eco américas

A monthly report on development and the environment in Latin America

Electric-car world looks to Bolivia's Salar de Uyuni

When Neil Armstrong and Buzz Aldrin made their historic walk on the Moon on July 20, 1969, one of the first things they saw when looking earthward was an immense, mirror-like sheet in southwest Bolivia's Altiplano.

The glittering, treeless void, known as the Salar de Uyuni, is the remains of a vast inland sea. Home of the world's largest salt desert, it is the breeding ground of three species of flamingo and hosts many other bird species, including the Andean goose (Chloephaga melanoptera) and the horned coot (Fulica cornuta).

Except for tourists who came to see the birds and the surreal landscape of the remote cactus-studded plateau, few people outside Bolivia knew much about Salar de Uyuni back then; and few do now.

But this situation is about to change, thanks to the area's abundant lithium reserves. The soft alkali metal is a key ingredient in the rechargeable batteries used in computers, mobile phones and, increasingly, electric cars. With forecasts calling for intense lithium demand as automakers develop more and better battery-powered vehicles, the Salar de Uyuni is being eyed as a key contributor to the green revolution.

Whether that will be good for the local environment, however, is a question facing Bolivian policy makers and green advocates.

The Salar de Uyuni holds an estimated 5.4

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Peru's Madre de Dios: carbon-storage test ground

Puerto Maldonado, Peru

Just two years ago, forest lined most of the dirt road from this jungle town westward to the Andean foothills. As paving of the Interoceanic Highway from the Brazilian border to the Pacific coast nears completion, however, cattle pastures and gold mines have advanced in lockstep with the road graders.

Such trends pose a stern test for Reducing Emissions from Deforestation and Forest Degradation (Redd), a concept aimed at allowing industrialized countries to meet greenhouse-gas emissions targets in part by funding forest protection in developing nations.

With deforestation the cause of 17% of the world's greenhouse gas emissions—more than those of the globe's entire transport sector—Redd is expected to be a high-profile topic at the upcoming United Nations climate conference in Copenhagen. (See Centerpiece—this issue.)

For many forest advocates, Redd represents a way of tapping the emerging world market for carbon offsets to create a strong economic incentive for woodland conservation. Indeed, Peru's environment ministry and green groups see compensation for avoided deforestation as the greatest hope for the country's rainforest.

"There has got to be some other financial force coming into the tropics than mining, logging and cattle," says Gregory Asner, a Carnegie

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This new bridge at Inambari, Peru, part of the Interoceanic Highway, gives migrants from the Andean highlands access to the Amazonian lowlands, where land clearing for agriculture and mining threatens plans to sell forests' carbon-storage capacity. (Photo: Barbara Fraser)

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Around the Region

Gold mine slated for biosphere in Mexico

Plans for a Canadian-run open-pit gold mine on the southern tip of Mexico's Baja Peninsula are drawing criticism in no small part on account of the project's location: in a biosphere reserve.

Canadian-owned Vista Gold says it expects the Paredones Amarillos mine, slated for the Sierra de la Laguna biosphere, to produce at least 1.2 million ounces of gold over a 9.3-year period.

Fred Earnest, Vista Gold's president and chief operations officer, says the US$190 million investment will create 400 construction jobs and 300 mining jobs.

Vista Gold intends to establish a foundation to support local health care and education, according to Earnest.

"We want to be a responsible corporate citizen in Baja California Sur," he says.

The project is opposed by some local residents and by environmentalists.

Pedro Zapata, water program coordinator for the Niparaja conservation group in the Baja California Sur city of La Paz, contends that chemical and heavy-metals runoff from mining operations could jeopardize precious groundwater supplies and leave a 58.7 hectare (145-acre) crater in a fragile ecosystem.

Sierra de la Laguna, designated as a biosphere by the United Nations Educational, Scientific and Cultural Organization (Unesco), is an island of pine and oak in a semi-arid to temperate sub-humid climate zone.

Experts say the biosphere, which hosts over 900 plant species, serves as a crucial collector of rainfall that helps recharge the aquifers serving a wide area of the southern Baja peninsula.

Conceding critics have "valid concerns," Earnest insists numerous safeguards are built into the project's planning and implementation, including water treatment and dust monitoring, best-practices mineral processing and a training program for employees.

Following U.S. and Canadian environmental standards, corrective measures will be taken when problems are discovered, Earnest says.

In November, Vista Gold discussed its project at public meetings in La Paz, El Triunfo and Todos Santos.

Invited by locals to review the project plans, Paul Robinson, a New Mexico environmental consultant and research director for the Southwest Research and Information Center, says arsenic contamination exists from previous mining in the region.

Robinson cautions that environmental enforcement and financial responsibility for reclamation could also be an issue in the Vista Gold project.

Vista Gold is hoping to receive a land-use permit for the mine during the next three months. This would allow the company to commence construction.

Zapata says opponents of the project are exploring legal avenues to halt the mine. He adds he expects to raise the issue before a citizen's advisory committee for Mexico's Environment and Natural Resources Secretariat.

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Company's assets frozen after filing of torture suit

A British court last month froze more than US$8 million in assets belonging to London-based Monterrico Metals after a lawsuit was filed on behalf of a group of Peruvian farmers who claim they were tortured in the wake of a protest against the company in 2005.

The farmers had marched to the mine, where they say police or security guards detained 31 demonstrators, including two women whom the farmers say were sexually assaulted.

One farmer, Melanio García, was shot during the protest and later died. A local journalist received photographs allegedly showing the protesters blindfolded and with their hands tied.

In a non-binding referendum in 2007, communities in the districts of Huancabamba and Ayabaca, in the department of Piura near the border with Ecuador, voted against mining operations slated for the area. (See "Copper project new focus for Peru's mine debate"—EcoAméricas, Oct. '07.) Río Blanco Copper, a Monterrico subsidiary, plans to develop a $1.44 billion, 1.25-billion-ton copper and molybdenum deposit on the Peruvian-Ecuadorian border.

Project organizers have completed the exploration phase, but have yet to file an environmental-impact statement. The Chinese state-owned Zijin Consortium bought a majority stake in Monterrico Metals in early 2007.

The Río Blanco concession covers about 15,990 acres (6,470 has), but contiguous claims held by other companies could create a mining district covering more than three times that area.

Local farmers worry about contamination of water sources, and environmental-

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Two-nation promise to spare Atlantic Forest

Argentina and Paraguay have pledged to halt deforestation in the Atlantic Forest, giving a last breath of hope to one of the world's greatest and most devastated biological treasures. Speaking in Buenos Aires last month at the World Forestry Congress, representatives of the two nations said their governments are committed to achieving "net zero deforestation" by 2020 in the Atlantic Forest, meaning they would restore the same amount of forest as is cut down each year, using native species.

They also said they'd initiate environmental-services payments to reward property owners who reforest the woodland, home to nearly 950 species of birds and two dozen species of critically endangered vertebrates.

"We will work to reduce deforestation to a minimum, simultaneously creating incentives and programs to promote restoration of native forest in priority areas," Maurice Closs, governor of Argentina's Misiones province, told the United Nations-organized congress. Misiones contains all of Argentina's remnants of the Atlantic Forest.

The Atlantic Forest in some places is more biodiverse than the Amazon, yet proportionally far more of it has been cleared. In Argentina, the Atlantic Forest is just 30% of its original size; in Paraguay only 13%. Brazil, where only 7% of the Atlantic Forest remains, has pledged to achieve a zero deforestation target by 2010.

In development's path

Once covering more than 120 million hectares (300 million acres), the Atlantic Forest stretches along Brazil's Atlantic coast and curves inland to eastern Paraguay and Argentina's northeastern province of Misiones. But since the arrival of Spaniards, French and Portuguese in the 16th century, it has been hacked down for timber and to clear land for ranching as well as sugar and coffee plantations.

Soybean production in Paraguay and conversion of native forest for tobacco, yerba mate, and pine plantations in Argentina have sped destruction during the 20th and 21st centuries, fragmenting the forest and affecting biological corridors that still sustain one of the world's highest levels of diversity and endemism.

The commitments Paraguay and Argentina made at the forestry conference seek not only to halt that destruction, but to reverse it.

In Argentina, for example, a 2007 forestry law called on provinces to place woodlands in three categories: those requiring complete protection; those where sustainable forestry is allowed; and those in which logging and other economic activities may occur. But to date, of 23 provinces only three—Salta, Chaco and Santiago del Estero—have completed that work.

That has left the rest of the provinces ineligible under the law to receive money from a national conservation fund intended to compensate landowners for conserving or replanting forests that provide environmental services, such as the maintenance of biodiversity and the preservation of watersheds.

The fund was to have been fed by a 0.3% earmark from the national budget and a 2% tax on agricultural exports, which together would generate an estimated US$260 million annually. But the money did not materialize, and only now does the fund look set to start: the Argentine Congress this month authorized "a maximum" of 300 million pesos (US$79 million) appropriation for the fund in 2010.

At the forestry conference, Gov. Closs of Misiones pledged to place 1.1 million hectares—90% of Argentina's Atlantic Forest area—in the first two, more restrictive categories. He also agreed to send the initiative to the provincial legislature, where the expected approval will enable environmental-service payments and the restoration of degraded areas.

Environmental services

Paraguay, meanwhile, decided in Nov. 2008 to extend a 2004 zero-deforestation law for the Atlantic Forest until 2013, an additional five years. It then promised at the forestry conference to speed regulation and implementation of a 2008 environmental-services law, which, like Argentina's, will reward landowners for restoring and protecting forests.

"If we can develop the system for promoting environmental services, either through direct payments or some kind of trading mechanism, we can provide an incentive for landowners to continue restoration activities beyond 2013 and achieve our zero-deforestation goal in 2020," says Lucy Aquino, director of the environmental group WWF in Paraguay, which pushed for the original law.

Skeptics cite violations by soy and cattle producers in Paraguay's Atlantic Forest and question the ability of authorities to enforce the zero-deforestation legislation.

These skeptics point specifically to cases in which the fines meted out by judges for illegal logging were so meager as to represent only a fraction of the profits to be earned from selling the timber.

But Aquino says such cases have been the exception.

"The zero deforestation law for the Atlantic Forest has been tremendously successful," she says. "Since 2004, it has reduced forest cutting in the region by 85%."

–Steven Ambrus

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A case of ample wind, but too few turbines

Buenos Aires, Argentina

For alternative-energy advocates in Argentina, wind rightly ranks high on the list of potential power sources. The strength and consistency of winds in Patagonia and other locations in the country give Argentina abundant wind-power reserves.

Thus far, however, this potential has gone largely unrealized, a problem that has given rise to growing concern among energy specialists as well as environmental organizations. With the country's production of oil and gas dwindling, many here believe alternative sources, particularly wind power, should be much farther along to help fill the breach.

On paper, wind projects by now should be growing at a pace to allow them to generate 8% of the country's electricity by 2016. Argentina's Congress passed a law in 1996 setting that deadline. Today, however, wind only accounts for 30 megawatts of the country's installed capacity of 25,000 megawatts—a paltry 0.12%. That's just a tenth of the wind energy being generated in neighboring Brazil.

Against a backdrop of shrinking oil and gas reserves and fears of future power shortages, concern about the scant wind-power progress appears to be prompting some action. In May, Argentine President Cristina Kirchner launched the Program for Electric Generation from Renewable Resources.

Carrying out one of the program's key initiatives, the state-owned energy company, Enarsa, has solicited bids on 15-year contracts for a total of 1,000 megawatts of installed capacity of renewable energy, half of which would be from wind. The deadline for bids was Nov. 26.

Goal to diversify

When she kicked off the renewable-power program, Kirchner noted that the government is committed to diversifying the country's power supply by boosting alternative sources, among which she included nuclear energy. Currently, some 50% of Argentina's power comes from thermoelectric plants, the vast majority of which burn natural gas; 40% is generated by hydroelectric dams; 8-9% is produced by the country's two operating nuclear plants and the rest comes from renewable sources.

To begin adjusting these proportions, Argentina in mid-2006 resumed construction of its third nuclear-power plant, Atucha II, which had languished in an unfinished state for over 20 years.

The government also began studying the feasibility of building a fourth reactor and is working to restart full-scale mining of the country's uranium reserves to ensure a domestic fuel source for its atomic power stations.

Experts blame the wind-power sector's slow development on the country's low, government-controlled electricity prices. They also cite a lack of government incentives and a dearth of local inputs, which means investors must go to the expense of purchasing wind-power equipment abroad.

All this adds up to a squandered opportunity, wind-energy boosters say. According to the Argentine Renewable Energy Chamber (Cader), if the country funded wind projects with 15% of the US$1.8 billion it spent last year to buy imported electricity and liquid fuels, it could develop 700 megawatts of installed wind power capacity.

Those pushing for more wind turbines note that in Argentine Patagonia, winds average 20 to 27 miles per hour (32 to 43 kms per hour) and have impressive constancy.

Comparing the energy a turbine can produce at the average prevailing wind speed in relation to what a turbine of the same capability could generate when spinning 100% of the time, wind-energy experts calculate a coefficient that can be used to gauge wind-energy potential in different regions.

Favorable winds

They say that in many areas of Patagonia, this coefficient surpasses 40%, while in areas of substantial wind power development in Europe, it registers in the neighborhood of 25%. Amid the evidence of concrete renewable-energy steps by the Kirchner administration, wind advocates say the country might be on the verge of realizing this potential.

"This is the first time I've been optimistic, because now the government appears interested in the subject," says Héctor Mattio, one of Argentina's leading wind power specialists and the director of the Regional Wind Energy Center, an agency run by the government of Chubut Province. "In Argentina there are projects and feasibility studies with very good results for more than 3,000 megawatts. The low electricity prices domestically have until now been an obstacle, but this bidding could lead to interesting prices and developers will no longer have excuses."

A key question is whether the country will develop its own ability to manufacture wind power equipment, says Hugo Brendstrup, industrial technology manager for the state-run firm Invap, one of three companies in Argentina developing wind turbines. Brendstrup argues Argentina has a unique opportunity to foster domestic wind-turbine manufacturing, but that if it misses this chance, foreign manufacturers eventually will fill the void.

–Daniel Gutman

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Officials at odds over Mexico City landfill

Mexico City

Mexico's federal government has called again on Mexico City authorities to shut down the massive Bordo Poniente, the federal capital's main dump.

Heavy rains recently flooded access roads to the Bordo Poniente, causing a temporary slowdown in garbage pickup. Access to the dump was restored, but federal authorities took the opportunity to criticize Mexico City's glacial progress in closing the landfill. Though Mexico City authorities say the Bordo Poniente won't reach capacity for several years, federal officials insist the dump already is overfull.

The dispute, which has pitted the federal Environment and Natural Resources Secretariat (Semarnat) against the city government, has prevented authorities from developing a unified approach to Mexico City's trash crunch.

Semarnat claims Mexico City has not complied with the terms of a 2004 agreement under which the dump would be closed by 2008. At the time, Semarnat had concluded the Bordo Poniente had nearly reached capacity and had grown so large that its sheer weight threatened to crush the underlying drainage system.

Currently, the Bordo Poniente contains an estimated 50 million tons of trash, making it one of the world's largest landfills. It sits on the northeast outskirts of Mexico City on federal land that once formed the bed of Lake Texcoco. The surrounding area is barren, and methane emissions deaden the air. Daily, the huge landfill receives 12,500 tons of unsorted solid waste—nearly all the trash produced by the federal district and surrounding areas.

Closing plan unravels

Under their agreement, Semarnat and city authorities planned to close the dump in stages. In the process, the city would begin to monitor methane gas that the landfill emits and treat the toxic fluids that seep from the dump as its vast piles of trash settle and compact. By 2008, the Bordo would stop receiving waste entirely.

The agreement, however, began to fray during the 2006 presidential election. The bitterest in modern memory here, the contest put municipal and federal authorities deeply at odds. It was in this polarized atmosphere that the Bordo Poniente emerged as an issue around the time it was supposed to close.

At that point, Semarnat began granting Mexico City a series of reprieves. A new, final closing date was set for January of this year, but the city obtained a court order to put off the deadline indefinitely on grounds it does not have another place to deposit all its trash.

Nearly a year later, little has changed. City officials insist that the dump has the capacity to be used for three more years, and they want to use that time to identify a suitable alternative.

"The only thing they've asked for is more time," says Mauricio Limón Aguirre, Semarnat's assistant secretary for environmental protection. "Now they want three years for all this. Coincidentally, the amount of time the federal district's government has left [until the next municipal elections] is three years. Obviously what they want to do is pass the problem on to the next administration."

City authorities deny this. "Their bosses [in the government] tell them to say that," says Pedro de Anda, who oversees the Bordo Poniente for the city's urban services department. "We are doing things responsibly so that this city functions."

De Anda says two new plants at the dump treat toxic fluids, and by year's end a pilot plant will begin to measure methane output. It's the first step toward collecting the gas and using it to generate electricity—something the municipal and federal governments both say they're eager to do.

Capacity disputed

De Anda and other officials dismiss Semarnat's claim that the Bordo Poniente should already be closed. By decree, the dump cannot exceed 12 meters in height; but there are sections far lower than that, De Anda says, and natural composting and improved compacting methods continually allow for more space. The city's calculations give the Bordo Poniente another two or three years. And independent researchers who study hydraulics say the dump could actually handle more than 12 meters.

Such disagreements, though, don't change the fact that Bordo Poniente will close one day soon—and that neither the municipal nor federal government has a concrete plan for an alternative. Most ideas put forth center on revamping Mexico City's trash-collection system, now a loose network of garbage truck drivers and scavengers whose combined efforts put the recycling rate at an abysmal 6%. There have also been legislative efforts to reduce waste. Non-biodegradable plastic bags were recently outlawed in the capital, and a similar measure for Styrofoam containers is in the works.

How soon these ideas bring about real change—and the Bordo Poniente finally closes—will depend on city and federal authorities agreeing to quit fighting and start acting.

"I'm as frustrated as anyone," says Arnold Ricalde, social coordinator of the Mexico City Waste Commission. "I think it's time to forget all the political issues and think more about the environmental decisions."

–Mary Cuddehe

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Centerpiece

Region sees rough road through Copenhagen

Above: Greenpeace activists stage protest outside Mexico's Foreign Relations Secretariat in August, calling on officials to take a strong position on global warming. Banner on inflatable globe reads: "Time is running out. Save the climate." (AP photo by Marco Ugarte) Opposite page: Cleared cropland encroaches on pristine rainforest in the Brazilian Amazon, south of the city of Lucas do Rio Verde in Mato Grosso state. (AP photo by John Stanmeyer)

In some ways, the issues facing Latin American and Caribbean nations at next month's United Nations global-warming summit in Copenhagen couldn't be clearer. With global deforestation accounting for more greenhouse emissions than the entire world transport sector, the need to slow land clearing is urgent in these countries, which possess the earth's greatest concentration of tropical woodlands. The region also has an acute need for programs and projects aimed at dealing with the emerging impacts of climate change. In forecasts of global-warming effects, Latin American and Caribbean countries rank among the most vulnerable to rising sea levels, drought, intensification of storms, and the loss of agricultural productivity.

Disturbingly unclear, though, is how a path forward on these issues will be found at the Dec. 7-18 Copenhagen meeting, which is intended to set the stage for the modification or replacement of the expiring 1997 Kyoto Protocol climate-protection regime. On the eve of the conference, Latin American and Caribbean countries are divided on some key questions and face recalcitrant opposition from the industrialized nations on others. Though these fundamental questions are unlikely to be resolved at Copenhagen, experts say many of them will trigger discussions that could produce key architecture for a final agreement. Thus far, however, discord appears to be the order of the day.

Debate is still raging, for instance, about the most fundamental underpinnings of a global agreement. One such debate is whether to bind developing countries to emissions targets—as developed countries have been bound under the Kyoto pact. Another is whether to negotiate a new pact based on the Kyoto Protocol after 2012, or simply create a new system. Narrower questions also have attracted heated discussion. High on the list is the financing level of the United Nations Adaptation Fund, which is intended to help developing countries cope with climate change. Another prominent question is whether to adopt a proposed initiative to slow emissions from land clearing known as Reduced Emissions from Deforestation and Forest Degradation (Redd).

With so much disagreement, the prospects for consensus are uncertain, to say the least. The gulf between the developed and developing world, as well as among developing nations themselves, is so gaping as to seem overwhelming.

"There are a thousand ways for this to go wrong, and only a few ways for it to go right," says Irving Mintzer, chief strategist for the Potomac Energy Fund, a private equity fund in Frederick, Maryland that advises investors on energy issues and clean technology. "It's a question of whether we will see through the confusion—what in other circumstances would be called 'the fog of war'—in order to promote balanced and sustainable development along with improvements in the economic positions of the developing world, including Latin America."

Topping the agenda is the structure of the hoped-for future climate agreement, which would succeed the Kyoto Protocol in

2013 and lock in more rigorous emissions-reductions targets until 2020. Should industrialized nations heed the calls of China and other developing countries and drive their annual emissions at least 40% below 1990 levels by 2020? Or should their target be a more modest 15-23% reduction, as most industrialized countries have proposed? Should developing Asian economic powers such as China and India be forced to make emissions-reduction commitments, as the United States insists? Should the entire developing world? Or would that be unfair given the industrialized nations' overwhelming responsibility for the accumulation of greenhouse gasses in the atmosphere over the last 150 years?

Latin American nations take the same position on the last question, placing the blame for global warming squarely on the industrialized countries. Asking developing nations to commit to targets, they say, is unfair and could cause them to slow their economic growth or be penalized for non-compliance. Nonetheless, Mexico, which is considered a developing country under Kyoto but in 1994 became Latin America's sole member of the Organization for Economic Cooperation and Development (OECD)—the group of developed economies—could become an exception. Mexico announced in Dec. 2008 that it would reduce its emissions to 50% of 2002 levels by 2050 using a national cap-and-trade program focused on the oil, cement, electricity and steel sectors. Moreover, some experts believe Mexico could be willing to negotiate a binding commitment, joining South Korea as the only developing countries expected to do so.

Meanwhile, Costa Rica has voluntarily committed to becoming a "carbon neutral" nation by 2021, meaning that by that year it would offset all greenhouse gases released through its use of fossil fuels by undertaking carbon-capture activities, such as the planting of trees. Costa Rica planted six million trees in 2007 and is continuing an ambitious reforestation program, using a 3.5% tax on gasoline to financially compensate landowners for planting and protecting forests on their lands. It also has restricted traffic in the capital, San José, and is moving to put in place laws and incentives favoring hybrid vehicles, clean energy and other mechanisms to combat global warming.

In the run-up to Copenhagen, Brazil has moved to address climate change in several ways. On Nov. 13, Dilma Rousseff, President Luiz Inácio Lula da Silva's chief of staff, announced Brazil would implement voluntary cuts to ensure greenhouse-gas emissions in 2020 are 36.1% to 38.9% lower than they would otherwise be. On Oct. 27, the lower house of the Brazilian Congress approved a bill setting the stage for such cuts. The bill, which does not set specific targets, is expected to clear the Senate and be signed into law before the climate conference. Aside from advocating targets, it calls on the executive to create incentives that would help reduce carbon emissions by industry; foster a carbon-trading market in Brazil; make carbon output a factor in the granting of public contracts; and boost the production and use of biofuels.

Brazilian officials also plan to pledge specific forest-conservation gains as a means of cutting the country's greenhouse-gas output. In late September, Environment Minister Carlos Minc announced the country would promise to reduce its Amazon deforestation rate 80% by 2020. According to UN figures, Brazil ranks 17th on the list of the world's biggest greenhouse-gas emitters. But this figure is misleading because it does not include carbon released through deforestation. In a study issued last month, the Environment Ministry reported that in 2007, the last year for which such figures are available, deforestation accounted for 51.9% of Brazil's greenhouse emissions. If deforestation were included in world rankings of greenhouse-gas output, Brazil would occupy either fourth or fifth place, says Marcio Santilli, cofounder of the Socio-Environmental Institute, a leading Brazilian green group.

For Latin nations, a vital question at Copenhagen is what role will be played by the United States, which leads the industrialized world in per-capita greenhouse emissions yet sat out the Kyoto Protocol and made no cuts. Feeling is strong in U.S. political circles that the Kyoto process has not worked, that it gives a pass to China, India and other developing-world emitters, and that it has failed even to get committed countries to meet their targets. Indeed, support is growing in the United States for scrapping the Kyoto-style system and developing a completely new approach.

Abandoning the Kyoto process could have an impact on Latin America, even though the region was not bound by the agreement's emissions-reduction targets. Latin nations have received a sizable share of investment under the so-called Clean Development Mechanism (CDM), a Kyoto initiative that allows industrialized countries to help meet their targets by funding greenhouse-gas-reduction projects in the developing world. With 24% of UN-approved CDM projects, the continent has seen hundreds of millions of dollars in investment in renewable energy, methane mitigation, clean transportation and forestry since 2002. Among the most successful in attracting such funds are Brazil and Mexico, which rank third and fourth, respectively, behind China and India in the number of CDM projects they host.

It is unclear how a new agreement might affect such initiatives. If a new accord fails to require aggressive emissions-reduction targets for the industrialized world, or if it does not permit a high percentage of those reductions to be made in developing countries, green investment in Latin America and the Caribbean could fall short.

In this sense, U.S. climate legislation is critical. Under the American Clean Energy and Security Act (Aces), which was approved by the House of Representatives on June 26, up to 1 billion tons of carbon dioxide equivalent per year could be offset through international projects. Experts say this would benefit Latin America and allow U.S. businesses to save up to 96% in compliance costs. But such appraisals could, of course, change if the legislation is altered or killed in the U.S. Senate.

"Demand for CDM credits will depend in part on whether U.S. legislation allows for international offsets and whether that will be done through the CDM or some other vehicle," says Remi Moncel, a climate associate at the World Resources Institute, an environmental think tank based in Washington, D.C. "It's a big uncertainty and a big risk for the CDM."

Even if it should survive, experts say, the CDM could be crippled by a tortuously slow approval process in the event it does not receive significantly more staff and funding. "The current structure of the CDM is inadequate for the necessary growth,"

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says Mintzer. "It is like trying to fill your swimming pool overnight with the kitchen faucet. We need a mechanism that can approve 5,000 projects a year, not just a few dozen."

Another uncertainty for the region concerns Redd, the proposed initiative slated for discussion at Copenhagen that would curb greenhouse emissions through the reduction of woodland destruction. With deforestation causing 17% of total greenhouse gas emissions—more than the entire worldwide transport sector combined—Redd seeks to create an incentive for woodland protection. It would allow industrialized countries to meet their greenhouse-gas emissions targets in part by funding projects in the developing world that prevent logging and conversion of forests into cropland and pasture.

Rainforest-rich Latin America and the Caribbean would become a prime focus for Redd. Not only does the region possess the largest tropical forest area, it also is home to five of the world's most biodiverse countries—Brazil, Colombia, Ecuador, Mexico and Peru.

But opposition to Redd abounds. Influential environmental groups, such as Greenpeace, worry it would divert money from clean technologies. Meanwhile, indigenous rights groups fear governments and corporations eager to collect cash incentives would become much less likely to recognize the longstanding land claims of forest communities.

Brazil: Redd's roadblock?

Most important is the opposition of Brazil, which dislikes market-based systems such as Redd. Brazil would prefer that any avoided-deforestation scheme be a centrally directed government enterprise. "Brazil's government always has been against any kind of market mechanism for avoided deforestation, and it's going to have an outsized influence in these talks," says Thomas Black, executive director of the Andean Center for Economics in the Environment, a think tank in Bogotá, Colombia. "It will prevent a united front in Latin America on Redd, and is probably going to prevent Redd from being approved in Copenhagen."

Black adds that many Redd supporters are opposed to placing avoided-deforestation efforts in government hands. "Such schemes raise visions of government corruption and inefficiency and could well be impractical," he says. "Does that mean the government is going to send out the army to fight forest-clearing coca growers or locals who log for their livelihood? The whole idea raises a lot of issues about how ministries and treasuries would handle all this, and Latin America is divided on it, with leftist countries, Venezuela, Bolivia and Ecuador also favoring nationalized schemes."

ISA's Santilli, credited with being a co-creator of the Redd concept (see Q&A—this issue), calls Brazil's attitude "ambiguous." Says Santilli: "[Brazil] solicits [greenhouse-gas-reduction] compensation through donations, but doesn't yet support inclusion of Redd in the carbon-credit market. It doesn't want to make a strong commitment to Redd. However, there are pressures from various sectors on it to do so, among them the Amazon state governors."

Brazilian groups seeking regional support for the initiative so far have made little headway with their own government, Santilli says. "Brazil always has opted for a preferential alliance with China and India, and has never been disposed to assume a leadership position among heavily forested countries," he asserts. Though some other Latin nations such as Venezuela oppose Redd, he adds, "[p]rivate Brazilian organizations that work for inclusion of forests in the international climate regime can always count on the strong support for Redd by other Latin American countries and must face Brazil's lack of support in climate negotiations."

Adaptation funds sought

On some major issues, the region speaks with one voice. Such is the case with the United Nations Adaptation Fund. Latin American and Caribbean nations are united on the need to dramatically expand the fund, which helps support everything from coastal storm-protection projects to improved waterworks in areas such as portions of Chile, Mexico, Guatemala and El Salvador that are expected to suffer from severe drought over the next 20 years.

In this case, however, the region's wishes have not been reciprocated by industrialized countries. Financed by a 2% tax on CDM carbon credits and voluntary donations from richer countries, the Adaptation Fund now stands, after one year in operation, at a paltry US$18 million. And wealthy nations are balking at developing-world demands for them to pledge significantly stepped-up annual contributions. Some experts say debate over the Adaptation Fund alone could be enough to cast a pall over the talks and derail any chances of an agreement in the near term.

"The lack of attention and investment in the Adaptation Fund is chilling," says Mintzer. "It is a deal-breaker for countries, including island states in the Caribbean, that are literally facing imminent and potentially fatal challenges where their access to fresh water and the ability of their populations to live without developing gills is on the table."

–Steven Ambrus

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Bolivia's lithium
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million tons of lithium, or 50% of the world's recoverable supply. That compares to 3 million tons in Chile, 2 million tons in Argentina, and 1.1 million tons in China.

Rechargeable batteries made from lithium are lighter and can hold a higher charge than rechargeable nickel batteries, the most commonly used in electric vehicles today. As such, lithium batteries could help countries cut dependence on imported oil, boost energy efficiency and fight global warming, experts say.

Such forecasts strike a chord with many Bolivian officials. "We want to put our lithium reserves at the service of the world's climate through car batteries and electric cars that don't contribute to climate warming," says Roger Carvajal, Bolivia's deputy minister for science and technology.

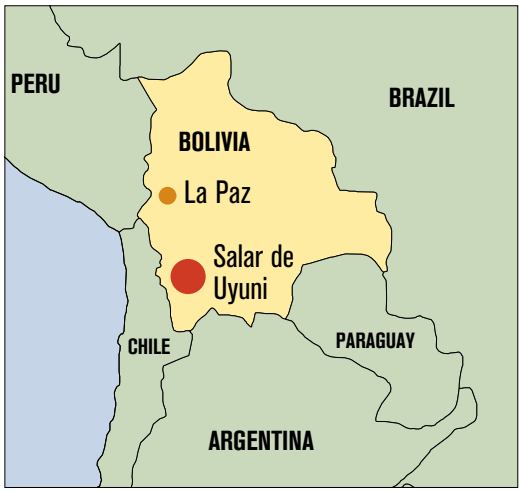
Earlier this year, Japanese conglomerates Mitsubishi and Sumitomo, as well as France's Bolloré Group and China's Citic Guoan Group, sent representatives to Bolivia to try to negotiate access to lithium. But they have not yet reached agreement with the government, which wants to mine lithium and have foreign companies build batteries and lithium-battery-powered cars in the country.

In May 2008, the Bolivian government began drilling four lithium wells and building a US$6 million pilot plant at the edge of the Salar de Uyuni to separate lithium from the other minerals with which it is found. Officials say that once such a plant ramps up, in the medium term it could create hundreds of jobs and generate tens of millions of dollars annually in foreign exchange. Bolivia expects to boost production from 500 tons of lithium annually in 2010 to as much as 40,000 tons by 2012. It plans to export lithium to the U.S. and Chinese markets the next year, and to begin producing lithium batteries for electric cars in 2018.

Demand for Bolivia's lithium could expand dramatically if electric-car initiatives pan out abroad. A major such initiative is the $2.4 billion program that U.S. President Barack Obama announced in March to spur development of plug-in electric vehicles. The bulk of that spending is slated to go to U.S. manufacturers of automobile batteries. Obama's goal, to get one million electric cars on the road by 2015, is sure to depend on lithium, experts say.

"I think there is going to be a very, very significant increase in demand for lithium," says Keith Evans, a California-based lithium consultant and former project manager at Chile's Salar de Atacama, currently the world's top lithium producer. "Science is on the side of the lithium-ion battery and demand for lithium could easily rise to five times what it is today."

But lithium mining involves digging wells



in the salt flats and pumping out underground brine, which is piped into evaporation ponds. The concentrated solution that remains is taken to processing plants, where lithium is separated from common salts and magnesium chloride. Though those processes are "among the least contaminating and most environmentally friendly of all mining activities," according to Haresh Kamath of the the nonprofit, California-based Electric Power Research Institute, there are still potential hazards, experts say.

Roads, evaporation ponds and barracks for workers must be built, and fresh water must be diverted from already scarce sources in the hot, dry area for use in the processing plants. That could pose risks for the salt-flat ecosystem, which serves as the breeding ground for the Chilean, Andean and James's flamingos, and is home to several thousand Aymara Indians.

Experts say the quality of the Uyuni reserves creates an additional hurdle. Compared to those of the Atacama, the Uyuni deposits require mining of a "much greater area of the Salar" to produce an equivalent quantity of lithium, according to a 2008 report by Meridian International Research, a French renewable-energy research firm.

Meridian, which maintains the world's lithium reserves are inadequate for a boom in electric cars, adds that trying to outfit even a small percentage of the world's cars with lithium batteries could result in "irreversible and widespread damage" to Uyuni.

Bolivian officials insist their country can ride the green-energy wave and avoid the environmental damage produced by some of the nation's other mining ventures. "We want to help care for the earth, not to cause environmental [harm]," says Deputy Minister Carvajal. "So we are going to do all the studies necessary to avoid environmental impacts."

–Steven Ambrus

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Carbon monitoring
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Institution for Science researcher who is based at Stanford University. "Redd represents an alternative."

But the plan to turn forest conservation into income could be torpedoed by competing forces—particularly in this region by miners who blast away with high-pressure hoses in search of gold. Another threat is climate change itself, which could compromise the ability of the region's forests to store carbon.

For avoided-deforestation efforts, this adds up to twin challenges—ensuring powerful economic incentives are brought to bear while at the same time developing reliable ways to measure and monitor forest-based carbon stocks.

Southeastern Peru's Madre de Dios department has become a laboratory for efforts on both fronts. For instance, Asner is testing new satellite and aerial technology to make monitoring faster, more accurate and cheaper.

To date, the difficulty and cost of monitoring tropical carbon stocks have been an obstacle. Some companies have embraced voluntary carbon offsets, but many are reluctant to pursue Redd without reliable ways to measure carbon in the forest and to monitor deforestation.

Aerial measurement

Asner says that by combining satellite images with three-dimensional, laser-generated aerial images, his team can calculate carbon stocks remotely with the same precision as can be achieved in the field—and at a fraction of the cost. In one afternoon, a technician sitting at a desk in Lima could produce an up-to-date image of the pilot area in Madre de Dios—some 4.3 million hectares (10.63 million acres)—at a cost of about 10 cents a hectare, he says.

From the air, Peru's Amazonian lowlands resemble a mottled green carpet adorned with snaking brown rivers and comma-shaped lagoons. Beneath the canopy, however, are dozens of forest types, from upland terra firme woodlands to palm swamps. They have different characteristics and store different amounts of carbon. Carried by plane 2,500 meters (8,200 feet) above the forest, Asner's Light Detection and Ranging (Lidar) system shoots laser beams at the trees below. The result is a three-dimensional image of the forest's biomass. Because about 48% of biomass is carbon, that allows Asner to calculate the forest's carbon stocks.

"These forests have, on average, 140 tons of carbon per hectare," Asner says of Madre de Dios. He can calculate the amount to within 20 tons per hectare. While that may still seem like a wide margin of error, other systems have an uncertainty level of 100% or more, he says.

Bamboo stores less carbon than a tree. But in the lowlands, carbon storage also depends on soil type and fertility, nutrient levels, frequency of inundation and human disturbance.

Asner found higher carbon stocks in forests that get enough seasonal flooding to wash nutrients into the zone, and lower levels in forests growing over more recent river meanders, where more severe inundation uproots trees.

Comparing Lidar images to satellite images enables Asner and Peruvian technicians to calculate biomass more precisely. They confirm their figures with on-the-ground spot checks of field plots. By making the software available for free and providing training, Asner hopes to develop an accurate, standardized system for use across the tropics. His next step will be to use Lidar to gather chemical data from trees so he can map species along with carbon stocks.

Subtler impacts

Monitoring must detect more than clear cuts. While selective logging causes less concentrated impacts than clear cutting, Asner says, the impacts add up. His data show that in tropical forests, selective cutting affects areas 20 times larger than clear cuts. And for every tree felled through selective logging, he says, 10 to 30 more fall due to the opening of access roads and damage during logging operations. Says Asner: "Selective logging "is better than [clear-cutting], but only if you do it well."

Global warming itself could compound the problem. "Climate change might trump all the issues," says Foster Brown, a scientist with the Woods Hole Research Center who studies land-use change in Acre, Brazil. "The range of plausible impacts [from climate change] is great enough to be of concern, and that is beyond the control of planners in the Amazon."

Climate models predict warmer, drier areas along the base of the Andes south of the equator—right where Peru hopes to offer forests for carbon offsets. Says Asner: "We have really scary evidence that these forests can't persist under a warm climate."

In Madre de Dios, alluvial-gold mining poses a particularly urgent problem. Environmental groups are devising a plan by which Redd will be used to persuade local landowners to protect their forested property. But miners worry about being forced out, and have threatened to lead regional strikes.

Whether initiatives such as Redd could create truly competitive incentives at the local level remains a question mark for many.

"[Redd] shows potential on the carbon-emitter side of the equation," Asner says. "The hard question is: can you bring it into a region and offset the desire to do mining?"

–Barbara Fraser

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ists are concerned that mining would damage or destroy páramo and cloud-forest ecosystems in the region.

On Nov. 1, three Río Blanco employees were killed in a confusing incident at a camp where exploratory mining is underway.

Company officials said about a dozen gunmen attacked the camp and set fire to the facilities. Government officials initially blamed traffickers who allegedly use the region to smuggle drugs to Ecuador, but police later discounted that version. An investigation is under way.

After the incident, some national government officials called for a military base to be established in the area, a proposal rejected by the Front for the Sustainable Development of the Northern Border of Peru, an association of local governments and community organizations.

The front instead advocated a "thorough and impartial" investigation, claiming police were harassing local community members in an effort to make them incriminate themselves or others.

Río Blanco General Manager Jian Wu stated that local residents were not to blame for the violence, saying the company has a good relationship with the area's communities.

Follow-up: Jian Wu, General Manager, Río Blanco Copper, Lima, Peru, +(511) 226-3322, jwu@rioblanco.com.pe; Javier Jahncke, Coordinator, Muqui Network Support Group for the Majaz Case, Lima, Peru, +(511) 470-0287, jjahncke@fedepaz.org.

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Investigation of activists in Chile draws criticism

A Chilean government investigation of eight activists in connection with a May 4 fire at the Puerto Montt offices of SalmonChile, a national salmon-farming industry association, is being condemned by critics as an attempt to stifle environmental and labor opposition to industrial salmon farming.

Invoking a controversial anti-terrorism law, the government investigated activists including two labor union leaders and biologist Hector Kol of the Aysén Small Fishermen's Association, a grouping of artisanal fishermen in northern Patagonia who are critical of industrialized salmon farming.

Chilean Senator Alejandro Navarro, former head of the Senate's environmental commission and a recent presidential candidate, says the government has "little evidence" and is violating international labor codes by its "persecution" of salmon labor leaders.

"They [the Chilean government] are creating a police state to protect their economic interests and a salmon industry which has only generated failures, pain and environmental contamination for southern Chile," Navarro says. "This government does not respect the fundamental principle that we are all equal under the law."

In September, the regional court in Puerto Montt gave the government four months, until Jan. 21, 2010, to continue its investigation and build a case against the activists. In August, the police entered the homes of each of the activists, removing their cell phones, computers, hard drives, compact discs, and files. The Puerto Montt district attorney in charge of the case, Sergio Coronado, told reporters that their most recent hypothesis is that a bomb had been placed on the first floor of SalmonChile's offices.

Authorities say recent attacks on banks in Chiloe and Santiago appear to have involved similar methods.

Kol, a leading authority in Chile on environmental damage caused by salmon farming, charged in an interview with EcoAméricas that the bomb theory is the sixth different hypothesis put forth by authorities. He says police have refused to release his computers and other belongings, which he says were confiscated illegally.

"This case is a reprisal by the government for our opposition to their plans to privatize the Chilean sea for salmon farming," Kol says. "They want to weaken and discredit the opposition because we are an economic threat to what was once the nation's second-leading export."

Kol says the activists and Chile's national labor union federation are considering taking their case to the international arena by filing labor and human rights complaints, respectively, with the Chile-Canada Free Trade Agreement and the Inter-American Court of Human Rights.

Follow-up: Hector Kol, Coordinator, Salmon Farm Program, Aysén Small Fisherman Association, Puerto Montt, Chile, +(569) 684-36573, kolhector2@gmail.com; Alejandro Navarro, Member, Chilean Senate, Valparaiso, Chile, +(56 32) 250-4582, anavarro@senado.cl.

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U.S., Cuban scientists planning joint research in Gulf of Mexico

Sensing a thaw in U.S.-Cuban relations, scientists from the two nations and from Mexico have drafted plans for collaboration in the Gulf of Mexico on issues including fisheries management and the protection of coral reefs and coastal ecosystems.

The agreement came last month during a marine sciences conference in Havana organized by the Cuban Ministry of Science, Technology and the Environment (Citma) and 1planet1ocean, a U.S. nonprofit.

Dan Whittle, a lawyer with the U.S.-based Environmental Defense Fund and a participant in the Havana meeting, says that because Cuba and the United States share many ecological resources, yet manage them in different ways, greater exchange is needed among academics, scientists and conservation groups.

"We can address the growing threats to coral reefs, ocean fish populations, habitats for migratory birds, marine mammals and turtles, and biodiversity," Whittle says. "Fishing, shipping, and oil and gas development in Cuban waters have a direct impact on the United States, and vice-versa."

The Havana conference came on the heels of a September visit to the United States by four leading Cuban marine scientists, a trip Whittle qualifies as "historic" given the dearth of visas the United States has granted to Cuban scientists in recent years.

Whittle says the visas are the latest signs of change in U.S.-Cuban relations. He also cites U.S. President Barack Obama's lifting of restrictions earlier this year on Cuban-American remittances and travel to Cuba, as well as recent government-to-government negotiations on immigration and postal services.

Such progress, he adds, might lead to the improvement of U.S.-Cuban joint action on the environment—a subject that cannot be addressed by nonprofit groups alone.

"It would be relatively easy to put it on the agenda as it is less political, and there really is an urgency to save fisheries," Whittle says.

A U.S. State Department spokesperson says there are no government plans to initiate such talks. Officials at the Cuban Interests Section in Washington could not be reached for comment.

Follow-up: Daniel Whittle, Senior Attorney, Environmental Defense Fund, Raleigh, North Carolina, (919) 881-2914, dwhittle@edf.org.

Q&A:

Redd co-creator urges idea's adoption in Copenhagen

A hot topic at next month's climate conference in Copenhagen will be a concept called Reduced Emissions from Deforestation and Forest Degradation (Redd). If Redd is included in a future climate regimen, industrialized nations could meet greenhouse targets in part by funding developing-world projects to slow deforestation. And if he were so inclined, Brazil's Marcio Santilli could claim some credit. Santilli, co-founder of the Socio-Environmental Institute (ISA), a leading Brazilian green group, is one of the concept's original proponents. That's why Time magazine named him one of its "Heroes of the Environment" for 2009. Santilli co-founded ISA in 1994, after serving in Brazil's Congress. He became ISA's first executive director but took a leave in 1995 to lead Funai, Brazil's indigenous-affairs agency, returning to ISA two years later. He now coordinates ISA's Environmental Law and Policy Program. Santilli spoke recently with EcoAméricas correspondent Michael Kepp.

Marcio Santilli

Were you the first person to come up with the Redd idea?

I and five other people presented the concept, which we called Credd, or Compensation for Reduced Emissions from Deforestation and Forest Degradation, at the UN climate change meeting in Milan in 2003. Credit should go to the whole group and to the efforts of many others who have tried to find a viable solution to encourage the reduction of tropical deforestation.

Why should Redd be included in a post-Kyoto climate treaty?

Protecting existing tropical forests is essential for the future of the planet. Yet the Kyoto Protocol didn't provide financial compensation for projects in countries that reduce greenhouse gas emissions through forest conservation. Any post-Kyoto treaty that results from the Copenhagen conference needs an instrument like Redd to correct this omission. Providing such compensation could cause developed countries to transfer billions of dollars in the form of carbon credits to tropical, developing nations, which have slowed greenhouse emissions by reducing deforestation rates. It is crucial that developing countries get the financial encouragement needed to reduce deforestation rates. Deforestation accounts for 17%-20% of greenhouse emissions worldwide, more than the global transport sector.

Some critics say carbon savings through Redd would lack permanence since forests can later be cut, and so-called leakage can occur when conservation in one area boosts deforestation in another.

Using annual, national deforestation rates is the best way to avoid this leakage. Forestry-related carbon stocks, because they are on the earth's surface and in contact with the atmosphere, will always be the most at risk. As such, measures to protect them need to be strengthened, not dismissed. The permanence of these stocks should be guaranteed on a daily basis, both by satellite monitoring and the constant presence of federal and state environmental field teams. If, for whatever reason, these carbon stocks are released into the atmosphere, all global efforts to reduce carbon emissions will be for naught. [Developing] countries with the most greenhouse emissions need to be compensated, a posteriori, for verifiable reductions of their deforestation rates. Countries whose forests have historically suffered from a significant amount of deforestation but which do not have control systems, such as satellite monitoring, should have access to investments, say donations, that are not linked to carbon credits. Although those countries should provide most of the capital for such control systems, part of the outside investments could go to putting control systems in place. It's of paramount importance that countries with forests have affordable access to remote monitoring technologies that can be coupled to local verifications systems. Countries whose forests have historically not suffered significant deforestation should be supported by other mechanisms outside the carbon-credit market such as developed-country donations and a tax on all carbon-market transactions.

Critics also say Redd might harm forest communities by triggering land grabs by governments or companies eager to earn income for protecting woodlands. And they claim developed nations might use Redd to skirt their greenhouse limits, creating a counterproductive shell game.

For Redd to function effectively, three things need to be put in place: international rules, national policies and local projects by forest communities. Without even one of these components, Redd will produce no results or skewed results. I don't believe any government or private company can reach consistent deforestation emissions reductions by expelling forest communities, among them indigenous groups, from their land. If such expulsions were to somehow occur, the responsible parties should be denied compensation because they have practiced a crime against humanity. As for developed countries using Redd credits to avoid post-Kyoto commitments, I feel that in any post-Kyoto agreement, all signatory countries must reach part of their targets by a compulsory reduction of their own emissions. They can't be allowed to reach their targets simply by buying enough carbon credits in developing countries. If some signatory countries don't achieve any emissions reductions, they should not have access to a compensatory mechanism, not even Redd.

Industrialized nations seem supportive of Redd, but worry it might flood the market with carbon credits, threatening revenue streams for renewable energy projects.

It would be marvelous if implementation of Redd were to suddenly cause significant deforestation-emissions reductions in tropical countries to the point of inundating the carbon market. But I don't think that this is a realistic hypothesis. Even with the existence of Redd, [reducing global greenhouse emissions] will be difficult and costly, and there will be a delay in the effective reductions from deforestation. So brokers of carbon credits coming from energy projects shouldn't get nervous.

What do you expect to emerge in the wake of Copenhagen?

I hope for strong climate-change mitigation, but the signs are that there will be bold emissions-reduction targets only for 2050, and laxer ones for 2020. And I hope any post-Kyoto treaty includes Redd programs. Developed countries need to adequately compensate developing countries for reaching post-Kyoto treaty targets. Redd is a fundamental mechanism for doing so.