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WORLD BANK

A regular series of notes highlighting recent lessons emerging from the operational and analytical program of the World Bank's Latin America and Caribbean Region.

Responding to Climate Change¹

An Action Plan for the World Bank in Latin America and the Caribbean

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Climate change is a very serious environmental challenge that affects prospects for sustainable development. Since the industrial revolution, the mean surface temperature of Earth has increased an average of one degree Celsius per century mainly due to the accumulation of greenhouse gases (CHGs) in the atmosphere.

Furthermore, most of this change has occurred in the past 30 to 40 years, and the rate of increase is accelerating. A change of this magnitude is unprecedented and will result in significant impacts both at a global scale, and for Latin America and the Caribbean in particular.

Key anticipated impacts include (a) decreased water availability, (b) lower agricultural productivity, (c) changes in the composition and productivity of ecological systems, particularly coral reefs and forests, (d) damage and population displacement due to rising sea levels and flooding from heavy rainfall events, and (e) higher incidence of heat stress mortality and exposure to vector- and water-borne diseases such as malaria, dengue, and cholera.

Impacts are Unavoidable

Even if drastic actions are taken that would dramatically reduce emissions of GHGs, there is very little that can now be done to address some of the anticipated trends. Many of these, notably sea-level rise are long-lasting and illustrate the strategic importance of complementing forceful action in reducing emissions with adaptation measures.

Planning for adaptation and capacity building to understand and address adaptation issues are the top priorities. Regrettably, the political will required to support adapta-

tion efforts is still weak, and there is considerable confusion. Yet even under uncertain circumstances, the region should emphasize work in adaptation, focusing on the areas that are the most vulnerable.



Climate change cannot be seen as an isolated phenomenon but rather as part of a series of impacts caused by unsustainable practices, with linkages to several other environmental challenges. Changes in land use, for example the elimination of forest cover to make room for extensive cattle raising, a process that has led to the destruction of large tracts of rainforest in the Amazon region, not

only leads to biodiversity loss, but also eliminates carbon sinks and thus contributes to a net increase of GHGs in the atmosphere.

Likewise, in urban areas, air quality has deteriorated from the uncontrolled emission of airborne pollutants. Some of these, notably volatile hydrocarbons and nitrogen oxides (NO_x), contribute to the formation of tropospheric ozone, which by itself may contribute to global warming. These and other linkages illustrate the complex interactions between different environmental impacts and highlight the need to develop strategic and comprehensive strategies to deal with impacts from climate change.

International Response

The international community has taken steps to address the challenge. At the Rio Conference in 1992, the United Nations Framework Convention on Climate Change (UNFCCC) was signed by most nations. Under the Convention, nations commit to reduce the anthropogenic

1 - Extracted and updated from Vergara (October 2005) "Adapting to Climate Change: Lessons Learned, Work in Progress and Proposed Next Steps for the World Bank in Latin America", World Bank, Latin America and the Caribbean Region, Sustainable Development Working Paper No. 25.

impacts on global climate to prevent “dangerous human interference with the climate system.”

The Framework Convention has set guiding principles, including: “The principle of *common but differentiated responsibilities* of states which assigns the financial lead in combating climate change to industrialized countries. In 1997 the Conference of the Parties adopted the Kyoto Protocol to the Climate Change Convention. The protocol sets specific targets for reduction of domestic emissions of GHGs by industrialized nations. Under the protocol some 40 industrialized nations would be obligated to cut their emissions by an average of 5.5 percent below 1990 levels. Developing countries would not be obligated to cut their emissions until the next round of the treaty takes effect. To help meet these targets the protocol establishes three flexibility mechanisms designed to provide developed countries with market-driven and efficiency-enhancing (cost-minimizing) instruments: joint implementation, emissions or carbon trading, and the Clean Development Mechanism (CDM).

The CDM allows industrialized countries to implement projects that reduce GHG in non-industrialized countries. Emission reductions generated by the project activities have to be “certified” to comply with emissions commitments. The United States, the largest GHG emitter, does not participate in the Kyoto protocol and this, besides limiting the size of the market, raises a question of equity in international efforts to address the problem.

The market created by the CDM for carbon reduction transactions (even in the absence of the United States), is potentially worth several billion euros per year. Thus, a sizable source of net financial flows, one that does not involve financial liabilities and that can also be linked to transfers of technology, is available to developing nations. The Latin America region can benefit from CDM resources by creating a reliable source of emission reductions. The current commitment period for the CDM (2005-2012) is necessarily just a first step, which in all likelihood needs to be complemented with additional actions.

The Adaptation Fund. The Kyoto protocol plans to establish a fund to finance adaptation activities. Resources for the Adaptation Fund are expected to come from a levy on global carbon trade (2 percent has been suggested) and additional pledges by industrial countries. This Adaptation Fund will become operational during the implementation period of the Kyoto Protocol.

Independent of the availability of CDM funds for adaptation, it is becoming clear that, given the priority character of the issues, funding through the convention’s financial instrument, the Global Environment Facility (GEF) dedicated to adaptation is likely to increase. The region has important pioneering activities in adaptation (see Box 1) and has a strong case for increased funding given the expected permanent impacts from climate change over which it has little control or influence.

Box 1 - World Bank involvement in adaptation was initiated in the Latin America region with the formulation of the CPACC (Caribbean Planning for Adaptation to Climate Change) Project in 1997. This focussed on the vulnerability of the island nations of the Caribbean to the impacts of climate change. These efforts continue and additional projects are either underway or in preparation in Colombia, the Andes, Mexico and Central America.

A Proposed Action Plan for the World Bank

The paper¹ proposes three main initiatives to guide World Bank actions in Latin America and the Caribbean.

- a) Strengthen institutional capacity to allow regional governments and civil society to play an active and influential role in the international climate agenda by:
 - *cooperating in formulation of policies*, standards, and guidelines and enhancing capacity to plan, manage, and monitor those policies;
 - *developing common regional positions* and participating vigorously in international forums and negotiations;
 - *supporting effective mechanisms* for sharing best practices in climate change assessment, adaptation, and technologies;
 - *promoting equity and fair valuation of carbon emission reductions* and developing a portfolio of activities eligible for funding by the Clean Development Mechanism (CDM).

- b) Improve knowledge and analysis to support planning for adaptation measures and funding by:
 - *strengthening knowledge and documentation* on vulnerable ecosystems and human health;
 - *assessing the impacts of climate change* and its implications for sustainable development;
 - *analyzing policy options* and identifying and supporting priority adaptation measures.

- c) Increase carbon financing for mitigation actions and maximize the value of funding by seeking synergies and aligning strategies closely with local environmental and social priorities.

Opportunities to address Climate Change and Local Development

The Kyoto Protocol and the CDM are potentially very important tools for addressing climate change impacts and simultaneously contributing to local development.

The **Transport Sector** is a major source of greenhouse gases in the region, and certainly the largest in an urban environment. While far less energy-intensive than transport systems in the United States, there nevertheless has been a continuing trend toward higher emissions per capita. From a mitigation perspective, transport is not an easy source on account of its diffuse character (many small emitters) and the limited impact that, at current prices, the purchase of emissions has on the overall financing of less energy intensive transport systems. Nevertheless, there is considerable potential, in particular in systems that may induce a modal shift from small capacity, private vehicles to a system based on larger capacity, energy efficient vehicles.



Box 2 - The Rio Amoya Environmental Services Project's objective is to displace CO₂ emissions from the existing Power Mix through the generation of electricity in a run of the river, 80 Mw power plan with zero associated CO₂ emissions.

The project also seeks to protect and use, in a sustainable manner, the environmental services provided by the Páramo (high alpine ecosystem unique to the Northern Andes) of Las Herosas, Peru.

Part of the project consists on the implementation of a protection and adaptation program for the Paramo. With anticipated changes in temperature, the highly hydrophilic vegetation of the Paramo may become vulnerable to changes in land use. Changes in the vegetation may result in an alteration of the water regulation regime of the Paramo. To prevent this, incentives will be generated through the project and in cooperation with local environmental authorities, to prevent land use changes in the area and to implement other activities to protect the Paramo.

The project has a strong social development component geared to maximize benefits to the local population. A fraction of the revenues from the emission trading will be channeled directly for a social development plan.

The **Power Sector** is a large source of greenhouse gases in Latin America. The CDM can support the goals of a reliable, efficient, and diversified power system in the region. In some countries (the Andean region), the power sector currently is based largely on hydropower and therefore is not a source of GHG. However, the earlier trend toward privatization and the downturn in economic growth has resulted in a tendency toward “carbonization” of the energy sector that favors installation of smaller, fossil-fuel based plants as an alternative to larger and more complex investments in hydropower capacity. Thus, some of the opportunities for GHG reductions have to be seen against a baseline of increasingly energy-intensive practices. The region has a considerable endowment of renewable energy sources. With carbon financing, several projects are being developed and others are under preparation to foster the development of these resources.

a. Run-of-river hydro plants - These units are relatively small, can have limited environmental impacts, and are more suited to address slow increases in demand and local reliability of power systems. Two of these projects have already been approved (see Box 2) or are under advanced preparation in the region. Because high mountain ecosystems are particularly vulnerable to climate change impacts, run-of-river hydro can help ensure the

sustainability of energy production and critical habitats.

b. Wind energy - Wind energy generation capacity is rapidly increasing (30 percent annually), although it still accounts for less than 1 percent of the World total. Yet of all the renewable energy alternatives, it is the source that is likely to best compete with fossil fuels in the short term. Recent trends, such as efforts to strengthen regional generation capacities, trying to reach off-the-grid areas, and increases in the cost of gas, tend to favor wind power.

There is a considerable potential for wind generation in the region, mostly along coastal and insular areas, as well as in high mountains and in the southern regions of the continent. Also, frequently the wind regimes are complementary to hydrology cycles, contributing to increase the robustness of power systems. While still marginal economically, the wind option should continue to be pursued with the help of the CDM. Carbon revenues will assist in reducing the gap between rates of return for traditional fossil fuel plants and wind systems, and will promote activities that help gain experience for further market penetration of wind power.

c. Biomass energy - Carbon revenues have the potential to improve the economic viability of biomass energy systems,

which are by nature specially suited for rural and off grid locations. Biomass fuels are still expensive to collect and process, but they are associated with zero emissions. Some opportunities that should be pursued include: Biodiesel (for power or transport), alcohol fuels, and burning of biomass. In all cases, emissions of local pollutants (particulates, chemical smog) should be avoided.

d. Energy efficiency and conservation. The CDM can assist in attaining the goals of improved energy efficiency and conservation through the internalization of global benefits from investments in these areas. Energy efficiency measures are a win-win opportunity where the economic worth of energy savings can be complemented with carbon revenues. The challenge is to identify those that are really additional to the business-as-usual scenario.

Environment Sector a. Wastewater treatment - In Latin America there is an important gap between collection of wastewater and its treatment that has not been bridged because of financial difficulties and the lack of economic incentives for full treatment. In fact, there is a worrisome trend toward de-linking sewage collection from sewage treatment; only a small fraction of sewage is treated.

On the other hand, primary and secondary business-as-usual wastewater treatment facilities contribute about 10 percent of global anthropogenic emissions of CH₄ (about 40 metric tons/year). N₂O emissions from facultative lagoons also contribute to global warming. CH₄ that is collected from sewage activated sludge can be used for power generation and to process heat, while technology changes can eliminate the formation of N₂O.

b. Solid waste management (landfill gas) - Proper solid waste management has long been an issue in the region. Carbon revenues linked to the capture and use of landfill gas can improve the viability of landfill operations by creating an additional source of revenue. Landfill gas is estimated to contribute 10 percent of all methane released to the atmosphere. The region already has one of these units in operation, financed through the GEF, and several others are under preparation with the involvement of carbon finance.

c. Air quality - Air pollution is a serious health and environmental concern. Several cities in the region are among the largest metropolitan areas in the world. Many

of them are failing to meet adequate air quality standards. A growing percentage of the total population lives in metropolitan and large urban centers and therefore may be exposed to high levels of ozone and particulate matter. Activities that seek air quality improvements should also review opportunities for harmonization of climate change and air pollution measures. This can be done through (a) assessments of the global dimension of air quality issues in urban areas, and (b) assessment of opportunities for reduction of GHGs as an incremental part of programs designed for air quality improvements. A review of programs that could contribute both to improved air quality and reduced emissions of greenhouse gases has been conducted by the GEF in the Mexico City Metropolitan Area (MCMA).

d. Forestry and land use management - Under the Kyoto Protocol carbon sequestration through land use management and forestry activities continues to be a controversial and unsettled topic. In May 2004, the Bank launched a carbon revenue Bio-Fund to fund demonstration projects (<http://carbonfinance.org/biocarbon/home.cfm>). This opens the possibility of linking climate change issues with the goals of conservation and protection of biodiversity. Projects could also be formulated that promote afforestation and watershed protection. The Bio-Fund provides an innovative tool that could have significant applications in the region.

e. Community development and carbon emission reductions - In 2005, the Bank launched the Community Development Carbon Fund (CDCF), which advances the spirit of the CDM in that sustainable development at the local level should be promoted as an integral part of the carbon market. The CDCF will ink small-scale projects seeking carbon finance with companies, governments, foundations and NGOs seeking to improve the livelihoods of local communities and obtain verified emissions reductions.

f. Partnerships - The activities outlined above require a sustained and substantial effort, which will continue to be facilitated through partnerships between the World Bank and third parties.

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