USAID
FROM THE AMERICAN PEOPLE

Financing Climate Adaptation and Mitigation in Rural Areas of Developing Countries

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This publication was produced for review by the United States Agency for International Development. It was prepared by Angela Crooks of ICF International.

Cover Photographs Courtesy of USAID Photo Collection

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Introduction

Climate change is projected to have potentially severe impacts on developing countries. The World Bank estimates that developing countries will require tens of billions of dollars to implement adaptation measures to reduce vulnerability to climate change and respond to climate impacts.[1] In terms of mitigating global warming, required measures are estimated at one percent of global GDP annually if immediate action is taken; costs increase considerably as action is postponed.[2] European Union sources state that global investment in fighting climate change needs to increase to $220.4 billion by 2020.[3] Given the enormous costs of tackling the climate challenge, attracting private sector capital is critical.

The US Agency for International Development (USAID), in cooperation with the US Department of Agriculture, has commissioned this study to explore opportunities for expanding private sector financing for global climate change adaptation and mitigation projects in rural areas of developing countries. Given this scope, climate change mitigation (greenhouse gas emissions reduction) and adaptation (reducing risk posed by the physical impacts of climate change) projects considered for financing would be in the forestry or agriculture sectors; mitigation projects would also include small-scale renewable energy and energy efficiency efforts at the village level.

In order to determine how USAID assistance may help overcome barriers to financing these types of projects, this report addresses the following questions:

- What types of financing mechanisms can be used to fund projects with climate benefits?
    - What are the barriers and opportunities associated with using these mechanisms?
    - Which types of climate projects are suitable candidates for which types of financing?
- How can USAID help overcome financing barriers and promote greater investment in climate projects in rural areas of developing countries?

Recognizing that it may also be possible to build upon or complement the work of other International Financial Institutions (IFIs), a summary of existing activities is included as Appendix I. Given the multitude of foreign assistance projects and the evolving nature of this work, the Appendix is by no means comprehensive. However, it may be useful as a reference tool in program planning.

The following sections describe the principles and assumptions that guide our analysis of financing opportunities, review the carbon and non-carbon financing mechanisms that are available (with particular attention to the barriers and opportunities associated with the use of these mechanisms, and identify possible program areas that USAID could explore to enable the implementation of projects that produce climate change benefits.

Guiding Financing Principles and Assumptions

Given the climate change focus of this study, we pay particular attention to the use of carbon financing – the use of financial instruments representing the greenhouse gas reductions of projects, which can be traded on "carbon markets" – to support projects in rural areas. "Traditional" financing mechanisms, such as microfinance and loan guarantees, are also considered. Only private sector financing mechanisms are included.

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[1] World Bank, "Clean Energy and Development: Towards an Investment Framework," Washington, DC, USA, 146.
[2] Nicholas Stern, *The Stern Review on the Economics of Climate Change,* (London: HM Treasury 2006), http://www.hm-treasury.gov.uk/stern_review_report.htm
[3] Peter Harrison, "EU debates climate funding for poor nations," Reuters, (2009), http://www.uk.reuters.com/articlePrint?articleId=UKTRE5211QP20090302

There are many activities that yield climate change mitigation and/or adaptation benefits. Because private sector financing is based on the potential to generate revenue, there are many projects that may have climate benefits but are not considered "bankable." For those projects which are bankable, the size and timing of project revenues, as well as various risk factors, determine which types of financing mechanisms are most appropriate. This report discusses which types of projects fit best with which financing mechanisms.

Public versus Private Financing

Attracting private sector capital to the climate problem is important for two reasons: 1) the magnitude of required investment necessitates the participation of both the public and private sectors; and 2) market mechanisms have proven to be an effective means of addressing environmental problems. In fact, market principles are central to the Kyoto Protocol, which serves as the underpinning for the vast majority of carbon dioxide trading. The premise is that market forces encourage participants to find least-cost solutions to environmental problems, in contrast to command-and-control structures, which do not allow for innovation.

Of course, public sector capital is critical to addressing climate change as well. Grants, Overseas Development Assistance, and funding from host country governments play a very important role in supporting climate mitigation and adaptation projects. There are many projects which are valuable, or even essential to climate change adaptation or mitigation, such as fortifying sea walls or rezoning agriculture to account for climate impacts. Some of these projects do not yield a tangible cash return but provide critical protection to local populations. Such projects are unlikely candidates for private sector financing.

There are also project categories which yield a return on investment but are less attractive than alternative investments. Governments, non-profits, and donor agencies can provide incentives to promote these valuable, but less competitive, investments. Donor agencies can also lower risks by pioneering new markets by developing and "test driving" new programs. For example, the World Bank's Prototype Carbon Fund facilitated numerous pre-Kyoto investments in carbon offsets, providing valuable learning experiences for Fund participants, project developers, and host country counterparts.

Investment Drivers

Identifying what drives private sector investment in climate projects is a first step in understanding potential barriers and opportunities to funding climate projects. Because the focus of the study is on mobilizing private sector investment, *profit* is the key driver behind project finance; this means that many projects which have climate benefits will not be capable of attracting financing from the private sector.

The list of potential climate mitigation or adaptation projects is vast. Climate mitigation projects exist throughout the energy, building, manufacturing, transportation, agriculture, and forestry sectors. Similarly, climate impacts (and thus adaptation opportunities) can affect almost every aspect of the economy and ecosystems. In choosing between project types, project developers or investors will weigh the costs, benefits, and risks of competing investment options. Investors will choose the project which yields the greatest return on investment. Ultimately, these decision-making criteria determine which types of climate projects are "bankable" and which should be left to the public sector.

Benefits and Revenues

In considering project benefits, private sector investors will evaluate a project's ability to generate revenue. The revenue from climate projects can come from its potential to generate carbon offsets

through reducing or sequestering emissions. Projects that deliver large quantities of offsets (e.g., hundreds of thousands of tons of carbon equivalent) over a relatively long duration (a decade or longer) are regarded as having high mitigation benefits; the smaller the quantity or shorter the duration, the lower the mitigation benefit.

Alternatively, a project with climate benefits may have sources of revenue that are completely unrelated to carbon – such as the sale of non-timber forest products. In this example, the promotion of alternative products may lead to enhanced carbon sequestration (a climate benefit). However, the project may be financed by product sales rather than carbon offsets. In some cases, a project may have revenues from both carbon offsets and other sources (e.g., forest carbon sequestration offsets combined with revenues from ecotourism).

Project Costs

Project costs include inputs such as equipment, land, labor, transportation, maintenance, administration and the cost of capital (such as interest on a loan). If a project sells carbon offsets, it will also incur additional costs. An outside company may be hired to develop the documentation needed to take the project through the offset approval and issuance process. Monitoring and verification are other costs that will be factored into the cost-benefit analysis.

If we assume that our investor is a carbon broker – as opposed to a wind turbine manufacturer or non-profit organization – he or she is likely to invest in projects that provide the largest volume of carbon offsets at the lowest cost and with the lowest risk. A review of carbon offset investments reveals which types of projects meet those criteria. Later in this report, the chart in the section on CDM is reflective of projects that yield the best "bang for the buck."

Risk factors are also factored into the analysis. Project risk – whether a project will be built on time and to specification – is one risk. Country risk – factors such as economic and political instability – is another consideration. There are also factors influencing revenue, such as the ability to sell a product or service. In many cases, climate projects are considered too risky.

Carbon vs. "Non-Carbon Financing"

We have defined "climate projects" to include any project with climate mitigation or adaptation benefits. This definition could have been limited to projects which produce carbon offsets, but the broader scope enables USAID to consider all financing options regardless of a project's eligibility for offset credit.

The universe of private sector financing for climate projects can be divided into three categories: 1) carbon financing; 2) "non-carbon" financing; and 3) a combination of carbon and non-carbon financing. Carbon financing is based on commodities called carbon offsets and carbon allowances (described later). Non-carbon financing refers to sources of debt or equity that are not based on the sale of carbon offsets.

The vast majority of climate projects are funded through a combination of carbon and non-carbon financing mechanisms. From a financial perspective, carbon offsets are often considered as the "icing on the cake" rather than the primary source of project financing. In other words, there is often some sort of underlying debt or equity investment that provides the financing to build or develop the project. Carbon offsets *typically* cover only a small percentage of the costs to build and implement a project. The relative contribution of carbon offsets to project revenues varies greatly by project type (e.g., whether the carbon offsets result from forestry, installing insulation, adding solar panels to a building, etc.). For expensive technologies which offset small amounts of carbon, the contribution of carbon offsets to project funding will be smaller (particularly renewable energy). For a wind turbine, carbon revenues

might counterbalance only one percent of the total project costs. For inexpensive solutions which yield large amounts of offsets, carbon financing will play a greater role (e.g., energy efficiency and forestry).

Despite their sometimes modest contribution to project financing, carbon offsets cannot be granted if the project is financially viable without them. In other words, carbon offsets must comply with the principle of *additionality*. If the offsets make the project viable – if they help overcome a financial hurdle – then the project passes the additionality test. There are other factors which determine additionality, but the financial test is a critical component of most carbon offset methodologies.

The additionality concept has been the subject of debate. Why not just give carbon offsets to all projects that reduce greenhouse gases (GHGs)? The answer is that carbon offsets were designed to provide an economic incentive to reduce emissions beyond a business as usual scenario. Offsets provide an economic reward for making a real difference in the total volume of greenhouse gases emitted to the atmosphere. This concept is particularly important in the context of a compliance scenario. For example, if utilities are required to reduce their emissions by a certain amount, the additionality prevents them from claiming credit for reductions that were already planned; it requires them to make environmental improvements or support projects that are making an improvement through the purchase of offsets.

The market price signal of offsets should reflect the cost of compliance (which policymakers establish based on complex and interrelated economic factors). If a utility faces a penalty of $40 for every ton of carbon it emits over its limit, then the cost of offsets will be less than $40 per ton. Therefore, the price of offsets is not driven by project costs alone; it is driven by compliance factors. Similarly, if a utility can reduce emissions at its facility for a cost of $25 per ton and the price of offsets is $10 per ton, it will buy offsets rather than implement its own projects. Carbon offsets were originally conceived to help meet compliance needs through the most cost-effective means available.

In the context of international development, it is important to keep in mind that carbon offsets do not provide large amounts of income for project development or poverty alleviation. In most cases, carbon offsets are used in combination with traditional, non-carbon financing mechanisms.

Although the carbon market provides a mechanism to create a revenue stream for climate mitigation, there is currently no corresponding market to realize the benefits of projects that reduce risks posed by climate change, i.e., adaptation projects.

Financing Mechanisms for Climate Projects

Carbon Offsets

Environmental commodities, such as carbon offsets, assign economic value to GHGs. By turning GHG emissions into tradable commodities, it is possible to use the power of market forces to mitigate global climate change. Carbon finance refers to transactions involving carbon offsets or carbon allowances. Carbon finance can be used to comply with regulatory obligations, support investments in projects, or provide an investment opportunity through arbitrage or speculation.

A carbon offset represents one ton of carbon dioxide emissions that is avoided or removed from the atmosphere. Emissions can be avoided by choosing cleaner, renewable technologies instead of fossil fuels or by using energy efficiency measures to reduce the total consumption of fossil fuels. Carbon dioxide (CO_2) can also be removed from the atmosphere by biological carbon sequestration, a process in which

plants absorb CO_2 through photosynthesis. Reforestation and low-till farming practices are common carbon sequestration measures.

Carbon offsets may include any of the six greenhouse gases regulated by the Kyoto Protocol (CO_2, CH_4, SF_6, N_20, PFCs, and HFCs). To create a common "currency," all gases are denominated as tons of carbon dioxide equivalent or "CO_2e" based on global warming potential (GWP) multipliers. For example, one ton of methane is equivalent to 21 tons of carbon dioxide based on its global warming impact. Therefore, one ton of methane is traded as 21 tons of CO_2e. In most cases, a ton actually refers to a metric tonne.

Financing Mitigation vs. Adaptation

As noted above, carbon offsets are provided only for mitigation efforts. There is currently no mechanism for the monetization and trading of adaptation benefits (although the insurance industry does assess climate risks and levy premiums). However, some projects may have both mitigation and adaptation benefits. Particularly in forestry and agriculture, projects may sequester carbon and reduce vulnerability to climate impacts. For example, planting trees in certain areas may prevent flooding of nearby agricultural plots.

Ultimately, carbon offsets exist because policies and international agreements have created obligations to reduce GHGs; trading frameworks and markets have evolved to support these policies.

Kyoto Mechanisms

The Kyoto Protocol brought cap and trade to the international level in an effort to combat global warming. Under Kyoto, countries negotiate reduction targets for each commitment period. Overall, the Kyoto Protocol seeks a 5% reduction during the first commitment period of 2008-2012 and is designed to be renegotiated and extended for future commitment periods. The US signed, but decided not to ratify, the treaty. The US is a signatory of the United Nations Framework Convention on Climate Change (UNFCCC), under which the Kyoto Protocol was established. The Protocol became legally binding in February 2005.

The agreement is designed to be flexible in order for countries to meet their obligations at the least possible cost. A country can comply with Kyoto by reducing emissions internally, by trading Assigned Amount Units (allowances), and/or creating reductions in other countries – known as Joint Implementation (JI) and the Clean Development Mechanism (CDM) – and applying those emissions credits to its own target. For example, it could be very expensive for a utility in Japan to reduce emissions in-country but inexpensive to upgrade a plant in China or Brazil (thereby reducing an equivalent volume of CO_2 at a much lower cost). In environmental terms, it does not matter where the GHG reductions occur; the atmosphere will still benefit. The CDM is implemented in developing countries, and JI refers to projects implemented in developed countries.

Voluntary Markets

When environmental commodities are sold to meet mandates (such as the national regulations adopted to implement the Kyoto targets), they are sold on the *compliance* markets. All other transactions occur on the *voluntary* markets. The evolution of voluntary markets shadowed the development of the Kyoto market. Some people and companies were motivated to take action on a voluntary basis – particularly in countries which were not signatories. Others welcomed voluntary efforts (such as the Chicago Climate Exchange) as opportunities to prepare for an eventual cap and trade system or to burnish their reputation by "greening" their carbon footprint.

Numerous universities, corporations, and state and local governments have purchased offsets to reduce their carbon footprints (i.e., offset their CO_2 emissions). Many individuals choose to offset their personal carbon footprints, and online carbon calculators can help them determine how many carbon offsets to buy in order to compensate for the emissions they generate directly or indirectly at home, work, and on travel.

Several non-profits use the voluntary markets as a way to support international development objectives. For example, the Clean Air Action Corporation (CAAC) and Institute for Environmental Innovation used the voluntary markets to generate income for farmers in Africa and India under The International Small Groups Tree Planting program (TIST). TIST is now issuing credits on the CDM market as well.

Credibility is critical to making carbon offsets effective environmental management tools. The voluntary market is unregulated, but a variety of standards have been developed to ensure the integrity of the offset product. Significant work has been done by experts around the world to develop procedures for measuring, monitoring, verifying, and reporting offsets. To a large extent, methodologies for voluntary market offsets build on work done to support CDM and JI under the Kyoto Protocol.

Growth and Current Status of Carbon Markets

The carbon markets have been growing at an impressive rate. In 2007, the carbon market grew to $64 billion, more than double its size in 2006. Most of the transactions took place on the European Union's Emissions Trading System (which has since been linked to the UNFCCC system), accounting for $50 billion of the total volume. Thirteen billion dollars of this amount consisted of credits from Clean Development Mechanism projects.[4] About $7.4 billion was invested in CDM in developing countries. The vast majority (nearly 90%) of these investments were in clean energy. An estimated $12.9 billion is invested in 80 carbon funds and facilities.[5] The voluntary market represented $265 million in transactions in 2007.[6]

Updated Kyoto commitments could bring significant benefits to the developing world if flexible mechanisms continue to be used to meet commitments. In terms of post-2012 commitments, the European Union (EU) continues to lead the way. The EU has committed to reducing its emissions by at least 20% from 1990 levels by 2020, and by up to 30% if other developed countries commit to comparable reductions under a new global agreement. According to one recent study, reducing GHG emissions 25% below 2000 levels by 2030 would require more than $200 billion in additional investment and financial flows.[7] The potential benefits for the developing world are substantial.

Impacts of the Global Financial Crisis

The carbon market has not been immune to the global financial crisis. During the second half of 2008, the price of European allowances fell 48% from a high of €29.30 in July to under €14 in the first week of December 2008.[8] Note that prices quoted in this report could change significantly over time.

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[4] World Bank, *State and Trends of the Carbon Market 2008* (Washington, D.C., 2008).
[5] "Carbon Finance, Development and the World Bank," http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:21520231~menuPK:34480~pagePK:64257043~piPK:437376~theSitePK:4607,00.html.
[6] Ibid., p. 1.
[7] United Nations Framework Convention on Climate Change Secretariat (2008): *Investment and Financial Flows to Address Climate Change: An Update,"* http://unfccc.int/documentation/documents/advanced_search/items/3594.php?rec=j&priref=600004974#beg, p. 7.
[8] Carbon Positive, *Gloom Envelops EU carbon market,* http://www.carbonpositive.net/viewarticle.aspx?articleID=1347

In a recession, lower economic activity means fewer emissions from industry and power utilities; this translates into reduced demand for offsets and allowances. If prices fall too much, project development may suffer. Voluntary markets had not suffered significant impacts as of December 2008, but demand is likely to diminish as companies and consumers reduce discretionary spending.

Some observers have expressed concerns that the crisis will inhibit countries from making post-Kyoto commitments to address climate change. Others see renewable energy and energy efficiency as part of the solution to the world's economic problems. Many US and European leaders have expressed commitment to fighting global climate change, despite global financial concerns.

Clean Development Mechanism (CDM)

As noted earlier, CDM is a mechanism under the Kyoto Protocol through which developed countries can invest in carbon reduction or sequestration projects in developing countries in exchange for credits, known as Certified Emissions Reductions (CERs). CERs can be used in limited amounts to meet obligations under the Kyoto treaty. Among other eligibility criteria, CDM projects are required to support the sustainable development objectives of the host country.

CDM Project Types and Locations

CDM investors tend to favor projects that generate large volumes of offsets at the lowest possible project development cost. Methane capture projects are popular because the captured methane can often be used as fuel, and, as noted earlier, methane has a GWP of 21.[9] In addition, methodologies for reducing methane emissions from landfills and through manure management are well known and have a proven track record. Similarly, HCFC-22 has a GWP of 1,700, with project costs of less than $1 per ton of CO_2e. It is not surprising that HCFC-22 projects represent 18% of the expected volume of CERs through 2012.[10]

At present, the only types of forestry and land use projects eligible for CERs are afforestation and reforestation (A/R). These projects commonly include conversion of land to agro-forestry systems or commercial plantations. To date, only one forestry project has been registered under the CDM – a project under the World Bank's BioCarbon Fund in China. No CERs have been issued from this project yet. However, there are approximately 27 A/R projects awaiting approval (with a total pipeline of nearly 4,000 projects).[11]

There are several methodologies approved by the CDM Executive Board for afforestation and reforestation activities. [12] Project sponsors are also welcome to suggest new project methodologies. However, this creates an additional step in the project approval process and requires more project development time.

Types of projects with already approved CDM methodologies include:

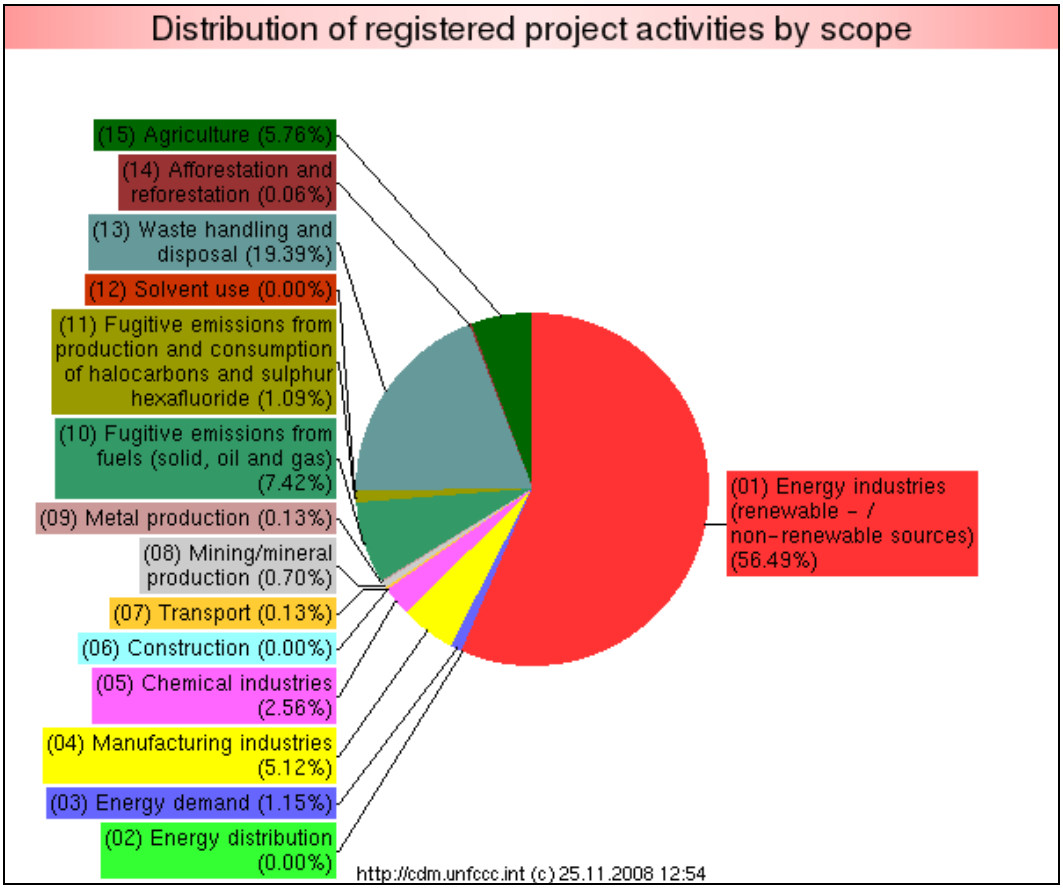
- Afforestation/Reforestation (A/R) of degraded lands
- A/R of land currently under agricultural or pastoral use

[9] Scientists have recently increased this factor to 23, but methane is still credited with a multiplier of 21.
[10] United States Government Accountability Office (2008): *International Climate Change Programs: Lessons Learned from the European Union's Emissions Trading Scheme and the Kyoto Protocol's Clean Development Mechanism,* p. 45.
[11] Carbon Positive, *Time running out for CDM forestry,* http://www.carbonpositive.net/viewarticle.aspx?articleID=1266
[12] Information about these methodologies can be found at http://cdm.unfccc.int/methodologies/ARmethodologies/index.html.

- A/R activities for industrial/commercial use
- A/R for sustainable wood production
- A/R allowing for silvipastoral activities (forest grazing)
- A/R activities on unmanaged grassland in protected areas
- Replacement of fossil fuel with biomass for heat generation in boilers
- Electricity generation from biomass residues
- Grid-connected electricity generation using biomass from newly developed dedicated plantations
- GHG reductions from manure management systems.

The following chart shows the distribution of approved CDM projects by type:

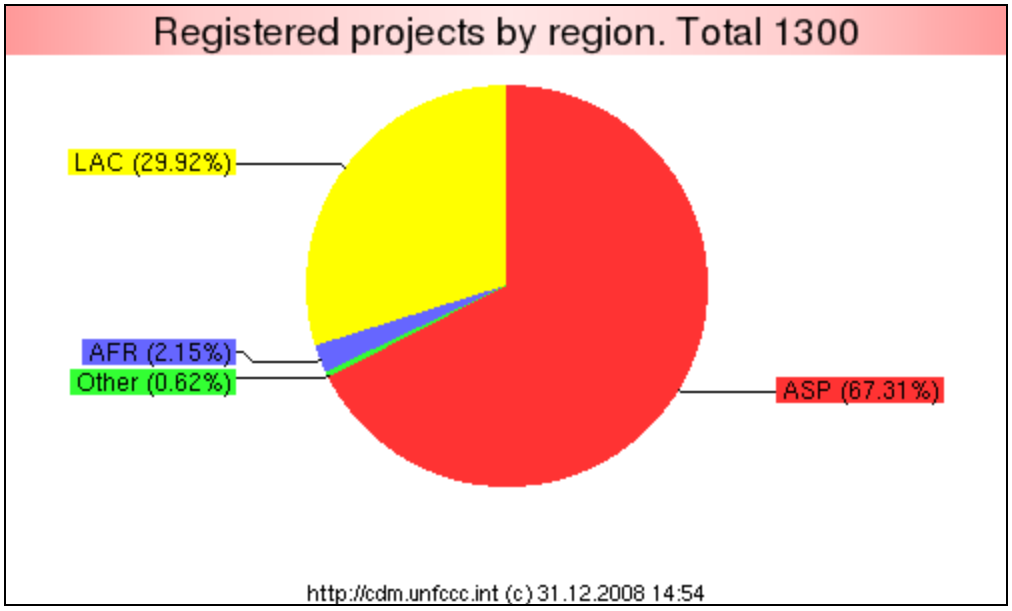
Figure 1: CDM Projects by Type



Note that agriculture accounts for 5.76% of registered CDM projects, and A/R projects account for only 0.06% of the total.

The location of registered projects is shown in Figure 2 below. Asia/South Pacific (ASP) and Latin America/Caribbean (LAC) dominate the market for CDM projects, with African (AFR) projects comprising only about 2% of the total.

Figure 2: CDM Projects by Location



Region	Number of projects
NAI-Africa	28
NAI-Asia and the Pacific	875
NAI-Other	8
NAI-Latin America and the Caribbean	389

CDM Prices

At of this writing, permanent CERs trade at $12-20 in forward purchase agreements and around $25 in the secondary issued market. The price of CERs from forestry projects is unknown, as none have been issued yet. Voluntary Emission Reductions (VERs) from forestry projects average $5, though projects accredited using high standards can fetch a premium up to about $8.[13]

Barriers and Opportunities in the CDM Market

Barriers

Post-Kyoto uncertainty is probably the most significant barrier to investments in CDM. It is unclear what will happen when the first Kyoto commitment period ends in 2012 and whether the post-2012 regime will allow CDM projects to be used for compliance. Given that many developing countries insist

[13] Carbon Positive, "*tCER prices, volumes to remain low,*" http://www.carbonpositive.net/viewarticle.aspx?articleID=1304

on the extension of CDM as a flexible mechanism for compliance, it is unlikely that CDM will disappear. However, the rules for using CERs beyond 2012 may take time to develop.

The current crediting period for CDM projects is 7-10 years, renewable twice. However, most buyers are reluctant to hold post-2012 CERs. Until new rules are in place, it is likely that prices will remain low for post-2012 CERs.

Forestry credits face additional challenges. Unlike other CDM credits, CERs from forestry expire based on rules governing crediting periods, re-verification, and expiration. Only temporary CERs (tCERs) have been of interest to buyers, because they can be applied in the current commitment period and there is great uncertainty regarding what sort of rules might be in place in the future.[14] The European Union, the biggest buyer of CERs, does not allow the use of forestry credits for Kyoto compliance.

Because CERs are used against emissions reductions targets, it is important to ensure that CDM projects represent real and additional progress toward those caps. The CDM project approval process is designed to issue credits only for projects that make a difference in reducing global GHG emissions from a business-as-usual scenario.

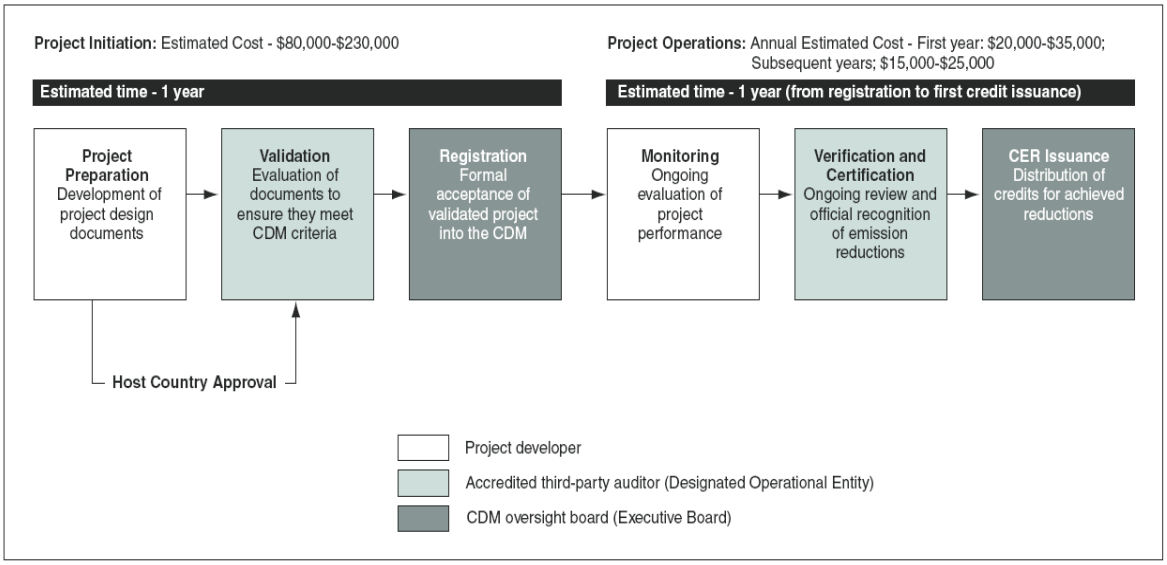
The cost of environmental integrity, however, can be quite high. As demonstrated in the figure below, the process for approving CDM projects can be both time-consuming and expensive. Consequently, smaller projects are less attractive due to their high transaction costs and poor economies of scale. The process for forestry credits is particularly cumbersome due to the complexity of methodologies addressing project risks and verification requirements.

Compounding the challenges associated with the approval process is that fact that there is a shortage of companies accredited to do monitoring and verification (M&V) work for the CDM Executive Board. There are also concerns regarding the reliability of existing verification firms. One of the largest verification companies, which has certified 40% of CDM projects to date, was suspended for 1-2 months following an audit. This has put further strains on the CER pipeline and has negatively affected the stock value of project developers that rely heavily on certification work. In many cases, Designated National Authorities (the host country entities responsible for approving projects), also need technical training.

[14] Ibid.

The following graphic illustrates the CDM project development cycle:

CDM Project Cycle



Source: GAO analysis of UNFCCC documents and UNDP data.

There are several project-related risks associated with CDM projects. Primary CERs are forward contracts, or the rights to future credits. There is a risk that the project will not produce the expected number of CERs. It is also possible that the CDM Executive Board will delay or reject a project. There is also a risk that the project will not be built on schedule or within budget. It is estimated that registered projects tend to yield only 76% of their forecasted CERs.[15]

The countries which are most in need of climate adaptation investments also tend to have the worst investment environments for any type of projects. Africa is the continent often regarded as facing the greatest climate change impacts, but there were only 27 CDM projects registered in 7 African countries in 2006. In order to expand geographic coverage of the CDM, former Secretary-General Kofi Annan launched the Nairobi Framework. An additional 44 African CDM projects, totaling $12-18 billion in capital investment, are currently awaiting registration.[16] However, barriers remain. Climate investment tends to follow Foreign Direct Investment and Africa still lacks institutional capacity to assure that investments are deployed and managed wisely.

Obstacles throughout the developing world include the small size of potential CDM projects; limited institutional capacity for project development; limited awareness of CDM in both the public and private sectors; inadequate financing support; and limited capacity to undertake unilateral projects.

[15] United States Government Accountability Office (2008): *International Climate Change Programs: Lessons Learned from the European Union's Emissions Trading Scheme and the Kyoto Protocol's Clean Development Mechanism,* p. 32.
[16] Ibid., pp. 1-3.

Opportunities

Despite the barriers, CDM has been an important mechanism for funding mitigation efforts in many developing countries. It has provided three times more funding for renewable energy and energy efficiency efforts than ODA projects. Under a high demand scenario anticipated in the future, CDM could spur as much as $100 billion in annual investments.[17] It is likely that such a rising tide would lift all boats, benefiting forestry and land use projects in addition to energy projects.

Programmatic CDM may provide a good opportunity for rural areas of developing countries. Also known as a Programme of Activities (PoA), Programmatic CDM (pCDM) is a single measure or set of interrelated measures to reduce emissions or sequester carbon at multiple sites. The activities are credited as one CDM project. The advantage of programmatic CDM is that it distributes transaction costs over a *group* of activities. In practice, few projects have been approved due to the challenge of verifying emission reductions on a programmatic scale (e.g., ensuring that light bulbs were distributed and the emissions reductions were achieved). A *sectoral* approach has also been suggested. This would entail issuing credits in relation to a baseline set for an entire sector. Facilities that beat a certain performance standard would receive credits. This approach requires reliable historic emissions data and the technical capacity to conduct monitoring. Forestry methodologies are currently under development for pCDM. Programmatic methodologies have been developed under some voluntary standards, such as the Gold Standard.

Voluntary Markets for Carbon Offsets

The size of the voluntary market has grown considerably in recent years. There are approximately 210 offset providers, including 87 US-based companies.[18] Detailed descriptions of many companies can be found in Clean Air-Cool Planet's report, *A Consumer's Guide to Retail Carbon Offset Providers.*[19] Another list is available at the Tuft's Climate Initiative website: http://www.tufts.edu/tie/carbonoffsets/carboncompanies.htm. Some providers of voluntary offsets, such as Reforest the Tropics, invest in projects in developing countries.

Although the majority of voluntary offsets are derived from energy efficiency and renewable energy projects, voluntary offsets have also played a major role in financing sequestration projects. According to Conservation International, most of the current financing for forest conservation in the carbon market results from voluntary initiatives.

The voluntary markets place greater emphasis on "social responsibility," which tends to favor forestry projects. Tree planting projects, for example, provide a tangible physical representation of carbon sequestration – making it easier to sell the abstract concept of carbon offsets to the general public.

Types of Voluntary Projects and Locations

The geographic distribution of projects differs compared to CDM projects. While China and India dominate the CDM market, the voluntary market is dominated by projects in the US and Canada. The percentage of African projects on the voluntary market is three times greater than on the CDM market.

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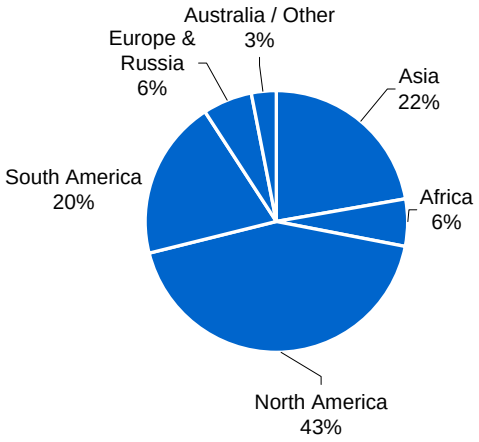
[17] Address by Yvo de Boer, Executive Secretary, United Nations Framework Convention on Climate Change, Africa Carbon Forum 3 September 2008 – Dakar, Sénegal, p. 3. http://unfccc.int/files/press/news_room/statements/application/pdf/carbon_forum_senegal_3_september.pdf

[18] United States Government Accountability Office (2008): *Carbon Offsets: The U.S. Voluntary Market Is Growing, but Quality Assurances Poses Challenges for Market Participants, p.*10.

[19] Clean Air-Cool Planet, *A Consumer's Guide to Retail Carbon Offset Providers, 2006,* http://www.cleanair-coolplanet.org/ConsumersGuidetoCarbonOffsets.pdf.

One reason for the difference is that buyers of voluntary offsets tend to prefer projects with co-benefits, such as the advancement of renewable energy technologies. Another reason for the difference is that smaller projects would face prohibitive transaction costs if developed as CDM projects.

Location of Voluntary Carbon Offset Projects (2006)[20]



Source: Hamilton et al. (2007)

"Failed" CDM projects sometimes issue credits on the voluntary markets. CERs may also be sold on the voluntary market. This might include credits from CDM projects that failed to obtain approval for a new methodology, failed to be validated by the CDM Executive Board, or could meet international approval criteria but did not meet the national approval criteria. Projects for which the timing does not mesh with CDM approval and validity timeframes may move to the voluntary market. For example, projects which qualify for CDM but extend beyond the 2012 boundary of Kyoto Protocol validity may be sold on the voluntary market. Similarly, projects which commenced before the registration date established by the CDM Executive Board or early action projects that missed the December 31, 2006 deadline may also be considered as candidates for Voluntary Emission Reductions (VERs). Note that VERs are generally not accepted by compliance regimes.

Voluntary Market Standards and Methodologies

The voluntary carbon market is unregulated, which means there is no single standard defining the legitimacy of carbon offsets. The majority of standards adhere to the principle of additionality, meaning that the reduction would not have occurred without the sale of carbon offsets. Standards vary in terms of the ways in which additionality may be proven.

Recent press coverage drew public attention to offset projects which failed to conform to generally accepted guidelines and standards. A report by the US Government Accountability Office (GAO) released in August 2008 examined the voluntary market in the United States and found that only three out of 33 offset retailers provided information about the additionality of their projects, and only nine provided information about quality assurance (such as the monitoring and verification procedures followed).[21] Despite this finding, the GAO did not recommend federal oversight be applied to the

[20] ICF International, *Voluntary Carbon Offsets Market Outlook,* Feb. 2008, p. 40.
[21] United States Government Accountability Office (2008): *Carbon Offsets: The U.S. Voluntary Market Is Growing, but Quality Assurances Poses Challenges for Market Participants,* p. 8.

voluntary offsets market since this would probably increase costs for providers and consumers. Moreover, the voluntary markets for carbon offsets have continued to grow even in the wake of negative publicity.[22]

Voluntary Offset Prices

The price of credits on the voluntary market rose 26% in 2008 to an average of $6.30 per ton.[23] Gold Standard VERs were trading at $10.80 per ton, while VERs priced on the Chicago Climate Exchange were at $2.90.[24]

Prices for voluntary offsets are influenced by several factors, but in general, the more rigorous the standard, the more expensive the offset. The table below summarizes the 2007 prices associated with leading offset project standards. As of February 6, 2009, the exchange rate was $1.28 per Euro.

Price Variation According to Offset Standard[25]

	Standard	€/tCO2
Premium	Gold Standard, Climate Community Biodiversity (CCB)	10+
Medium	VER+, Voluntary Offset Standard, Voluntary Carbon Standard (high)	5 – 7
Basic	Voluntary Carbon Standard (low), Carbon Financial Instrument (CCX)	2 – 3

Source: Buen (2007)

Projects that offer ancillary benefits (i.e. additional environmental, social, or economic benefits) tend to have higher prices. These projects have greater marketing value from a Corporate Social Responsibility perspective.

Barriers and Opportunities in the Voluntary Market

Barriers

Offsets, particularly voluntary offsets, have received bad publicity. A June 2007 article in *The Guardian* noted: "The problem with offsetting is twofold. First, these schemes are unregulated and wide open to fraud. There is nothing but the customer's canniness to stop a company from claiming to be running a scheme which does not exist; claiming wildly exaggerated carbon cuts; selling offsets that have already been sold; charging hugely inflated prices. EasyJet, the cut-price airline, backed out of offsetting in April

[22] Rosenthal, John, "Are Carbon Offsets for You?" msn.com, accessed December 8, 2008, http://travel.msn.com/Guides/greenarticle.aspx?cp-documentid=475287

[23] United States Government Accountability Office (2008): *Carbon Offsets: The U.S. Voluntary Market Is Growing, but Quality Assurances Poses Challenges for Market Participants,* p. 13.

[24] "VER prices up 26% in 2008," Sept. 17, 2008, http://www.carbonpositive.net/viewarticle.aspx?articleID=1238

[25] ICF International, *Voluntary Carbon Offsets Market Outlook,* Feb. 2008.

on the grounds that 'there are too many snake-oil salesmen in the business.'"[26] It is difficult to accurately assess how much business may have been lost in this growing market due to negative press.

There are several important barriers to creating carbon offsets. Under both CDM and the voluntary market, there may be uncertainty regarding who owns the credits. Is it the landowner, the project developer or the government? Uncertainty regarding the science of carbon sequestration can give rise to disputes between verifiers and project developers regarding how many offsets should be issued from a given project.

Tapping into the carbon market may create new problems for project sponsors. There is a risk that committing to long-term forestry offset contracts will give producers less flexibility in responding to market and environmental trends. For example, carbon contracts could make it impossible to change land use patterns in order to sustain core economic activities.

On the demand side, the fact that companies have less discretionary spending in the midst of the financial crisis may or may not be counterbalanced by the growing concern about climate change. It is also possible that companies and citizens in the United States will be less likely to take voluntary actions if the new government adopts federal measures to combat global warming.

Opportunities

Voluntary markets offer greater flexibility and lower transaction costs than the Kyoto market. CDM projects can only take place in countries that have ratified Kyoto, have established a Designated Operational Authority, and have institutionalized a process for the approval of projects. In contrast, voluntary standards do not require host country approval of Kyoto participation. Greater flexibility in methodologies also lowers transaction costs.

The lack of a standardized methodology for VERs could be a risk for the buyer of the offsets if a project is deemed to be flawed. The reputation of a project developer could be jeopardized, but a lender or investor is less likely to be harmed (assuming the offsets are sold after the project is implemented).

In the CDM market, credits are typically purchased *after* reductions are made and verified. In voluntary schemes, payments are sometimes made on an *up-front* basis. Considering that the greatest financing need is for covering project development costs, this is a major advantage of the voluntary market. These arrangements are frequently made on an equity basis but could also be made through a loan or bond.

Although forward payments reduce the burden on producers, they increase risks for investors. One approach is to make payments on a quarterly ex-post basis according to the number of trees planted; this model was used by The International Small Groups Tree Planting Program (TIST).

Another advantage is that the voluntary market is more amenable to branding. In other words, it may be possible to charge a premium for added benefits, such as enhanced biodiversity, conservation, or poverty alleviation. In the CDM world, the source of offsets (and the extent of co-benefits) is often less important to buyers. Because co-benefits are a high priority for USAID, this is an important advantage of the voluntary market.

[26] The Guardian, June 16, 2007, *The Inconvenient Truth about the Carbon Offset Industry,"* http://www.guardian.co.uk/environment/2007/jun/16/climatechange.climatechange.

Private Sector and Non-Profit Carbon Funds

Carbon funds are vehicles used to collect money for the purchase of carbon reductions or for direct investment in reduction projects. Investors receive either carbon offsets or cash as a return on their investment. The money may directed to the project developers who supply the offsets or investments may be made directly in offset projects. Carbon funds are sponsored by non-profits, investment funds, and foreign aid agencies.

It should be noted that there are many other types of investors who may or may not use carbon funds as vehicles for investing in offsets, including investment banks, private equity funds, hedge funds, project developers and lenders, clean tech companies, energy companies, major corporations, and other carbon players. These entities may directly invest in projects or offsets.

Non-profit organizations, such as Carbonfund.org and The Climate Trust, work with businesses and individuals to invest in projects for the benefit of the environment. The mechanism for collecting financing is similar, but the focus is more on offsetting emissions than on making a profit.

ODA Carbon Funds

The United Nations and World Bank have been particularly active in developing carbon funds to support climate investment. The World Bank has developed 13 different carbon funds, which are described on the Bank's Carbon Finance website. The Funds are included in this discussion, because private sector capital may be included. Funds can help boost investor confidence and serve as vehicles for capacity building.

Perhaps the most significant fund is the Adaptation Fund, which is capitalized by a 2% tax on CDM projects. The Adaptation Fund became operational through the adoption of several decisions at the recent Conference of Parties in Poland (COP-14). However, participants were unable to reach consensus on taxing Joint Implementation and emissions trading in order to scale up the Adaptation Fund.

The Least Developed Countries Fund, developed under the UNFCCC framework, addresses priority climate change adaptation needs in the world's poorest countries. At present, a total of $115 million has been committed by 14 donor countries to implement the urgent and immediate adaptation actions identified by the National Adaptation Plans of Action. The amount will increase as donor countries continue to make voluntary contributions to the Fund.[27]

The Forest Carbon Partnership Facility was developed by the World Bank to provide technical assistance in reducing emissions from deforestation and forest degradation. It will provide per-ton incentives to some countries, and the hope is to tap into other incentives developed for REDD.

The Community Development Carbon Fund is another World Bank initiative, with $128.6 million available to support the poorest communities, which would otherwise find it difficult to attract carbon finance. Investors include governments as well as major corporations.

[27] "Frequently Asked Questions on the Least Developed Countries Fund," http://www.thegef.org/projects/Focal_Areas/climate/documents/LDCF_FAQs.pdf

Other Financing Mechanisms

There is a long list of financing mechanisms that do not necessarily rely on carbon offsets as a source of revenue. In this section, we review financing mechanisms commonly used in international development and consider their potential for supporting climate projects in rural areas of developing countries.

Certain enabling conditions are prerequisites for successful financing endeavors: good governance, supportive policies and institutions, clear land tenure, a stable macroeconomic environment, and well-designed agricultural and/or forestry policies. It is advisable that the financing mechanisms described in this paper be used in countries with favorable conditions or in conjunction with private sector or financial sector reform programs.

Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD)

Recognizing that 20% of the anthropogenic CO_2 emitted to the atmosphere is the result of the clearing and burning of tropical forests, a variety of financing mechanisms are being discussed to support REDD. The use of the existing carbon market infrastructure is one approach being considered. The Stern Report finds that $10-15 billion per year, delivered through the carbon markets, could reduce tropical deforestation by 50%.[28] The Woods Hole Research Center found that 94% of deforestation in the Amazon could be avoided for less than $5 per ton of carbon.[29]

Fearing that the availability of carbon at such a low price could act as a disincentive for developed countries to make reductions of greenhouse gases at home, alternative proposals advocate a dedicated REDD trading mechanism; in other words, a separate environmental commodity would be created under the updated Kyoto Protocol. Yet another scenario requires developed countries to buy a portion of their international emissions allowances rather than getting them for free; the revenues would go into UN funds to pay developing countries for avoided deforestation efforts.

As discussions take place, a few projects have already been initiated under voluntary carbon schemes. The Climate, Community and Biodiversity Alliance (CCBA) has backed a forest conservation project in Indonesia that would cover 770,000 hectares (or 1.9 million acres). Through this project in Ulu Masen on the island of Sumatra, local communities are expected to receive $26 million in the first five years of a 30-year project for 16.85 million tons of CO_2. The project covers the island's largest unprotected block of unprotected forests.

Even at carbon prices of only $3 per ton, REDD projects would provide a better payoff than selling logging concessions. In Cameroon, an 830,000 hectare tract of rainforest, which is home to gorillas and elephants, would provide $64 million versus $26 million in logging concessions.[30]

In support of REDD, industrialized countries have invested $300 million in the World Bank's newly created Forest Carbon Partnership Facility (FCPF). The FCPF will pay countries to save their tropical forests. As a first step, the facility will support capacity building in calculating business-as-usual scenarios and developing monitoring methodologies for preserved forests. Donor nations include Australia, Finland, France, Japan, Norway, Spain, Switzerland, the United Kingdom, and the United States.

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[28] Ibid.
[29] "REDD carbon markets: Proposals compared," Aug. 22, 2008, http://www.carbonpositive.net/viewarticle.aspx?articleID=1209
[30] Carbon Positive, *Carbon credits paid to preserve forest,* http://www.carbonpositive.net/viewarticle.aspx?articleID=1004

The FAO, UNDP, and UNEP have established the UN-REDD Programme to allow donors to pool resources and provide funding for activities. The fund has commitments of $35 million. One of the objectives of the program is to ensure that communities benefit from international initiatives.

A Memorandum of Understanding was signed by governors from California, Illinois, Wisconsin, and six states in Brazil and Indonesia on November 19, 2008. The leaders agreed to work together on new programs to protect and restore tropical forests and pledged that emissions reductions from REDD initiatives would be considered eligible carbon offsets under US legislation.

REDD does have certain drawbacks. There is a danger that placing greater value on forests will lead to land rights abuses by state and government interests. For example, the government of Papua-New Guinea has already asserted authority over carbon transactions from forests, despite the fact that the majority of forest land is privately owned. Illegal logging is another danger to REDD, because it threatens to undermine sincere commitments.

It is unclear at this stage whether special mechanisms will be established to support reduced deforestation or if the UN will rely on the carbon markets and donor assistance. Given the attention this topic is receiving, is likely that significant funding will be dedicated to REDD.

Term Loans and Project Finance Loans

Traditional loans can be used in combination with carbon financing. In most cases, there will be a substantial source of revenue other than carbon offsets. A purchase agreement for carbon offsets could serve as part of the loan collateral, depending on other risk factors (project type, etc.). Opening a carbon line of business could be an innovative area for banks to explore, supported by solid project evaluation skills and good investment advice.

Microfinance

Microfinance is the delivery of financial services to low- and moderate-income populations that lack access to formal financial institutions (e.g., commercial banks and insurance companies). Generally, support in the form of credit, loans, insurance or savings accounts is provided by a range of microfinance institutions (MFIs) including credit unions, state-owned development agencies, commercial banks, financial NGOs, or credit cooperatives. Loans are typically quite small – ranging from $50 to as much as $2,500.

In "village banking," groups of individuals and families in a community come together to provide and guarantee loans to individuals in the group.[31] If one borrower cannot repay the loan, the other people in the group must compensate. Building on this model, microfinance could be used to aggregate small climate-friendly projects if the upfront investment costs are modest and suitable projects can be identified.

To date, most MFI climate-related programs have focused on financing options to help people acquire renewable energy technologies. For example, the Citigroup Foundation recently partnered with USAID and the Small Enterprise Education and Promotion Network to team up six MFIs in Asia and Africa with renewable energy companies and organizations.[32] The program, "Microfinance and consumer lending to improve energy access to energy services in eastern and southern Africa," examines how MFIs can incorporate loans for energy services into their standard lending portfolios.

[31] FINCA International. Retrieved from www.villagebanking.org on November 30, 2008.
[32] McKee, Katherine (2008). Microfinance: Climate Change Connections. World Bank Institute. Development Outreach. April, 2008.

Other targets of microfinance for climate change adaptation and mitigation include education and financing to promote sustainable land use and farming practices, the promotion of Clean Development Mechanism projects that could supply income for sustainable forestry and agriculture projects, and the provision of insurance for healthcare and natural disaster risks associated with climate change. A number of respected MFIs and networks – including ACCION, MercyCorps, BASIX (India) and Equity Bank (Kenya) – are exploring various microfinancing products to respond to climate change challenges and opportunities.[33]

One barrier to microfinance is that interest rates on microcredit loans are high compared with loans from commercial banks. The rate difference is due to increased administrative costs, as MFIs specialize in handling more loans of smaller value than commercial banks. The transaction costs could be burdensome to borrowers; borrowers could even become more vulnerable by depleting livelihood assets to repay loans. Notably, microfinance services typically do not reach the poorest of the poor – the group most vulnerable to climate impacts.

Some promoters of microfinance assert that this mechanism can reduce climate vulnerability by increasing resources (such as overall income), thereby enabling people to cope with stresses that may arise due to climate change.[34] However, these climate benefits are too small and too indirect to be measurable.

The major challenge in using microfinance is that this instrument is meant to provide short-term loans, but carbon finance is generally slow to provide a payoff. Given that most MFIs require frequent payments from borrowers, this can create a problem. In forestry projects, for example, it requires approximately 20 years for a tree to offset one ton of carbon. Although soil projects in the agriculture sector generally have a shorter turn-around (4-5 years), this timeframe is still long in microfinance terms. Small-scale renewable projects (e.g. solar cook stoves and methane captures projects) are a better bet, as demonstrated by existing microlending programs.

Concessions

Under concession arrangements, the government allows a private entity (usually from another country) to operate and maintain an asset over a long period of time. Concessions are generally used for large-scale infrastructure or logging operations. Concessions typically involve foreign operators, but can provide value by creating local jobs. Profits are made based on project revenues or fees charged.

Although most forest concessions have focused on timber production, concessions can also be developed for forest restoration, management, and conservation. However, it is unlikely that carbon offsets from sequestration would be adequate to cover the fees required for concession rights. If REDD payments become available for avoided deforestation, concessions might be used for forest management.

Biofuel crops are good candidates for concession financing. Biofuel crops can be grown on arid land that is unsuitable for food production (an adaptation measure). Biodiesel can be made from non-edible jatropha nuts, found in dry areas of East Africa. Ethanol and biodiesel can also decrease dependence on foreign oil and enhance energy security. Large-scale renewable energy facilities could also be operated on a concession basis.

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[33] Ibid.

[34] Hammill, Anne et al (2008), *Microfinance and Climate Change Adaptation,* p. 114, IDS Bulletin Vol. 39, #4, September 2008.

Bonds

Governments, corporations, and international financial institutions can issue interest-bearing bonds to fund climate mitigation and adaptation activities. The money used by investors to buy the bonds is used to fund programs. Several types of bonds may be used to raise financing from private sector investors. General obligation bonds are paid out of future tax revenues. Revenue bonds are paid out of charges and revenues associated with a specific project or program. It is also possible to issue a bond that is a hybrid of the two types. The interest paid is lower than on corporate bonds, but it is not subject to taxation. Tax-exempt government bonds are the largest source of financing for pollution prevention and environmental infrastructure projects in the United States.[35]

Daiwa Securities Group and the World Bank issued the Certified Emission Reduction Linked Uridashi Bond (also known as the Cool Bond). The bond offers investors 100% principal protection in US dollars. It has a fixed coupon rate of 3% for the first 15 months, followed by a variable interest rate linked to the performance of CER market prices and the actual versus estimated delivery of CERs that will be generated by a hydropower project in China.

The World Bank also teamed up with the Scandinavian company SEB to issue a green bond to raise funds for climate mitigation projects. The green bonds will be denominated in Swedish kronor and have a maturity of six years. The coupon is 3.5% and invests in the World Bank's Aaa/AAA-rated bonds.

Forestry-backed bonds were issued in Chile. The bonds, totaling $13 million, were purchased by institutional investors such as pension funds, banks, and insurance agencies. The funds raised from the bonds will be used to purchase young forests (15-20 years old) and pay for forest management and reforestation costs. The bondholders will earn a share of the profits when the forests are harvested.[36]

Green bonds can be used to finance many types of projects. It is important, however, to be able to provide assurance of a reliable revenue stream and a reasonably high profit. Bonds are generally issued for large amounts, and there are substantial costs associated with issuance in order to cover legal fees, underwriting, insurance, etc. A creditworthy partner is needed in issuing bonds in order to assign a rating. This is not likely to be a good financing mechanism for small-scale projects in the developing world, unless many projects are bundled, perhaps as part of a larger carbon investment bond. Methane capture projects would be good candidates for carbon investment. Biofuels projects could be viable candidates for separate bond issuances.

Debt-for-Nature Swaps

In debt-for-nature swaps, the hard-currency debt owed by a country is exchanged by the creditor for financial commitments by the debtor, usually in local currency. Swaps typically cover one country or region and forgive millions of dollars of debt. The proceeds may be invested in projects through a local environmental organization. Debt-for-nature swaps may be commercial or bilateral (between countries).

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[35] World Wildlife Fund (2003): *Conservation Finance e-Resources: Compendium of Examples for Self-Sustaining Projects to Protect Wildlife and the Environment,* http://www.worldwildlife.org/what/howwedoit/conservationfinance/WWFBinaryitem7136.pdf, p. 7.

[36] Food and Agriculture Organization of the United Nations, *Financing Sustainable Forest Management ,p. 4.* http://www.fao.org/forestry/media/16559/1/0/

Commercial debt-for-nature swaps are based on:

- The willingness of banks or other commercial creditors to sell debt owed to them by developing country governments to third parties at a substantial discount from the debt's face value, because the creditors do not expect the debtor government ever to fully repay its debts;
- The ability of conservation organizations to raise money from their members or donors to buy the discounted debt from creditors; and
- Agreement on the amount of local currency that the debtor government will spend on new conservation programs in exchange for the conservation organization's cancellation of the debt.

The local currency amount will be only a fraction of the debt's face value in hard currency, but will be significantly more than the price at which the debt was purchased.[37] The same principles hold for sovereign debt cancellation and require the involvement of the US Treasury, US Department of State, USAID, and overseas counterparts. Swaps are time-consuming and complex to arrange. They may also be vulnerable to currency devaluation or inflation.

Debt forgiveness agreements lay out the criteria for project eligibility. Notably, forest conservation work is eligible under the Tropical Forest Conservation Act (which USAID currently supports). It may thus be possible to prioritize projects that maximize sequestration and adaptation benefits.

Environmental Funds

Conservation Trust Funds

Conservation trust funds can raise and disburse financing to qualifying projects. A trust fund is defined as money that must be used for specific purposes (such as conservation). The money is kept separate from other sources, and the fund is managed by an independent board of directors. There are three main forms of trust funds: endowment funds; sinking funds; and revolving funds. An endowment fund is invested, and only the interest or investment income is used to support project activities. Investments are typically made over a long time horizon in commercial bank deposits, government treasury bonds, and corporate stocks and bonds. In contrast, sinking funds spend down part of their capital each year – usually reaching zero over a predetermined period of time. Revolving funds continually receive new capital from fees or taxes and continually spend these revenues. Revolving funds may set up reserve funds as a safeguard against unforeseen events.

According to the World Wildlife Fund, conservation trust funds have the following advantages and disadvantages:

<u>Advantages</u>

- They can provide sustained, long-term funding for protected areas.
- They are a way of channeling a large international grant into many small local grants, and extending the lifetime of the grant over many decades.
- They can be used to strengthen "civil society" by appointing NGO and private sector representatives to the trust fund's board and giving them the same powers as government officials, making grants directly to NGOs and other institutions of civil society.

<u>Disadvantages</u>

- Conservation trust funds may sometimes have high administrative costs, especially if the fund's capital is relatively small or if the fund provides substantial technical assistance to grantees in the design and implementation of projects.

[37] Ibid, p. 17.

- They may generate low or unpredictable investment returns, especially in the short term, if they do not have a well-conceived investment strategy.
- If a fund's objectives and its criteria for making grants are not clearly set forth at the outset in the trust fund's legal documents, the fund's board may end up financing many unrelated projects that lack a common focus.[38]

Conservation trust funds are largely grant-making institutions, which often invest in capital markets to obtain additional income. Conservation trust funds are good sources of financing for agricultural and forestry activities with climate benefits, but these projects do not typically have a revenue source – which means that the role of private sector financing is limited. Conservation trust funds can become "carbon funds" if they develop projects that are eligible for the sale of carbon offsets.

Forestry Funds

Public-private partnerships can pool resources to achieve environmental objectives. For example, the US Forest Service and the US Fish and Wildlife Service have developed programs to generate offsets on public lands. The Forest Service partnered with the National Forest Foundation (NFF) to solicit donations for the Carbon Capital Fund. The Fund supports reforestation projects on lands managed by the Forest Service. The NFF manages the fund and uses a private contractor to measure and verify offsets.

The Fish and Wildlife Service partners with companies and non-profits to develop carbon sequestration projects on wildlife refuges. The partners retain the rights to carbon credits resulting from the projects. The program has resulted in the addition of 40,000 acres of land to the refuge system and the restoration of more than 80,000 acres of wildlife habitat with more than 22 million trees.

Carbon and forestry funds operated by private entities or through public-private partnerships can also use carbon offsets as a source of funding for projects. Depending on how the fund is set up, many types of adaptation and mitigation projects could be supported (assuming that these projects generate carbon offset revenues).

Payment for Environmental Services

Programs of payments for environmental services (PES) are becoming an increasingly popular way of conserving and restoring natural resources. Although the term "payments for environmental services" is relatively new, such programs have been in existence for quite some time. The primary environmental services that receive payments are watershed protection, carbon sequestration and storage, biodiversity protection, and landscape beauty.[39] Watershed protection schemes typically involve payments to upstream communities to maintain water quality (by protecting trees, avoiding road construction, etc.). Watershed schemes do not usually create tradable commodities. Carbon sequestration payments are addressed above in the sections on carbon markets. Biodiversity protection is based on payments to land uses that are thought to protect species, ecosystems, or genetic diversity. Similarly, landscape beauty refers to the protection of specific sites that have particular cultural value, such as national heritage sites.

Payments for environmental services are often administered by international non-profits, such as World Wildlife Fund, and/or national governments. In a recent WWF PES scheme in Indonesia, households

[38] Ibid, pp. 1-15.
[39] *Markets for Environmental Services,* http://www.oas.org/dsd/PES/Markets.htm

agreed to pay $0.60 per month in special charges to conserve watershed forests vital to the agricultural sector and local industry.[40]

It seems that PES overlaps with the carbon markets, and potentially with REDD if payments are given for avoided deforestation. PES does not leverage significant investment from the private sector.

PES, Debt-for-Nature Swaps, and many types of funds provide grants for carbon offset projects. These types of mechanisms are incompatible with carbon financing, which requires financial additionality.

Collateralized Loan Obligation Vehicles

Collateralized Loan Obligations (CLOs) are corporate entities constructed to hold fixed income assets as collateral, enabling the entities to sell packages of cash flows to investors. The entities issue debt and/or equity, and the proceeds are used to purchase the portfolio of credits. The bonds and equity are entitled to cash flows from the portfolio, in accordance with the priority of payments set forth in the transaction documents. Losses are applied in reverse order of seniority, with junior tranches offering higher interest rates to compensate for higher default risk. This financial mechanism has gained some notoriety in the recent financial meltdown, particularly as applied to mortgages, and as a result its application for climate change projects in developing countries would undoubtedly be regarded with some skepticism.

It has been suggested that carbon offset CLOs could be used for project and infrastructure finance loans, while generating enough income to offset the emissions from the investments in the portfolio.[41] Such structures require skills in valuation, credit rating, and risk management – skills that are in short supply in developing country financial institutions. CLOs also require that high-risk projects be counterbalanced by stable projects, such as large-scale multi-million dollar projects in infrastructure. It seems that structuring such a portfolio would be extremely complex, and that projects in developing countries would be too risky and small-scale to fit with the mechanism.

Recap: Financing Mechanisms Barriers and Opportunities

Regardless of the type of financing mechanism or combination of mechanisms used, a project must be "bankable." Projects with the greatest bang for the buck – or revenue per dollar invested - represent the best opportunities. Carbon financing can be used in conjunction with the traditional financing mechanisms described in the previous section, provided that the opportunity makes sense and additionality criteria are met. Standard loans are frequently used in combination with carbon financing.

The rules for CDM are quite rigorous. Large-scale projects emissions reduction projects with proven methodologies tend to be favorites of investors. Smaller projects in rural areas or in countries with risky investment clients bear similar transaction costs with less profit. The impending expiration of the first phase of the Kyoto Protocol is an impediment to CDM investment, although short-term demand will continue.

The voluntary carbon market currently offers a more promising source of financing for projects in rural areas of developing countries than does the CDM market. The voluntary market can overcome an important barrier by providing up-front payments for offsets (CDM projects do not produce a revenue stream until after the projects are implemented). Due to simpler methodologies and lower transaction costs, even forestry projects have been able to access voluntary markets. Voluntary offset sellers are also able to charge a premium for ancillary benefits, such as adaptation co-benefits or poverty reduction.

[40] *Payment for Ecosystem Services,* http://www.worldwildlife.org/science/projects/ecosystemserv/item1987.html
[41] Ryan, John, *A Carbon Offset CLO,* Journal of Structured Finance, Fall 2007.

Despite the possible co-benefit premiums, voluntary offsets generally trade at a discount relative to CERs. Both CERs and VERs can be used in support of ODA carbon funds, effectively engaging private sector investment.

REDD is an extremely promising financing mechanism for mitigation and adaptation, but the rules governing REDD programs under the UNFCCC are still under development. It is possible that REDD could be used in combination with concession agreements for forest or land management.

Microfinance has had a good track record for supporting very small scale renewable energy projects, but it has not yet been tested as a financing mechanism for climate projects in the forestry and agricultural sectors. The high transaction costs and long payback periods associated with these projects may represent an insurmountable barrier.

Green bonds are most suited to large, energy-related projects. It is unlikely that the rate of return on forestry and agriculture projects would be sufficient to justify the costs of issuing bonds. Exceptions may include bundled or large-scale projects with the potential to generate significant volumes of offsets. Collateralized loan obligation vehicles are deemed to be inappropriate for rural climate projects due to issues of scale and transaction costs.

Debt-for-nature swaps and environmental funds can use either public or private funding sources. Similarly, payments for environmental services and climate risk insurance are driven largely by governmental and non-profit entities. These mechanisms could be considered if USAID is interested in public-private partnerships. However, initial meetings with USAID suggested that the agency would prefer a greater degree of private sector involvement.

Finally, as addressed in the next section on recommendations, the use of loan guarantees holds particular promise. The Development Credit Authority could be useful in combination with carbon revenues.

Possible USAID Interventions

USAID could provide technical assistance to support offset creation, reduce costs, and keep income local. In the carbon offset world, little attention is paid to addressing the development needs of the host country or maximizing benefits to local communities. By giving a larger role to host country entities, more revenue would be kept by the local population. USAID could provide technical assistance to jumpstart organizations that develop and market climate-friendly investments in developing countries. Efforts could support the voluntary markets and expand to compliance markets if USAID mandates change.

USAID could support or develop a country-level brokerage service with expertise in carbon finance to help ensure that local interests are represented. The brokerage service could help local project developers understand issues related to contract length, timing of payments, and the types of projects that qualify for credit. The brokers could also aggregate smaller projects and market the country or certain regions as attractive places for investing in sustainable harvesting or climate projects. With local capacity, less money would go to foreign project developers.

Other small businesses could receive training and equipment to support project development, as well as the *measurement, monitoring, and verification* of carbon reduction and sequestration activities. The TIST model of providing personal PDAs for monitoring and verification is a good example. Assistance could also be provided in developing new methodologies for voluntary offset projects and providing training in

the use of existing methodologies. Emphasis could be placed on programmatic and small-scale projects. Measuring, monitoring, and verifying forest carbon should be a priority, because these skills could be applied for A/R now and will probably be needed to obtain REDD funding in the future.

Existing technical assistance efforts of other donor agencies target national governments and low-hanging fruit (primarily energy-related projects). USAID could confer with other donors to explore whether there is a *niche to fill in the forestry and agriculture sectors* (which generally represent high-hanging fruit), supporting local service providers such as project developers and monitoring and verification companies. It is possible that new programs are already under development by other donors (see Appendix 1 for a listing of other funding efforts), and these could be leveraged or supported by USAID.

USAID could consider developing a carbon facility. A carbon facility could make forward sales of carbon offsets to investors on the voluntary market and the proceeds could go to support the financing of climate projects in rural areas – particularly in forestry and agriculture. These project areas are often overlooked for more profitable options, but forestry and agriculture projects often have adaptation as well as mitigation benefits. A premium could be charged for offsets that offer both of these co-benefits. These offsets could be branded with a special name to distinguish them from those that have only mitigation benefits. Additional research would be needed to develop a list of eligible projects that the facility would support and identify suitable partners and implementers. Note that the World Bank's Community Development Carbon Fund has focused primarily on renewable energy and energy efficiency projects. See http://wbcarbonfinance.org/Router.cfm?Page=CDCF&ft=Projects for more details.

USAID could use the Development Credit Authority (DCA) to guarantee 50% of a special carbon loan portfolio offered through a bank.. Financial institutions in USAID-eligible countries have less experience with these types of transactions. This lack of experience typically translates into overly risk-averse financial institutions that are unwilling to make loans to even credit-worthy borrowers or projects. In addition to the novelty of the sector, the current price volatility of carbon offset prices will pose a hurdle to lending. Financial institutions in developing countries, which already have a hard time valuating common commodities like grain, may valuate carbon offsets at 0% or a minimal percentage of their nominal value. Common to almost all types of investments in USAID-eligible countries, borrowers lack adequate collateral in the eyes of financial institutions, which typically require 100% - 200% of the loan value in immovable collateral.

To address these issues, USAID could utilize its DCA guarantee to provide an initial safety net to financial institutions to overcome their initial risk-aversion and understand the real risks of financing climate change related projects. The guarantee could also be used to substitute non-existent collateral in order for borrowers to meet the collateral requirements of banks. As a significant amount of climate change investments are project finance investments, there is even less initial collateral, so a guarantee could help.

Of USAID's four credit guarantee tools, a loan portfolio guarantee or a portable guarantee could best be applied for financing climate change related projects. A loan guarantee could be used for large scale projects that generate significant carbon offsets; however, a loan portfolio guarantee or portable guarantee may be more appropriate to USAID's usual, programmatic type of work. With the use of a loan portfolio guarantee, USAID could stimulate banks to make a portfolio of loans for a specific type of project or projects (e.g. methane capture) across a variety of borrowers including both businesses and villages.

If the projects are all the same type, then whole portfolio could apply under the CDM as a PoA and generate stable carbon offset revenue (although there is no guarantee that offsets would be awarded).

Individually these projects would be too small to cost-effectively register under the CDM, but collectively economies of scale could be reached.

In conjunction with a guarantee, technical assistance would also be required to help the bank learn to assess the risks and potential rewards associated with climate projects. While the guarantee can help banks disburse loans, to ensure sustainable access to finance, banks need to understand and build in-house capacity to analyze climate projects. Technical assistance could also be provided to businesses or villages that are interested in offsetting carbon emissions through projects that have additional benefits, either monetary or non-monetary. Any loan application to a bank must still be seen as a loan based on a sound business plan and reliable cash flows. Undoubtedly businesses or villages interested in climate projects will need technical support in writing financials and business plans that are appealing to a loan officer in a bank.

Given the monumental challenges of climate change mitigation and adaptation, USAID assistance can be very valuable in promoting project development. Innovative mechanisms and programs, such as voluntary carbon markets and DCA, are needed to facilitate investments in climate projects in rural areas of developing countries.

Appendix I: Global Climate Change Adaptation and Mitigation Funding

Donor/ Initiative	Countries	Focus/Projects	Website
African Development Bank Group (AfDB)	African countries	In 2006, the AfDB initiated a climate adaptation and risk management (CRM) program with interventions in policy, capacity and project level.	http://www.afdb.org/portal/page?_pageid=473,30670406&_dad=portal&_schema=PORTAL
Asian Development Bank (ADB) - *Asia Pacific Carbon Fund, Technical Support Fund and the Credit Marketing Fund*	Developing member countries of ADB	ADB established a Carbon Market Initiative (CMI) under which it manages three projects: The **Asia Pacific Carbon Fund (APCF)** provides upfront carbon co-financing against future carbon credits until 2012 to enable clean energy projects to meet their financing gap to implementation. The APCF also provides upfront cofinancing to CDM projects in ADB's Developing Member Countries (DMCs) for future delivery of certified emission reductions. The **Technical Support Facility (TSF)** provides support for CDM projects. CMI will provide targeted technical support to project developers and sponsors in the following levels: 1) upstream support in project preparation and 2) downstream support in project execution and commercialization. The **Credit Marketing Facility (CMF)** assists sponsors to market additional credits generated beyond those that have been sold upfront to APCF.	http://www.adb.org/Clean-Energy/cmi.asp http://www.adb.org/Documents/Others/Asia-Pacific-Carbon-Fund.pdf

Australian Government - *AusAID*	Developing countries near Australia; Indonesia and Papa New Guinea	**Climate Change adaptation**: Australia will invest $150 million over three years to meet high-priority climate adaptation needs in vulnerable countries. The primary geographic emphasis of the program will be Australia's neighboring island countries, but targeted policy and technical assistance will also be available for other countries. **Climate Change Mitigation**: Australia's International Forest Carbon Initiative (IFCI) aims to demonstrate that reducing emissions from deforestation can be part of an effective international response to climate change. Total funding allocated for the initiative to date is $200 million over five years, focused on Indonesia and Papua New Guinea. Within the framework of the Indonesia-Australia Forest Carbon Partnership, Australia will support Indonesia in the development of its national framework for avoided deforestation and in the implementation of the Kalimantan Forests and Climate Partnership. Through the PNG-Australia Forest Carbon Partnership, Australia will assist Papua New Guinea to develop its avoided deforestation policies, forest carbon measurement system, and demonstration activities to enable Papua New Guinea's participation in future international forest carbon markets. Credible accounting of changes in forested areas is essential for such participation, so as a first step Australia will support Papua New Guinea in the development of a rigorous forest carbon measurement and accounting system.	http://www.ausaid.gov.au/keyaid/mitigation.cfm; http://www.ausaid.gov.au/keyaid/adaptation.cfm; http://www.climatechange.gov.au/international/publications/fs-ifci.html

Austrian Development Cooperation (ADC)	Developing countries	ADC does not have specific separate climate change programs but integrates into existing programs and projects. In the energy sector, great attention is paid to energy efficiency and renewable energy systems. Other focal sectors include water supply and sanitation, and rural development. ADC pursues the following principles: 1) Promotion and use of synergy between climate protection and other development cooperation sectors. 2) Institutional support for partners, capacity building, and awareness raising. 3) Ensuring that additional greenhouse gas emissions are minimized or avoided in ADC's cooperation programs and projects. 4) Building on regional and context-specific analyses, particularly considering the interaction between the effects of climate change and socioeconomic aspects. 5) Taking into account traditional techniques and socioeconomic practices.	http://www.entwicklung.at/en/
Belgian Development Cooperation (BCD)		On 10 September 2008, Professor Jean-Pascal Van Ypersele submitted a report with recommendations for Belgian Development Cooperation to Minister for Development Cooperation Charles Michel. The report is entitled "Climate change and the Belgian development cooperation policy: Challenges and opportunities." On 7 March 2008, Belgian Development Cooperation organized a conference on "Climate Change, a new Challenge for Development Cooperation?" The BCD has also organized a panel discussion on avoided deforestation in DR Congo to combat climate change.	http://www.dgcd.be/en/topics/index.html http://www.biodiv.be/news/avoided-deforestation-dr-congo-combat-climate/

Canadian International Development Agency (CIDA)	Developing countries	In 2006, CIDA provided CAD$1,025,000 in untied technical assistance to the Inter-American Development Bank (IADB) for a joint work program to promote renewable energy, energy efficiency, and carbon finance projects in Latin America and the Caribbean; As of 2005, the **Canada Climate Change Development Fund** had supported projects in more than 50 countries, in addition to making a $10 million contribution to the Least Developed Countries Fund (LDCF) managed by the United Nations and the GEF. The **Adaptation to Climate Change in the Caribbean** project is funded by CIDA and focuses on strengthening the technical capacity of national and regional institutions.	http://www.acdi-cida.gc.ca/CIDAWEB/acdicida.nsf/En/JUD-4189500-J8U; http://www.cimh.edu.bb/curprojs.htm
Caribbean Development Bank (CFB)	Caribbean countries	CDB provided financing for the Caribbean Community Climate Change Center toward the establishment of an **information clearinghouse**. The clearinghouse will support the scientific research component of the Center's work program and improve access to scientific knowledge resources and tools necessary to support sound decision making concerning climate change and sustainable development.	http://www.caribank.org/titanweb/cdb/webcms.nsf/AllDoc/1586ABF7D17E68D8042574E4004C6492?OpenDocument
Danish Development Agency (DANIDA)	Vietnam	**Capacity Development for National Climate Change Focal Point in Vietnam**: This project aims to strengthen human resources and institutional capacity of Vietnam for effective negotiation, policy analysis, and coordination of climate change activities. The capacity for managing climate risks, including seasonal forecasting, early warning systems, disaster preparedness, mitigation, and relief, needs to be improved for the region as a whole.	http://www.ambhanoi.um.dk/nr/exeres/2fb21c2d-d094-437f-af37-245e5ffdd16b,frameless.htm?nrmode=published

Deutsche Gesellschaft fur Technische Zusammenarbeit (GTZ) – *Climate Protection Program*	Developing countries	The current objective of the **Climate Protection Program** is to mainstream climate protection activities within German Development Cooperation. This includes measures to reduce and prevent greenhouse gas emissions, and measures to foster adaptation to the adverse effects of climate change. The Climate Protection Program thus assists developing countries in meeting their commitments under the UNFCCC, and involves these countries in Kyoto Protocol implementation. Activities focus on building and expanding institutional and human resource capacities, and on carrying out individual projects to serve as models in the field of climate protection. The Climate Protection Program provides ongoing support to a range of individual projects through: 1) National and regional climate studies. 2) Training measures and workshops. 3) Conceptual and methodological studies on fundamental issues of climate protection in developing countries. 4) Policy studies on long-term climate protection.	http://www.gtz.de/en/themen/umwelt-infrastruktur/umweltpolitik/4158.htm

European Bank for Reconstruction and Development (EBRD) - *Climate Investment Funds*	Developing countries	EBRD's **Climate Investment Funds** will enable a dynamic partnership between multilateral development banks and developing countries to undertake investments that achieve a country's development goals through a transition to a climate-resilient economy and a low carbon development path. The EBRD has also established the following carbon funds: **Netherlands Emissions Reductions Co-Operation Fund**: buys Joint Implementation Carbon Credits from its 13 countries of operations eligible for this mechanism **Multilateral Carbon Credit Fund**: is designed to develop the carbon market in countries in transition and to help EBRD and European Investment Bank shareholders and other parties to meet their mandatory or voluntary emission reduction targets. Became operational in 2006. The fund will buy carbon credits from investments under the European Union scheme as well as the Protocol's JI and CDM. It will also aim to facilitate the direct trading of carbon credits between some of its shareholders (so-called Green Investment Schemes). **Donor Funding**: The Bank can help governments and companies in its region of operations overcome obstacles in emission trading by providing technical advice funded by donor governments. For example, as part of the Bank's Early Transition Countries Initiative for its poorest countries of operation, donors have approved funding to help in development of complex CDM projects.	http://www.ebrd.com/country/sector/energyef/carbon/index.htm

European Commission (EC) – *EU Action Plan on Climate Change and Development*	Developing countries	**The EU action plan on climate change and development** ensures that climate change is incorporated into all aspects of EU development policy. It will help developing countries implement the UNFCCC and the Kyoto Protocol, and support more research into tackling climate change. Its four priorities are raising the political profile of climate change, support for adaptation in developing countries, support for mitigation and sustainable development paths, and developing administrative capacity in vulnerable countries. The action plan is funded through the Commission's geographical programs for countries and regions, and its program for the environment and sustainable management of natural resources. **Global Climate Change Alliance (GCCA) -** will spend €60m in 2008-10 to create awareness and jointly address climate change between the EU and the most vulnerable developing countries (typically least developed countries and small island developing states). The alliance will be based on improved dialogue on addressing climate change, feeding into the discussions on a post-2012 agreement under the UNFCCC; concrete support for adaptation and mitigation measures and the inclusion of climate change in development strategies and programs. Support will be given to five priorities: 1) adapting to climate change; 2) reducing emissions from deforestation, while preserving livelihoods and ecosystems; 3) enhancing participation in the global carbon market through the Clean Development Mechanism; 4) promoting disaster risk reduction; and 5)integrating climate change into poverty reduction efforts. Existing funding for climate change and environmental issues will also contribute to the goals of the alliance – and EU governments have been asked to provide more funds for it. **Coordination with other donors -** The Commission participates actively in the vulnerability and adaptation resource group. This is a forum for debate, consisting of a core group of bilateral and multilateral donors, with a broader range of groups (academia, research institutes, and other interest groups) invited to join the discussions, depending on the issue. The group has produced two papers: 1) 2003 Poverty and Climate Change: Reducing the Vulnerability of the Poor through Adaptation in 2003 2) 2006 Synthesis Report	http://ec.europa.eu/development/policies/9interventionareas/environment/climate/climate_en.cfm

European Investment Bank (EIB)	Developed and developing countries	**Global Authorization Mechanism**: a simplified and accelerated process for the financing of small- and medium-scale projects (public or private) outside the EU aimed at promoting climate change mitigation and adaptation investments, with special emphasis on carbon credit generating projects. The €5 million Climate Change Technical Assistance Facility (CCTAF) provides advance funding for activities associated with the development of project-based carbon credits under the JI and CDM mechanisms of the Kyoto Protocol on a conditional loan basis. **Carbon Finance**: 1. Multilateral Carbon Fund (see EBRD) 2. Carbon Fund for Europe: co-managed by the World Bank, the fund has at its disposal €50m. It is designed to help European countries and companies in the EU ETS meet their Kyoto commitments. It helps developing countries achieve sustainable development by fostering investment in clean technology projects. The fund can also buy carbon credits generated after the end of the Kyoto commitment period in 2012 – up to a limit of 40%. 3. The EIB/Kreditanstalt für Wiederaufbau (KfW) Carbon Programme, a risk sharing arrangement between the EIB and KfW, focuses on helping EU-based small- and medium-sized enterprises to access carbon credits for voluntary or statutory compliance purposes. 4. The Post 2012 Carbon Credit Fund is designed to support environmentally beneficial projects from 2012 onwards and is the first dedicated facility of its kind. The fund will exclusively purchase and trade Post 2012 credits, thereby supporting the development of projects that help the environment by extending their carbon-based revenue stream. A consortium composed of Conning Asset Management (Europe) Limited and First Climate has been selected as fund manager.	http://www.eib.org/projects/topics/environment/climate-change/

Fonds Français pour l'Environnement Mondial (FFEM)		The FGEF encourages projects that reduce the consumption of fossil or organic carbon through: 1) Improved energy efficiency. 2) Renewable energy and substitution by energy sources producing fewer CO2 emissions. 3) Carbon sequestration in forests and soils.	http://www.ffem.fr/jahia/Jahia/site/ffem/lang/en/pid/3569
Global Environment Facility (GEF)	Less-developed countries	**Climate change adaptation**: GEF supports projects that reduce or avoid greenhouse gas emissions in the areas of renewable energy, energy efficiency, and sustainable transport. Recently, the UNFCCC asked the GEF to support pilot and demonstration projects in the field of adaptation. Under its strategic priority, Piloting an Operational Approach to Adaptation, the GEF supports projects that provide real benefits and may be integrated into national policies and sustainable development planning. In addition, the GEF supports adaptation activities through the Least Developed Country Fund and the Special Climate Change Fund. **Climate change mitigation**: GEF supports interventions that increase resilience to the adverse impacts of climate change and vulnerable countries, sectors, and communities.	http://www.gefweb.org/interior.aspx?id=232
Inter-American Development Bank (IADB)	Developing countries	**Adaptation for Climate Change and Disaster Mitigation in the Caribbean**: a study to evaluate the possibilities and comparative advantages for the countries of the region of carbon sequestration and renewable energy development, with the aim of taking advantage of the innovative financial mechanisms of the protocol of the CDM and the Global Environment Facility, which can lead to new development and capital flow opportunities.	http://www.iadb.org/projects/project.cfm?id=TC0002034&lang=en

France - Interministerial Taskforce on Climate Change		France finances grants to specialized funds, various multilateral organizations, or within a bilateral framework. It increases its development assistance every year in the field of climate change. On the whole, French development assistance for climate change reached €400 million in 2006. Beyond research, France also supports actions including adaptation, biological sequestration of carbon, and climate monitoring. France also supports Kyoto protocol mechanisms, specifically through the signature of bilateral agreements aiming at the promotion and completion of projects under the CDM or JI.	http://www.effet-de-serre.gouv.fr/la_cooperation_internationale
International Finance Corporation (IFC) - *Carbon Finance Unit*		IFC's **Carbon Finance Unit** (CFU) develops new products for the carbon market, including a Carbon Delivery Guarantee and monetization of forward contracts, both for qualified sellers of Certified Emission Reductions (CERs). The Unit advises on investments to provide flexible financing, including equity, to carbon-rich projects, and is considering targeting debt facilities with local banks that will lend to sponsors of emission reduction projects. CFU products and services include: 1) Carbon Delivery Guarantee. 2) Monetization of future cash flows from sales of carbon credits. 3) Debt and equity for carbon-rich products and businesses. 4) Work with Financial Intermediaries and municipalities to help aggregate carbon credits from their various investment operations.	http://www.ifc.org/ifcext/sustainability.nsf/Content/CarbonFinance

International Fund for Agricultural Development (IFAD)	Developing countries	**Mitigation**: IFAD currently supports reforestation projects in the Himalayas and Yemen. An IFAD-supported program in China is setting up solar power systems to help poor households get energy from the abundant sunlight in the area. A biogas project in China is turning human and animal waste into a mixture of methane and carbon dioxide gases that can be used for lighting and cooking. **Finance**: IFAD is expanding its grant and loan portfolio for projects that reward poor people for ecosystem services. Since 2001, IFAD has supported a grant program in Southeast Asia that has had a significant impact on secure access to land, watershed protection and biodiversity conservation. A grant program focusing on Africa will address carbon emissions and avoided deforestation. **Technology**: IFAD supports research institutes and other bodies to test, adapt and disseminate technology to help climate-proof agriculture.	http://www.ifad.org/climate/ifad.htm
International Monetary Fund (IMF)	Member countries	The IMF can provide advice, through its discussions with member countries, and through its technical assistance work, on appropriate fiscal and other macroeconomic policies to mitigate climate change and adapt to its consequences. In addition, the Fund can provide financial assistance to member countries in response to a range of macroeconomic disturbances, including natural disasters, for example through the exogenous shock facility for low-income countries.	http://www.un.org/climatechange/pdfs/bali/imf-bali07-11.pdf
Japan Bank for International Cooperation (JBIC)	Developing countries; Asia	JBIC provides proactive support for environmental conservation and improvement projects, offering favorable loan terms for such projects. In April 2008, JBIC established the **Facility for Asia Cooperation and Environment** (FACE) to enhance its support for climate change mitigation measures in developing countries, as well as to provide assistance for Asia.	http://www.jbic.go.jp/en/about/role-function/pdf/JBIC_Role%20and%20Function_E.pdf

Japan: Ministry of Foreign Affairs (MOFA) – *Cool Earth Partnership*	Developing countries	Starting this year, Japan will provide funds amounting approximately to US$ 10 billion (¥1,250 billion) in aggregate over the next five years. Assistance will be provided to developing countries that are making efforts to reduce GHG emissions and achieve economic growth in a compatible way, on the basis of policy consultations between Japan and those countries. **Assistance for adaptation to climate change and improved access to clean energy** (~ US$2 billion): Grant aid, technical assistance and aid through international organizations will be provided to address the needs in developing countries. A new scheme of grant aid, "Environment Program Grant Aid,"will be created as a component of this package. In the context of improved access to clean energy, feasibility study on rural electrification projects with geothermal energy and "co-benefit" projects that address climate change will be conducted. **Assistance for mitigation of climate change** (~ US$ 8 billion): "Climate Change Japanese ODA Loan" with preferential interest will be created to provide loans amounting to ¥500 billion for the purpose of implementing programs to address global warming in developing countries. Through capital contribution and guarantee by JBIC (JBIC Asia and Environment Facility), trade and investment insurance by NEXI, and government support (projects to be implemented through NEDO), together with private funds, up to ¥500 billion will be provided for projects to reduce GHG emissions in developing countries. In this context, the Asian Clean Energy Fund (at ADB) will also be used to promote energy conservation in the Asian-Pacific region. Japan aims to create a new multilateral fund together with the United States and the United Kingdom, calling for participation from other donors as well.	http://www.mofa.go.jp/policy/economy/wef/2008/mechanism.html

Japan International Cooperation Agency (JICA)	Developing countries	JICA assists capacity development programs through technological cooperation under ODA (Japanese Government's Official Development Assistance) for sustainable development in developing countries. JICA uses a "co-benefits approach," which includes both adaptation and mitigation measures. Types of activities include: **Mitigation measures**: Cooperation activities which contribute to reduce emissions and enhance removals of GHGs, such as cooperation in rural electrification using renewable energy, prevention of deforestation, and afforestation/reforestation. **Clean Development Mechanism (CDM)**: Cooperation such as capacity development and support to the implementation of CDM. **Adaptation measures**: Cooperation that leads to improving adaptation capacity, such as improvement of water supply and irrigation facilities, introduction of crop varieties for arid regions, and disaster management. **Cooperation** that is effective for both adaptation and mitigation measures, such as mangrove afforestation/reforestation activities, which both enhance CO2 removals and address sea-level rise.	http://www.jica.go.jp/english/publications/reports/study/topical/climate_1/pdf/cli_02.pdf
Kreditanstalt feur Wiederaufbau (KfW)	Developing countries	KfW Entwicklungsbank is responsible for financial cooperation with developing countries The KfW group has instituted a climate protection fund on behalf of the German government that should make it easier for business enterprises to acquire Certified Emission Reductions (CERs) generated by CDM projects. As a result, private financial resources will be mobilized for sustainable development in partner countries. **The EIB/Kreditanstalt für Wiederaufbau (KfW) Carbon Program:** see EIB	http://www.bmz.de/en/issues/energie/klimaschutz/kyoto_protokoll/index.html

Multilateral Investment Guarantee Agency (MIGA)	Developing countries	MIGA focuses on supporting green infrastructure investments in developing countries that build renewable energy capacity, encourage resource conservation and distribution efficiency, improve sanitation, and offset GHG emissions. Since FY90, MIGA has provided guarantees for 59 green infrastructure projects in all regions of the world. These guarantees represent half of MIGA's cumulative issuance in the infrastructure sector – or $2.5 billion. MIGA's added value in green infrastructure development includes: 1. Mitigation of risks and dispute resolution, often at the subsovereign level, keeping investments on track. 2. Support for projects that address resource scarcity and waste issues in middle-income countries such as China, where the prospect of working with untested local governments often inhibits investment. 3. Longer loan tenors and reduced costs, including for projects in frontier markets.	http://www.miga.org/documents/MIGA_climate_change_brief_07.pdf

Netherlands Development Cooperation		The Netherlands' development policy aims to: 1. Help countries offset climate change (adaptation). This is necessary because negative effects of climate change, such as hurricanes or droughts, can seriously affect economies. Equally, climate change makes poverty reduction more difficult and more expensive. 2. Take climate hazards into account in terms of development programs and projects in order to avoid investments being damaged, yielding less than planned or, even unintentionally increasing people's vulnerability. 3. Give more people in developing countries access to modern energy (electricity, gas, sustainable energy such as solar and wind power). This generally reduces the emission of GHGs. 4. Build up developing countries' capacity to use the CDM. The objective is to help formulate projects that produce less CO2 while also contributing to poverty reduction and sustainable development. 5. Pursue active involvement in the international climate debate, for example at UN and EU level. The objective is to exchange adaptation experiences with other donors, look for coherence and, where possible, act in concert.	http://www.minbuza.nl/en/themes,environment/environment-themes/environment-themes/climate/What-is-the-Netherlands-doing-.html
New Zealand AID (NZAID)	Pacific region	The Pacific Regional Environment and Vulnerability Program currently allocates NZ$6.5 million a year for regional programs designed to protect and enhance the Pacific region's natural resource base for sustainable development and poverty elimination. Separate assistance of approximately NZ$10 million a year is provided to Pacific Regional Organizations that also deliver on sustainable natural resource management, disaster risk reduction, renewable energy, and climate change.	http://www.nzaid.govt.nz/programmes/r-pac-environment.html

Nordic Development Fund (NDF)	Honduras	In 2004, Honduras and the NDF signed a €6 million loan to support Pro-Bosque, a multiphase sustainable development program aimed at increasing the economic, social and environmental benefits generated by the Honduran forestry sector.	http://www.portofentry.com/site/root/resources/industry_news/2223.html
Nordic Investment Bank (NIB)		**Post 2012 Carbon Credit Fund**: see European Investment Bank	http://www.eib.org/projects/topics/environment/climate-change/
Norway Ministry of Foreign Affairs (ODIN)	Tanzania	Norway granted NOK 500 million to Tanzania over a period of five years, for a partnership agreement to enhance forest and climate efforts.	http://www.regjeringen.no/en/dep/smk/Press-Center/Press-releases/2008/nok-500-million-to-forest-and-climate-ef.html?id=508504
Norwegian Agency for Development Cooperation (NORAD)		To contribute to reaching the goals of the CDM, NORAD has established a support mechanism to enable eligible entities to prepare the necessary documentation for submission of CDM projects to the Designated National Authority and the CDM Executive Board. Developing new CDM methodologies or adapting existing methodologies can also be supported. The guidelines for support to CDM project development give an overview of criteria for support, eligible costs, and projects, and describe how to apply for support.	http://www.norad.no/default.asp?V_ITEM_ID=1750
Organization of the Petroleum Exporting Countries (OPEC) Fund for International Development	Developing Countries	The OPEC fund provides public sector financing, private sector financing, grant operations, and trade finance operations. In 2001, OPEC released a landmark environmental report that provides international investment agencies and investors with data indicating baseline carbon dioxide emissions needed for responsible economic development to protect the global environment. Entitled "Climate Change: Assessing our Actions," the report urges investors to report emissions from their projects and encourages the use of renewable energy sources. The OPEC fund also provides research grants to groups such as the International Dryland Development Commission for climate change research.	www.opecfund.org http://www.opecfund.org/projects_operations/commitments_2008.aspx

Overseas Private Investment Corporation (OPIC)		OPIC recently issued a four-part plan to address the issue of GHGs and increase support for clean energy and green technology to: 1) reduce portfolio emissions; 2) cap transactional emission reductions; 3) support energy efficiency, renewable energy, and clean technology; and 4) enhance accounting and transparency.	http://www.opic.gov/documents/GHGfactsheet.pdf
Swiss Agency for Development and Cooperation	Vietnam	**Sustainable forest management in Vietnam - contribution to mitigation of climate change**: In view of the challenges of sustainable forest management, SDC has been supporting the Forest Sector Support Partnership in Vietnam since 2001, with the aim to maximize the efficient and effective use of all resources applied in the forest sector. In addition, a Trust Fund for Forests has been created that prioritizes poverty alleviation, sustainable forestry management, and economic growth. Through this support, Switzerland gives long-lasting and important support to a sector that is crucial for mitigation of climate change, and thus contributes to the global agenda.	http://www.deza.ch/en/Dossiers/Dossier_Annual_Development_Cooperation_Conference_2008/Climate_change_in_the_Mekong_Region

United Kingdom Department of International Development (DFID)	Developing countries	**International Environmental Transformation Fund**: DFID with the UK Department for Environment, Food and Rural Affairs (DEFRA) will work to support development and poverty reduction through better environmental management, and help developing countries respond to the realities of climate change. The UK is providing £800 million (announced in 2007 budget). DFID will also expand and diversify its research as part of a wider effort to tackle climate change across the UK government. **DFID's research strategy report** also states that DFID will research climate science, especially in Africa; how to tackle climate change in national and international policy; strategies for adapting to climate change; and mitigation and low carbon growth. DFID will establish an International Climate Change network to provide in-country research and advisory services. **Climate Change Adaptation in Africa (CCAA) research and capacity development program**: a joint program of the International Development Research Centre, Canada, and DFID. The program aims to improve the capacity of African countries to adapt to climate change in ways that benefit the most vulnerable. Building on existing initiatives and past experience, the CCAA program works to establish a self-sustained skilled body of expertise in Africa to enhance the ability of African countries to adapt. A number of the first projects seek to increase the resilience of agricultural systems	http://www.dfid.gov.uk/news/files/climate-etf.asp ; http://www.dfid.gov.uk/default.asp ; http://www.idrc.ca/ccaa/

United Kingdom Ministry of Foreign Affairs: *Strategic Programme Fund*	22 countries	The Strategic Programme Fund (SPF) program directly supports delivery of the objective to promote a low-carbon, high-growth global economy. It is the result of a merger of the old Climate Change and Energy and Economic Governance programs. The program supports delivery of the following outcomes: 1) A visible and accelerated shift in investment initiated in the major economies toward low carbon; 2) Political conditions created for an equitable post-2012 agreement at the UNFCCC COP in Copenhagen in December 2009 of sufficient ambition to avoid dangerous climate change; 3) Risks to UK and EU energy security managed through more diverse and reliable external sources of supply and more efficient global consumption; and 4) Increased international commitment to an open, stable and equitable low carbon global economy delivering higher standards of living.	https://fco-stage.fco.gov.uk/en/about-the-fco/what-we-do/funding-programmes/strat-progr-fund/strat-prog-fund-climate
United Nations Development Program - *Millennium Development Goal Carbon Facility (The "Facility")*	Developing countries	UNDP offers project development services, including performing due diligence, providing technical assistance for CDM or JI project approval, and establishing the monitoring system for the project's emission offsets. As a development organization, UNDP does not seek to generate profits from the Facility, however UNDP will apply a flat-rate cost-recovery fee in order to recover its direct costs. In providing its services, UNDP will leverage its proven expertise in environmental project development, its extensive local presence and its in-depth understanding of each country's sustainable development goals. **Nairobi Framework**: Initiated by the United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP), World Bank Group, African Development Bank, and the Secretariat of the United Nations Framework Convention on Climate Change (UNFCCC) with the specific target of helping developing countries, especially those in sub-Sahara Africa, to improve their level of participation in the CDM.	http://www.undp.org/mdgcarbonfacility/index.html http://cdm.unfccc.int/Nairobi_Framework/index.html

United Nations Framework Convention on Climate Change - *Adaptation Fund*	Developing countries that are parties to the Kyoto Protocol	The Adaptation Fund was established to finance concrete adaptation projects and programs in developing countries that are parties to the Kyoto Protocol. The Fund is to be financed with a share of proceeds from CDM project activities and receive funds from other sources. (The share of proceeds amounts to 2% of CERs issued for a CDM project activity.)	http://unfccc.int/cooperation_and_support/financial_mechanism/adaptation_fund/items/3659.php
United States Agency for International Development (USAID) – *Global Climate Change Program*	Developing and transition countries	USAID's Global Climate Change Program is active in more than 40 countries and, since 2001, has dedicated more than $1 billion to promote: 1) Clean energy technology. 2) Sustainable land use and forestry: USAID is not only promoting activities that preserve carbon stocks but is also helping to develop methodologies for measuring changes in carbon stocks in USAID's land use and forestry projects. 3) Adaptation to climate change. 4) Climate science for decision-making. USAID places particular emphasis on partnerships with the private sector and on working with local and national authorities, communities, and nongovernmental organizations to create alliances that build on the relative strengths of each. Bringing together a diverse range of stakeholders helps avoid unnecessary duplication and lays the foundation for a sustained, integrated approach. Through training, tools, and other means of capacity building, USAID helps developing and transition countries address climate-related concerns as a part of their development goals. USAID has recently published, "Adapting to Climate Variability and Change: A Guidance Manual for Development Planning, Aug 2007."	http://www.usaid.gov/our_work/environment/climate/

World Bank - *Carbon Finance Unit (CFU)* and *Climate Investment Funds*	Middle-income and low-income countries	**The Carbon Finance Unit (CFU)** uses money contributed by governments and companies in OECD countries to purchase project-based greenhouse gas emission reductions in developing countries and countries with economies in transition. The emission reductions are purchased through one of the CFU's carbon funds on behalf of the contributor, and within the framework of the CDM or JI. The CFU does not lend or grant resources to projects, but rather contracts to purchase emission reductions similar to a commercial transaction, paying for them annually or periodically once they have been verified by a third-party auditor. **Climate Investment Funds**: agreement between multilateral development banks (MDBs) and countries to bridge the financing and learning gap for climate change efforts. MDBs will provide additional grants and concessional financing to developing countries to address urgent climate change challenges.	http://carbonfinance.org/Router.cfm?ItemID=3&Page=Funds www.worldbank.org/cif

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