fuelwood, and urban forestry. In many countries, ambitious forest management goals are contained in national forestry action plans developed by the various forestry agencies. These plans have identified – usually in specific terms – existing forest areas under threat, reforestation opportunities, and possible interventions. A major amount of research, for example, has been completed on converting *Imperata* grasslands to forests. However, these ambitious plans are characteristically under-funded. To credibly estimate the scale of the opportunity for all interventions outlined above – including the carbon implications – would require considerably more assessment.

6. FUTURE PROSPECTS FOR ERC PROJECTS IN THE REGION

The Kyoto Protocol – where countries agreed on a "legally binding" emissions reduction protocol, including agreement on a carbon trading scheme – has clearly moved Parties of the FCCC toward a regime that more adequately addresses the problem of global climate change. Most notably, the ERC concept has become more defined and interest in the concept by developing countries, developed countries and investors has increased.

Entry into force of the Protocol is the next step in the FCCC process. The Protocol opens for signature in March 1998 for one year, although countries may accede to it after that period. It will enter into force after at least 55 Parties to the FCCC, encompassing Annex I countries, which account for at least 55% of the total global emissions of CO_2, have ratified, accepted, or acceded to the Protocol. Prospects for ERC project development and implementation in the Region will become even more defined as the FCCC process continues. 1998 FCCC meetings in Bonn and Buenos Aires will help clarify broad questions related to measurement, reporting, emissions accounting and compliance issues. For advocates and opponents of ERC, these meetings will also provide a forum for defining the future scope and operational aspects of JI, AIJ and CDM. Constructive involvement from fast growing developing countries of the Asia-Pacific Region for the Convention, particularly in Bonn and Buenos Aires in 1998, is critical to the further development and implementation of the FCCC – especially ERC mechanisms.

Active and constructive involvement from developing countries is also necessary because emissions from developing countries are expected to surpass developed countries in the near future and comprise the bulk of emissions in the

coming decades. In addition, developing country involvement is critical from a political point of view. US President Clinton and the US Congress have indicated in different terms that developing countries must participate in a meaningful way to address global climate change. Ratification by the EU and Japan seems more certain. As mentioned earlier, several developing countries of the Region have created criteria for ERC projects. Others seem set to follow. This progress might demonstrate that developing countries realize the ERC investment opportunities and seek a greater role in addressing global climate change in general.

Finally, it is important to note that the Protocol is not the only driver encouraging public and private entities in developed countries to invest in ERC projects in developing countries. Ultimate implementation of the Kyoto Protocol would certainly ensure the widest possible participation by both developed and developing countries in ERC projects. However, as mentioned earlier, demonstrating corporate-environmental responsibility produces a public relations benefit and demonstrating voluntary action hedges possibly stringent future regulation. These are often sufficient incentive for an investor. Thus, regardless of the short-term policy uncertainty, unilateral Annex I government and private programs directly investing and encouraging investment will continue – likely on an accelerated basis.

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