

INTER-AMERICAN DEVELOPMENT BANK

Sustainability Report 2011



Who We Are and What We Do

The Inter-American Development Bank (IDB) is the main source of multilateral financing for Latin America and the Caribbean. Since it began operations in 1961, the IDB has provided more than US\$207 billion in loans and guarantees to countries in the region for projects to reduce poverty, raise standards of living, spur economic growth, protect natural resources, foster integration and trade, and reach other agreed goals. Approvals of loans, guarantees, and operations of the IDB Grant Facility in 2011 totaled US\$10.9 billion, and Bank disbursements on approved loans amounted to US\$8.4 billion.

How We Are Governed

The IDB is a global partnership of 48 member countries in which the 26 borrowing countries of Latin America and the Caribbean hold the majority of shares. The Bank's 22 non-borrowing members in North America, Europe, the Middle East, and East Asia provide resources and technical expertise. The voting authority of each member corresponds to its subscriptions to shares in the Bank's ordinary capital. The IDB holds a credit rating of AAA/aaa, the highest available.

Each member country is represented on the IDB Board of Governors, which delegates oversight of day-to-day Bank operations to the Board of Executive Directors. The Bank's senior officers are its president, executive vice president, and four vice presidents. Other IDB affiliates are the Multilateral Investment Fund, which fosters private sector growth through grants and investments, and the Inter-American Investment Corporation, which supports small and medium-size businesses.

The IDB's highest authority is its Board of Governors. Most members of the Board of Governors are finance ministers or central bank presidents. The Board holds an annual meeting to approve the Bank's financial statements and review major policy decisions. The Board of Executive Directors—14 individuals representing the 48 member countries—approves country and sector strategies, operational policies, and loans. The Board also sets conditions for Bank loans, authorizes borrowings in the capital markets, and approves the institution's administrative budget. The IDB president, elected by the Board of Governors for a five-year term, manages the Bank's operations and administration together with an executive vice president and four vice presidents.

Sustainability in Our Institutional Strategy

The IDB's priorities and structure are aligned to meet the needs of the region and to serve as a catalyst for development. The Bank has made major advances in effectiveness, transparency, and accountability. With the Ninth General Capital Increase, approved by the Bank's Board of Governors in 2010, the Bank will better meet the needs of its member countries and fulfill its mission to reduce poverty and inequality and to bring sustainable development to Latin America and the Caribbean. This calls for an increasingly strong Bank presence in environmental protection, sustainable energy, climate change, and food security, including helping to design policies for the transition to sustainable economies, enhancing institutional capacities, and ensuring the protection of vulnerable populations.

IDB People and Locations

The IDB's 1,947 employees are located at its Washington, D.C., headquarters, in country offices throughout Latin America and the Caribbean, and in offices in Tokyo and Paris. Some 68 percent of IDB staff are nationals of the Bank's borrowing countries. Women account for nearly 46 percent of the Bank's professional staff and 34 percent of management.

About This Report

This is the Bank's seventh annual Sustainability Report. It covers sustainability progress and performance in the 2011 fiscal year for the Inter-American Development Bank.

This document is available in electronic format in English and Spanish. Printed copies may be ordered in English. A bilingual summary brochure of the report is available in both digital and print format.

The symbol "@" signifies that there is additional information available through the online version at www.iadb.org/sustainability.

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A Message from Our President

Despite a slowing world economy during 2011, the countries of Latin America and the Caribbean continued to reap benefits from their economic reforms by posting an average growth rate of 4.3 percent. Foreign direct investment reached a record US\$354 billion, the region's poverty rate continued to fall, and urban unemployment dipped to 6.9 percent.

These results are positive and encouraging, yet many challenges remain. We know that the European crisis, the U.S. fiscal deficit, and the deceleration of China's economy pose potential threats to the region's gains. In addition, other more far-reaching challenges have the potential to affect our region and the lives of future generations. Among them are energy security, food security, science and technology, natural resources management, climate change adaptation and mitigation, and the continuing scourge of poverty and inequity. So we continue to work closely with our member countries and our partners to build on the region's achievements, while we take steps to address these complex challenges.

These long-term challenges—unlike those that originate from beyond our shores—can be addressed by the countries of our region. That is the purpose of the agenda set forth by the IDB's Ninth General Capital Increase (GCI-9), which lays out our strategy for helping Latin America and the Caribbean build a sustainable future. For the IDB, sustainability means helping countries conserve their natural and social capital to ensure long-term environmental and social benefits.

Among these challenges are ensuring sustainable agriculture and food security, the theme of this *Sustainability Report 2011*. Our region is favored with abundant resources, including 28 percent of the world's arable land and 33 percent of its renewable water. By using these resources, Latin America and the Caribbean has become an international agricultural powerhouse, supplying a large proportion of the world's soybean,

coffee, sugar, beef, and poultry exports. Rising world food prices have fueled economic growth in many countries, spurring rural employment.

At the same time, however, nearly two-thirds of our region's rural population remains impoverished. Millions of small-scale farmers barely scrape out the merest subsistence living. Additional millions of low-income consumers suffer from the same higher food prices that bring prosperity for others. Clearly, the region's status as a breadbasket does not mean that everyone has enough to eat: an estimated one person out of seven in Latin America and the Caribbean does not have secure and consistent access to enough food.

These challenges to our region's agriculture and food security illustrate the need for a green economy that recognizes the complexities of our interrelationships with the natural world. Water, for example, is critical for both food production and energy generation. At the same time, energy is needed for producing, harvesting, transporting, and irrigating crops. Forests and natural areas protect our water resources, whose abundance and distribution will be affected by climate change.

The Bank fully supports the conclusions of a recent U.N. Environment Programme report that calls for creating sustainable agricultural systems that improve soil fertility, use water more efficiently, foster diversity of crops and livestock, reduce contamination of the environment, conserve biodiversity, and reduce greenhouse gas (GHG) emissions. Such steps to conserve ecosystem services and natural capital will help our region's agricultural sector to build resilience for adapting to climate change impacts.

As the Bank works to improve sustainability, it is also helping small-scale farmers to boost productivity and income while ensuring affordable food for consumers. In one innovative project profiled in this report, some 9,400 small-scale producers in the Dominican

Republic are using new technologies and technical assistance to increase crop yields while strengthening the resilience of their agricultural systems to threats posed by climate change. Similarly, a large-scale operation approved in 2011 for Mexico will control agricultural pests and develop innovative techniques to benefit 1.4 million farmers.

The need to address the cross-cutting nature of these issues was a key recommendation of the IDB's Independent Advisory Group on Sustainability, which submitted its report in 2011. In response, the IDB in 2012 is building a biodiversity platform that will guide our support for managing ecosystems, estimating biodiversity and ecosystem service values, and improving institutions, particularly in the areas of agriculture, tourism, fisheries, and forestry. By doing more to protect biodiversity, the Bank will also be safeguarding its future ability to conserve the water, soil, and other resources on which prosperity depends.

The Bank has also taken the lead in helping countries address climate change. Its role in this area was strengthened in 2011 with the approval of a new Climate Change Strategy, which sets forth an ambitious plan for leveraging external resources for mitigation and adaptation measures. These include addressing the most significant consequences of climate change in water, coastal and terrestrial ecosystems, and agriculture; reducing emissions from deforestation and power generation/use; promoting low-carbon transportation; supporting smart infrastructure solutions; and incorporating social dimensions in climate change actions.

In addition, the Bank made significant progress in the development and implementation of the Sustainable Emerging Cities Platform during the year, contributing to a heightened awareness of sustainability issues in our region's urban areas. Launched in March 2011, the program is working with five pilot cities by providing comprehensive technical support, by helping to build capacity to promote environmental, urban, and fiscal sustainability, and by identifying specific solutions to the challenges of environmental and social sustainability in urban areas. Building on the Platform, in 2012 we will establish a special program and multi-donor fund to enable the expansion of the work under way to other cities in the region, as part of the IDB Sustainable Cities Initiative.

Achieving successful outcomes in a complex world requires a solid foundation of knowledge that addresses the specific needs of individual countries. Last year, for example, the IDB financed a study that pinpoints the investments needed in conservation and new agricultural techniques to help farmers adapt to climate change.

The IDB has a solid record of helping countries achieve economic and social progress while building sustainability into production systems. For this reason, I am pleased to present the IDB's *Sustainability Report 2011*, which describes the priority issues the Bank is working on with countries in the region, as well as actions being taken to ensure that IDB policies and investment operations help lay the foundation for a secure and prosperous future.

Luis Alberto Moreno
President



Our Key Figures

	2009	2010	2011
The Bank's operations			
Number of projects in portfolio	613	647	597
Volume of projects approved (US\$ billion)*	15.5	12.7	10.9
Total number of projects approved	152	170	167
Total disbursements (US\$ billion)	11.9	10.9	8.4
Sustainability investments			
Lending to support climate change initiatives, sustainable energy (including renewables), and environmental sustainability (US\$ billion)	3.66	3.61	4.60
Environmental and social risk management			
Approved loan and investment grant operations by environmental and social safeguard category (number)			
Category A	10	6	7
Category B	51	67	56
Category C	61	57	35
Other (B.13)	46	38	67
No Category	1	1	2
Projects declined for noncompliance with IDB Environment and Safeguards Compliance Policy	2	0	0
Approved loan operations with an environmental and social safeguard (ESG) specialist assigned			
Category A	10	6	7
Category B	28	44	32
Category C	13	4	1
Other (B.13)	32	18	22
Non-sovereign guaranteed projects in implementation			
Projects in supervision with an IDB Environmental/Social Safeguards specialist assigned	133	126	148
Projects with conducted site visit	22	28	15+ **
Projects with high environmental and social risks rated satisfactory in the implementation of safeguard mitigation measures	N/A	N/A	79%
Sovereign guaranteed projects in implementation			
Projects in supervision with an IDB Environmental/Social Safeguards specialist assigned	38	162	187
Projects with conducted site visit	12	29	50
Projects with high environmental and social risks rated satisfactory in the implementation of safeguard mitigation measures	N/A	N/A	73%
Knowledge			
Number of registrations in staff training	8,438	11,683	15,885
Training hours delivered to staff	135,678	128,889	163,406
Training and knowledge costs (US\$ millions)	6.00	6.05	7.1
Number of registrations in training on environmental and social safeguards	379	294	174
Training hours delivered on safeguards	1,771	1,437	1,334
Number of external registrations for client training	2,003	2,410	3,327
Training hours delivered to clients	103,629	70,852	132,265

* includes all approved loans, as well as grants (Haiti), but not trade finance facilitation program operations.

** Does not include non-sovereign guaranteed operations monitored by consultants through environmental and social monitoring agreements.

Report Highlights 2011

- **Focusing on agriculture and sustainability in our region ...** Meeting growing global demands for food and other agricultural products is an important economic opportunity for Latin America and the Caribbean. Yet the critical long-term environmental and social challenges this presents include impacts on ecosystem services, greater vulnerability of rural communities, land use changes, and increased climate change impacts. This year, in light of the Rio+20 conference, Part I of the *Sustainability Report* focuses on understanding sustainability in agriculture in our region. Read more on **page 6**.
 - **Understanding our institutional strategy for sustainability ...** the Bank's Ninth General Capital Increase sets out two overarching objectives: reducing poverty and inequality and achieving sustainable growth. It also establishes a series of targets, project output goals, and performance indicators that are explained on **page 29**.
 - **Increasing our sustainability investments ...** In 2011 the IDB approved 167 loans, 54 of which targeted climate change initiatives, sustainable energy, and environmental sustainability, totaling US\$4.6 billion—a significant increase over previous years. For details on these loans, see **page 32**.
 - **Our priority sustainability actions ...** In pursuit of the Bank's overarching goals in GCI-9, we have identified protection of the environment, response to climate change, promotion of sustainable energy, and ensuring food security as an institutional priority. In Part II of this report we showcase activities undertaken during 2011 to address priority sustainability issues associated with biodiversity loss, food security, and climate change:
- 
- The IDB and Biodiversity – **page 34**
The IDB and Food Security – **page 36**
The IDB and Climate Change – **page 40**
- **Decreasing the GHG emissions in our portfolio ...** Since 2009 we have been calculating emissions from the projects we finance that generate significant amounts of GHGs, as well as emission reductions from low-carbon development projects. In 2011 we saw an increase in avoided annual emissions of 43 percent—comparable to a small-sized coal-fired power plant. Read more about the methodology and results on **page 44**.
 - **Monitoring environmental and social safeguard performance ...** In 2011 we established a baseline on the performance of environmental and social safeguard measures in our portfolio. See the results on **page 56**.
 - **Contributing to regional development goals ...** New IDB investments in 2011 included support to seven national frameworks for climate change mitigation, three projects with components that contribute to better management of terrestrial and marine protected areas, access to agricultural services and investments for over 2.5 million farmers, and access to improved low-carbon transportation systems for more than 800,000 people. See more on **page 60**.

CASE STUDIES QUICK REFERENCE

- Helping forest communities earn livelihoods and protect natural resources in Brazil: **page 31**
- Controlling energy costs with photovoltaics in Chile: **page 38**
- Boosting productivity and conserving resources in the Dominican Republic: **page 39**
- Finding ways to produce more food and reduce climate change risk: **page 46**
- Building resilience for farmers and food security in Jamaica: **page 47**
- Lowering energy use and GHG emissions in Paraguay: **page 58**
- Protecting small-scale farmers in Haiti: **page 59**

Part I

Sustainability in Our Region

Understanding the environmental and social sustainability implications of agriculture in Latin America and the Caribbean



- This section sets the context for the Bank's work in sustainability. This year, in light of Rio+20, the focus is on sustainability in agriculture in Latin America and the Caribbean. Ensuring sustainable agriculture is one of the greatest global challenges in the face of growing human populations, increasing demands, and climate change. And it is one of the most important elements in establishing green economies. The section opens with an Introduction by the Stockholm Environment Institute on the intersection of water, energy, and food issues.
 - Four specialists—Rodomiro Ortiz, Luiz Martinelli, Britaldo Soares-Filho, and Susanna Hecht—present technical papers examining agriculture from social and environmental perspectives: how climate change affects agriculture, the interrelation of agriculture and ecosystem services, approaches to low-carbon agriculture, and the sociopolitical transformation of agriculture and deforestation over the last 30 years.
 - Four people with long and substantive experience working at the forefront of sustainability—David McLaughlin, Pavan Sukhdev, José Campos, and Héctor Malarín—offer their perspectives on how to achieve sustainability in Latin America and the Caribbean in the context of a rapidly changing world.
 - Together, these articles and perspectives provide the reader with a regional context for the important sustainability work of the Bank. A clear message is the need for solutions to come from an integrated understanding of our world that incorporates changes in water, environment, climate, productivity, and sociopolitical systems.
- The opinions presented by named authors in this report do not necessarily reflect the perspectives of the IDB.*

INTRODUCTION: THE NEXUS OF WATER-ENERGY-FOOD

Stockholm Environment Institute



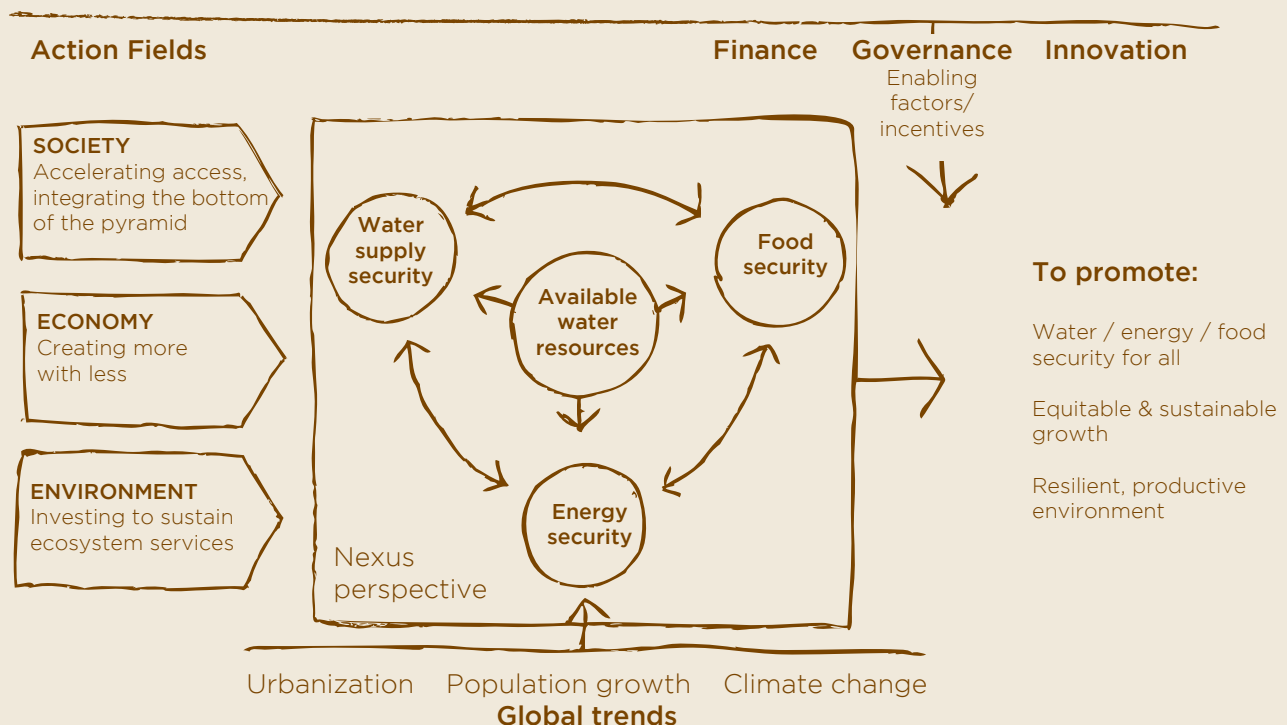
As the world prepares for the United Nations Conference on Sustainable Development (Rio+20), there is growing recognition that the greatest challenges facing us today—feeding people, fighting poverty, addressing climate change, and procuring energy for all—cannot be solved piecemeal. While the 1992 Rio conference produced agreements on climate change, biodiversity, and drylands, there is now a push to take an integrated approach that recognizes the critical nexus between water, energy, and food and the complex interactions between ecosystems and human activity, especially in a changing climate.

The four articles in this year's *Sustainability Report* examine how climate change, ecosystem services, low-carbon development, and sociopolitical change affect agriculture, emphasizing the need to adopt an integrated-systems view of the world to achieve sustainability.

A model developed by the Stockholm Environment Institute distills the components of the water-energy-food nexus, framed around the availability of water. This model illuminates interactions and trade-offs among water management, energy management, and food production, using as an entry point the availability of water resources. The model also emphasizes the importance of sustaining biodiversity and ecosystem services as the basis of a resilient and productive environment. For all sectors, and in particular for food production, understanding these interactions can help decision makers find solutions that will maximize benefits across all three realms.

Several global trends are highly relevant in Latin America and the Caribbean. Income is rising across all social strata, accompanied by increases in both production and consumption. Accelerated development linked to globalization is also hastening urbanization and concentrating large numbers of poor

The water-energy-food nexus



people in peri-urban zones, where they are vulnerable to constrained availability of water, energy, and food. In rural areas, intensified agriculture responding to global demand for commodities, energy development, mining, and the expansion of infrastructure are degrading resources, disproportionately affecting the poor. Finally, climate change poses particularly acute threats to many areas, in particular the high mountain ecosystems in the Andes and some Caribbean islands. Viewing these challenges from an integrated systems perspective is useful for stakeholders and decision makers in order to chart development pathways where the trajectories of social and ecological systems remain within acceptable thresholds.

The countries in Latin America and the Caribbean are physically and socioeconomically diverse. Some areas have ample rainfall; others struggle to irrigate crops. Some countries rely on hydropower to meet large shares of their energy needs; others use mostly fossil fuels. Some countries are embracing biofuels production with its accompanying concerns about ecosystem loss and competition with food crops. An integrated systems approach can help set priorities for investments that promote socioecologically resilient development. A focus on efficiency, on creating more with less, is also relevant in the face of increasing regional productivity and consumption. A number of key interactions exemplify the water-energy-food nexus in the region:

- **Water is needed for food production:** 90 percent of the region's agricultural land is rain-fed. In the water-constrained Andes, there is sufficient water to produce a diet of 3,000 kcal with 20 percent animal products. But changing precipitation patterns and growing demand for food are increasing the need for irrigation. Combined with urbanization, this is increasing pressures on rural landscapes and on water supplies.
- **Water is needed for energy generation:** Hydropower supplies 46 percent of the region's electricity, far above the 16 percent global average, but only 38 percent of the region's potential hydropower has been tapped. In addition, growing and producing biofuels can require large amounts of water.
- **Energy is needed for food production:** This is the least well understood link, but food production, harvesting, transport, processing, packaging, and marketing all use up significant energy resources.
- **Energy is needed for water:** Energy is needed for desalination (which could become important mostly in the Caribbean), water distribution, and irrigation.

These examples highlight the importance of applying integrated systems models. Similarly, reduction in glacier water contributions will affect water supply for upstream and downstream uses, including small- and large-scale agriculture, urban water utilities, and hydropower. The situation in La Paz–El Alto, Bolivia, illustrates this: the rapid urbanization of El Alto in the last decade has created several challenges, including increased demand for tap water. The current water supply system is connected to the system of La Paz, and the water utility serves about 1 million of the 1.65 million residents of both cities, but this includes only 35 percent of households in El Alto. Irrigation for peri-urban agriculture consumes 10 percent of the water available to El Alto. Water sources for the cities come from glaciated watersheds that have lost up to half of their glacier area over the last few decades.

To solve the shortages in water supply for these two cities, various infrastructure options are being analyzed—many of which are proposed by funding agencies taking a top-down approach to climate adaptation. These initiatives need to incorporate local social processes so that they can respond to local needs. In El Alto, it is important not only to provide water for households but also to consider the subsistence agricultural uses of the peri-urban zone, as well as the agro-pastoral uses of the upper watershed, where infrastructure projects are envisioned. Climate trends should also be incorporated into infrastructure design to accommodate uncertainty and variability in water supply.

All across the region, development is the top priority, along with providing the energy to support development. At the same time, there is pressure to minimize carbon emissions, which often leads to the promotion of hydropower and the increasing attractiveness of biofuels production. Where water is plentiful, these may be successful strategies. But in regions with limited water resources, hydropower and biofuels may compete directly with food crop production and other ecosystem service flows. An integrated systems approach will highlight these trade-offs and help ensure that benefits in one realm do not come at the expense of another.

To apply the nexus framework effectively in this region, however, we will need to fill several important knowledge and policy development gaps, including:

- Watershed-level information on land use, terrestrial ecosystems, and water balances.
- Studies on impacts of hydropower development on ecosystems and their services.

- Integrated policy frameworks that take into account climate change adaptation in the water sector, mitigation in the energy sector, and food security measures.
- Better integration of analytical frameworks for water and energy planning.
- Integration of informal participatory bottom-up processes with formal top-down interventions.

An analysis of what we know and don't know about water may provide interesting content for a future *Sustainability Report*.

Using integrated water-energy-food systems approaches in Latin America and the Caribbean will improve understanding of key trade-offs and better inform decision making. In many cases, such analyses are best served by examining and taking decisions about watersheds. In northern Peru, for example, the department of Piura is home to close to a million people. The valleys of Chira and Piura, with a combined irrigated area of 82,985 ha, face water shortages due to the low regulation capacity of the Poechos reservoir, which has high sedimentation rates, and to increasing water demand to irrigate biofuels. Rice covers half of the Chira valley and 30 percent of the Piura valley; biofuels are now grown on 3 percent of the total irrigated area, and there are plans to add 10,000 ha. Other major crops include cotton, plantain, corn, citrus, and tubers.

A scenario analysis of the situation in this area, including reservoirs, canals, and irrigated areas, allowed investigation of changes in water demand and supply as a function of increases in population and in areas for different biofuel crops (maize, sugarcane, and sorghum). The analysis indicated that the current water supply and infrastructure cannot support the desired increases in irrigated area for biofuel crops. It also showed an urgent need to integrate water resources and land use planning to address erosion and increase water productivity through changes in biofuel crop choices and agricultural practices.

Another example illustrates the importance of a participatory approach to planning. Colombia's Coello-Combeima watershed provides water to more than half a million people in several cities and one of the largest irrigated areas in the country (24,000 ha). The watershed also supports subsistence and small-scale agriculture on the margins of the main stem of the river, as well as hydropower electrical production for the national grid. Hydrologic regulation for the system is provided by two sensitive ecosystems in the headwaters: páramo and cloud forest. The competing water demands for urban and agricultural uses have caused water shortages and conflict between users. Urban contamination and erosion reduce water availability in some river sections. The discovery of gold is creating additional pressures on water quality. Through a participatory process, stakeholders have identified opportunities for resource conservation that may also contribute to reducing conflict—for example, through conservation of the páramo.

Resource management is complex, but integrated systems models can help stakeholders better understand interactions among biophysical, sociocultural, and economic resources and systems. More-complex models can incorporate economic and political drivers of change that can advance understanding, improve decision making, and ultimately promote socioecological resilience in the face of global socioeconomic and climate changes. The articles and commentaries in this report examine food production in complex social, environmental, and political contexts. Ultimately, policies and decisions for sustainability must be based on an understanding that embraces this complexity. Integrated systems models like the nexus approach can help stakeholders come to terms with the critical interactions that are the basis of complexity.

The Stockholm Environment Institute (SEI) is an international non-profit research organization that has worked on environment and development issues at local, national, regional, and global policy levels for more than 20 years. This Introduction was prepared by David Purkey and Marisa Escobar. Purkey runs the Northern California office of SEI-US and is actively involved in the development, dissemination, and application of the Water Evaluation and Planning system. Escobar is a senior scientist at SEI-US, leading initiatives on water resources and benefit sharing in Latin America through capacity building in collaboration with local universities.

CLIMATE CHANGE AND AGRICULTURAL PRODUCTION



Rodomiro Ortiz

Rodomiro Ortiz is Professor of Genetic and Plant Breeding at the Swedish University of Agricultural Sciences in Alnarp. Over the years he has worked as a researcher with Universidad Nacional Agraria La Molina, the International Potato Center in Peru, Rutgers University, and the International Institute of Tropical Agriculture (IITA) in Nigeria and as Nordic Professor in the Royal Veterinary and Agricultural University of Denmark. Previously Ortiz served as program director at the International Crops Research Institute for the Semi-Arid Tropics in India, at IITA, and at the International Center for Improving Maize and Wheat in Mexico.

Extreme temperatures, water scarcity, and floods are expected as a result of global climate change, mainly due to an anthropogenic-led increase of greenhouse gas emissions. This change of climate will severely affect agriculture worldwide. Under most global warming scenarios, crop yields are likely to decline due to increasing temperature and declining rainfall, thereby raising food insecurity and threatening human nutrition. Other expected changes are reduced crop quality, intensified nitrogen leaching and soil erosion, and diminishing land and water resources for farming.

Governments and farmers worldwide—particularly smallholders—will have to adapt their agro-ecosystems to unstable, variable weather patterns because climate change will affect food availability, stability, use, and access. Hence, the main challenges for agriculture in this century will be to increase the supply of food, improve its distribution and access, and enhance resilience of the whole food system while reducing GHG emissions, eliminating air and water pollution from agricultural fields, avoiding biodiversity and habitat losses, and phasing out unsustainable water withdrawals.

Climate Change in Latin America and the Caribbean

Latin America and the Caribbean is vulnerable to changes in climate due to geography. Changes in extreme temperatures, which affect agriculture, have been observed over the last 50 years in the American continent. The average temperature increased by 1°C in the twentieth century in Mesoamerica and South America, although it showed great spatial and seasonal variability.

Mesoamerica and the Caribbean islands are within the hurricane belt, and hurricanes and extreme weather events have shown more volatility and strength in recent years. Additionally, glaciers feed much of South American agricultural water flows. With these retreating due to warming, water availability and hydroelectric generation will be seriously affected.

El Niño–Southern Oscillation (ENSO) is another important phenomenon affecting climate variability in Latin America. ENSO events were labeled twice in the twentieth century as the “El Niño of the century” due to the unprecedented warming in 1983 and 1998 in the eastern Equatorial Pacific. Intense rainfalls caused landslides and floods, whereas drought was noted in other areas. Anthropogenic-led changes could influence the increasing frequency and magnitude of ENSO events, which will continue to affect agriculture.

Floods, droughts, freezing, heat waves, and hailstorms, as well as variation in balance between temperature and rainfall or hurricane intensity and frequency, are the most important extreme events that may occur due to climate change. Some of them—particularly more periods of warm nights, intense rainfall, and consecutive dry days—have severely affected Latin America and Caribbean in recent years. The latest increase in extreme events has led to a 2.4-fold increase in the frequency of flooding, droughts, and landslides, although some of these could be related to ENSO events. These changes in the intensity and frequency of extreme events will increase the vulnerability of Latin American and Caribbean agriculture to climate change.

Although there may be some questions about the credibility of models for climate prediction, the climate change scenarios for the continent suggest an increase in temperature between 1° and 6°C. The consensus among models regarding rainfall changes points toward an increase of summer rainfall in southeastern subtropical South America, a decrease of rainfall across the continent during winter, and reduced rainfall—irrespective of the season—in the southern Andes. Short rainfall periods will decrease the length of the crop cycle, thereby affecting productivity. There will be a shortening of favorable weather for the crop-growing cycle and an increase of drought in northeast Brazil. Warm nights will also occur more frequently throughout tropical South America, whereas cold nights will decrease. An increase in temperature and decrease of rainfall will affect crop yields negatively, and an increase of 4°C will reduce livestock productivity significantly.

Expected Impacts of Shifting Temperatures and Rainfall

The impacts of climate change will vary according to the farming system and its location. For example, farmland values in hot and wet Amazon and equatorial regions may decrease, while in temperate or high-elevation locations and the Southern Cone of South America they may increase. Equatorial regions are very vulnerable to climate change because farming there is close to the limits of tolerating high temperatures.

The impacts in each country will depend on the interaction between weather, topography, soil types, water availability, and the kind of crops, livestock, and

trees used by farmers in their agro-ecosystems. But less rainfall, increased floods, and temperature extremes (> 2°C) will have a negative impact on food security, particularly in semiarid and arid zones. On average, crop and livestock productivity may decrease throughout Latin America and the Caribbean by the end of this century. Moreover, about 50 percent of agricultural land in some areas (such as central and southern Chile, the Peruvian coast, and southeast Brazil) will likely be affected by desertification and salinity.

A recent study suggests that revenue losses in Latin American and Caribbean agriculture could range from 12 to 50 percent by 2100, even after some adaptation of crops, livestock, and farming systems to climate change. Another study suggests that the total output for agriculture could fall 12 percent by 2080 if carbon dioxide (CO₂) fertilization occurs and 24 percent if it does not, and this is without considering how water stress will affect crop and livestock production.

The glaciers in the Andes of Argentina, Bolivia, Chile, Colombia, Ecuador, and Peru have lost 20 percent of their volume, which will affect the supply of both water and energy in South America. Hydropower accounts for at least 50 percent of the energy supply in the Andean Community, where farmers in many areas also depend significantly on water from the glaciers. The temperature increases in the Andes are also affecting water cycles and mountain habitats, where rainfall changes will affect water supply as well. Likewise, coastal areas can be affected by climate change due to sea level rise, which may make the water supply unsuitable for both agriculture and human consumption due to saltwater intrusion.

ADDRESSING CLIMATE CHANGE AND ITS IMPACTS ON OR FROM AGRICULTURE

Adaptation Options

- Develop sound forecasts that facilitate farmers' adoption of climate-resilient technologies.
- Improve land and water management.
- Use climate-resilient seeds and breeds.
- Value and incorporate indigenous and traditional knowledge for addressing climate change.
- Strengthen interdisciplinary research on adaptive capacity of agriculture.
- Provide incentives to farmers for engaging in practices to adapt to climate change.
- Offer risk management tools to help farmers manage weather and market variations.
- Invest in infrastructure (such as roads) that gives farmers better access to inputs and markets.

Mitigation Options

- Intensify agriculture sustainably to enhance productivity of agro-ecosystems.
- Promote conservation agriculture and other resource-conserving technologies.
- Reduce emissions by minimizing pre- and post-harvest losses and waste on food systems.
- Lessen livestock- and rice-related emissions.
- Avoid deforestation and promote reforestation and afforestation.
- Reward farmers and the food industry for mitigating climate change.
- Ensure agriculture becomes eligible for voluntary carbon credits for GHG offsets.
- Extend the scope of carbon markets to include the critical role of soil as a carbon sink.

Unfortunately, research about the impacts of climate change on the agriculture of the region is so far limited to a few crops or production systems and has been restricted to small geographic domains. Moreover, future climate forecasts and modeling approaches are limited to a few platforms, and the region lacks a comprehensive assessment to validate global climate model forecasts, thereby resulting in significant difficulty in decision-making processes regarding adaptation measures for agriculture. Furthermore, there are doubts about the consequences of climate change because there are no scenarios with a level of probability for sound *ex ante* impact assessments. Nonetheless, farmers are known to monitor changes in climate, and they quickly respond to new weather conditions through establishing complex adaptation mechanisms in their agro-ecosystems. Their knowledge will therefore be a valuable source for developing site-specific adaptation measures.

Contrasting future scenarios for climate and agriculture were summarized as part of the Intergovernmental Panel on Climate Change (IPCC) meetings, providing some information for the region. For example, maize and pasture productivity may rise due to an increase of rainfall in the pampas of Argentina, Uruguay, and southern Brazil, whereas wheat yield will be reduced in the humid pampas of Argentina and will increase in Uruguay and the semiarid pampas of Argentina due to the rising temperature. Rice yield will mostly decrease in Bolivia and Central America, while soybean output may increase in South America. An increase of nematode pests due to climate change is likely to have a negative impact on the productivity of coffee in Brazil, and increasing rainfall will favor wheat scab during the spring season in the Southern Cone. The IPCC also suggests that rising temperatures coupled with decreasing water in the soil may lead to a gradual replacement of tropical forest by savannah in eastern Amazon, whereas semiarid vegetation will tend to be replaced by arid-land vegetation in Latin America, and there will be significant biodiversity loss through species extinction in tropical regions.

Outlook Summary

Climate change is already happening, as noted by the increased frequency and intensity of storms, drought, flooding, other extreme weather events, saltwater intrusion, altered hydrological cycles, and rainfall. Although the models for predicting climate may provide contradictory scenarios, most of them indicate that the most vulnerable areas in the region are the South American Andes, Central America, and the Caribbean islands.

The impacts of the changing climate on agro-ecosystems and food availability and prices depend on the farming system, size, and location. The challenges that farmers and consumers will face relate to food supply, distribution, and access. How to adapt agriculture to climate change will remain the main challenge of next decades. Some possible adaptation measures are provided in the Box on page 11. Improving farmers' ability to use water and fertilizers efficiently, as well as their management of fragile soils, is essential for adapting agriculture to the shocks of climate change.

In addition to adaptation measures, agriculture needs to reduce GHG emissions in order to mitigate climate change. A more efficient use of land, water, and other natural resources will be very important. The Box also summarizes some possible mitigation actions. They include, among others, avoiding deforestation, appropriate land management, agricultural intensification to curtail expansion to forests, protected areas (for example, in Amazon forests), not burning crop residues and weeds, proper amounts and timing of nitrogen fertilizers, the use of resource-conserving technology, crop breeding for input efficiency, managing livestock feeds and diets, and silvi-pastoral systems.

Governments should use planning and management tools to both adapt to and mitigate climate change in agriculture. They should provide incentives for farmers to engage in practices that help them adapt to climate change. Likewise, farmers will benefit from risk management tools to manage weather and market variations. Knowledge management systems—at both national and regional levels—for sharing information on best practices and relevant technology will help address the challenges brought to agriculture by the changing climate.

Integrated approaches are needed to adapt agriculture to climate change and mitigate its GHG emissions. The agenda should therefore focus on livelihood improvements coupled with agro-ecosystem resilience, eco-efficiency, and sustainability rather than just productivity gains. Intensifying agro-ecosystems sustainably by producing more food with lower inputs, adapting agriculture to climate change (as well as mitigating climate change through eco-efficiency in agriculture), conserving agro-biodiversity through its use, adding value throughout the food chain, improving the nutritious quality of the human diet, and making markets work for smallholders are all key steps needed to address climate change and vital development issues.

A longer version of this article, including endnotes and a full reference list, is available at www.iadb.org/sustainability/ortiz.

ECOSYSTEM SERVICES AND AGRICULTURAL PRODUCTION IN LATIN AMERICA AND CARIBBEAN



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Latin America and the Caribbean faces a daunting challenge: produce food, fiber, and fuel for a growing demand while preserving its mega-biodiversity and associated ecosystem services. This is one of the few regions in the world that might be able to accomplish this task due to its geography and relatively low population density. But it cannot be done at the expense of agriculture, one of the region's most economically valuable ecosystem services.

Agriculture and livestock are vigorously expanding in Latin America and the Caribbean due to a series of political and economic changes initiated in the 1990s. As a consequence, this region became an important global food producer. For instance, the region is a leading producer and exporter of soybean, sugar, coffee, fruits, poultry, beef, and—more recently—ethanol. But agriculture, while being one of the region's most precious ecosystem services, depends on numerous ecosystem services provided by healthy and resilient ecosystems.

According to the Millennium Ecosystem Assessment (MA), “ecosystem services are the benefits people obtain from ecosystems.” The MA identified three broad categories of services: provisioning, regulating,

and cultural. Provisioning services include food, wood and fiber, fuel, and freshwater. Regulating refers to climate regulation, disease regulation, waste control, flood mitigation, and water purification. Cultural involves aesthetic, spiritual, educational, and recreational services. All of these depend on basic supporting services, such as soil formation, photosynthesis, and nutrient cycling. The MA understood that human well-being includes multiple needs: from basic materials for food and shelter to good health, security, and freedom of choice and action.

This article focuses on the relationship between agriculture and regulating and provisioning services in Latin America and the Caribbean. This does not mean that cultural services are less important, but they are beyond the scope of this article.

Regulating Services

Regulating services are those that are essential to meet basic needs like food and water. Examples of these are regulation of climate, diseases, and water quality. Climate encompasses several different aspects, such as physical attributes, that interfere directly with ecosystem functions, such as precipitation and air temperature. Global changes in climate are expected to affect the capacity of ecosystems to meet basic human needs. Consistent warming throughout the year is predicted for South America by the end of this century, for example. Precipitation patterns are more difficult to predict, but it seems likely that there will be a reduction of rainfall in eastern Amazonia and northeast Brazil and an increase in rainfall in the northwest coast of Peru and Ecuador and in the southern region of Argentina. Although total annual rainfall will not change drastically in the region, the breadbasket between southern Brazil and northern Argentina will likely face more extreme precipitation events, with possible deleterious consequences for agriculture.

Climate-regulating services also provide one of the clearest linkages between biodiversity and ecosystem services. The Amazon basin is the origin of the

moisture that is transported by a corridor linking the basin to the breadbasket region. Moisture from the Amazon also contributes to the center-west region of Brazil, where most of the soybean in that country is produced. This is the same water vapor source that may cause extreme precipitation events under a global change scenario at the end of this century. The key role that the Amazon forest plays has already been shown in the local water cycle, in which the forest pumps water back from the soil to the atmosphere. More recently, it was shown that forests also contribute to rain by emitting to the atmosphere isoprene that is transformed in particles of 2-methylthertion, a hygroscopic particle that helps to form rain droplets. Recently, researchers preliminarily demonstrated a third mechanism through which microorganisms, by releasing biological surfactants to the atmosphere, may help to form rain droplets by acting like particles of 2-methylthertion. Therefore, all these mechanisms indicate that biodiversity plays a key role even in the water cycle, which is primarily driven by physical factors.

Provisioning Services

Perhaps the most important ecosystem service in Latin America and the Caribbean is the provision of food, fiber, and fuel. The food supply in the region, with the exception of the Caribbean, has steadily increased in recent decades, reaching values similar to or larger than the world average food supply. Another important feature of the food economy is the proportion of food of animal origin, which is increasing in Central and especially in South America, reaching proportions significantly higher than the world average.

Agriculture is a critical part of the region's economy. Although the relative participation of agriculture in the gross national income (GNI) per capita has been decreasing steadily since the 1980s, in absolute terms there has been an increase in the GNI linked to agriculture since 2001. Several countries have become net exporters of agricultural commodities, and this has helped a net positive trade balance. For instance, in 2007 agriculture accounted for 40 percent of Brazil's trade surplus.

Because of its importance, agriculture must start to use more-sustainable and less environmentally deleterious practices. Accordingly, it is necessary to change the agricultural paradigm of investing only in agricultural expansion and/or intensification. Countries have to develop and promote sustainable agriculture; they must invest in agricultural practices that will both continue production of crops and promote ecosystem

services. Carbon sequestration by agricultural soils, pollination by native flora, and improving soil nutrients from conservation tillage practices are all examples of providing ecosystem services while maintaining crop yields.

Agro-ecosystems are a simplification of more complex natural ecosystems. The main goals of sustainable agriculture are to mimic natural ecosystems, adding complexity to agro-ecosystems and thereby increasing their functional diversity. Additionally, sustainable agriculture recognizes the role of neighboring landscapes in providing key services to agriculture. The most recognizable of these services are pollination and biological pest control.

Most staple crops do not depend on pollinators, but several fruits, vegetables, nuts, and stimulant crops, like coffee, are highly dependent on them. Latin America and the Caribbean is an important fruit and vegetable producer and the largest coffee exporter in the world. The economic value of insect pollination for the region has been estimated to be about €12 trillion, with much of this coming from coffee.

The few more-specific studies of pollination in the region focus on coffee, passion fruit, and grapefruit. These studies, and others, have concluded that the number of pollinators and other useful insects decrease in proportion to the distance of agricultural fields from natural ecosystems. Therefore, it is fundamental that agricultural fields are embedded in a landscape mosaic with patches of native ecosystems alongside crops, thereby providing shelter for pollinators and other insects that are enemies of crop pests. The two major threats to pollinators are deforestation (loss of habitat) and the use of general insecticides that kill not only agricultural pests but also other insects. Unfortunately, the use of insecticides is rapidly increasing in the region.

Agricultural sustainability also means incorporating a variety of new management techniques. These include, for example, not tilling, retaining cover crops, and managing nutrients. No-till or reduced-till techniques means letting crop residues from the last harvest cover the soil with minimum soil disturbance. This would mimic natural ecosystems where bare soil is rarely exposed; it was inspired by ancient techniques adopted in the *roçados* of Brazilian Indians and the *chinampas* of the Aztecs in Mexico. Today this kind of cultivation practice is widespread in the region, especially in Brazil, Uruguay, Paraguay, and Argentina. In Brazil alone this approach to tillage is being used on more than 27 million ha of agricultural land. No-till has several advantages over conventional till: it builds

up soil organic matter, increases soil fertility, enhances biological nitrogen fixation, and prevents soil erosion. In the southern region of Brazil, the average rate of carbon gain in the soil under no-till has been estimated at almost 0.50 Mg/ha/yr, decreasing in the Cerrado region to 0.35 Mg/ha/yr. A negative side of no-till is the inevitable growth of weeds. Recently this has become particularly problematic as weeds are becoming glyphosate-resistant, which will require the replacement of glyphosate, which has a low environmental impact, with herbicides that are less environmentally friendly.

Crop rotation is also important, as it both keeps soil covered year-round and promotes better nutrient cycles, allowing for the natural replacement of lost nutrients through changing crops. Crop rotation is usually done with a cash crop and a cover crop that is normally an N-fixing legume. Part of this fixed nitrogen is used by the next crop. This extra nitrogen from biological nitrogen fixation also decreases the use of N-fertilizer that can have diverse deleterious effects on the environment. One important unintended consequence of the use of legumes as cover crops is an increase in the emission of N_2O , a potent greenhouse gas. Therefore, it is important to maximize N uptake by plants as soon as N is available through the mineralization-nitrification process.

Crop-livestock systems are the ultimate layer of complexity that can be added to sustainable agriculture; these systems consist of adding animals to no-till and crop rotation systems. In these systems animals act like recyclers of nutrients, taking them from vegetation and returning them to the soil via excreta. The expected result is improved soil fertility and an accumulation of carbon in the soil. In order for this system to work properly, it is paramount to choose the right stocking rates of animals, ensuring that their nutrient uptake will not be excessive and that vegetation biomass of forage crops will be enough to act as mulch for the next crop.

Integrated crop-livestock systems were initially used in Latin America and the Caribbean to establish pasture in areas where rice was first cultivated as a cash crop, which makes use of the nutrients returned to the soil through rice biomass burning. In Uruguay, since the 1960s, crop-livestock integration has been the predominant management system. Since the 1990s, the system has been used in parts of the pampas in Argentina. In other areas, like the Amazon region and the Brazilian Cerrado, this system was used to improve soil fertility of degraded pastures and to maintain a cash-flow crop to finance improvements of degraded pastures. More recently, areas of the Amazon and

Cerrado have been adopting crop-livestock systems as a long-term management practice. This system is particularly developed in the south region of Brazil, where there are several such systems. For instance, in larger properties mechanized soybeans are cropped in the summer, and forage for cattle for beef is cultivated in the winter. In smaller properties, maize, rice, beans, and other crops are combined with cattle for dairy or with sheep and goats. The main advantages of the crop-livestock systems are a better economic return to the farmer, improvement of the physical, biological, and chemical soil properties, and an improvement in the productivity of the following crop.

All the sustainable practices just described have the potential to mitigate greenhouse gas emissions. Under conventional agriculture, in most cases there is a reduction in the carbon stocks of the soil, probably because there is an increase in the soil organic matter mineralization and an increase in carbon being lost through erosion. Agricultural practices like no-till, crop rotation, and crop-livestock systems seem to prevent these losses and in several cases promote carbon accumulation in the soil. This is an important agro-ecosystem service because the increase of organic matter influences several soil properties, leading to an increase in crop productivity. However, no-till management and the use of cover crops like legumes may increase N_2O emissions, offsetting the carbon accumulated in the soil. More studies are needed to fully evaluate the role of N_2O emissions under different cropping systems in the region. Under tropical and subtropical conditions, N_2O emissions under no-till cropping systems are low, maintaining the benefits of mitigating GHG emissions of this system. However, in order to avoid any nitrogen losses to the atmosphere or from deep leaching, it is advisable to synchronize N-availability with plant uptake.

In summary, agricultural systems, depending on how they are managed, can produce not only food, fiber, and fuel but also a series of ecosystem services. But for that to happen, agricultural fields have to be integrated into landscapes with a mixture of natural vegetation and crops. Success will require continued reductions in deforestation and development of agro-forestry mosaics. Increases in agricultural production have to come from sustainable intensification, which in turn implies the adoption of a series of sustainable management practices, some of which are described in this article.

A longer version of this article, including endnotes and a full reference list, is available at www.iadb.org/sustainability/martinelli.

CHALLENGES FOR LOW-CARBON AGRICULTURE AND FOREST CONSERVATION IN BRAZIL



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Brazil sits squarely under the magnifying glass of international scrutiny as both one of the largest carbon dioxide emitters from land use change and the custodian of the largest tropical forest in the world. Recent efforts by the Brazilian government to curb deforestation on private properties, crack down on illegal logging, and establish vast tracts of native forests as protected areas (more than 790,000 km² created since 2002, now covering 46 percent of the Brazilian Amazon biome), when combined with the recent downturn of the agricultural sector, helped reduce deforestation in 2011 by 68 percent of the historical baseline between 1996 and 2005, resulting in a CO₂ reduction of more than 1 billion tons. In addition, voluntary registries that encourage responsible land management by cattle ranchers and soy farmers and the perception among Amazon farmers and ranchers that standing forests will soon gain value through a carbon market are sustaining further reductions in deforestation. These perceptions and voluntary initiatives have been bolstered by international commodity certification systems as well as by moratoriums on growing soy and beef on recently

cleared lands, which attempt to exclude illegal deforesters from international commodity markets.

The Amazon forest is also an important player in regional climate regimes; its forests cool the air by pumping about 7 trillion tons of water per year into the atmosphere via evapotranspiration. In essence, the forest functions as a giant air conditioner that keeps the regional climate humid and rainy by cycling atmospheric water in the form of aerial rivers to the southeast and center of the South American continent. In addition, the Amazon forest influences the regional climate of areas such as the U.S. Midwest via climatic teleconnections.

Intensification of the cattle industry has been suggested as one way to reduce pressure on forest margins and spare land for soybean or sugarcane production, and this is the cornerstone of Brazil's plan for reducing greenhouse gas emissions. The National Climate Change Plan (NCCP) and Brazil's proposed Nationally Appropriate Mitigation Actions aim to constrain the land area occupied by extensive cattle ranching by intensifying production. To this end, federal credit programs such as the low-carbon agriculture program and R&D activities in Brazil are aligning to support intensification goals, but there is no guarantee that this will decrease the demand for land at the forest margin, particularly if land tenure issues are not thoroughly resolved through a comprehensive land titling and zoning program and if enforcement of existing environmental laws remains inconsistent in frontier regions. Moreover, the attack on the Brazilian Forest Code along with federal and private investments in infrastructure continue to threaten the progress toward NCCP targets.

Scenarios of Potential Agricultural Expansion in Brazil to Meet Biofuel and Crop Demands

Although improving the productivity of ranching could allow Brazil to reconcile forest conservation with crop expansion, yielding land to agricultural production as demand increases for food and biofuels produced domestically, this strategy is not straightforward.

Rather than large investments in cattle intensification, this strategy will require application of the best science to develop sound solutions that satisfy the principles or goals of a low-carbon rural development strategy. The technical, institutional, and policy solutions can be addressed in the context of a national strategy that includes a carefully planned expansion of sugarcane, soy, and other crops and forest plantations onto land that has already been cleared for cattle pasture as well as land titling at the forest margin. This must be accompanied by a low-carbon program that emphasizes investments in designing and implementing solutions both to develop best practices for land use and to maintain or recover forests in order to maintain climate stability and all the ecosystem services that forests provide.

Science must inform participatory low-carbon land use planning. A scientific platform named SimBrasil does this; it includes the best data and knowledge on land use, cropping, ranching, and forestry as well as forest carbon biomass and land cover change and land use emissions to serve as a tool to explore with stakeholders a range of national strategies aimed at reconciling crop expansion and forest conservation in Brazil.

SimBrasil was originally developed for the World Bank's Low-Carbon Country Case Study for Brazil. For land use and land use change and forestry (LULUCF), the study developed two scenarios: a reference and an alternative low-carbon scenario. In the reference scenario, 20 million ha of additional land are required to accommodate the expansion of all activities by 2030, increasing the total area in agriculture by 7 percent. In the low-carbon scenario, cropland for grains is expected to expand by 26 percent. In addition, sugarcane crops are projected to expand by 6.4 million ha so that Brazil will replace 80 percent of its gasoline consumption with ethanol and still meet 10 percent of estimated global demand for ethanol to achieve an average worldwide gasoline mixture of 20 percent ethanol by 2030. This scenario also assumes the expansion of commercial forest plantations by 2.7 million ha to eliminate deforestation due to charcoal production by 2017 and offset 46 percent of coal used for iron and steel production by 2030. Finally, under the low-carbon scenario, a countrywide forest restoration of 44 million ha would take place by 2030 to bring illegally deforested riparian zones and legal reserves into compliance with the Forest Code.

All this will amount to 70.4 million ha, but in contrast to the reference scenario no direct deforestation will take place because a portion of arable pasturelands that cover over 90 million ha in the Cerrado and Atlantic forest alone will be used to accommodate

agricultural expansion, and degraded or low productivity pastures will be used for reforestation. Thus, the main assumption of the low-carbon scenario is that it is possible to free up pasture for crop expansion by increasing livestock productivity and that simultaneous expansion of cropland and forest plantations by 50 percent and restoration of 44 million ha of forest would be feasible if cattle ranching in Brazil could be intensified from the current of 1.1 head to 1.5 head per ha.

Under the low-carbon scenario, SimBrasil results indicate that deforestation throughout Brazil could decrease by 68 percent by 2030 compared with the reference scenario. Moreover, Amazon deforestation would fall steeply to 17 percent of the historic annual average of 19,500 km² from 1996 to 2005, complying, therefore, with the NPCC target of 20 percent of the baseline by 2020.

Brazil's annual emissions from LULUCF, which already account for the 68 percent reduction in Amazon deforestation that took place since 2004, are approximately 350 M tons of CO₂. If a low-carbon scenario prevails, further reductions may result in a drop in Brazil's annual emissions to only about 200 M tons of CO₂ by 2030 from LULUCF. Over this period, emissions from livestock under this scenario will eventually surpass the ones from land use change, thus highlighting the need to improve the productivity of cattle ranching in order to reduce enteric methane emissions.

Model results reveal, therefore, that Brazil has a unique opportunity to meet its goals of agricultural expansion by 2030 while undertaking a large forest restoration program that would recuperate 44 M ha of forests and potentially sequester about 5 Pg (petagrams) of carbon. But to harvest the full range of opportunities to mitigate GHG emissions, it is essential that Brazil coordinate policies and measures across environmental and agricultural sectors simultaneously.

Pathways for Low-Carbon Agriculture

It is clear that Brazil has the potential to make a substantial contribution to climate change mitigation while developing a low-carbon rural economy. Nevertheless, this effort is not trivial and will demand diverse policy initiatives and financial incentives. For example, the cornerstone proposal of the low-carbon study—intensification of the Brazilian cattle herd—may be viable in terms of land availability, but it will be difficult to implement. According to one study, it will be necessary to subsidize cattle ranchers with US\$280 billion (net present value between 2010 and 2030)

in order to intensify production to 1.5 head per ha by 2030. This is the Achilles' heel of this plan, as cattle ranching provides, in general, very low rates of return.

Many cattle ranchers in areas where intensification would be required have invested little in capital or new technologies. Thus it is expected that this undertaking would be led by agribusiness and would only take place in regions where conditions are highly favorable for intensification. These regions might be characterized by proximity to markets and supply of agricultural inputs, proximity to high-productivity grain production zones, and availability of arable land that is not suitable for cultivation of higher-rent crops such as soy or sugarcane. Therefore, understanding the geography of intensification will be key to its success. Pasture restoration is cited as central, although it may be prohibitively costly due to a steep yield decline after three to five years of use.

With this in mind, adopting integrated crop-livestock systems, whether associated or not with feedlot systems, may be a more feasible option. However, such systems demand upfront investments, capital—in addition to agricultural knowledge and business skills—and arable land. If these conditions are met, such systems may attain sustainable stocking densities of three animals/ha or more, while at the same time providing carbon fixation through, for example, rotation of *Brachiaria* and maize. Additional efforts include genetic improvement of the herd, which is particularly important for Brazil, as its herd is double the size of the U.S. herd but produces less meat.

Low-Carbon



Agriculture and Comprehensive Environmental Conservation

Although the low-carbon study showed that agricultural expansion can take place in Brazil without further deforestation, this may not be a win-win game due to the indirect impacts on deforestation of the growth in the agricultural sector, as it capitalizes deforesters and increases land prices. Therefore, additional measures are needed to reduce deforestation in Brazil. These include protected area (PA) consolidation in the Amazon, mainly through support for the ARPA program as well as creation of new PAs along the active deforestation frontier. Although the PA network covers 46 percent of the Brazilian Amazon, PAs in the other Brazilian biomes are still scant.

In addition, it is necessary to put PAs to work by upgrading extractive production chains in sustainable use reserves in order to lower production costs and stabilize a market floor price. International certification schemes and improvements in supply chains are also needed to provide a price premium for sustainable activities such as Brazil nut collection and rubber extraction in Acre and elsewhere in the Amazon. Other measures include promoting ecotourism in more-accessible PAs and supporting the role of forest concessions in supplying certified timber through reduced-impact logging.

Enforcement initiatives include the Plan of Action for the Prevention and Control of Deforestation in the Amazon and the PRODES and DETER programs that aim to monitor deforestation annually and detect it in close to real time. Fire prevention and active fire brigades must be expanded to a great extent to tame forest fires that contribute to carbon emissions and forest degradation in Brazil. This is particularly important for climate change mitigation programs, given that the loss of forest carbon to the atmosphere through fire represents a threat to the “permanence” of reductions in carbon emissions from deforestation.

Programs for sustainable use of natural resources,

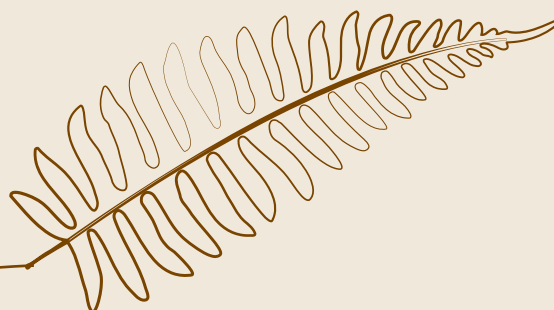
such as PAS (Sustainable Amazon Program) and state land use zoning initiatives represent complementary efforts that must be expanded and consolidated in order to harness sustainable development with conservation of natural resources. In this respect, it is crucial to effectively engage the drivers of deforestation in a low-emission rural development strategy. Commodity roundtables for palm oil, soy, and sugar/ethanol have developed international standards and criteria for certification of supply chains that are attracting producers and industry participation. Certification criteria include prohibition of production on illegally deforested lands and compliance with local laws. As a result, farmers and ranchers are coming together to form voluntary property registries whose owners are committed to improving their socio-environmental performance.

Many project-level initiatives are attempting to harness market mechanisms or implement payments for ecosystem services in order to place economic value on standing forests. Perhaps the most important initiative being considered is REDD+—Reducing Emissions from Deforestation and Forest Degradation in developing countries and the role of conservation and sustainable management of forests in enhancing forest carbon stocks. This focuses on creating both an institutional framework and the necessary economic incentives for developing countries to reduce CO₂ emissions from deforestation and forest degradation. REDD+ should be part of a comprehensive rural planning strategy that supports the sustainable development of rural livelihoods.

A whole series of initiatives could be placed under the umbrella of payments for ecosystem services. These include BolsaFloresta—a forest allowance established by a state law—in Amazonas and environmental compensation to private properties with a surplus of forest from those that have deforested beyond the limit established by the Forest Code.

Nevertheless, whereas programmatic costs of forest conservation are low (US\$21–54 per ha within a 20 year period), forest restoration will require at least 20 times more investment. (The costs of forest restoration can go from US\$750 per ha (minimum intervention) to US\$4,000 per ha.) In this respect, a carbon market paying as low as US\$10 per ton of CO₂ sequestered through forest regrowth would provide about US\$4,000 per ha to fund a countrywide forest restoration effort, thereby triggering multiple socioeconomic and environmental benefits. As a new rural development model, REDD+ and other payments for ecosystem services must therefore be integrated into a low-carbon agriculture program to enable Brazil to develop a culture of forest stewardship and environmental responsibility that equals its prominence as an agricultural commodity exporter.

A longer version of this article, including endnotes and a full reference list, is available at www.iadb.org/sustainability/soares.



LAND USE DYNAMICS AND FOREST TRENDS IN LATIN AMERICA AND THE CARIBBEAN



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Catastrophic deforestation and environmental degradation have become habits of thought about forest landscapes of the Latin American tropics. Yet these truisms blind analysts to three surprising changes. First, deforestation has slowed dramatically in the Brazilian Amazon to rates 67 percent below those of 2004 and is now below its historic baseline. Second, Central American clearing is slowing as well and has declined by as much as a third over levels of the 1990s. Finally, the increasing recognition of the importance of forests as landscapes for livelihoods, ecosystem services, and supporting matrices in conservation is a new direction in sustainability, affecting policy and practices in substantive ways.

These dynamics, unfolding mostly in the last decade, would have been unimaginable in the 1980s, the period that most shaped Euro-American perceptions of tropical forest trends. Deforestation “hot spots” remain and certainly command attention: Maranhão, the arc of deforestation in the southern Amazon, the Bahian forests in the Sao Francisco watershed, the

Chaco, the Petén, and the Yucatan as well as areas near infrastructure in the Peruvian Amazon and the Upper Putumayo are all sites of accelerated clearing, each with a different political ecology. But it is important to recognize that platforms for alternatives exist, and ways to moderate the hyper-destructive characteristics of earlier periods are evolving. Latin America has become an innovator in tropical environmental policy, institutions, and incentives that support forested landscapes. These positive transformations in forests can be swamped, however, by careless new infrastructure initiatives and resource mining to meet commodity demands.

The mid-1980s to mid-1990s was a time of sharp institutional, political, policy, and economic transition in Latin America as authoritarian regimes were overthrown and civil wars wound down, so land use dynamics from that period are not entirely applicable to the period since 1995. The deforestation of the 1970s and 1980s shaped the perception of forest dynamics for a generation and was decisive in structuring approaches to regional conservation and development: set-asides for conservation, some colonization, and cattle ranching as the vanguards of integrating metropolitan economies.

Transformations in Latin America

Since the 1980s, major transformations have occurred in four main arenas:

- Institutions and governance at the level of the state and the rise of Latin America’s civil societies.
- Market evolution, especially in the globalizations of demand, commodities, and labor and the emergence of new environmental markets.
- Significant changes in the paradigms of tropical science, the technologies of monitoring land use dynamics, the understanding of regional environmental histories, and the rise of ecological economics and political ecology.
- The intense processes of Latin American urbanization.

All had significant effects on Latin American forest trends, and it can be argued that out of these interactive processes, major innovations in institutions, policies, and incentives have evolved (and are evolving further with REDD+) for new landscape politics in the twenty-first century.

The late 1980s and the 1990s were characterized by new constitutions, institutions for environmental management, development ideologies, decentralization, globalization, expanding market access, social movements, and civil society participation in development politics. These changes had several consequences: the land use profiles of small-scale grain producers changed and a socio-environmental civil society unfolded with concerns for environmental justice, working conservation landscapes, more-equitable land distribution, and the potentially positive role of people in forests. At the same time, new categories of indigenous and local community “rights holders” emerged from “occupants” or “squatters” on forested lands. The recognition of local knowledge, property rights, forest livelihoods, and participatory planning became new elements for development practice.

Markets in Latin America also shifted substantially during the last 30 years—with important consequences for deforestation. These shifts included vertically integrated global agro-industrial commodities in soy, beef, and sugarcane; new niche markets for biodiversity-friendly tropical fruits, nuts, coffee, and cacao; environmental markets for commodities and ecosystem services; and clandestine globalized economies in coca and timber. Large-scale livestock and soy production remain as huge influences on forests, with the livestock sector using some 70 percent of cleared land in Amazonia and dominating land use in Central America. Expansion of livestock also results from intensification in other areas, pushing production to peripheral, often forested, lands—an effect that can be slowed through clearer property regimes, better cadastral monitoring, and silvo-pastoral techniques. The rapid increase in soy is the result of expansion on old frontiers, technological innovation, and high levels of agronomic and market information linking production and market chains. The sector is rife with debates over longer-term sustainability, but what is clear is that intensification of land use does not necessarily slow expansion.

Organic and fair trade markets supported by an improved understanding of agro-ecosystems have been successful on a small scale and have also been the precursors to emerging markets for ecosystem services. Payments for ecosystem services including

watersheds, erosion control, biodiversity conservation, and carbon offsets have emerged over the last decade. While these new markets have changed perceptions on the values of standing forests, the markets themselves have been slow to develop because of the collective nature of the resources, weaknesses in market penetration, and leakage.

The clandestine globalized economies of coca and timber remain important factors in deforestation both in terms of direct clearing and also in terms of indirect impacts, including money laundering in ranching. Valuable tropical timbers still largely defy attempts at certification due, in part, to widespread corruption. Interestingly, remittances from migrants working abroad back to their country of origin are also key contributors to forest recovery.

Improvements in science and technology have also contributed to reducing rates of deforestation. The ability to document and understand the drivers of land use change has profoundly influenced the politics of rural development. Fragment and matrix ecology, understanding of climate change, satellite technologies, and improved computing capacities have been coupled with profound changes in the social sciences, including socio- and political ecologies of land use and new economic tools. Together these efforts have documented local knowledge systems, production impacts, ecologies, economics, institutions, policy environments, and political changes that produced resilience as well as land degradation in land use and forest management. Our understanding of land use change has moved from simplistic representations of two or three driving forces (population, markets) to a more profound review of situation-specific interactions among a large number of factors at different spatial and temporal scales.

Urbanization continued in the region. Urban food production and forestry is increasingly important for food security and environmental services—and far more prevalent than often realized. In some ways it represents a new “agricultural frontier” for the sprawl-based cities of much of Latin America.

Slowing Deforestation, Transitioning Forests, and Agro-ecology

The slowdown in deforestation in the Brazilian Amazon may be an ephemeral process that will be overtaken by huge infrastructural programs. However, new institutions, new actors, and emerging environmental politics linked to livelihoods and global change suggest that a reversion to the destructive

business-as-usual from the 1980s is unlikely. While future trajectories are debatable, there are reasons for optimism. Deforestation in Amazonia has had a volatile trajectory, reflecting patterns as diverse as El Niños in 1995 and 2010, shifts in exchange rates, and regional policies. The transformation cannot therefore be rooted in simple causal explanations. Institutions have changed, including human-occupied reserves, conservation policies, enforcement of regulations, regional approaches to conservation, and the rise of social movements nationally and internationally. Central America and the Caribbean is also undergoing a decline in the rate of clearing compared with the 1980s and 1990s. Clearing rates have reduced from 1.6 percent per year from 1990 to 2000 to 1.3 percent per year from 2000 to 2005, even though “hot spots” remain, especially in areas of proposed infrastructure development. Civil wars in the region affected land use through their impacts on the structure of the agrarian frontier, the dislocation of populations into new regions, international migratory circuits, resettlement programs, and agrarian reform activities.

Other factors also affected clearing besides the general trend of agricultural retraction and forest expansion in many areas. These included the impact of remittances (international and national), the rapid acquisition of protected areas, the recognition and demarcation of traditional populations and their territories, and the development of the Meso-American Corridor, with its efforts to link native reserves, protected areas, and agroforestry areas, as well as better forest legislation, agrarian reform, and the rise of forest reforms for sustainable systems within protected areas. Transnational models of complex conservation such as the Meso-American Corridor are also increasingly integrating the region through institutional coordination, regional economic and ecological zoning, and participatory planning. As with Amazonia, better monitoring, new forms of institutions at many levels, an active civil society, and strategic international alliances have been key.

The slowdown in clearing rates is complemented by another process—forest recovery or “forest transitions.” The Latin American tropics show extensive areas of cyclic forest recovery in the short and long term as parts of fallow-based agriculture and periodic abandonment due to social unrest and

climatic and tectonic events. In Central America, the larger-scale environmental context of hurricanes, volcanic activity, mass movements, and the antiquity of human settlement may have produced a legacy of relatively resilient forests that periodically go through destructive periods. Interestingly, population levels in many rural areas remain as high as they were during their periods of maximal clearing. Thus a new kind of sometimes uneasy dynamic between forests and human settlement seems to be evolving, often as part of farmer agroforestry/agro-ecology intensifications in a context of diversified income sources from wages, farming, natural resources, commerce, clandestine economies, and commerce, supplemented with state or family transfers.

The vegetation of forest transitions, regardless of their drivers, is anthropogenic, successional, and usually derived from an “unnatural” disturbance and as such was often considered ecologically uninteresting and generally suffered from a lack of systematic attention from scientists. This indifference was misplaced because research increasingly shows that these successional forests provide significant socio-environmental services: they are rapid absorbers of atmospheric CO₂, are more biodiversity-rich than previously thought, can buffer regional diversity declines by providing refuges and connectivity to older-growth systems, and can moderate stream flows, mediate local microclimates, improve soils, and provide habitats for crop pollination and biological control of pests.

The knowledge bias that viewed the study of “untrammeled” nature as the only ecologically worthwhile endeavor is gradually shifting as research matures on tropical matrix ecology focused on forests, agro-forests, and forest landscapes shaped by people as essential to the support of biodiversity and the functions of ecosystems at larger scales. The conceptual division that perceived forests as one thing and agriculture as another is also gradually eroding, as researchers using an array of new remote sensing techniques, ethnographic exploration, political ecology, and development analysis now recognize that agrarian landscapes in Latin America, although fragmented, are often highly wooded and becoming more so in smallholder systems.

Trees outside of forests often encompass economic, social, and symbolic values as well as ecological ones. Numerous studies focus on the conservation role of embedded trees in the agricultural matrix, including trees in pastures and agroforestry systems, as land demarcations or fences, among other situations. These studies highlight three main ideas: First, considerable significant biodiversity persists in agricultural landscapes and is often created and supported by human efforts. Second, environmental markets that support complex forested landscapes and the people who manage them are certainly a central element for any carbon plan for the twenty-first century.

Third, the term “forest” and classifications of land use need to be substantively redefined to capture the nuances of forest in settled, non-frontier landscapes because these will increasingly become sites of conservation for some species and support systems and corridors for others. Economic and ecological

zoning and vegetation classification exercises carried out with local people are one way of recalibrating classification systems, and methods for doing so already exist. Research increasingly recognizes that the integration of biodiversity in the agricultural context can make important contributions to ecosystem services, to agricultural systems, and to rural livelihoods. In this larger sense, the idea of domesticated landscapes with degrees of intervention provides a much more tractable framework for longer-term regional management than the dichotomies—agriculture versus forest—and classification systems that still dominate the perception of tropical landscapes in many policy contexts.

A longer version of this article, including endnotes and a full reference list, is available at www.iadb.org/sustainability/hecht.





Pavan Sukhdev

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Ensuring sustainable agricultural production—and addressing food security challenges—is a priority for development in Latin America and the Caribbean. Achieving this goal is a substantial challenge because of limited lands, soils, and water and because of deterioration in soil and water quality. Farm productivity is further limited by pest and disease buildup and by diminishing returns from traditional crops. While demand for food products is rapidly increasing, the costs of inputs and of the environmental and social externalities of agriculture are also growing. Climate change is causing shifts in water availability and temperatures and increasing the frequency and severity of extreme events. Pursuing a “green” approach to agriculture is therefore central to addressing food security challenges and is particularly important for small farms.

Small farms are crucial to sustainable agricultural production. Globally, small farmers grow food for local markets, cultivate 60 percent of the arable land, and are critical for addressing global food supply and scarcity risks. In Central America, 63 percent of farms are smaller than 2 ha, while in South America 36 percent are this small. Such small farms lack the necessary economies of scale to respond effectively to climate and resource limitation challenges, and these farmers have trouble getting access to risk-sharing mechanisms such as crop and disaster insurance. Small farmers are also increasingly marginalized where land tenure has not been clarified or where access to land is reduced or inequitable.

Nevertheless, improvements in small-farm yields will have high social significance throughout Latin America and the Caribbean. Small-farm productivity is not only important for any global solution to anticipated problems of food supply, it is also vital to the livelihoods of very large poor populations around

the world. For example, it has been estimated that a 10 percent increase in farm yields reduces poverty by 7 percent in Africa and by 5 percent in Asia. In other words, improvements in small-farm yields are a triple solution: for food supply and scarcity, for livelihoods and employment security, and for persistent poverty in rural areas in developing countries.

“Green” small farms are critical for human well-being and social equity and can significantly reduce environmental risks and ecological scarcities. “Greening” will require adoption of a range of sustainable practices. The suite of “green” agricultural practices include agro-ecological approaches such as organic crops, integrated pest management, bio-pesticides, intercropping, crop diversification, and improved soil and water management (no-till practices, crop rotation, livestock and crop integration, nitrogen-fixing fodder, furrow contouring, and drip irrigation). There are also a range of options for small-farm management, including new institutional arrangements such as farmer/producer associations, product certification systems, contract farming, strengthened supply chain linkages, and improved post-harvest storage and processing management. Significant progress has already been achieved through “greening” small farms in developing countries: one study of 186 projects in 59 countries showed that mean yields had increased by 79 percent across a wide variety of systems and crop types.

Further research and evaluation is recommended to determine where and how small-farm yields in Latin America and the Caribbean could be enhanced. Strategic investments in “greening” small farms will result in better market access for certified products, declining reliance on agro-chemicals, enhanced soil and water quality, and an improved capacity to adapt to climate change.

David W. McLaughlin

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Agriculture currently occupies over 40 percent of Earth's land area and consumes 70 percent of available freshwater. Production systems have increased food output in recent decades by improving crop yields. These increases have had consequences, such as a reduction in the quality of species' habitats through changes in land use, fragmentation of natural land cover, and depletion of soil and water resources. Growth of the human population and economic development in many emerging markets such as Brazil, China, India, and Indonesia will require food production to increase 70 percent beyond 2011 levels by 2050. Additionally, there is an increasing reliance on agriculture to provide not only food and fiber for this growing population, but also energy and renewable materials, such as plant-based packaging materials.

All this means that pressure to increase conversion of land from natural cover to agriculture will continue to grow. At the same time, levels of food security, malnutrition, and food emergencies are on the rise as extreme weather events and social and economic disruptions reduce food availability. Balancing the use of land and water with the need to conserve biological diversity will be among the greatest challenges that confront society.

Food companies are rapidly becoming aware of the importance of sustainability of production of agricultural commodities. They are actively participating in forums such as the Roundtable for Sustainable Palm Oil, the Roundtable on Responsible Soy, the Better Sugar Cane Initiative (Bonsucro), the Roundtable for Responsible Biofuels, and the Better Cotton Initiative. Efforts are under way to create global standards on beef production through the Global Roundtable for Sustainable Beef. As an example of the increasing acceptance of these initiatives, in just three years roughly 8 percent of global palm oil production has been certified under the Sustainable Palm Oil standard.

Many leading companies are also analyzing their own environmental impacts and taking measures to mitigate and reduce them. This requires engaging with companies in their supply chains to improve environmental performance and understanding the issues and concerns of the countries or regions where they source their commodities. Although some companies may be taking these actions to maintain or improve their reputations, most are concerned about availability of long-term supply. These market forces have been helpful in encouraging producers to certify their operations because sustainability is increasingly being demanded by U.S. and European markets and customers.

In the absence of effective land use planning and legal enforcement, and in the presence of corruption and the potential for attractive financial returns, environmental effects of agricultural development are likely to be substantial and permanent. Addressing land use planning, governance and law enforcement, productivity, and market drivers is a monumental task that requires the engagement of civil society, governments, multilateral institutions, and the private sector. Given the shift in trade flows and economic development in countries such as Brazil, China, and India, sustainability considerations need to be mainstreamed among companies and consumers in these important markets to achieve the required changes in production practices. The agricultural sector will continue expanding to meet society's demands. If these factors are not addressed, agricultural practices will have undesirable effects on climate, ecosystems, and humanity. Solutions to mitigate and minimize the undesirable effects of expansion exist, and concern is growing among many key stakeholders. All actors must engage to achieve agricultural sustainability.



José Campos

José J. Campos is the Director General of the Center for Tropical Agricultural Research and Education, an international organization based in Costa Rica that combines science, graduate education, and technical cooperation to improve well-being and reduce poverty through sustainable agriculture and natural resource management in Latin America and the Caribbean. This commentary was prepared by Campos and by Dietmar Stoian, who between them have more than 50 years of experience working in forestry, competitiveness, rural development, and ecosystem management in Latin America and the Caribbean.

A turning point for agriculture, after a 25-year period of neglect, came with the *World Development Report 2008*, which called for making agriculture a vital instrument for development—to stimulate growth in poor countries, reduce rural poverty, and move toward sustainable resource use. In light of the global food crisis and the increasing impact of climate change on agriculture, it had become clear that the growing demand for food, fodder, fiber, and fuel could only be met through an innovative approach to agricultural development. Given the dual nature of agriculture as both victim and agent of climate change, considerable efforts and societal negotiations are needed to reach global food security without inducing unmanageable climatic impacts. Moving our current agri-food and overall economic systems into such a “safe operating space,” as described by Bob Scholes at the recent climate treaty meeting in Durban, requires thinking and acting outside the box and a substantial increase in investments in agricultural R&D.

Despite the magnitude of these challenges and the need for society and the economy as a whole to identify solutions, we see positive trends and new opportunities for revitalizing the agricultural sector as an engine for development and sustainability. Demand for food produced with environmental and social responsibility continues to grow. In addition to established schemes for small- and medium-scale producers, such as organic and fair trade certification, the agri-food industry is increasingly adopting new voluntary standard systems for sustainable agriculture. Governments and markets provide growing incentives to reward such efforts. Technological development further fuels these trends, such as the advance in information and communication technologies in rural areas, the growing availability of renewable energy, and improved germplasm. International conventions reinforce the move toward a low-carbon economy, climate-smart agriculture, and equitable access to related technologies and resources.

New thinking and action is needed to steer public and private investment toward innovative R&D on the sustainable use of soil, water, and agro-biodiversity; toward improvements in rural infrastructure and services; toward capacity building to create a critical mass of leaders for sustainable agricultural development; toward systematization and scaling of successful payment for ecosystem services, carbon, and REDD+ experiences; and toward the development and broad-scale application of metric systems to monitor compliance with voluntary and mandatory standards systems in terms of economic, social, and environmental performance.

A somewhat negative view of agriculture in relation to development is giving way to a more positive yet realistic perspective on its overarching importance and inherent potential. Five of the top 10 traded commodities are agricultural products. Their importance will grow as world population and the associated demand for food increase. Trade-offs among different land uses will intensify, as will competition for arable land, water, and critical raw materials for fertilizers, such as phosphorus. Identification and minimization of these trade-offs can best be achieved through system approaches and collective actions involving researchers, development practitioners, grassroots organizations, political decision makers, and the private sector.

We need to be innovative in developing climate-smart territories built around medium-input/high-output agriculture, secure livelihoods, and sustainable and inclusive value chains. This requires political vision and will, a substantial increase in investments in agricultural R&D, equitable negotiations among diverse stakeholders, and joint learning and action to identify and scale innovative solutions. Latin America, with its significant natural and human resources, has a high potential to play a lead role in this move toward sustainability in agriculture and beyond.

Héctor Malarín

Héctor Malarín is Chief, Environment, Rural Development and Disaster Risk Management, at the Inter-American Development Bank. He has been with the IDB since 1994. Previous assignments include Principal Project Economist in the Environment and Natural Resources Management Division, Regional Operations Department 1, and Project Economist in the Environment and Natural Resources Management Division, Regional Operations Department 3. Malarín has led projects around Latin America in the areas of agriculture, natural resources management, sustainable regional development, land administration, and tourism.



The 2007–08 food price crises caused hardship on a number of fronts throughout the world. The steep rise in prices led to economic difficulties, particularly for already poor populations, and generated social and political turmoil in many countries. The *Outlook* done by the Food and Agriculture Organization and the Organisation for Economic Co-operation and Development (OECD) foresees that average crop and livestock product prices over the next 10 years are expected to be above those of the 10 years prior to the 2008 food price crisis, with a high degree of unpredictability. Governments and the agribusiness sector are concerned about price levels and volatility because they threaten food security and competitiveness. In this regard, Latin America and the Caribbean can be an important part of the solution to future food price crises.

The region has abundant possibilities for expanding farm production, including 28 percent of the world's arable land and one-third of its renewable water resources. The richness of its natural resources has allowed the region to produce 52 percent of the world's soybean exports, 45 percent of the coffee and sugar, 44 percent of beef, 42 percent of poultry, 70 percent of bananas, 12 percent of citrus, and one-third of the maize. The upward trend on food prices has lifted economic growth in many countries in Latin America and the Caribbean and has become a major source of employment in rural areas, where more than 30 percent of the labor force works in the sector.

Major challenges still exist in this region if it is to contribute to satisfying the growing world and regional demand for food.

- **Slow growth in agricultural productivity.** The annual rate of growth of total productivity has been lower here than in OECD countries over the last 40+ years. In particular, in Central America and the Caribbean, which is a net food importer, low productivity growth has negative implications

for food security. A partial explanation of this is the share of public resources allocated to agricultural research: only 1.1 percent of agricultural gross domestic product in Latin America and the Caribbean in 2007, compared with 2.4 percent in industrial countries.

- **Rural poverty.** In spite of a 37 percent increase in agricultural production from 1999 to 2009, almost two-thirds of the rural population remains impoverished. Lack of access to improved agricultural services and rural infrastructure, such as roads, electrification, and irrigation, are keys to reducing consumer prices for food. Moreover, family agriculture faces major disadvantages that have limited its access to these services and markets.
- **Vulnerability to climate change.** Climate change could lead to shortfalls in food production and deteriorating food security, hampering efforts to reduce undernourishment, rural poverty, and low productivity. Higher temperatures may eventually reduce crop yields, encourage weeds and pest proliferation, and change precipitation patterns. Rice production could decline by 20 percent and maize by 3 percent. These changes in production and prices could affect the daily per capita calorie intake in the region, with an expected reduction of 9 percent by 2050.

Our strategic response to agriculture has helped position the Bank as a leading international agency in the region since 2007. Nevertheless, slow productivity growth, rural poverty, and vulnerability to climate change may require innovative, multisectoral interventions, including promoting environmentally friendly agricultural practices and technologies, facilitating access to financial instruments, and providing more-inclusive rural infrastructure. This approach must consider the underlying effects of climate change on agriculture as an overarching framework in the definition of its scope. The Bank is ready to assume this important task.

Part II

Sustainability in Our Operations

Ensuring environmental and social sustainability through IDB programs and investments in Latin America and the Caribbean



- This section looks at how the Bank is helping the region manage its opportunities and challenges for environmental and social sustainability.
- It provides an overview of the Bank's Institutional Strategy for Sustainability, as set out in our Mandate, and the priorities established in our Ninth General Capital Increase (GCI-9), which calls for continued emphasis on climate change mitigation and adaptation, sustainable energy, and environmental sustainability.
- The section provides a breakdown of our sustainability investments, which increased significantly in 2011, as well as our strategy toward continued assistance to the region with respect to biodiversity, food security, and climate change and how our investments in these areas help meet specific development goals of the region.
- For the first time, the *Sustainability Report* details the results of a comprehensive analysis of the greenhouse gas emissions associated with Bank investments—both in projects generating new emissions and in low-carbon development projects that avoid emissions.
- The section also provides detailed information on our safeguard policies and how we implement and monitor safeguard performance, particularly in our most complex and high-risk operations.

OUR INSTITUTIONAL STRATEGY FOR SUSTAINABILITY



Through the Bank's new institutional strategy, the IDB is committed to expanding its focus on environmental and social sustainability directed at maintaining the underpinnings of development. We identified "protection of the environment, response to climate change, promotion of sustainable energy, and ensuring food security" as one of five institutional priorities during a process leading up to the General Capital Increase in 2011. We are tracking the Bank's contributions to regional development goals. And we are continuously working to strengthen IDB's safeguards system.

Sustainability at the IDB means maximizing the positive environmental and social impacts of our work while minimizing the negative risks and impacts.

These commitments build on significant increases in lending and non-lending volume toward environmental improvement, as well as noteworthy initiatives and activities such as the Sustainable Energy and Climate Change Initiative (SECCI), which has demonstrated effective results in mainstreaming climate change solutions in country dialogue and sector operations. We are also increasingly involved with partners such as the Global Environment Facility, the Climate Investment Fund (CIF), and the Forest Carbon Partnership Fund (FCPF), and a strong suite of sustainability standards guides all our work.

Our Institutional Strategy and Priorities

Our main mandate emanating from the Bank's charter is to foster the economic and social development of the IDB's borrowing member countries in Latin America and the Caribbean, both individually and collectively.

In the Ninth General Capital Increase, approved in 2011, the Board of Governors set two overarching objectives: reducing poverty and inequality and achieving sustainable growth. Alongside these objectives are two strategic goals: addressing the special needs of the less developed and smaller countries and fostering development through the private sector. To achieve these objectives and goals, the Bank has identified five sector priorities:

- Social policy for equity and productivity.
- Infrastructure for competitiveness and social welfare.
- Institutions for growth and social welfare.
- Competitive regional and global international integration.
- Protection of the environment, response to climate change, promotion of sustainable energy, and ensuring food security.

The fifth priority effectively calls for an increasingly strong Bank presence in environmental protection, sustainable energy, climate change, and food security, including helping to design policies for the transition to sustainable economies, enhancing institutional capacities, and ensuring the protection of vulnerable populations.

With this strengthened focus, in 2011 the Bank continued to support countries in planning and designing policies relating to climate change, biodiversity protection, and food security. Our goal is to assist in the transition to a greener economy while at the same time supporting enhancements to countries' institutional capacity to tackle these issues. More specifically, in order to achieve reductions in carbon emissions in the region the IDB will continue to help countries develop the adequate institutional and regulatory frameworks to allow investments in sustainable transport, alternative fuels, renewable energy, and energy efficiency. In addition, the Bank will give priority to activities and investments on adaptations to climate change impacts in key sectors such as water supply, agriculture, and energy. And we will help to build food security through enhanced agricultural productivity.

These priorities are coupled with a results framework that runs from 2012 to 2015, which will help us measure and report on our progress and monitor our contributions toward selected regional development goals as well as progress on operational effectiveness and efficiency. And all these efforts are made within the context of the Agenda for a Better Bank, which sets out the actions necessary to maximize the effectiveness and impact of our interventions and recognizes the significance of environmental and social risks in the projects we finance. Project Snapshot: Forest communities earn livelihoods while protecting natural ecosystems

SUSTAINABILITY TARGETS AND GOALS



Under GCI-9 the Bank has set itself a series of targets, goals, and indicators to measure its sustainability impact in the region.

Our Sustainability Investment Target

Lending program priorities are an expression of the Bank's highest priorities and mandates. We have set lending targets—expressed as a percentage of total lending—for small and vulnerable countries; for poverty reduction and equity enhancement; for climate change, sustainable energy (including hydro), and environmental sustainability; and for regional cooperation and integration.

Lending Target for 2015:

- 25 percent of total Bank lending to support climate change initiatives, sustainable energy (including renewable), and environmental sustainability.

During 2011 we worked on the methodologies to calculate which loans qualify toward these lending targets, starting in 2012.

Our Contribution to Development Goals

The IDB tracks regional goals as a way to monitor longer-term development progress and provide information that can help us review and set priorities. The output indicators established for the project and country level help measure the Bank's contribution to regional development goals. (See page 60)

Project Outputs Goals for 2015:

- 91 percent of power generation capacity from low-carbon sources over total generation capacity funded by the IDB.
- 8.5 million people given access to improved public low-carbon transportation system.
- 10 climate change pilot projects.
- 5 national frameworks for climate change mitigation.
- 30 projects with components contributing to improved management of protected areas.
- 5 million farmers given access to agricultural services and investments.

Our Projects' Safeguards Performance

Our indicators for Operational Effectiveness and Efficiency will allow us to better monitor the Bank's development results. These will measure our efforts and serve for internal accountability. Specifically, these include efficiency indicators to monitor our clients' satisfactory implementation of environmental and social mitigation efforts in Bank-financed projects. During 2011 we continued to improve our supervision and monitoring of the most environmentally and socially complex projects in our portfolio and to report the ratings for Category A projects. (See page 56)

Goal for 2015:

- 85 percent of projects with high environmental and social risks rated satisfactory in implementation of safeguard mitigation measures.

Who is Responsible for Sustainability?

In short, achieving the sustainability objectives and targets set out under the GCI-9 requires commitment and responsibility across the Bank. Responsibility for achieving the Bank's sustainability mission, lies with the President, supported by the Executive Vice President, four vice presidents, and specialists in the different programming, operational, and technical areas of the institution. The Bank's Independent Consultation and Investigation Mechanism (ICIM) (see page 57) and the oversight body, the Office of Evaluation, both of which report to the Board, play important roles in ensuring sustainability is taken seriously. Further information on the Bank's structure, roles, and responsibilities is available online. @



EVALUATING FOREST CONSERVATION POLICY: PROTECTED AREAS IN BRAZIL

Building a highway through a rainforest normally sets off a predictable chain of events: first settlers, then a herringbone pattern of side roads, and ultimately conversion of the land into soybean fields and cattle ranches. In Brazil's Amazon, however, the government of the state of Acre tried a new approach. Before building began, the government created sustainable use areas along the future highway in which communities would continue to earn their living from the forest while observing strict limits on deforestation and forest degradation.

The Acre model appears to hold considerable promise for preventing deforestation, both there and elsewhere in the Amazon. But have Acre's sustainable use protected areas actually succeeded in reducing deforestation? The answer to this question is not so simple. Most studies measure effectiveness by simply comparing rates of deforestation inside and outside of protected areas, ignoring the fact that these are typically sited in areas with different degrees of deforestation pressure. As a result, they mix together the effects of deforestation of the protected areas and their siting, thereby generating overly optimistic assessments.

To overcome this problem and properly answer this question, the IDB, together with Duke University in the United States and the Tropical Agricultural Research and Higher Education Center in Costa Rica, conducted a study using a new evaluation approach that combines statistical techniques to control for the siting of forest conservation policies and accurate land cover change data derived from remote sensing techniques.

We found that the sustainable use protection in Acre has been very effective in stemming deforestation. We also found that sustainable use protection is more effective than strict protection. These results added to a growing body of evidence that suggests that sustainable use protection is more effective than strict protection in stemming deforestation.

Creating a forest-based economy. Acre's sustainable use areas are a cornerstone of the state's 12-year effort to create an economy based on its forest resources. With the support of nearly US\$500 million in financing from the IDB and other international and national agencies, Acre has established a system of protected areas covering nearly 1 million hectares, in addition to lands that are under federal protection. In two-thirds of this area, communities are permitted to collect Brazil nuts, latex, and essential oils, to farm small plots, to hunt and fish, and to harvest timber according to forest management plans.

Many of Acre's sustainable use areas were created as a result of an IDB operation approved in 2002. The program also paved 70 kilometers of the state's major highway and provided technical assistance to increase

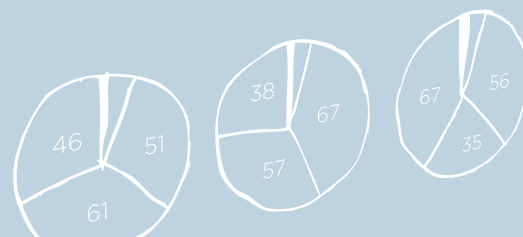
competitiveness of timber and non-timber products and to promote marketing. Acre's deforestation rate dropped from 111,000 ha/year in 2005 to 22,000 ha/year in 2008.

A new IDB-financed program set for 2012 will further strengthen the competitiveness of the forestry and agroforestry sectors through institutional innovation. The new program aims to increase the contribution of forestry and agroforestry to economic growth and poverty reduction in Acre. It will finance implementation of sustainable forest concessions and community forestry, access to modern value chains, and improvements in the government's capacity to deliver high-quality public services to the forestry and agroforestry sector.

The recent study also contributed to a larger debate over the role of sustainable use areas in forest conservation. In the traditional view, only complete protection—including the removal of forest communities—can effectively prevent deforestation. This study indicated otherwise, however.

Acre's sustainable use areas are a cornerstone of a 12-year effort to create an economy based on forest resources.

OUR SUSTAINABILITY INVESTMENTS



The IDB invests in sustainability in a variety of different ways. It provides loans and grant funding that target environmental sustainability, climate change mitigation and adaptation, and sustainable energy. More specifically, the Bank has defined its sustainability lending investment activities as those related to four categories:

Climate Change Mitigation

This category includes all activities that contribute to stabilizing greenhouse gas concentrations in the atmosphere by reducing anthropogenic emissions of GHGs and by protecting or enhancing GHG sinks. Projects in 2011 included a wide range of renewable energy and sustainable energy policy projects, as well as two projects supporting climate change mitigation policies and finance in Peru and in Trinidad and Tobago.

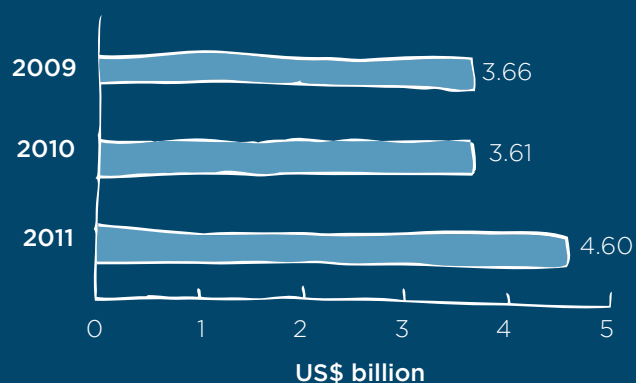
Climate Change Adaptation

This category includes all activities that reduce the vulnerability or increase the resilience of human or natural systems in the face of climate change and increased climate variability. Projects approved in 2011 included a US\$15 million non-reimbursable grant to Haiti for technology transfer to small farmers, and a US\$10 million loan for flood mitigation infrastructure for Belize City.

Sustainable Energy

This category includes all activities that contribute to increasing access to renewable energy, supporting long-term renewable energy supply and reducing price risks, and ensuring quality and economic efficiency of renewable energy services. Projects approved in 2011 included the rehabilitation of a hydroelectric plant in Brazil, a new hydroelectric plant in Peru, and four non-sovereign guaranteed investments in wind power throughout the region.

IDB Sustainability Loans 2009-2011 (in US\$ billions)



In 2011 the IDB approved 167 loans of which 54 qualified as loans supporting climate change initiatives, sustainable energy, and environmental sustainability.

Environmental Sustainability

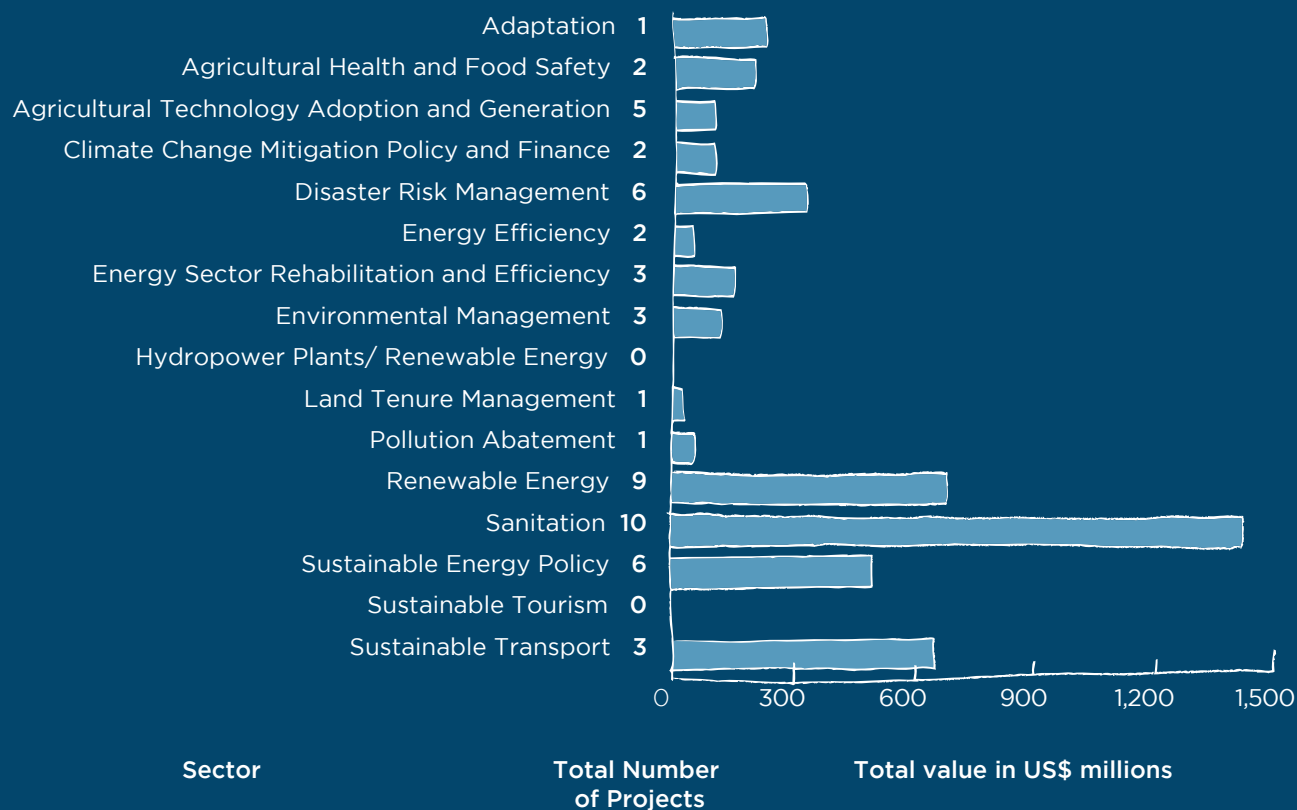
This category includes all activities related to the conservation and sustainable use of biodiversity and to the reduction of pollution. Projects in 2011 included 10 sanitation operations, two sustainable tourism operations in Argentina and Uruguay, and a program to support agri-food health and safety in the Dominican Republic.

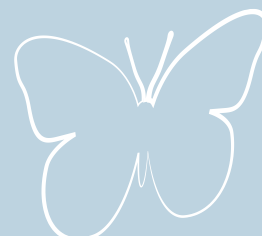
For the purpose of calculating this target, we count all loans, as well as special non-reimbursable grants to Haiti, whose primary objective meets one or more of the categories above. During 2011 a detailed methodology was developed to account for the GCI-9

lending targets. This methodology will be applied uniformly starting in 2012. In the meantime, and for the purpose of this *Sustainability Report*, the data on our sustainability investments are based on the accounting approach taken in previous reports.

In 2011 the IDB approved 167 loans of which 54 qualified as loans supporting climate change initiatives, sustainable energy (including hydro), and environmental sustainability. These totaled US\$4.6 billion, representing a significant increase in the overall percentage of Bank lending targeting this area and a correspondingly significant increase in the investment value over the same period (US\$3.66 billion in 2009; US\$3.61 billion in 2010).

IDB Sustainability Loans, 2011 (by sector, number of projects, value in US\$ millions)





Latin America and the Caribbean is a biodiversity superpower. The region includes 6 of the top 10 most biodiversity-rich countries in the world. It also includes the Galapagos Islands, the Amazon, the Meso-American Reef, and Meso-America itself, which has only 0.5 percent of the world's land area but 10 percent of its biodiversity. Fifty percent of the plants in the Caribbean are endemic to the area. These biodiversity resources are the basis for agriculture, fisheries, and forestry and they offer opportunities for businesses from tourism to payments for ecosystem services.

Unfortunately, as is the case globally, trend lines show that key habitats for threatened species are not adequately protected, that the number of species facing extinction is growing, and that natural resources, such as fisheries stocks, continue to be overexploited. Increasing global demand for food, energy, resources, and the infrastructure to deliver these products is placing biodiversity at further risk. The main Millennium Development Goal target for biodiversity—achieving a significant reduction in the rate of loss by 2010—was not met. According to the Millennium Ecosystem Assessment, about 60 percent of the ecosystem services that were assessed in 2005 were degraded or used unsustainably. A 2010 analysis of biodiversity indicators showed declines in vertebrate populations, habitat specialist birds, shorebirds, forest coverage, mangroves, sea grass beds, and the condition of coral reefs.

At the same time, it is also clear that there is growing global awareness of the challenges to biodiversity and the importance of increasing efforts to address them. The challenges and opportunities were outlined in the 2011 Independent Advisory Group on Sustainability (IAG) report and recommendations to the IDB. The report indicates that “biodiversity and ecosystem services . . . should be given equal weight with climate change mitigation and adaptation.” This recommendation is reflected in emerging market interest in sustainability, private sector certification and round table initiatives, new biodiversity standards for International Finance Corporation (IFC) projects, and the green accounting and green economy approaches launched at the October 2010 Convention on Biological Diversity Conference of the Parties meeting in Nagoya, Japan.

Our Strategy for Biodiversity

Active involvement with the Global Environment Facility has increased financing for protected areas, and the Bank has grown its portfolio of biodiversity-friendly infrastructure, agriculture, and tourism projects. At the same time, the Multilateral Investment Fund (MIF) has continued to develop small- and medium-sized investments in agriculture, tourism, recycling, and climate change solutions. The Bank has continued to improve biodiversity management in projects, including improving biodiversity baseline studies, supporting biodiversity planning, and establishing biodiversity offsets. The Bank is currently preparing a strategic platform to address the various challenges and opportunities offered by biodiversity in Latin America and the Caribbean.

Our Actions in 2011

- In response to the IAG report, the Working Group on Sustainability began preparation of a platform for biodiversity. In developing this platform we are reaching out to develop partnerships with others, including, for example, The Nature Conservancy's Latin American Conservation Council.
- We approved projects supporting tourism and watershed management in Panama and Nicaragua and continued support for improved biodiversity management in Brazil, Costa Rica, and Colombia as well as coastal and marine management in Ecuador and Costa Rica.
- The Bank also continued to work with Peru and Guyana in developing national programs on Reducing Emissions from Deforestation and Forest Degradation, with co-benefits for biodiversity.
- We worked to standardize safeguards application where projects may have adverse impacts on biodiversity and ecosystem services. These approaches included enhancing our decision support system to identify potential overlaps between projects and critical natural habitat and establishing initial standards for evaluating and mitigating impacts on biodiversity and for establishing biodiversity offsets.

Our Focus for 2012

During 2012 the Bank will continue to develop a biodiversity platform that will focus on ecosystem management, biodiversity and ecosystem service values, and improved environmental governance and institutions. The new platform will look toward helping conserve key ecosystems, particularly those that are important providers of services. There will also be a focus on improving accounting for costs and benefits arising from biodiversity and ecosystems, including work in the agriculture, tourism, fisheries, and forestry sectors. Finally, we will work toward improving the planning, monitoring, licensing, and enforcement capacities of regional and national government institutions responsible for environmental management. The proposed approach to the new Bank biodiversity platform will be presented for consultation at Rio+20.

As cross-cutting themes of the biodiversity platform, the IDB will examine how to contribute more effectively to addressing climate change impacts on biodiversity, fully involve indigenous peoples, leverage additional resources, and involve the private

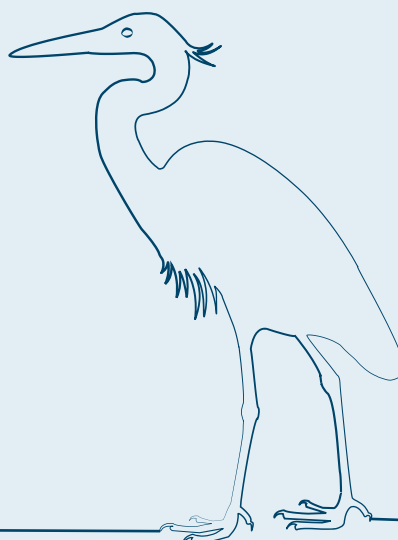
A new biodiversity platform will look toward helping conserve key ecosystems, particularly those that are important providers of services.

sector in biodiversity and ecosystem management. Climate change is likely to have substantial impacts on vulnerable ecosystems, and we will work with partners to support adaptation approaches for biodiversity. Clearly, indigenous peoples are one of the key stakeholders in biodiversity and natural resource management in Latin America, and the Bank will continue to work toward integration of

traditional knowledge into biodiversity management. We have already been exploring new financing mechanisms for biodiversity, including acting as an implementing entity for Global Environment Facility funds as well as the Adaptation Fund and REDD financing

sources (the Forest Carbon Partnership Facility, the Amazon Fund, and the Guyana REDD Investment Fund).

The Bank will also continue to strengthen safeguard application in infrastructure projects, including providing guidance on biodiversity baseline studies, impact assessment, and impact mitigation. Finally, the Bank will focus on ensuring private sector participation through demonstration work with biodiversity-related investments and enterprise development.





Increases in global demand for food commodities and biofuels, and associated price volatilities, present both opportunities and challenges for Latin America and the Caribbean. Global market demand is driving expansion of crop production and infrastructure for the efficient delivery of commodities to markets. At the same time, a slowing agricultural productivity growth rate and the need to manage environmental and social externalities, including exclusion, land use change, and soil and water impacts, present challenges. Climate change, particularly changes in precipitation patterns and glacial water flows, are demanding adaptation of agricultural practices. Several countries in the region are also directly affected by food price volatility—including Haiti, Nicaragua, Honduras, and Guatemala, where the food security index is considered “extreme.”

To take advantage of increasing demand, small farmers need support to improve market access, financing, capacities, and technology access. Technological advances to intensify agricultural production and private sector initiatives to improve environmental and social standards are also critical to ensure sustainability.

Our Strategy toward Food Security

We will continue to support improvements in market access, capacity, and access to financing to help nations respond to increasing global demands while ensuring that environmental and social externalities are minimized. The IDB will particularly help address the challenges for small farmers, including supporting improved access to technology, building capacity, ensuring financial security, helping climate change adaptation, and clarifying land tenure. At the same time, we will focus on helping buffer the impacts of food price volatility on rural and urban populations and vulnerable groups.

In the Ninth General Capital Increase, the Bank incorporated actions relating to three of the sector priorities: infrastructure for competitiveness and social welfare; competitive regional and global integration; and protection of the environment, response to

climate change, promotion of renewable energy, and ensuring food security. The first two sector priorities will support the linkages and infrastructure to gain access to emerging markets, including those in agricultural commodities, while the third will focus on improving agricultural productivity so as to ensure global and national food security.

A range of strategic actions will address these priorities, including fostering policy dialogues with governments on how to improve profitability for national producers, creating incentives for private investment, and supporting effective public expenditures on agriculture. The Bank will focus investments on eliminating obstacles to price transmission from the international to local producers; improving sector competitiveness by supporting research and information management and development for improved agricultural technologies, sanitation, and phytosanitary standards; supporting improved land management, including security and property rights; supporting financial and other risk management; improving post-harvest practices; supporting rural infrastructure to improve market access; adapting to climate change; and strengthening institutions focused on small farmers.

Our Actions in 2011

- A continued focus on projects that address the need for the region to adapt to climate change impacts in priority sectors such as agriculture and to build food security through enhanced agricultural productivity. In 2011, eight projects were approved in the areas of agricultural health and food safety, agricultural technology adoption and generation, and land tenure management. These contributed to our sustainability investment totals for 2011.
- An increase in the number of farmers given access to agricultural services and investments through IDB loans, from 980,265 in 2010 to 2,522,080 in 2011, putting us halfway toward our goal of reaching 5 million farmers by 2015. (See page 60.)

- Extension of the IDB Food Crisis Response Fund for three years, which was originally approved in 2008 to provide rapid and effective assistance to countries most negatively affected by the 2007 increase in the prices of foodstuffs. To date, more than 18 operations (US\$11.9 million) have been approved (the majority in small and vulnerable countries) for non-reimbursable funds to assist the poorest and most vulnerable populations (the demand side), increase the production of foodstuff (the supply side), or address trade issues related to the food crisis. The Fund has fostered long-term interventions through 10 loans, leveraging a total of US\$1.06 billion. The current 2012–13 pipeline and inventory of loan operations for agriculture and rural development in the region total 15 projects for US\$517 million. With the extension of the Fund, new resources will be allocated until 2014.
- Approval of a US\$190 million loan to Mexico to contribute to sustained productivity gains in the agriculture sector, with specific components focused on agricultural innovations. This builds on Bank experience gained in 2010 through a loan to Argentina similarly focused on such innovations.
- A study done with grant funds on development intervention strategies for improving the effectiveness of agricultural research organizations. Of particular importance was the focus on a new model for these organizations, public policies to promote agricultural productivity, and new mechanisms to promote the interaction of individuals involved in agricultural research and development to support efforts to adapt and better respond to the changing socioeconomic context. The study will serve as inputs to investment and technical guidance to countries and to our lending in agricultural research and development.
- Approval of a US\$230 million loan for 15 provincial projects for agricultural and rural development in Argentina on rural infrastructure (irrigation, drainage, flood control, roads, electrification), on food and agricultural services (technology development and climate change adaptation, agricultural health and food safety, commercial development, information technologies and communications, bioenergy development), and on institutional strengthening. In addition, it will finance public-private initiatives for the generation or consolidation of agri-food clusters and the promotion of private investments in promising agri-food productive chains.
- Approval of a corporate loan to the largest Chilean-owned fruit exporter to help consolidate its position as a hemispheric leader in best environmental

practices in the agro-industrial sector. IDB support helped take the company's environmental leadership a step further by building one of the first full-scale photovoltaic plants in Latin America's agroindustrial sector. (See page 38.)

Our Focus in 2012

Tackling the issues associated with food security will require a focused approach to address the barriers in the region to minimizing impacts on the population and to becoming a key producer that can help address the global food security crisis. We will also consider the cross-cutting effects of climate change on agriculture as a constraint on domestic food production through more frequent and more severe climate shocks and the reduction of domestic yields or increases in price variability.

The focus of actions in 2012 will be on agricultural technology, agricultural health and food safety, and rural infrastructure. The work on technology will explore new knowledge models, including dynamic and innovative regional research and technology networks, extension services driving deployment of improved cultivars and breeds, and institutional policies and strategies that engender these actions. In the area of agricultural health, the focus will be on consolidating national agricultural health systems by providing incentives for private sector participation in health planning and execution and by promoting regional approaches to managing agricultural pests and standardized health protocols. On food safety, the emphasis will be on the nexus between water and food, cost-effective applications of food safety requirements in smallholdings, and the reduction of food hazard risks. Finally, rural infrastructure—including irrigation, rural roads, and rural energy and communications—will be a major factor in determining regional productivity, market access, and adaptations to climate change.

In 2012 the Bank will work on a number of operations targeting these areas, including in Mexico a comprehensive agricultural sector adaptation to a climate change program, which will contribute to the establishment of tools for agriculture and fisheries to adapt to the impacts of climate change. In Brazil, we will work with EMBRAPA on a program to reduce GHG emissions. The program will adapt and transfer climate-smart technologies to be introduced into EMBRAPA's R&D facilities and to be adopted by agricultural producers across Brazil.



PROJECT SNAPSHOT: MAJOR CHILEAN FRESH FRUIT PRODUCER TO CONTROL ENERGY COSTS WITH SOLAR-GENERATED ELECTRICITY

SUBSOLE CORPORATE LOAN, CHILE

Chile's highly competitive fresh fruit industry is dominated by multinational firms—with one exception. From its start just a decade ago, Chilean-owned Grupo Subsole's quality management and solid business plan won it financial support from the IDB Group. Today Subsole is one of the country's largest exporters of grapes and a hemispheric leader in best environmental practices in the agro-industrial sector.

Subsole is now taking its leadership role one step further by building one of the first full-scale photovoltaic (PV) plants in Latin America's agro-industrial sector. The plant will not only be good for the environment, it will also be critical in helping the firm control energy costs—a major factor in maintaining its competitive edge in the face of uncertain petroleum prices.

The plant is being built as part of an operation supported by an IDB non-sovereign guaranteed loan of up to US\$32 million, extended in 2011 to refinance the firm's capital structure and to fund capital expenditures to increase production and export capacity. Its feasibility and engineering studies were financed by a technical cooperation grant from IDB's Sustainable Energy and Climate Change Initiative.

Scheduled to go on line in 2010, the plant's electricity production will be used mainly to pump water for irrigation and to heat water for cleaning fruit. The plant will be located at Agricola Don Alfonso Ltda., Subsole's farm in Chile's northern Copiapo Province. Its three acres of solar panels will generate up to 307 kilowatt peak units, taking advantage of the nearly uninterrupted cloudless days that make this location one of the world's best solar power sites. Power not used by Subsole operations will be sold to the national grid and help meet high demand from the region's mining industry. In a second phase, Subsole could increase the PV plant capacity up to 2 MW, allowing Subsole to meet and exceed its internal demand and sell the excess to the grid.

While many pilot PV plants operate in Latin America, this will be the largest PV plant in Chile. It is expected

that Subsole's example will influence other agricultural firms to make similar investments.

Priority on energy efficiency. Prior to the IDB loan, Grupo Subsole had worked with local consultants to increase energy efficiency in its production and processing facilities. With SECCI technical cooperation grant funds, the firm carried out additional energy audits that led to a number of energy-saving actions, including minimizing the use of heated water for cleaning fruit, replacing existing electric motors with more-efficient ones, and increasing energy efficiency for irrigation and water storage.

The new PV plant will be critical in helping Subsole control energy costs—a major factor in maintaining its competitive edge.

Subsole strictly adheres to international best practices in the management of agricultural chemicals and wastes. It was one of Chile's first fruit-exporting companies to implement a fruit quality control and certification program along the entire

value chain, from production to shipment. Using the Bank's environmental and social safeguards, Subsole strengthened this program further and standardized the procedures throughout the company's operations.

Increased production made possible by the IDB loan is also helping support the creation of more than 10,000 direct and indirect jobs. Many of the firm's current employees are women, often heads of households with few alternative employment opportunities. At Subsole they earn good wages and receive health care and nutritious meals. The company offers flexible working hours so that women have more options for taking care of their children.

Since its founding in 2002, Grupo Subsole has grown between 20 and 30 percent annually. Its affiliated companies are active throughout the fruit supply chain, from growing to packing to exporting. Unlike the multinational firms, Subsole owns most of its producing farms, with the remainder participating as associated farms. Its growing areas are distributed strategically from north to south, ensuring year-round production. @



PROGRAM TO SUPPORT TECHNOLOGICAL INNOVATION IN AGRICULTURE, DOMINICAN REPUBLIC

Small-scale farmers often lack the credit and information they need to adopt new technologies to increase productivity, protect the environment, and conserve resources. In the Dominican Republic, an innovative program is removing these constraints, enabling some 9,400 farmers to earn livelihoods that are more economically and environmentally sustainable.

The centerpiece of the Program to Support Technological Innovation in Agriculture is a menu of new technologies that the farmers carry out using subsidies and technical assistance. The subsidies are provided in the form of vouchers, which farmers use to purchase inputs from private sector suppliers. Ministry of Agriculture extension agents provide technical support. The program is being carried out with the help of a US\$34.3 million IDB loan that was approved in 2010.

The technologies offered by the program were selected not only for their potential to boost productivity but also for their positive or neutral effect on environmental sustainability. In addition to providing immediate benefits, the new methods are helping to make agricultural systems more resilient to the increased weather extremes and the pests and diseases that will likely come with climate change.

A menu of technologies. One technology offered is the use of floats and lasers to level land before planting rice. Precise control of the degree of slope can prevent the accumulation of rainwater and increase the efficiency of irrigation and fertilizer application. The result is an increase of 15–25 percent in rice yields and a 25–50 percent reduction in water use.

Farmers are also using improved irrigation technologies, including pressurized systems and localized water delivery, sprinkling, and drip irrigation. More-efficient irrigation reduces weeds and drainage problems and increases yields up to 50 percent while lowering costs associated with water, fertilizers, and labor.

Another technology being used is improvement of pastures to supply forage for cattle in low-rainfall areas and during the dry season. With the support of the program, farmers are improving their mix of grasses and herbs, both endemic and introduced, and applying fertilizers. Use of enclosures, including electrified fences powered with solar panels, reduces overgrazing and protects the soil by letting farmers rotate cattle from one pasture to another.

Participating farmers, agricultural agents, and suppliers also receive training in the use of agrochemicals. They learn about protection for workers, proper chemical doses and application, management of spills and leaks, and the proper disposal of empty containers. They also learn to use pesticides that are less toxic to people and the environment, when to apply them, and alternatives to herbicides, such as mulching and biological control.

Random selection of participants. This program follows an earlier IDB operation that provided small-scale farmers with subsidies to adopt new technologies. An evaluation of that effort showed that participants increased rice and cattle productivity. But it was not able to identify which farmers were most likely to benefit from the program due to the lack of a comparable baseline control group; the farmers themselves chose to participate and thus did not represent the same profile as a group of non-participants.

In the new program, farmers are selected at random, which ensures that they will have similar characteristics to the control group of non-participating farmers. As a result, the evaluation will be able to correlate the farmers' success in raising productivity with such factors as farm size, quality of the land, access to water, and level of education, thus providing valuable lessons for future programs.

This is the first time in Latin America that a random selection process has been used to implement an agricultural technology program. @

THE IDB AND CLIMATE CHANGE



Latin America and the Caribbean is highly vulnerable to the detrimental effects of climate change. According to the Intergovernmental Panel on Climate Change, important changes in precipitation and increases in temperature have been observed in the region. Moreover, climate models project a mean warming in the region that could bring about significant changes to the region's natural systems, affecting crop yields and the availability of water for human consumption, energy production, and irrigation. These effects of climate change threaten to undermine long-term efforts to achieve sustainable development, affecting disproportionately the most vulnerable groups in society, including the poor and indigenous peoples.

Our Strategy for Addressing Climate Change in the Region

To respond to increasing demands from clients for help in addressing climate change, the General Capital Increase commits the Bank to support mitigation and adaptation efforts of borrowing members while meeting their developmental and energy requirements. GCI-9 sets a target of having 25 percent of total lending by 2015 focused on actions that support development along a low-carbon path, reduce vulnerability and adapt to climate change, foster environmental sustainability, and enable the development of sustainable energy sources and uses.

In March 2011 the IDB Board of Directors approved the Integrated Strategy for Climate Change Adaptation and Mitigation, and for Sustainable and Renewable Energy (CCS), which serves as a guiding instrument for scaling up our response to regional demands for action in this area. Leveraging the IDB's institutional strengths and its unique advantages, the CCS promotes the development and use of a range of public and private sector financial and non-financial instruments to strengthen the institutional, technical, and financial capacity of the IDB and its regional members to address climate change challenges.

The CCS makes a case for investing along five strategic lines: knowledge generation, capacity building, mainstreaming within the Bank, increased lending and technical cooperation, and leveraging of external resources for mitigation and adaptation operations. The CCS also calls for a strong mobilization of Bank resources and for a major effort to expand access to international climate finance and partnerships, including: the Green Climate Fund, the Global Environment Facility, the Adaptation Fund, the Forest-Carbon Partnership Facility, and the Climate Investment Funds, as well as bilateral fast-track financing.

The Strategy's upcoming Action Plan (2012–2015) will lay out priority areas of intervention and the specific tasks, activities, and instruments to implement these five strategic lines of action. It also provides an operational platform to respond to key climate change challenges in the region. Adaptation responses include increasing financial resources to address some of the most significant consequences of climate change and focusing on impacts on water supply and water quality, coastal and marine ecosystems, forests and other fragile terrestrial biomes, and agriculture. Mitigation responses include supporting activities with the largest potential for GHG emission reductions, such as reductions from land use change and deforestation, low-carbon transport systems, and low GHG footprints of power generation and use. Cross-cutting issues include the promotion of smart infrastructure, the inclusion of social dimensions and mainstreaming of climate change in social programs, the expansion of access to international climate finance, and the expansion of private sector investments. The Action Plan provides for tracking two levels of progress toward GCI-9: lending program indicators and regional development goals in the area of climate change and sustainable energy.

In addition, in 2011 the IDB approved the Sustainable Energy Sector Guidelines, which provide methodological guidance to Bank staff for the design and implementation of programs, projects, and technical assistance operations in the area of sustainable energy.

Our Actions in 2011

In order to address risks, mainstream climate change in its operations, and further integrate both public and private sectors, during 2011 the Bank worked on strategic and operational development, adaptation and mitigation efforts, knowledge generation and dissemination, the establishment of partnerships, and the mobilization of climate finance from external sources.

- **Lending in 2011:** We approved over 50 loans targeting climate change and environmental sustainability. Of this, two-thirds were focused on climate change mitigation, climate change adaptation, sustainable energy, or environmental sustainability.
- **Technical Cooperation.** In addition to investment through loans, the Bank contributed US\$20 million to the SECCI grants program and welcomed the contribution of €5 million from Germany to the second phase of the multidonor fund. The SECCI Funds are the main vehicle to finance technical assistance for policy analysis, capacity building, support for specific adaptation/ mitigation approaches, and investment grants. Climate change-related grants cover multiple aspects of mitigation and adaptation: for instance, in 2007–2011 SECCI Funds allocated US\$67 million for an array of programs on low-carbon technology and climate adaptation: energy (48 percent), vulnerability reduction and adaptation (17 percent), climate finance (12 percent), climate policy and institutions (12 percent), and REDD (3 percent).
- **Climate Investment Funds in Four Countries.** During 2011 the IDB and MIF helped four countries obtain over US\$200 million in financing from the Climate Investment Fund, which will support high-priority climate change mitigation and adaptation measures. Multidisciplinary teams of specialists from the IDB helped the countries prepare national climate change investment plans. Upon approval, the CIF allocated US\$60 million to Mexico under the Forest Investment Program to help reduce deforestation and create more-inclusive opportunities for communities; US\$30 million to Honduras under its Program on Scaling up Renewable Energy for Low-Income Countries to strengthen the renewable energy policy and regulatory framework in the country as well as develop renewable energy grid-connected and rural energy projects; US\$25 million to Jamaica to mainstream climate change and improve adaptive capacity under the Strategic Plan for Climate Resilience; and US\$86 million to Bolivia to mainstream climate change and improve adaptive capacity at national and subnational levels, particularly in the water sector.
- **Launch of the Sustainable Emerging Cities Platform.** Since the launch of this platform in March 2011, the Bank has made significant progress on its development and implementation. The program will provide cities with greater comprehensive technical support, better enabling them to build the capacity to promote environmental, urban, and fiscal sustainability. Building on the pilot methodology study undertaken in 2010 in Trujillo (Peru), in 2011 the Bank expanded this to develop Action Plans for Port of Spain (Trinidad and Tobago), Santa Ana (El Salvador), Goiânia (Brazil), and Montevideo (Uruguay). The plans will be completed and executed in 2012. @
- **Implementation of REST.** In 2010 the Bank launched the Regional Environmentally Sustainable Transport Action Plan (REST-AP) to facilitate the mainstreaming of climate change mitigation and adaptation in IDB's transport operations. Initial activities focused on building knowledge and capacity, participating in international seminars and workshops, developing studies (on climate instruments in the transport sector, for example), and training IDB staff on sustainable urban passenger and freight transport. During 2011 we approved four loans (with a combined value of US\$50 million), four technical cooperation projects, capacity building efforts, and publications. And we positioned the transport sector in the region in the context of international climate change financing under the Framework Convention on Climate Change.
- **First IDB Clean Technology Fund (CTF) Loan.** In September, the Bank approved its first IDB-CTF public sector blended loan: US\$300 million of IDB ordinary capital and US\$20 million in concessional CTF financing. The program supports sustainable transport in four mid-sized Colombian cities for a total of 800,000 passengers on a daily basis. According to estimates, CO₂-equivalent emissions may be reduced by more than half, or up to 78,000 tons, within a year.
- **New Climate Change Guidelines.** IDB staff worked with leading industry specialists to draft the Liquid and Gaseous Fossil Fuel Power Plant Guidelines, part of a series, which help guide Bank investment in sectors and subsectors known to contribute significantly to climate change. Three guidelines developed earlier (coal-fired power plants, cement



plants, and landfill projects) are used in IDB project preparation by staff and clients. The goal is to set out an approach for financing projects in high-emitting sectors in a manner consistent with IDB's commitment to protecting the environment and reducing adverse impacts on climate. The guidelines provide clear and quantitative minimum GHG performance criteria as well as guidance on assessing and managing a given project's potential impacts on climate change. In 2001, the IDB continued to support the adoptions of these standards among commercial Banks it partners with in the region.

- **GHG Portfolio Footprint.** The Bank finalized its methodology for calculating emissions from projects it finances that generate significant amounts of GHGs. The results show an increase of avoided annual emissions by 43 percent in 2011, an amount that compares to a small-sized coal-fired power plant. There has been a rise in the number of IDB projects focusing on renewable energy and energy efficiency to avoid or reduce emissions. The amount of GHG emissions avoided by IDB projects has therefore grown significantly in the past three years. This is mainly because of the effective work of mainstreaming climate change into the Bank's operations as well as a strategic shift in connection with the GCI-9, which has brought about a different focus for IDB projects. (See page 44.)
- **Energy Efficiency in Water and Sanitation Utilities.** In 2011 the Bank released *Manuals and Tools for Water and Sanitation Utilities* in Spanish, to address the knowledge gap and limited capacity among water utilities on matters of energy efficiency and to provide guidance for energy and maintenance audits, in order to identify common energy savings in water pumping systems, calculate energy savings as well as needed investments and financial return periods, identify weak links and common errors in maintenance, and apply best practice overall. The aim is to support appropriate and financially viable energy-efficient measures. In 2011 IDB teams used these new tools in the preparation
- of three public sector water and sanitation operations. The manuals will be available in 2012 in English, Portuguese, French, and Dutch.
- **Knowledge and Capacity: Climate Change.** A number of knowledge sharing initiatives were launched in 2011: an electronic community whose objective is to mainstream climate change adaptation and vulnerability reduction throughout IDB operations; the Carbon Finance Knowledge Platform, which includes a training manual on estimating REDD+ opportunity costs and a one-of-a-kind map with information on carbon markets; the Climate Policy Scholar Program, with Dr. Adrián Fernández Bremauntz as the first Scholar; a Speaker Series on Climate Change and Development, with Lester R. Brown and E. O. Wilson as the first speakers; and a Regional Policy Dialogue to promote knowledge sharing among high-level policy and decision makers from the region and experts in key areas of development.
- **Knowledge and Capacity: Sustainable Transport.** In 2011 the Bank chaired the Sustainable Low Carbon Transport partnership, which aims to raise awareness on transportation's role in sustainability and climate change. With that same goal in mind, we organized or supported several important international events: in January, Transforming Transportation in Washington, DC, for senior decision makers and transport experts; in May, the Conference on Sustainable Transport, Air Quality and Climate Change for Latin America and the Caribbean: How to Achieve Sustainable Urban Transport? in Rosario, Argentina; in June, the Foro de Transporte Sostenible de America Latina, a high-level forum on sustainable transport in Bogota; and in October, as a supporter, the Congreso Internacional de Transporte Sostenible in Mexico, the world's largest event on Sustainable Transport. We also published *Reducing Greenhouse Gas Emissions from Transportation Projects, Programs, and Plans*, which provides an overview of various sustainable low-carbon transport strategies.

- **Forest Carbon Partnership.** After almost a year of negotiations, the Party Committee of the Forest Carbon Partnership Fund approved the Common Approach to safeguards and approved IDB acting as one of the first Delivery Partners under the FCPF Readiness Fund. This is a key development in the life of the FCPF, which should improve the service coverage to REDD Country Participants. The IDB played a key role in developing the concepts at the core of the Common Approach and in helping the multistakeholder task force reach a consensus regarding this important milestone. The Common Approach, which includes innovative approaches to safeguards at the program level for REDD+ projects, represents a key building block for the evolving systems of Climate Finance and is already influencing approaches to safeguards beyond the FCPF. IDB's status as a Delivery Partner is expected to be formalized by mid-2012, through the signature of a Transfer Agreement with the World Bank in its role as Trustee of the FCPF.

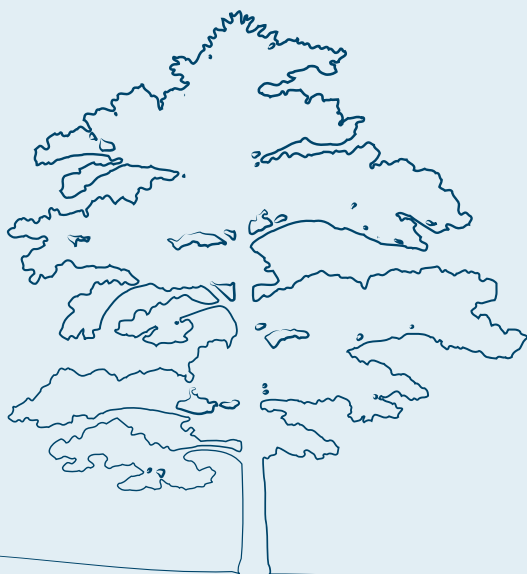
Our Focus for 2012

Reducing vulnerability and supporting adaptation to climate change are priorities for IDB action in 2012. Among these, the Bank intends to: engage immediately in a process of ambitious investments to address some of the most significant consequences of climate change in the region; increase quality and availability of climate change vulnerability data and analyses by improving models, downscaling data, and producing detailed local projections; develop programs to reduce impacts of climate change in water supply/quality; reduce vulnerability to climate impacts in coastal and marine ecosystems; strengthen

the resilience of forest and other fragile terrestrial biomes to climate impacts; and address the impacts of climate change in agriculture.

With Latin America and the Caribbean accounting for 12 percent of global GHGs, the Bank's mitigation work will focus on agriculture, forestry, and other land uses, which currently represent two-thirds of regional emissions. On transport systems, we will continue to promote low-carbon transport systems, given growing concern that the transport sector's emissions are increasing more rapidly than any other sector's. In addition, the Bank will target power generation and use by promoting large-scale deployment of world-class renewable energy (based on large endowments for solar, wind, and geothermal), promoting market entry of new promising sources like marine and wave energy, and developing mechanisms to reduce risks for private sector investments in renewable sources. The aim is to generate a downturn from the projected increase of the region's GHG emissions.

Expanding operations on adaptation and mitigation requires active engagement of international funding sources and leveraging of the Bank's own resources. Thus the IDB will continue to participate actively in the International Climate Agenda, including participation in the Conferences of the Parties of the U.N. climate change treaty, and will strengthen its capacity to mobilize the Green Climate Fund, Climate Investment Funds, Global Environment Facility, Adaptation Fund, and Forest-Carbon Partnership Facility, in addition to bilateral fast-start financing. At the regional and national levels, the IDB will also advocate for long-term planning and decision making to address adaptation and mitigation issues. @



GHG EMISSIONS IN OUR PORTFOLIO

In 2006 the Bank made a commitment to calculate emissions from Bank-financed projects generating significant amounts of greenhouse gases as part of our Environment and Safeguards Compliance Policy. Since then the Bank has been working to develop these calculations. In order to reduce GHG emissions in the future and help countries move toward a low-carbon economy, it is essential to know the amount of emissions generated or saved by past projects.

To that end, the IDB has developed accounting tools to screen sector loan investments for GHG emissions. These were calculated for projects approved in 2009, 2010, and 2011. This includes public and private sector loan investments that fall under the environmental impact category A and B and belong to one of seven traditionally high-emitting sectors: agriculture, energy, industry, tourism, transport, urban development, and water and sanitation. The tool also calculates emission reductions (that is, emissions that have been avoided) from renewable energy and energy efficiency projects, such as more-efficient energy generation or the improvement of an existing industrial plant. Based on this approach, we calculated the GHG emissions associated with more than half of our loan approvals in a given year, which translates to 52 in 2009, 60 in 2010, and 54 in 2011 (for a total of 166 projects). The aggregated results are calculated from 84 percent of these projects over the three-year period (since the remaining 16 percent, when analyzed, were not found to emit significant GHG emissions—management reform of ministries, for example, or improving a system of technology infrastructure). To avoid double counting, supplementary loans (additional finance for already existing projects) are not included. In the case of financial intermediaries, policy-based loans, financial emergency, and the trade finance facilitation program, adequate methodologies have not yet been developed.

Methodology

The methodology used to analyze these investments is based on established international GHG accounting standards developed by the IPCC, the World Resources Institute, and the World Business Council for Sustainable Development. The tools provide a way to consistently monitor projects approved by

the Bank. Sixteen sectoral GHG accounting tools allow the calculation of emissions with varying levels of required data and at various project stages. The “initial review” enables quick estimates of construction and operations emissions during project preparation. This simplified approach is designed to estimate the bulk of emissions from a project using data generally available at the early stages of project development. Data-intensive methods provide more detailed methodologies for estimating construction and operational emissions once the project has been implemented and detailed data are available. For renewable energy and bioenergy projects, the tools calculate the emissions that have been avoided.

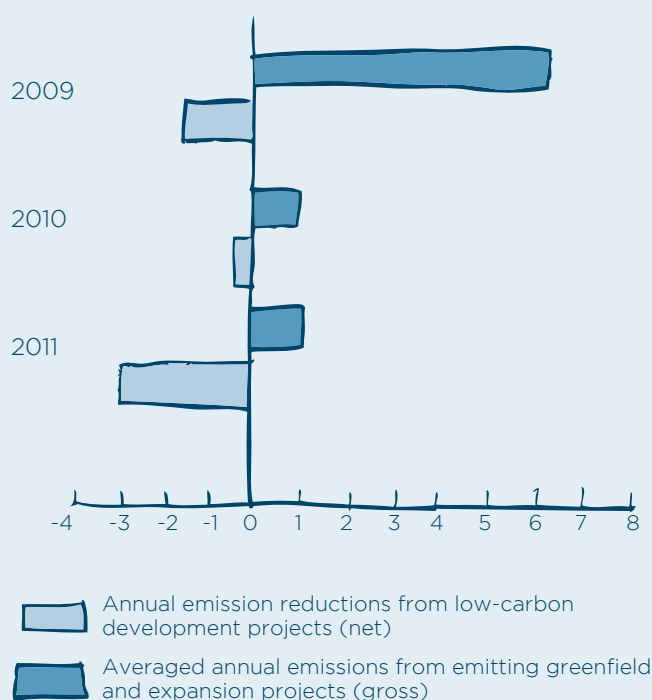
Results for 2011

The results for 2011 follow screening of 54 operations and the subsequent evaluation of 43 projects that were estimated to result in significant GHG increases or reductions. Based on data for 2009 and 2010 that were calculated for comparison purposes, the number of low-carbon development projects, such as renewable energy and energy efficiency, that avoid GHG emissions, has grown significantly in the past three years. This can be attributed in part to the effective work of mainstreaming climate change into the Bank’s operations as well as a shift in connection with GCI-9, which has brought about a different focus for IDB projects.

The Bank’s investments in renewable energy projects have mostly been wind farms. While 2009 saw the approval of two wind farms in Mexico, this number doubled in 2011: a regional project and another three farms were approved for Mexico and the Dominican Republic.

Greenfield and expansion projects generate emissions during construction and operation. Their annual emissions represented in the Figure on page 45 are averaged over the lifetime of an IDB loan. The emissions associated with a given project appear only in the year of approval, not in the calculations for subsequent years. A few projects can be responsible for a large share of some of the averaged annual gross emissions in a given year.

GHG Portfolio* Assessment 2009-2011 (million tCO₂eq)



* Calculable IDB loan investments approved in a given year.

Year	Averaged annual emissions from emitting greenfield and expansion projects (gross)	Annual emission reductions from low-carbon development projects (net)
2009	6.3	-1.6
2010	0.7	-0.4
2011	0.9	-2.8

In 2011, the IDB approved a US\$50 million loan to finance a cement plant in Paraguay that accounted for 20 percent of the averaged annual gross emissions for that year. And two coal-fired plants approved for Brazilian regions Pecem and Maranhão in 2009 accounted for 80 percent of the averaged annual gross emissions for that year. The Figure above shows that there has been a significant drop in emissions from new projects due to stricter regulations and guidelines with regard to project selection. (See Tupi Case Study, page 58.) In addition, the fluctuation of aggregated GHG emissions from

one year to the next can be influenced by simple factors such as when exactly a high-emitting project is approved. And new investments in general always carry a potential to tip the IDB emissions balance in one direction or the other.

Working with Others

IDB is part of a working group of international financial institutions (IFIs) committed to harmonizing accounting for GHG emissions associated with project investments. The working group was set up in 2005 at the G8 Summit in Gleneagles to exchange views and experiences on assessing and reporting GHG emissions, with the goal of developing a common approach. At a March 2011 meeting of the IFIs' Carbon Footprint Working Group, a comparison of greenfield and expansion project calculations based on the different methodologies and tracking tools found no major discrepancies among the different instruments. Differences mainly stem from the diverse data requirement of the tools and some variations in calculation methods.

Many larger questions remain, but the working group notes that experience and learning by doing will be a necessary part of addressing them. In addition, institutions generally accept that due to differences in mandates and stakeholder interests, full harmonization of GHG emissions accounting is not possible. Nonetheless, as an approach to harmonization, all organizations have agreed on some "common minimum elements" such as counting direct and indirect emissions and using the same established international GHG accounting standards.

Next Steps

The Bank has already developed a tool for renewable energy. As a next step, we will update the tools to include a boundary and baseline approach to calculate the GHG emission reductions of energy efficiency improvements. This approach will only apply to already existing plants such as cement, steel, fossil fuel power, and wastewater treatment plants, where energy savings are possible. This updated tool will add to the Bank's suite of instruments, which include the GHG guidelines on landfills, cement plants, and coal-fired powered plants. These set minimum climate change performance criteria in order for Bank clients to comply with a specific GHG emissions threshold.



KNOWLEDGE SNAPSHOT: STUDY HIGHLIGHTS AGRICULTURE AND GHG IMPACTS OF FOREST CONSERVATION

FINDING WAYS TO PRODUCE MORE FOOD AND REDUCE CLIMATE CHANGE RISK

Latin America's farmers are expected to supply a large portion of the 50–85 percent increase in food that the world will need by 2030. If they do so by converting forests to new farmland, the result will be a significant increase in greenhouse gas emissions. If they are prohibited from further deforestation, the effect would be to reduce production and economic returns.

In an effort to clarify these trade-offs, in 2011 the IDB commissioned a study that examined how a hypothetical ban on deforestation in the tropical regions of Latin America would affect national, regional, and global food production, prices, agricultural employment, and GHG emissions between now and 2030.

Some of the results were surprising, according to Stephen Vosti, author of the study and professor of agricultural economics at the University of California at Davis. “We found that the world can adjust to even a complete cessation of deforestation in tropical Latin America, not just by increasing food production in other regions, but also by reducing demand,” he said. For example, more expensive beef will lead to lower consumption and therefore to less land being devoted to producing cattle feed. “Relatively small changes in production and consumption can be amazingly resilient shock absorbers,” he added.

The second result, while not surprising, emphasizes how impacts vary according to region or country. “When we talk about halting deforestation, we normally think about the Amazon,” said Vosti. “But other areas often left out of the debate would take a much bigger hit from a deforestation ban.”

Brazil, for example, with its diversified economy and variety of climate zones, could compensate economically for lower food production in the Amazon. But the smaller countries of Central America,

with fewer economic alternatives, would suffer disproportionately. The study suggests that decisions made at the international level on payments for forest protection should take these regional differences into account.

Additional key findings for the period up to 2030 are as follows:

- Prevention of deforestation on some 3.3 million hectares would save an estimated 2.2 billion tons of CO₂ equivalent.
- Economic losses in tropical areas would total US\$12.7 billion, although impacts would vary considerably from country to country; in non-tropical areas, the gross value of agricultural products would increase by US\$3.4 billion.
- Potential compensation through carbon emissions trading would offset about half of the lost agricultural value.
- A drop in tropical Latin America's agricultural output would be made up by producers outside the region.

The study results will be used to help guide discussions on operations involving agriculture and forest conservation. An example is the proposed IDB financing for a second phase of an environmental management operation in Brazil's state of Acre. In the operation, the state would consolidate its efforts to protect its forests while increasing economic opportunity by exploiting its forests on a sustainable basis. In the Bank's agricultural projects, the study results point to the importance of increasing production through improved technology as an alternative to deforestation.

The world can adjust to even a complete cessation of deforestation in tropical Latin America not just by increasing food production in other regions but also by reducing demand.



AGRICULTURE AND CLIMATE CHANGE, JAMAICA

Climate change models describe scenarios of rising global temperatures, often many decades into future. But they provide limited guidance for governments and individuals seeking immediate and practical ways to reduce risks.

In Jamaica, a new IDB-financed study uses real data from recent past events—not future predictions—to generate recommendations on building climate change resilience into agricultural systems. The study is being used by the government to help design investments under the country's Strategic Program for Climate Resilience (SPCR) of the Pilot Program for Climate Resilience (PPCR), an initiative of the Climate Investment Funds in which the IDB is an implementing body. The SPCR sets out a program for financing climate change mitigation and adaptation measures for agriculture and other key sectors.

The program's investments and policy measures have been endorsed on the order of some US\$25 million in grant and concessionary financing. The Planning Institute of Jamaica, the focal point for both the study and the PPCR, has previously collaborated with us in strengthening Jamaica's institutional capacity for natural disaster risk management.

Measures to build resilience. The study examines the impact that extreme weather-related events—hurricanes, drought, and heavy rains—have had on Jamaica's agriculture over the past two decades. Since 1995 alone, losses in crops, livestock, and agricultural infrastructure have totaled at least an estimated US\$90 million. Extreme weather events like these will become more frequent and more intense as the global climate changes.

The study, prepared by the U.N. Food and Agriculture Organization, proposes a mix of measures—some to be carried out by individual farmers, others by government. Many of the measures are part of strategies Jamaican farmers have traditionally used to deal with extreme weather events—only now they have become more urgent in light of climate change.

The measures include informal irrigation systems, mulching to retain soil moisture, crop diversification, and adjustments in planting seasons. In a drought, farmers may plant quick-growing scallions or drought-resistant cassava. They create hedgerows to protect crops vulnerable to high winds, such as bananas, and rely on tubers that stay safe underground to get them through the hurricane season. Of course, some traditional farming practices also reduce sustainability. For example, slash-and-burn practices, which degrade soil nutrients and increase erosion, would exacerbate the effects of climate change.

The study recommends that the proposed SPCR do a detailed assessment of the effectiveness of such traditional practices for managing future risks. It also urges measures to develop crop varieties and animal breeds better suited to changing rainfall regimes and higher temperatures as well as alternate means for controlling insect pests and fungal diseases, which are likely to increase with warmer and wetter conditions.

At the government level, a major priority will be to protect water resources, which are particularly vulnerable to climate change. The study recommends the construction of reservoirs and catchments as a means of recharging groundwater and reducing the impact of drought periods. Public sector agencies would also promote information sharing, both among farmers and within government, as a basis for decision making. Land use planning would help to ensure that crops are best suited to the areas in which they are planted.

In addition, the study sees a need for more data on links between agriculture and livelihoods, on risks and vulnerabilities, on spatio-temporal mapping of risks, and on cost-benefit analyses of investments for adaptation.

The agriculture and climate change study was funded by the IDB's Food Price Crisis Fund, which the Bank established in 2008 with resources contributed by donor countries at the height of the worldwide spike in grain and oilseed prices. @

OUR SUSTAINABILITY STANDARDS

In addition to designing projects that target climate change mitigation and adaptation, sustainable energy, environmental sustainability, and traditional development projects that include sustainability outcomes, we work with our partners to ensure that all IDB investments minimize harm to people and the environment. We do this through implementation of sustainability standards, equivalent to best international practices that guide our work—from initial consideration for financing through preparation and implementation to completion and evaluation. The policies are applied to all IDB projects (loans, guarantees, and grants). By doing this we:

- Deliver high-quality results to clients.
- Avoid the impacts of negative environmental and social externalities.
- Enhance the development effectiveness of our operations.
- Contribute to GCI-9 targets and goals.

Safeguard Policies in Practice

During the earliest stages of design, the Bank classifies a project according to its potential environmental and associated social impacts and risks following an A, B, C classification model for high to minimal risk, although recognizing that some operations cannot be classified. This determines the depth and breadth

of environmental and social assessment required and identifies key potential environmental, social, health, safety, labor, and other safeguard issues. We then evaluate the adequacy of environmental and social assessments, plans, and procedures and the institutional arrangements on environmental and social risks and impacts. When a proposed project does not meet safeguard standards, the design is modified or mitigation measures are included.

In 2011, the Tupi cement project in Paraguay and the Peligre hydroelectric plant rehabilitation program in Haiti provided good examples of safeguard policies in practice. The original Tupi project design did not meet IDB standards with respect to GHG emissions. We worked with our client to help redesign the process to increase energy efficiency and reduce GHG emissions in line with IDB's cement plant guidelines (see page 58). In the case of Peligre, the project was redesigned to address concerns that the dam would be empty for at least five to six months during dry season, affecting thousands of farmers and crops (see page 59). In both cases, prior to approval by the IDB Board, the projects were sufficiently redesigned to address the safeguard issues raised.

The Bank's analysis is summarized and made public, including the requirements that will become part of the contractual agreement once approval is granted. If the due diligence process reveals serious problems

IDB Safeguard Policies

- The Environment and Safeguards Compliance Policy mainstreams environmental considerations into IDB's social and economic development objectives.
- The Indigenous Peoples Policy requires the safeguarding of indigenous peoples' rights in all IDB operations and the mainstreaming of indigenous priorities for development in the IDB portfolio.
- The Involuntary Resettlement Policy aims to minimize the physical and economic disruption of people living in the area of IDB-financed projects and defines the scope and criteria of any resettlement plans.
- The Disaster Risk Management Policy works to prevent and mitigate disasters resulting from natural hazards and to improve post-disaster responses.
- The Access to Information Policy ensures that appropriate information is disclosed to the public about the Bank's activities and projects.
- The Operational Policy on Gender Equality in Development ensures proactive attention to gender issues across development sectors and throughout the design, implementation, monitoring, and evaluation of IDB-financed operations. @

without reasonable remedies, IDB financing does not go forward until there is an acceptable plan to resolve the issues. In case of uncertainties due to a current lack of information, the project may proceed to Board approval with the condition that appropriate requirements be included in the loan agreements at key milestones, such as prior to first disbursement, and be duly accepted by clients.

Once a project is approved, we work with clients to ensure effective implementation of environmental and social measures as part of project supervision. This process is streamlined to ensure an effort commensurate with risk and stage of execution of project—higher-risk projects, in other words, receive more attention.

Recognizing the importance of ensuring our projects and clients are on track with environmental and social management and safeguard mitigation actions, the GCI-9 set a target of 85 percent by 2015 for the satisfactory performance of all loans for projects with high environmental and social risks. In 2011 the Bank undertook the first phase of an analysis of the safeguard performance of Category A projects approved after July 2006 (see page 56). Whenever key issues are identified through the Bank's supervision activities, corrective plans are devised, and disbursement may be suspended until critical actions are taken.

The Road to Improved IDB Safeguard Management

Since the introduction of our Environment Policy in 2006, and through restructuring over the past few years, we have made great strides in improving implementation of the safeguards in Bank-financed projects. In particular this includes:

- Increased sectoral safeguard specialists (25 in 2011, 3 to be added in 2012).
- Development and application of good practice.
- Consistency in application of safeguards.
- Specific resources earmarked for safeguard management.
- Allocation of effort according to category and risk level.
- Streamlined internal quality assurance.
- Accommodation of shortened project preparation time frames.
- Streamlined supervision process (level of effort commensurate with risk and stage of execution of project) and reporting.
- Development of Financial Intermediation manual to streamline approaches to such operations.

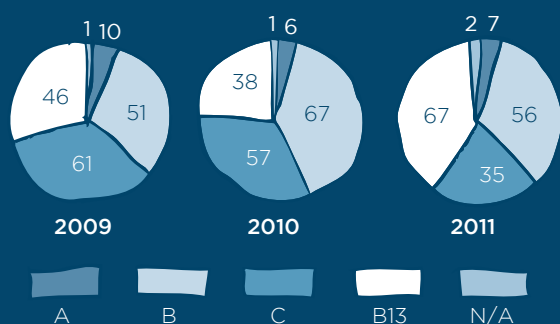
The 2011 IAG report recognized these advances and the adequacy of the Environment Policy to support the Bank's new sector priorities (see page 50).

Our Focus for 2012

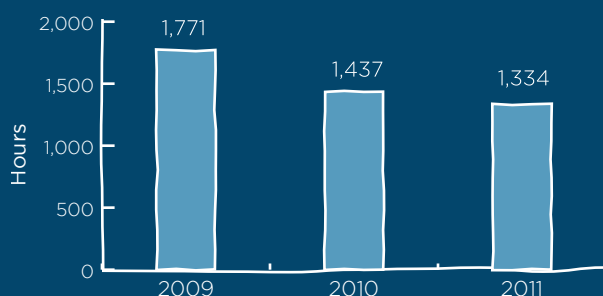
In 2012 we will continue to strengthen a number of aspects of the Bank's safeguard function.

- Improved supervision of environmental and social management of projects in execution.
- Increased emphasis on strengthening country systems and capacity building of IDB counterparts.
- Continued development and dissemination of case studies for lessons learned on how to design better projects and solve issues arising during project implementation.
- Improving the efficiency and effectiveness of our processes and procedures.

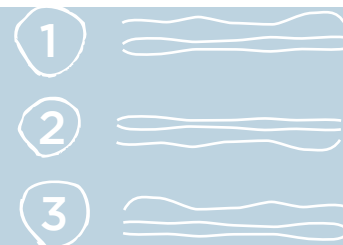
IDB Loan Approvals, by environmental and social impact classification, 2009–2011
(Number of projects approved)



Training hours delivered on environmental and social safeguards to IDB staff



OUR SUSTAINABILITY ACTION PLAN



In 2009 the Bank engaged an Independent Advisory Group on Sustainability to assess the Bank's experience implementing our Environment and Safeguards Compliance Policy. The group was also to provide advice on IDB efforts to address critical environmental issues, suggest policy and process improvements to better address these issues, and help us identify how the Bank could address emerging sustainability issues through its new institutional strategy.

Their report, submitted in 2011, recognized the adequacy of the Environment Policy in supporting our new sector priority—protecting the environment, responding to climate change, promoting renewable energy, and ensuring food security—as well as the great strides made in improving implementation of the safeguards in Bank-financed projects. The IAG recommended a number of additional measures to strengthen our capacity to meet the commitments of GCI-9 and maintain our leadership role. Their recommendations mainly seek to:

- Mainstream environmental considerations, particularly at the country level.
- Ensure better effectiveness in the implementation of the safeguards.
- Give more importance to the critical issues of biodiversity and ecosystem services, particularly through improved mainstreaming.

In 2011 Management created a Sustainability Working Group to determine, with the benefit of independent expertise, the best way to incorporate appropriate activities to respond to the IAG's recommendations. Its work followed two main tracks:

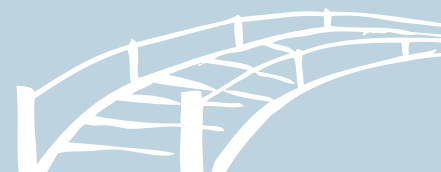
- Mainstreaming environmental and sustainability considerations.
- Addressing sustainability in the Bank's private sector operations to streamline the focus of safeguards work and strengthen our capacity to operationalize sustainability opportunities with the private sector.

The Working Group has set a Sustainability Action Plan for 2012 and beyond. Progress on these action items will be reported on IDB's website and in subsequent *Sustainability Reports*. @



Track	Recommendation	Action Items
Mainstream environmental and sustainability considerations	Improve the integration and mainstreaming of environmental sustainability considerations into Bank Country Strategy and Programming exercises.	Develop a study of experiences incorporating environmental dimensions into Country Strategy and Programming exercises and products. Prepare four country environmental sector notes; once completed, these will be included in new Country Strategies.
	Review Bank experiences in promoting environmental and sustainability governance.	Analyze Bank interventions to promote environmental and sustainability governance.
	Increase Bank's focus on biodiversity and evaluate need for a Biodiversity initiative with similar characteristics as the Climate Change initiative.	Develop a biodiversity initiative/platform.
	Prepare a Bank-wide approach on the Rio 2012 Earth Summit covering environmental and social sustainability.	A comprehensive "Green economies and institutional frameworks for sustainability: Rio+20 and the IDB" paper presented at the IDB General Assembly 2012 will include the Bank's biodiversity platform, a communication campaign with a documentary on the region's biodiversity, and an IDB position paper on Green Economy.
	Transform the Sustainable Energy and Climate Change Unit into a Climate Change and Sustainability Division.	As of January 1, 2012.
	Create knowledge management initiatives to facilitate mainstreaming of sustainability considerations.	Expand the knowledge base among Bank staff and regional stakeholders about the economic and environmental value of biodiversity through training, knowledge sharing, documenting of Bank experience, and strategic partnerships with academic and research institutions.
Address sustainability considerations in Bank's private sector operations	Increase reliance on and strengthen country systems.	The Bank will increase emphasis on strengthening country systems for operations. Activities will include not only equivalency analysis but also support for the borrower's capacity to facilitate reliance on country systems.
	Seek consistency with other multilateral development banks.	A comparative analysis of the IFC's performance standards is under way and will include in 2012 a review of the IFC guidelines and the approach being considered for updating the World Bank's safeguard policies. The Working Group will propose to the Board any changes required to the IDB Environment and Safeguard Policy to ensure harmonization with international benchmarks.
	Mainstream sustainability considerations in private sector operations.	In 2012, three safeguard specialists will be dedicated to supporting private sector operations to strengthen collaboration and priorities and streamline the focus of safeguards. In addition, three sustainability officers will be added to the private sector operational department to help find new opportunities to support the green economy and social value creation.

SUSTAINABILITY IN COMPLEX PROJECTS



The IDB has a mandate to foster economic and social development through investments in projects that promote economic growth and meet the needs of people, particularly groups on the margins of the economic and social mainstream.

In 2011 these projects, financed with loans totaling US\$10.9 billion, ranged from those with relatively low environmental and social impacts to potentially more complex projects. Principal among the latter were projects that build the infrastructure the region needs to grow and compete in a demanding global environment. By their sheer size and nature, such

projects have the potential to produce environmental and social risks and negative impacts, sometimes on a large scale.

In 2011, seven approved projects were designated Category A, meaning they were likely to have significant negative environmental or social impacts. The projects accounted for 4 percent of the year's total lending. These operations are closely monitored and supervised by IDB staff—from initial preparation through implementation to completion—to ensure compliance with Bank policies and guidelines.

Sustainability Policies and Directives Triggered

	OP-710 Resettlement	OP-102 Information	OP-704 DRM	OP-270 Gender	OP-765 Indigenous	OP-703 Environment and Safeguards Compliance Policy						
						B.3 Environmental/ Social Assessment	B.4 Other Risk Factors	B.6 Consultation (#)	B.8 Transboundary Impacts	B.9 Natural Habitats and Critical Sites	B.10 Hazardous Materials	B.11 Pollution Prevention & Abatement
Rodoanel	✓	✓				P✓	✓	✓2+		✓	?	✓
Marena		✓	✓		✓	✓		✓2+		✓	✓	
Tupi		✓	✓			P✓		✓2			✓	✓
Nat. Urban Dev	✓	✓	✓	✓		P✓		✓2		✓		✓
Chaglla	✓	✓	✓	✓	✓	✓	✓	✓2		✓		✓
Prosamin	✓	✓		✓		P(✓)	✓	✓		✓		✓
Montes del Plata		✓				✓	✓	✓2+			✓	✓
Industrial Park*	✓	✓	✓	✓		✓	✓	X0		✓	✓	✓

P Met with Pelosi Amendment (environmental assessment is made available more than 120 days before voting can take place).
2+ More than 2 consultations undertaken.

* The Haiti Industrial Park is part of a larger Multiple Works project categorized B; however as a sub-project it is categorized A and as such is detailed in this section of the report.

Environmental and Social Impact Indicators

	Families resettled	Resettlement / compensation	Resettlement plan	Number of cultural sites affected	Annual GHG emissions from operation in tonnes of Co ₂ eq	Annual GHG emissions reductions from operation in tonnes of Co ₂ eq	One-time GHG emissions from construction in tonnes of Co ₂ eq	GHG reduction plan /EE measures	Critical/ natural habitat converted /degraded (ha)	Biodiversity offset/ compensation plan
Rodoanel	2,300	\$120m	✓	1 preserved	16,700		308,700	N/A	120 NHC	✓
Marena	N/A	N/A	N/A	0		-667,000	31,100	N/A	0	N/A
Tupi	0	N/A	N/A	0	246,000		200	✓	0	N/A
Nat. Urban Dev	3,700	\$44m	✓	0	N/A		N/A	N/A	0	N/A
Chaglla	25	\$7.2m	✓	0		-475,935	98,200	N/A	500	N/A
Prosamin	3,451	\$111m	✓	0	2,500		117,200	N/A	0	N/A
Montes del Plata	2	X	N/A	1 preserved	1,400		227,600	X	0	N/A
Industrial Park*	369	\$4m	✓	0	78,900		15,100	X	X	X

N/A Not applicable.

X Not available.

* The Haiti Industrial Park is part of a larger Multiple Works project categorized B; however as a sub-project it is categorized A and as such is detailed in this section of the report.

What do we mean by complex or high-risk projects?

All IDB Projects are screened and classified as A, B, C, or B13* according to their potential environmental and social impacts, but we also recognize the importance of addressing environmental and social risks in the projects we finance. Our analysis of these risks considers the likelihood and severity of potential issues related to lack of environmental and social management capacity, environmental and social sensitivities, a poor track record of the borrower or relevant third party, or significant reputational risks. Category A operations are always deemed high-risk operations because of the significance of their potential impacts, but we can also distinguish Category B, C, and B13 operations that may pose high risks due to one of these factors. For example:

- An education project that involves reconstruction is likely to have moderate to low impacts and is deemed Category B, but the potential risks may be high in countries with lower environmental capacity, such as inappropriate construction codes in earthquake-prone areas.
- A land titling project does not have immediate negative impacts as such and may be Category C, but it may have significant risks at the implementation level if not designed properly to include adequate consultation.
- A Financial Intermediary may be classified as a high-risk B13 operation due to a poor track record in environmental and social management and/or a high possibility of onlending to high-impact projects.

*B13 operations are those for which an ex-ante impact classification may not be feasible.



1 Mario Covas Rodoanel Project, Brazil: The objective of this operation is to improve mobility, connectivity, safety, and convenience for users of the regional road system through construction of the northern section of the beltway, or “Rodoanel,” bringing it to modern and efficient technical standards in terms of road safety, emergency response, and user support. Resettlement will involve removal of 2,786 structures (including residences and commercial buildings). A Resettlement and Compensation Master Plan will include more detailed Involuntary Resettlement Specific Plans for each works segment, revegetation of affected areas, and support for development of municipal parks and other green public areas along the road perimeter. The project will also invest around US\$16 million in compensation funds to enhance conservation in protected areas in its area of influence. Other positive project benefits include removal of housing from areas at risk of landslide and the formal status given to more than 1,000 makeshift dwellings. The project will also reduce GHG emissions. @

2 Marena Renovables Wind Project, Mexico: This project will finance construction of a wind park in Oaxaca, Mexico, with a capacity of 396 MW, involving 132 wind turbines (3 MW each), three substations, a 52 km transmission line connecting to the national grid, maritime access to the site, and civil engineering works (new access roads and improvement of existing ones). Project risks are primarily due to the scale of the wind park, the potential for significant direct and indirect impacts on avian and marine fauna, the likelihood of residual impacts on the terrestrial fauna, and the presence of social conflicts in the vicinity. Mitigation and compensation measures include the construction of a desalination plant to provide safe and reliable water to 1,300 residents of Santa Maria; a conservation plan for marine turtles in the bodies of water surrounding the wind concession; and the creation of a permanent private 200 ha protected area for the Tehuantepec Jackrabbit, which has a worldwide population of less than 1,000. @

3 Tupi Cement, Paraguay: This project will finance construction and operation of a new cement plant, a limestone quarry as well as clay and pozzolana quarries, the infrastructure for extracting and crushing limestone, and a port enabling transportation of the raw materials by barge.

The plant includes a clinker kiln, a milling process, and blending, storage, and ancillary facilities. To manage the potentially significant GHG impacts, the plant was redesigned to increase its energy efficiency and reduce its GHG emissions, in line with the IDB cement plant guidelines. Other possible impacts from quarrying operations and the port construction and operation will be mitigated through an integrated Environmental, Social, and Health and Safety Management Plan for construction and an Environmental, Social, and Health and Safety compliance assurance plan for operation. Innovative mitigation and management measures will be implemented, including a natural green dust and noise barrier and implementation of a Community Engagement Plan at the limestone quarry site. @

4 National Urban Development Program, Ecuador: This program promotes access to basic services, housing, and a healthy environment for low-income families on the outskirts of Guayaquil and on a watershed that fills an irrigation aqueduct. An integrated intervention will relocate in the city 3,700 families from this irregular settlement, improving both their social and their environmental conditions. The program is expected to strengthen the regulatory framework regarding urban growth and protection of water resources. The environmental component of the operation will support the creation of a buffer forest and vegetation on some 2,000 hectares to prevent informal settlements in the future. @

5 Chaglla Hydroelectric Power Project, Peru: This project involves the design, construction, operation, and maintenance of a 406 MW hydroelectric power plant and associated infrastructure on the Huallaga River in Peru. Key environmental impacts relate to adverse effects on endemic fish species, including species potentially new to science, from changes in river hydrology and the unavoidable loss of natural habitats due to flooding of the reservoir. Such impacts will be mitigated and compensated through appropriate management during dam operation of the ecological flow release in the dewatered stretch of the river and variations of flow downstream of the powerhouse, along with implementation of a biodiversity compensation. This will include actions such as support to the Tingo Maria National Park to help ensure it meets its conservation

objectives and programs aimed at conserving the biodiversity of the Carpish Important Bird Area and the Monzón-Carpish Priority Conservation Area. @

6 Montes del Plata, Uruguay: Montes del Plata is a project to develop a eucalyptus plantation-based pulp production plant. The project includes construction and operation of a pulp mill, an electricity generation plant, and infrastructure, including a port and barge terminals. This new sector for the IDB entails potential reputational risks associated with the pulp mill sector in Uruguay, as well as possible indirect and cumulative effects of associated large-scale plantation development. Construction impacts are mainly related to dredging activities, clearing and preparation of the areas, access roads, and materials disposal. Additional impacts are likely to be related to changes in the water quality of the Rio de la Plata, noise, air emissions, effluents from the pulp mill operation, and associated local socioeconomic impacts. Mitigation and management measures include implementation of environmental management systems and procedures and a commitment to adopt the best available technology for pulp production, using modern procedures, processing liquid effluents in compliance with Uruguayan and

international standards, and controlling air emission and noise measures. The company is also implementing a code of conduct to avoid possible impacts from the temporary influx of workers. @

7 PROSAMIM III, Brazil: The project involves installation of drainage and sanitation systems, improvements to housing through urban land use planning (including the removal of populations from at-risk areas), construction of adequate housing, creation of recreational areas, environmental and health education for the local population, and the consolidation of local institutions. The general objective is to help solve environmental, urban planning, and social problems in Manaus, Brazil, specifically for those living below the 30-meter flood contour in the São Raimundo Igarapé watershed. For the large number of families to be resettled (3,451 in this phase), management and mitigation measures include a detailed resettlement plan (significantly improved through IDB's involvement to include post-resettlement measures and monitoring of livelihood restoration) and environmental management plans (including specific plans for recovery of degraded areas and monitoring of fauna). @

8 Industrial Park, Haiti*: In 2011 the Bank approved a multiple works program for infrastructure development in Haiti that includes the North Industrial Park (PIN), which will contribute to private investment and job creation. The PIN's social and environmental impacts include interruption of agricultural activities in the area, uncontrolled influx migration, and slum creation—all of which could have long-term impacts on the mangroves and other marine and coastal habitats along the coast.

The Bank has developed an environmental, social, and health and safety management plan to address the direct impacts (including compensation or relocation of economic activities) and is working with the U.S. Agency for International Development on a regional Master Plan for northern Haiti that will contribute to better management of indirect and cumulative impacts arising from the PIN's implementation. In addition, the Bank is working with the United Nations Development Programme and the Global Environment Facility to support development of the Caracol Bay protected area to ensure protection of the Caracol Bay ecosystem and its mangroves. @

* The Haiti Industrial Park is part of a larger Multiple Works project categorized B, however as a sub-project it is categorized A and as such is detailed in this section of the report.



OUR SAFEGUARD PERFORMANCE



Our Results Framework, as detailed in GCI-9, sets out a series of indicators for Operational Effectiveness and Efficiency that will allow us to better monitor our development results. These will measure the Bank's efforts and serve for internal accountability. Specifically, these include efficiency indicators to monitor the satisfactory implementation of environmental and social management and mitigation measures by our borrowers in Bank-financed projects, particularly those with high environmental and social risks.

Environmental and Social Supervision of Projects

The Bank's safeguards supervision and support activities are designed to help ensure that borrowers implement projects in accordance with our Environment and Social Safeguard Policies. The Environment Policy includes an overarching requirement for safeguard supervision, stating that we will monitor the executing agency or borrower's compliance with all safeguard requirements, and it requires the incorporation of safeguards in project operational, bidding, and legal documents, as well as the inclusion of indicators in the project's results framework. It also calls for the inclusion of milestones, time frames, and corresponding budgetary allocations to implement and monitor environmental and social management plans and the analysis, review, and reporting of safeguard commitments during the Bank's administration and portfolio review.

There are also specific requirements for supervision when projects involve indigenous peoples, involuntary resettlement, financial intermediation, or global credit loans or when a project is prone to significant natural hazard. For example, for projects with significant adverse impacts on indigenous peoples, the Indigenous Peoples policy requires socioculturally appropriate mechanisms to enable indigenous people to participate in monitoring and evaluating agreed-upon mitigation, restoration, or compensation measures.

The Bank also requires the incorporation of safeguard supervision considerations into a range of operational and legal documents and project budgets, consultation of affected parties during project execution, the use of expert panels and independent

supervision, corrective action plans, supervision missions, and project monitoring and completion reports and ex-post evaluations.

Safeguard Supervision in Practice

In 2011 we continued to strengthen supervision of environmental and social safeguards during the execution of projects, focusing on three main areas:

- Improving the inclusion of legal requirements in loan documentation, as well as their quality and consistency, particularly in sovereign guaranteed operations, where enhancements were most needed.
- Streamlining the way supervision findings are reported and allowing the implementation of mitigation measures in high-risk operations to be rated in order to be able to report on portfolio performance in a consistent and aggregate way.
- Strengthening the way we work with clients to achieve the social and environmental outcomes that the project aimed for, including providing technical assistance, enhancing communication and site visits, and reviewing consultants' reports.

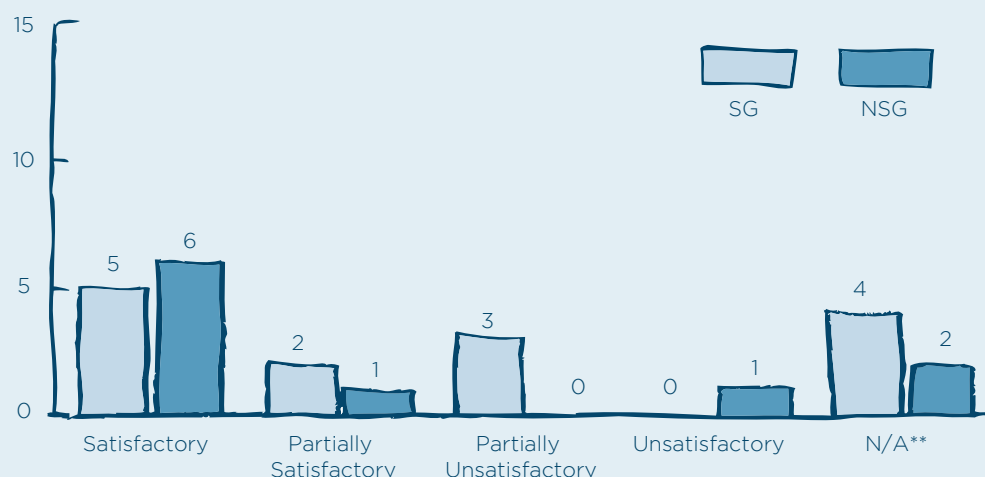
Safeguard Performance Data for High-Risk Projects in Operation

Our supervision results for Category A Projects approved by the Bank since 2006, when the Environment Policy went into operation, constitutes the baseline against which progress toward the goal set out in the Results Framework will be measured on an annual basis starting in 2012.

This shows that in 2011 half of the sovereign guaranteed Category A projects and 75 percent of non-sovereign guaranteed Category A projects currently in supervision were rated satisfactory.

In 2011 the Bank began to broaden its analysis of safeguard performance data to include high-risk Category B, C, and B.13 operations and Category A operations approved before July 2006. A total of 63 operations were assessed for the rating in total (including the Category A projects detailed above).

Category A Projects in Supervision*



SG = sovereign guaranteed NSG = non-sovereign guaranteed

* Projects approved since January 2006.

** Supervision not conducted during 2011 for four SG and two NSG operations due to a lag time between project approval, contract signing, and project commencement. These six projects are expected to commence supervision activities in early 2012.

The results for 2011 exceeded our interim milestone of 55 percent of projects with satisfactory ratings, and put us close to the GCI-9 goal of 85 percent.

These initial results demonstrate the complexities of safeguard performance in the highest risk operations, particularly those categorized A. During 2012 we will continue to track the safeguard performance of these high-risk projects, working particularly with Executing Agencies/Borrowers whose performance is partially unsatisfactory or unsatisfactory to resolve the challenges of meeting the safeguard requirements. In addition, the Bank will continue to increase its efforts to track the safeguard performance of the highest-risk operations in our portfolio.

Our Grievance Mechanism: The Independent Consultation and Investigation Mechanism

The ICIM, approved by our Board of Executive Directors in 2010, provides an independent forum

and process to address complaints from communities or individuals who allege that they are or might be adversely affected by IDB-financed operations. The ICIM also oversees compliance with the IDB's environmental and social policies.

The ICIM is a reflection of the IDB's institutional commitment to accountability, transparency, and effectiveness. The process responds directly to concerns raised by communities affected by projects. It functions independently from IDB Management. The ICIM's activities are reported to the public and to the IDB Board of Executive Directors. Consequently, the ICIM lays the path for a more open dialogue with civil society. As it offers the IDB and civil society a way to review the impact of IDB-financed operations in member countries, the ICIM strengthens civil society's role as a partner in the development process.

Since 2010 there have been 17 complaints registered: 3 have been resolved, 10 are in the Consultation Phase, and 4 in the Compliance Review Phase.

GCI-9 Indicator: Effectiveness Loans (Safeguard Performance)	Goal 2015	Interim milestone 2011	Results 2011
For sovereign guaranteed operations – percent of projects with high environmental and social risks rated satisfactory in implementation of mitigation measures	85%	55%	73% satisfactory implementation (based on 49 operations)
For non-sovereign guaranteed operations – percent of projects with high environmental and social risks rated satisfactory in implementation of mitigation measures	85%	55%	79% satisfactory implementation (based on 14 operations)



PROJECT SNAPSHOT: IDB CEMENT PLANT GUIDELINES LOWER ENERGY CONSUMPTION AND GHG EMISSIONS

TUPI CEMENT PROJECT, PARAGUAY

Proposals to finance cement plants pose a dilemma for multilateral institutions. On the one hand, cement is critical for building the infrastructure needed to reduce poverty and improve economic competitiveness. On the other hand, cement plants contribute a significant portion of the GHG emissions produced by human activities worldwide.

In 2010 the IDB established a set of Cement Plant Manufacturing Guidelines for energy efficiency and GHG emissions that projects would have to meet to qualify for Bank financing. One problem was that the smaller plants generally found in the region are inherently less efficient than large plants and would find it difficult to meet the guidelines.

The guidelines were put to their first test in 2011 when the IDB received a request to finance the Tupi Cement Plant in Paraguay. We found out that small plants can, in fact, achieve efficiencies comparable to those of large plants, with some additional effort and ingenuity.

High energy costs. The project is being carried out by three international sponsors affiliated with Yguazú Cementos S.A., a Paraguayan cement importing firm that is acting as the IDB borrower. One sponsor, InterCement Brasil S.A., has achieved international recognition for its high environmental standards.

In the project, limestone will be mined 400 kilometers north of the capital of Asunción and barged down the Paraguay River to the new plant, which is being built 40 km from the city. There, the limestone will be burned, along with additives such as iron ore and fly ash, to produce clinker—the first-stage raw material in cement production.

Fossil fuels used in burning limestone (coal and petcoke in the case of Tupi) represent some 40 percent of the cost of producing cement. This same fossil fuel combustion also is responsible for 40 percent of the CO₂ emissions produced by cement

manufacture. The remaining emissions come from the burning that converts the limestone to lime. After burning, the clinker is ground and mixed with additives such as pozzolana (a mineral similar to ash) and other ingredients to produce the final product.

Economic savings and environmental gain. The plant's original design did not meet the Bank's guidelines for energy efficiency and CO₂ emissions. First, its thermal efficiency of 3,349 MJ/tonne clinker did not meet with the required 3,680 MJ/tonne clinker. Second, it emitted 840 kg CO₂/tonne of clinker, which was 20 kg higher than IDB standards.

Faced with this challenge, IDB hired external engineering consultants to work with the client and plant manufacturer to bring energy efficiency to state-of-the-art levels that would both reduce emissions and cut fuel costs. As a result,

an adjustment was made to the clinker cooler that was cost-effective and brought the project's energy efficiency within range of the Bank's guidelines. At the same time, plans were made to burn larger amounts of clinker raw material for shorter times in order to optimize the production process. Reducing the ratio of clinker to pozzolana and other admixtures in the kiln's production of clinker lowered CO₂ emissions by 2.4 percent, which met the guidelines' requirement.

The plant modifications will save 535,500 tonnes of CO₂ emissions over the plant's 75+ year lifetime. In addition, the avoided energy cost due to the improvement of its thermal efficiency has been estimated to be US\$325,868 per year.

After the plant achieved compliance, the IDB approved a US\$50 million non-sovereign guaranteed loan for the project. The new plant will make Paraguay self-sufficient in the production of cement while generating 1,000 jobs during construction, 300 direct jobs during operations, and numerous jobs in the construction and infrastructure sectors. @

Small cement plants can achieve efficiencies comparable to those of large plants.

PROJECT SNAPSHOT: POWER PLANT REPAIR PLANS ALTERED TO PROTECT SMALL-SCALE FARMERS



PELIGRE HYDROELECTRIC PLANT RESTORATION, HAITI

With one of its three turbines out of commission and a second barely functioning, the Peligre power plant that supplies half of Haiti's electricity clearly needs the IDB-funded rehabilitation work that is now underway. But just as clearly, in the view of the Bank, the repairs must be carried out in a way that protects the livelihoods of 50,000 very poor farmers. The story of how the IDB spotted a potentially serious problem and found a solution illustrates the role of our environmental and social safeguards and hands-on project execution in adding value to Bank-funded projects.

The Peligre dam was built in 1956 to control flooding from the Artibonite River and create a reservoir for irrigation works that would help farmers produce 60 percent of the country's rice. In 1971, the dam took on a second function when it was retrofitted with three 18-megawatt generating units to become the country's only renewable energy plant, providing nearly half of the country's power supply when fully operational. The power company, Électricité d'Haïti, assumed control of the dam's operations.

Early on, serious environmental issues appeared, such as the severe deforestation in the river's upper watershed, which increased erosion. The resulting accelerated deposition of silt in the reservoir reduced the dam's storage capacity. Periodic drawdowns, carried out to remove sediments, further disrupted the supply of irrigation water. These problems were compounded by the aging plant's deteriorating electro-mechanical equipment. As a result, the plant's average annual production has fallen to 162 gigawatt-hour (GWh) from its potential 320 GWh capacity under optimum operating conditions (that is, the average availability of 22 out of 54 megawatts). At the same time, high volumes of water released during floods destroyed irrigation canals and embankments.

To address these problems, the IDB in 2008 approved a US\$12.5 million grant to finance the complete electro-mechanical rehabilitation of the Peligre Plant. The IDB grant financing included customary and standard IDB environmental measures.

In 2009, two bidding processes were carried out: one for supervision of the Peligre contract, and the second for the rehabilitation of Peligre's equipment. The first contract was awarded to Fitchner GmbH from Germany and the second is expected to be finalized shortly. The two bidding processes resulted in higher costs than anticipated in the original 2008 budget amount. In 2011, the IDB approved an additional US\$20 million in supplementary financing to cover these cost increases. By mid-2011, the financing proposal was ready to go to the Board of Executive Directors for approval, and negotiations were nearly concluded with the firm that would carry out the repairs.

During preparation of the supplementary financing, the Bank conducted an environmental and social safeguard audit of the project's status, including plans to drain the reservoir before making the repairs. Normally the draining would not have been necessary. Dams used for hydroelectric generation are outfitted with gates that can be closed to prevent water from entering the penstock, thus making the turbines accessible for repair crews. But in the case of Peligre, tree limbs and other debris blocked the gates from closing.

The audit confirmed that draining the reservoir would jeopardize the livelihoods of the valley's farmers as well as the country's food security. If the reservoir were left empty only during the rainy summer season, more than 10,000 hectares of irrigated croplands furthest from the river would have been affected; the river's own flow would have been sufficient to irrigate the remainder of the farmland surface. If the repairs extended into the winter dry season as well, a large part of the production on the entire 32,000 hectares could have been lost.

The project team halted the operation as well as the bidding process for the rehabilitation work and contracted with three top international engineers to find a solution. Their recommendation was to inspect the gates underwater and then repair them. Once the gates can properly function, work can proceed with the rehabilitation without emptying the reservoir. The gate repairs are expected to be performed during 2012 prior to beginning the overall rehabilitation project, which is scheduled for completion in 2014. @

OUR CONTRIBUTION TO MEETING REGIONAL DEVELOPMENT GOALS



It is important to track regional goals in order to monitor longer-term development progress in the region and provide information on what contributions and priorities should be. Tracking these goals will help identify gaps or areas where institutional priorities may need to be revised. Of course, meeting regional goals cannot be solely due to the Bank's interventions. So we have defined a series of output indicators at the project and country level. Since outputs are direct products and services due

to a project's activities, they are a better measure of the Bank's direct contribution and will promote transparency and accountability for the Bank's resources.

More specifically, the Bank is tracking its outputs toward the priority area "protecting the environment, promoting renewable energy, responding to climate change, and enhancing food security" in six areas.

PROJECT RESULTS OUTPUTS				REGIONAL DEVELOPMENT OUTCOME	
Project Outputs (Expected Results)	Baseline (2005–2008)	Expected Results Output (2012–2015)	Progress in 2011	Indicators of Bank Contribution to IDB Regional Development Goals	Progress (Year)
Percentage of power generation capacity from low-carbon sources over total generation capacity funded by IDB	91%	93%	100		
Number of people given access to improved public low-carbon transportation system (indigenous and Afro-descendant)	n/a	8.5 million	833,287	Carbon dioxide emissions per US\$1 GDP (PPP) (baseline: 0.29 kilograms, 2006)	0.29 (2008)
Climate change pilot projects in agriculture, energy, health, water and sanitation, transport, and housing	n/a	10	5		
National frameworks for climate change mitigation supported	n/a	5	7	Countries with planning capacity in mitigation and adaptation of climate change (baseline: 3, 2009)	11 (2011)
				Annual reported economic damages from natural disasters (baseline: US\$7.7 billion, 2007)	US\$2.1b (2009)
Number of projects with components contributing to improved management of terrestrial and marine protected areas	15	30	3	Proportion of terrestrial and marine areas protected to total territorial area (baseline: 19.3 percent, 2010)	19.3% (2010)
Farmers given access to agricultural services and investments (women, men, indigenous, and Afro-descendants)	n/a	5 million	2,522,080	Annual growth rate of agricultural GDP (baseline: 3.66 percent, 2005–2007)	1.78 (2008–2010)

Source: 2011 IDB Development Effectiveness Overview

Understanding Project Results Indicators

Percentage of power generation capacity from low-carbon sources over total generation capacity funded by IDB

This indicator refers to the ratio of net capacity (MW) of power plants added to the region's power generation system that use low-carbon sources over total MW funded by the IDB. Use of renewable sources instead of fossil fuels reduces the production of contaminants and GHGs. In 2011, all the IDB-funded operations that added power to the region used renewable sources, such as the Marena removable wind power project in Mexico (396 MW) and the Chaglla hydroelectric power plant in Peru (installed capacity of 406 MW). In other words, 100 percent of power generation funded by IDB in 2011 was from low-carbon sources.

Number of people given access to improved public low-carbon transportation system

Improving public transportation systems can greatly reduce GHG emissions by encouraging people to drive less; it has a co-benefit of improved air quality and therefore health-related benefits. Since urban transport in our region is highly inefficient and often exacerbates many social inequalities, the Bank has worked to promote the development of new public transport systems, such as the Bus Rapid Transport system in Paraguay and a high-capacity bus service to improve mass transit in San Salvador. We expect to expand support of these types of projects over the coming decade and see this area as having important consequences related to poverty reduction and climate change mitigation.

Climate change pilot projects in agriculture, energy, health, water and sanitation, transport, and housing

Pilot projects are operations aimed at contributing to the development of strategies for mitigation and/or adaptation to climate change. These activities might include feasibility studies, development and/or trial of technologies or practices, institutional capacity and planning, and awareness raising or behavioral change campaigns.

National frameworks for climate change mitigation supported

National frameworks for climate change mitigation will provide the information and tools needed to design cost-effective policies aimed at controlling GHG emissions. In 2010, for example, the IDB undertook three policy-based loans aimed at enhancing and strengthening the adaptation and mitigation frameworks and capacity of the target countries.

Number of projects with components contributing to improved management of terrestrial and marine protected areas

In the past, IDB loans have included components that aim at strengthening or improving the management of protected areas, such as the Pasto Mocoa road in Colombia and the Misicuni hydroelectric plant in Bolivia.

Farmers given access to agricultural services and investments

To maintain or increase agricultural growth and to face the challenges of feeding an increasing population while adapting to climate change, farmers need access to improved agricultural services and investments. Examples of these include investments in agricultural research and technology transfer, including the development of new varieties adapted to droughts; irrigation investment to expand water availability and compensate for land erosion and degradation; information systems and improvements in data collection, dissemination, and analysis; definition of land tenure and property rights to give farmers incentives to protect and invest in resource conservation; integration of small- and medium-scale farmers into value chains; agricultural health and food safety services to meet national and international standards; and insurance and early warning systems to prevent and mitigate the impact of natural disasters. In 2011, these investments included, for example, a cadastre and property registry program in Paraguay.

Part III

Sustainability at Home

Minimizing our environmental footprint and supporting our communities



- The IDB recognizes that environmental and social sustainability begins in the workplace. Our commitment to sustainability includes efforts to minimize the environmental impact of our physical facilities and employees (our direct “footprint”), to maximize the potential of employees, and to support neighboring communities.
- This section provides a snapshot of some of the key activities during 2011: the Bank’s support for the wider communities in which it operates as well as ongoing initiatives to support local organizations; the Bank’s carbon footprint in Washington, D.C., and in its country offices; and efforts to have a diverse and inclusive staff.

OUR COMMUNITIES



The IDB-DC Solidarity Program has strategic partnerships with more than 50 local community-based organizations to promote community development initiatives for low-income Latino and Caribbean communities in the Washington, D.C., area. The program supports these organizations through grant making, volunteerism, surplus equipment donation, and technical assistance. In 2011, the program awarded US\$340,775 in grants to 28 local organizations that provide social services to these communities.

Awareness Campaigns. To continue fostering community engagement among staff, families, and retirees, in 2011 the program coordinated two major awareness campaigns at the local and regional level: the Pink Campaign raised more than US\$17,500 to support breast cancer research; the HIV/AIDS Awareness Campaign raised over US\$15,000 to support services for HIV/AIDS and terminally ill patients. Two major drives, the Pedal for Progress bike drive and the Shoebox Project for the Homeless, were organized with the World Bank and the International Monetary Fund, which this year collected and donated 65 bikes and 252 boxes of basic essentials for the homeless and for low-income families. In addition, the Share the Magic Campaign donated more than 3,000 toys, 180 boxes of food and baby items, and US\$7,000 in mini-grants.

Community Training. As part of its technical assistance support, the program co-sponsored training for local community interpreters who provide low-income individuals with interpretation related to health services, legal advice, immigration documentation, housing, and court appearances. The program collaborated with the professional football club FC Barcelona and the Gates Foundation by providing training to young Latinos on polio-related issues to support the launching of the partnerships of these organizations.

Ongoing Support in Haiti. The IDB and Shakira's Pies Descalzos Foundation announced a partnership to rehabilitate Haiti's historic Ellie Dubois School, as part of the Bank's school reform program in Haiti. This announcement was also to raise awareness on the important role that education is playing in Haiti's reconstruction efforts. The IDB and the Foundation will have contributed US\$800,000 by the time the project is completed.

La Escuelita. In this program staff volunteers have been teaching basic finance, English, and Spanish literacy to some of the cleaning and moving staff at headquarters. Lessons on motivation, health, geography, and history are also included. La Escuelita continues to operate with much success—counting on the participation of IDB employees and those of the cleaning firm. The program won the Bank's Solidarity Award for 2011 for outstanding community service and has received the Bank President's Certificate of Recognition for the past two years.

Staff Association Assistance to Communities in Need.

The IDB Staff Association maintained an active role, supporting communities in need. In 2011 it organized the East Africa Donation Drive in response to the severe drought and food crisis in that area. With assistance from the Staff Association, the IDB raised money and helped get food and medical assistance to those most in need. The donation was made to Doctors without Borders. In under one week, hundreds of IDB employees participated in this effort and raised almost US\$9,000. While East African countries are not part of Latin America and the Caribbean, the IDB community understands that we are all citizens of the world and that it is crucial to rally behind all peoples when they are in dire need.

Social Entrepreneurship Training. In 2011 the Bank launched on-the-ground social entrepreneurship training with ASMUNG, an organization in Panama that seeks to create local economic opportunities in order to improve the income of its local workers and foster their social development. The goal of this program is to offer IDB employee participants a hands-on opportunity to develop entrepreneurship skills while helping the local organization achieve a sustainable business. A business plan is in place that entails reorganizing actual resources; providing training in accounting, marketing, and business skills; and making local areas more attractive to potential tourists. These activities will be carried out by IDB staff volunteers selected through a process of alignment of skills and experience. Decision making will involve local indigenous Ngöbe Buglé women. In early 2012, up to six IDB employees will travel to Panama to assist in these efforts.

OUR SOCIAL ASSETS



There is an important connection between an organization's sustainability and how it manages its human resources. IDB employees are the Bank's greatest resource, representing the organization and the region. Ensuring diversity and an inclusive environment is an integral part of the effort to build social capital.

Since 2010 the Bank has had an institutional mandate to increase the diversity of its staff and foster an inclusive work environment, with specific goals set for 2015 on expanding the participation of women at senior and executive levels. We are looking for increased diversity of ethnicity, gender, age, national origin, disability, sexual orientation, education, religion, work style, expertise, and work experience, among other characteristics.

An action plan to increase awareness on diversity and inclusion (D&I) has been implemented since December 2010. Some of the results during 2011 included the participation of 800 Bank staff, consultants, and clients in D&I awareness and training events at headquarters and in the Brazil Country Office. In addition, a number of steps have been taken to foster a more inclusive work environment in general and to support, in particular, women and staff from underrepresented groups.

In 2011, actions included:

- Three Affinity Groups were created: on Afro Descendants and Indigenous Peoples, on the LGBT community, and on persons of Asian nationality and descent.
- A Pilot Mentoring Program was launched, with women accounting for 54 percent of all participants and 72 percent of all mentees. A Bankwide Mentoring Program should be launched by the end of 2012, taking into consideration lessons learned from the pilot.
- An Onboarding Program for new and relocated employees was launched, and training sessions were initiated for headquarters and country office staff.
- A professionally equipped lactation room was inaugurated.
- The Professional Women's Network and HRD organized a debate with outside speakers on International Women's Day.
- An event highlighting Haitian talents drew 130 participants.
- A Diversity and Inclusion Strategy for the period 2012/2020 is currently being prepared and should be approved during 2012.

OUR HUMAN RESOURCES IN NUMBERS

	2009	2010	2011
Total number of staff	1,837	1,881	1,947
Male/female staff (%)	49/51	49/51	49/51
Male/female executive staff (%)	82/18	76/24	68/33
Male/female managerial staff (%)	N/A	72/28	66/34
Male/female technical staff (%)	55/45	54/46	54/46
Male/female support staff (%)	15/85	14/86	14/86
Borrowing country/non-borrowing country	1,248/589	1,277/604	1,326/621
Headquarters/country offices (%)	69/31	68/32	67/33
Total consultants* (full-time employee equivalent**)	981	1,097	1,269

* Includes all Contractual Categories (Individual Consultants, Research Fellows, Temporary Help, and Trust Fund appointees).

** FTE = Full time equivalent based on 260 days.

OUR FOOTPRINT



Since 2007 we have had a program to reduce GHG emissions through eco-efficient measures where possible and to offset emissions through carbon reduction programs in the region. In 2011 the Bank's carbon emissions were calculated as 20,373 tCO₂eq. These were offset through investments in carbon credits generated from a biomass boiler project in Peru and a hydroelectric project in Honduras. Through the purchase of carbon credits, the Bank continued to achieve zero net emissions. @

Over the past four years the Bank has expanded its corporate responsibility program to its country offices, in particular seeking innovations for reducing our environmental impact. The Country Carbon Competition gives awards to the offices that support the commitment to become carbon-neutral by proposing new ways to reduce GHG emissions. Winning country office proposals are selected on the basis of the proposed project's environmental impact, innovation, potential for replication, ease of implementation, and return on investment.

In 2011, three projects received awards. The office in Colombia will undertake an analysis of its building's lighting in order to identify opportunities for efficiency upgrades, the potential to incorporate solar energy, and the installation of recycling centers. Suriname plans to use the funds to pay for the additional cost of a hybrid vehicle and to install lighting occupancy sensors. And Uruguay will replace many of its existing lightbulbs with high-efficiency LED lights.

At headquarters, we are in the first phase of a facility improvement program that involves replacing the building management system in the main building, which was nearing completion at the end of 2011. The new system will reduce energy costs by controlling building equipment as well as temperature and ventilation more efficiently. In 2012 the program will continue with the replacement of major HVAC equipment for the building.

In addition, in 2011 the Bank applied for Leadership in Energy and Environmental Design certification for its headquarters. The application is under review, but we expect to receive certification in the first quarter of 2012. The concept of greening has been taken into the heart of our units, divisions, and departments who pilot "green" programs. For example, as part of our *beyondBanking* program, which encourages financial intermediary clients to pursue a more socially inclusive, transparent, and environmentally friendly business model, some staff members started a group called planetBanking Ambassadors. This initiative aims to make sure that while IDB Investment Officers encourage their clients to reduce their carbon footprints as part of the Bank's indirect footprint, they are making similar efforts to reduce their own direct footprints as well. As staff members become more enthused about their own initiatives, such as printing competitions, recycling programs, and incentives to reduce the use of water bottles, they are more motivated to have clients realize the importance of "going green."

Offsetting IDB's Carbon Footprint

Biomass Boiler Project, Paramonga, Peru. This project replaces the need for fuel oil at a sugar refinery by installing a new biomass boiler that produces the steam required to process sugarcane from the biomass residue of sugarcane production. In addition to reducing GHG emissions, this project reduces the amount of local pollutants emitted from combustion.

Hydroelectric Power Plant, Babilonia, Honduras. This project displaces the need for electricity from fossil-fuel-fired power plants by adding a hydroelectric power plant to the electricity grid. The project will increase the reliability of service for the surrounding area and also extend electricity to some homes that are currently using only kerosene. Despite the fact that it is in a mountainous region, the plant was constructed using only cable cars and animal-drawn vehicles, eliminating the sometimes harmful environmental impacts of road construction.

IDB FOOTPRINT AT A GLANCE

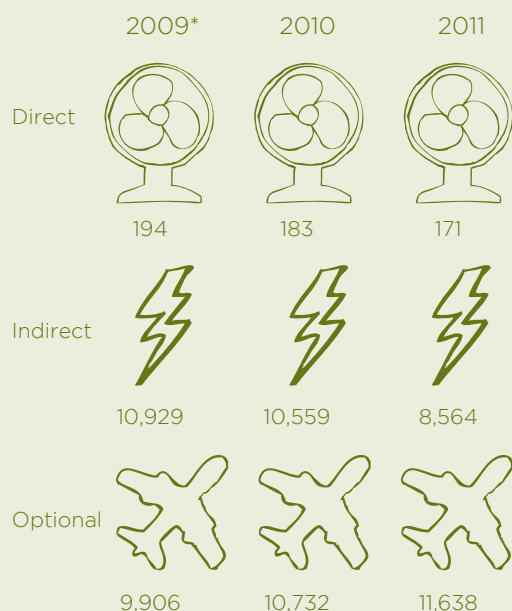


IN-HOUSE ENVIRONMENTAL PERFORMANCE (HEADQUARTERS)

Total CO₂ emissions (tons CO₂eq)

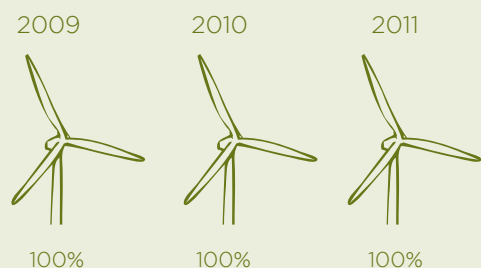


Breakdown of CO₂ emissions by scope (tons of CO₂ eq)



* Data corrections made in 2011, to reflect the most recent applicable emission factors and improvements in data accuracy.

Renewable energy use (through purchase of RECs)



Paper use (tons)



Recycling—paper, cardboard, aluminum, plastics, and glass (tons)

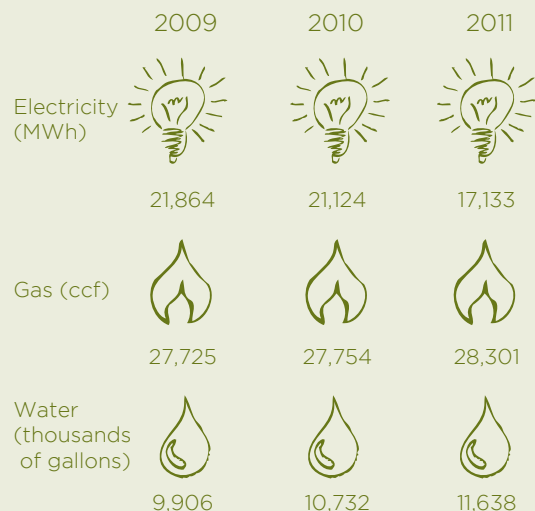


** Increased recycling in 2011 is a result of the single stream recycling introduction and an ongoing process to improve the quality of data collected.

Waste generation (tons)

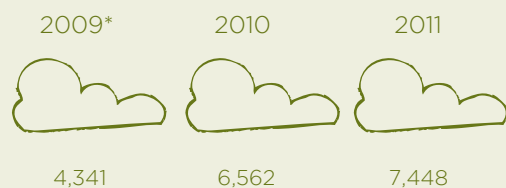


Utilities use



IN-HOUSE ENVIRONMENTAL PERFORMANCE (COUNTRY OFFICES)

Total CO₂ emissions (tons CO₂eq)



* Data corrections made in 2011, to reflect the most recent applicable emission factors and improvements in data accuracy.

The Bank's Corporate Environmental and Social Responsibility (CSR) Report is available online. The report describes the actions we have taken as an organization through an internal CSR Program to improve the environmental footprint of operations and to address social responsibility issues at the corporate level. Institutionally, key impacts are found in energy and water consumption, business travel, waste generation, and paper use. The Bank is tracking impacts in these areas in order to create a road map to reduce the overall environmental footprint of the entire organization and to increase the awareness of staff and constituents. @

COMMUNITY INVESTMENT

Donations in cash—IDB-DC Solidarity Program (US\$ thousand)



Donated items of surplus equipment— IDB-DC Solidarity Program (no.)



Number of volunteers—IDB-DC Solidarity Program



* Data corrections made in 2011.

The *Sustainability Report 2011* was produced by the Environmental and Social Safeguards Unit (VPS/ESG), Janine Ferretti, Chief. A peer review process was undertaken by an inter-departmental Editorial Committee.

The IDB welcomes opinions on the content of this report as well as the Bank's overall sustainability performance. Should you have any questions or comments to share, please contact the Managing Editors by e-mail: sustain@iadb.org.

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