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GLOBALWATERS



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In Latin America &
the Caribbean

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Protecting Central America's
Fragile Ecosystems

& more ▶

A FRESH WELCOME TO THE NEW YEAR

As we begin the new year, we take a fresh look at some of the challenges unique to safeguarding the rain forests, mangroves, farms, and coastal waters that make Latin America and the Caribbean (LAC) one of the most biodiverse regions in the world.

The stories in this edition of *Global Waters* take readers on a fascinating journey through the beautiful and fragile ecosystems of the LAC. USAID and our implementing partners have been working together to protect biodiversity and improve food security in this region rich with natural resources, but threatened by overuse, pollution, climate change, and other risk factors.

Protecting the region's many resources requires the participation of all stakeholders and a clear understanding of what's at risk if those resources are not managed properly. By engaging local fisheries, lobster divers, water user associations, farmers, businesses, and residents alike in training and educational programs, the agency is proving successful in teaching a population with diverse needs and interests how to share the region's natural gifts in a sustainable manner.

As a result, farmers are mastering new techniques, fishermen are learning when and how to fish for the greatest bounty, and small local business owners have been able to improve the quality of the water supply by reducing exposure to unnecessary contaminants.

Clearly we still have many lessons to learn and challenges to face, but our participants are gradually finding that as the size of their catch or crop increases, so does their income, health, and the welfare of their families and communities. And the natural beauty of Latin America's coastlines and forests is protected and nurtured along with its inhabitants.

We hope you will enjoy learning about our efforts in Latin America and the Caribbean and that you will share the stories you find in these pages with your colleagues and friends.

The Water Team
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PRESERVING BIODIVERSITY: Leaders of the Cofán indigenous community strategize plans for management of natural resources in the group's territory.

Photo Credit: USAID

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ON THE COVER: Scenes from the LAC's natural beauty

Photo Credits: (Clockwise from top left) Jerry Bauer, USAID/Ecuador, Kendra Helmer, Thomas J. Müller

striking BALANCE^a

In Latin America &
the Caribbean

The lush rainforests of the Amazon Basin; the high-altitude shores of Lake Titicaca; the glacier-carved grasslands of the páramo: The unique and biodiverse geography of Latin America and the Caribbean provides a rich backdrop for the people and wildlife that claim this region as their home. Yet the challenge of improving the livelihoods and health of the human population while simultaneously working to protect, conserve, and restore endangered ecosystems and the water resources that support them is a daunting one. For USAID and its implementing partners in Latin America and the Caribbean (LAC), these goals are inextricably linked.

The LAC region includes five of the world's 10 most biodiverse countries: Brazil, Colombia, Ecuador, Mexico, and Peru – as well as the single most biologically diverse area in the world – the eastern slope of the Andes Mountains. It is also home to approximately 27 percent of the world's mammals, 34 percent of

its plants, 37 percent of its reptiles, 43 percent of its birds, and 47 percent of its amphibians. In fact, 40 percent of the plant life in the Caribbean is found nowhere else on earth. Therefore, approaching humanitarian concerns in the region with an eye for conservation is not only appropriate, it is necessary.

Threats to ecosystems and watersheds are severe and numerous, as deforestation, gold mining, land conversion for agriculture, infrastructure development, climate change, and other impacts pollute rivers and fragment habitats. Such activities not only pose a risk to nature, they threaten indigenous groups, urban dwellers, and industries – all of which depend upon the ecosystem services that intact and healthy wild lands and waters provide. A number of USAID projects in the LAC region have confronted these growing challenges head on, and by taking a holistic approach, have notched gains for conservation and quality of life alike.

NATIVE TRADITION: This member of the Cofán indigenous community lives in one of Ecuador's most sensitive ecosystems in the Guamez Valley region.

Photo Credit: USAID



Supporting Livelihoods at Lake Titicaca

The largest lake by volume in South America, Lake Titicaca is home to several native species of fish – important sources of protein for both the humans and the endemic birds that live around the lake. But on the lake’s Bolivian shores surrounding Cohana Bay, roughly 20,000 cattle also roam. While providing milk for small family farms, they produce 400 tons of manure daily, creating a significant source of water pollution in the lake.

To mitigate this impact and boost the economic stability of families living around the bay, USAID began the Manejo de la Contaminación en el Eje Hidrográfico El Alto-Lago Titicaca program, referred to as PROLAGO in the English translation, in 2009. PROLAGO has provided cost-sharing and technical support to farmers to build stables – more than 150 so far – where cows can stay at night. The benefits of the sheds are many: the cows stay warm and increase milk production, they stay away from the lake shores and inlet streams, and their manure is concentrated and can be easily collected.

The collected manure becomes fodder for vermicomposting, a process which uses worms to compost the waste into organic, material-rich humus. USAID has helped connect farmers to markets for this soil-enriching agent, including lowland coffee farms and municipal gardens in La Paz. Some families are also using manure to fuel biodigestors, another “recycling” system, in which microbes process manure into a high-quality fertilizer and produce methane gas for cooking as a byproduct. “A once worthless resource is now a coveted resource,” said Bruce Bayle, USAID/Washington environmental specialist.

PROLAGO is estimated to have prevented 1,000 tons of manure from entering Lake Titicaca each year, while also providing families with an additional, more dependable source of income. USAID is tracking the environmental impact of this reduction with 23 water monitoring stations that begin high up in the watershed – at 13,500 feet in the city of El Alto – and end within the lake itself.

Another aspect of the PROLAGO program has its focus on industry rather than agriculture, yet shares the goal of creating harmony by protecting water resources and simultaneously supporting the local economy. A major industry in El Alto is leather tanning, a toxic

**“YOU CAN HAVE YOUR
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FOR THE ECOSYSTEM.”**

process, which uses chromium as a curing agent to make the leather supple. “The program correctly decided if we’re going to get some impact in El Alto, we don’t need to work with little guys, we need to work with biggest guys in each sector,” said Mr. Bayle. Thus, PROLAGO targeted the city’s largest tannery.

Building on an earlier USAID effort called the Cleaner Production Program, the PROLAGO team helped the tannery implement relatively simple changes.

A substantial change was introducing an improved mix of tanning chemicals, which significantly lowers the amount of toxins such as chromium, that wind up in wastewater, typically dumped in a nearby stream. As an added financial benefit, tanneries also save money by using less of the expensive chemicals.

Conservation Across the Amazon

Taking an even broader approach to meeting the collective needs of the environment and LAC’s human population, one of USAID’s largest environmental programs in the region is the Initiative for Conservation in the Andean Amazon (ICAA). With \$37 million from USAID and \$10 million from partnering organizations, ICAA launched in 2006 as a five-year program to foster sustainability in the region, while simultaneously improving local livelihoods. Centered on various communities in the Amazon Basin, the river and its related ecosystems serve as a touchstone for the program, even though most projects have terrestrial-focused goals.

With 20 organizational partners, ICAA developed five consortia, each dealing with different trans-boundary regions and issues. One consortium, led by the Rainforest Alliance, includes activities in Bolivia, Colombia, Ecuador, and Peru, and offers technical guidance to coffee farmers to utilize more sustainable techniques in processing their beans. On

DRAMATIC OVERVIEW: Aerial view of the Amazon River Basin.
Photo Credit: Jorge López

one farm, implementing the new strategies reduced water consumption from 10 liters per kilogram of coffee beans to just one liter per kilogram.

Meanwhile, other ICAA consortia give communities that would otherwise not have a voice in political debates the capacity to contribute and influence decisions affecting the natural resources they depend on. By teaching Spanish and offering communications and computer training to the Cofán indigenous group, for instance, a consortium organized by The Nature Conservancy allows the Cofán to engage on a national level in discussions involving land claims and infrastructure development. Similar efforts supported by a University of Florida-led consortium paid off in Peru, when members of

another indigenous group noticed a decline in water quality and fish perishing in unusual patterns in the Tipishca and Abujao rivers. Using their community's new avenues for communication, they were able to contact the regional government, which responded by enforcing regulations that governed non-renewable resource extraction in the nearby area. ICAA's next phase, ICAA II, is currently in the planning stages and will offer new opportunities to take on environmental challenges in the Amazon region.

Community Support for a Watershed

Like ICAA, another USAID-supported effort has channeled the desire of local populations for sustainability into real conservation action. As rural people have migrated into Ecuador's capital of Quito, the population has swelled – and so has the population's thirst. The current monthly use of water in the city of two million is enough to fill 15,000 Olympic-sized swimming pools.

Meanwhile, protected areas in the upland páramo – high-elevation grasslands that provide roughly 70 percent of Quito's water – were in need of restoration and greater levels of oversight. According to Paola Zavala, mission environment officer with USAID in Quito, "There was a concern that demand for water was going to be higher and higher and that there was going to be a scarcity of water."

To address that concern, USAID helped rally support to create FONAG, or the Quito Water Conservation Fund, using one percent of the city's municipal water revenue. From 2000 to 2004, while the fund built capital, USAID helped subsidize conservation activities, such as training park guards, sharing information on sustainable land management with private landowners, and conducting habitat restoration work in the páramo's protected areas. For the urbanites, farmers, and businesses of Quito, "It was a perfect link between conservation and water and getting the users involved to establish something that will last for a long period of time," said Ms. Zavala.

When the fund was converted to dollars from the local currency in 2000, it totaled just \$21,000. Today FONAG totals nearly \$9 million and supports programs ranging from environmental education for students to monitoring water metrics and biodiversity.



CHOCOLATE EXPORTS: Through a partnership with USAID, farmers in Ecuador now process cocoa beans and ship them worldwide.

Photo Credit: Satre Communications



Since finding success with FONAG, USAID has helped launch five more water funds in other areas of Ecuador, and the program has also provided guidance for water funds in Colombia, Peru, and Bolivia. "We have to make sure that these have sustainable financing and good structure so they can overcome political changes and have the technical expertise to keep going," said Ms. Zavala.

Protecting a Treasured Coast

Another Ecuador-based effort, Sustainable Forests and Coasts, is a five-year program initiated in 2009, which has married the twin aims of supporting communities while conserving critical natural resources. In one element of the program, USAID has worked with Ecuador's Ministry of Environment (MAE) and communities in the Gulf of Guayaquil to protect mangrove forests – a unique ecosystem type that serves as a natural protective barrier against flooding and other extreme weather events. Many communities in the gulf rely on income from crabbing, so any solution had to permit them to continue this harvest while also preserving the mangroves.

The MAE awarded communities the right to crab at sustainable levels in certain areas, but only if the people took action to protect the mangroves. To help communities save this important resource,

USAID assisted in the development of a monitoring system. Using marine radio frequencies, residents can now alert authorities to any illegal activities. To date, the surveillance system has been implemented on 7,558 acres of mangrove forests. Other aspects of the Sustainable Forests and Coasts project include replanting shoreline vegetation and training land managers in best practices that protect habitats and watersheds. It is estimated that by the middle of 2012, these projects will have improved management over more than 135,000 hectares of Ecuador's marine areas.

With such programs, "You can have your cake and eat it too," said Victor Bullen, bureau environmental officer with USAID/LAC. "You can improve water quality and access while also improving it for the ecosystem." In the LAC, it's clear that biodiversity conservation and humanitarian aid can go hand-in-hand—and must, if healthy ecosystems and peaceful communities are to coexist in a changing world.

K. Unger Baillie



FOR MORE INFORMATION, VISIT:

http://www.usaid.gov/locations/latin_america_caribbean/

PROUD ACCOMPLISHMENT: PROLAGO's efforts have produced happier, more productive cows and kept their manure out of the lake.

Photo Credit: Bruce Bayle, USAID

THE MAREA PROGRAM

PROTECTING CENTRAL AMERICA'S ECOSYSTEMS WITH SUSTAINABLE SOLUTIONS

SERENE SCENE: View of the archipelago, mangroves, and coral reefs, showing some development for tourism.

Photo Credit: Helena Miranda/MAREA

In the early morning, a young fisherman plunges off a commercial fishing boat into sparkling blue waters off the Honduran Moskitia Coast, carefully gathering his lobster catch for the day. This diver, like most others, might have submerged up to 10 times a day, three times more than allowed by safety guidelines. Although efficient and financially lucrative, repetitive, same-day scuba dives can be dangerous because of the excess build-up of nitrogen in body tissues, which can lead to a variety of debilitating physical problems and possibly early death. In addition to the toll this dangerous activity takes on the human population, diving and other kinds of commercial fishing have decimated the spiny lobster, shrimp, and sea turtle populations, along with other species of fish that Central Americans rely on to survive. It is a vicious cycle, where limited economic alternatives and governance in these distant coastal regions drive Moskitia Indians to risk dreadful physical disabilities, while at the same time, the coastal ecosystems they rely on are rapidly degrading due to overharvesting of natural resources.

In order to put an end that cycle, the Honduran government and its neighbors in Central America signed an agreement banning scuba diving for lobster, which will go into effect in February 2012. But securing support for the ban requires buy-in from all stakeholders in the region. While few question the need to implement the ban, there is great concern about what will happen to the divers and the lobster industry once it is implemented.

The USAID Regional Management of Aquatic Resources and Economic Alternatives (MAREA) program has been working to gain acceptance of the ban by bringing together officials from environmental and fishing agencies of the Central American countries along with other relevant local institutions to address those concerns.

In Central America, more than 21 percent of the population resides in coastal communities, where at least 250,000 residents live in poverty and directly depend on lobster, shrimp, and fish harvests for their livelihood. The lure of the lobster-dive is economic: "These divers have been able to make \$20 per day in a region where most fishermen earn \$1 - \$2 per day," said Sergio Martinez, MAREA's fisheries expert.

Another challenge is that soil erosion from farming and coastal development along the Central American coastline has degraded critical ecosystems, including coral reefs and seagrass that support the fish stock. More than 50 percent of the region's mangrove forests have been lost by conversion to other uses like intensive agriculture and aquaculture, shrinking the habitat for maturing lobsters and fish. The loss of mangrove forests also leaves the coast vulnerable to flooding because they no longer block strong waves and winds that rush ashore, whittling away the shoreline during the stormy season. These pressures on the ocean and coastal habitats could put as many as 136,000 Central American fishermen out of work, according to a 2010 report from

the Organization for the Fishing and Aquaculture Sector of Central America (OSPESCA) and the UN Food and Agriculture Organization (FAO).

To tackle these challenges, USAID's strategy is to promote alternative livelihoods and to foster novel, more sustainable fishing practices.

To help find employment for the many fishermen who stand to lose their jobs, USAID has secured financing agreements to support the equipment purchases needed to assist with the creation of new job opportunities. For example, the Program is working with the Central American Bank for Economic Integration to provide loans and outside donations to help offset the cost of upgrading village fishing boats with fiberglass to ready them to carry tourists. "The goal of this joint initiative is to create an opportunity for private and public

investment in new, sustainable tourism activities that can employ out-of-work fishermen and divers," said MAREA Chief of Party, Nestor J. Windevoxhel.

USAID is also encouraging local fishermen and country-level natural resource managers to adopt a broader, ecosystem-based approach to marine-coastal conservation. For the past year, MAREA has made significant strides educating local fishermen and regional leaders about rights-based mechanisms such as 'catch-shares,' which grant fishermen exclusive access to fish stocks in designated areas while making other vulnerable areas off-limits.

"Rights-based mechanisms work to alleviate the 'problem of the commons' where fish stocks are a common resource. The goal of these programs is to incentivize fishermen to utilize their resources in a sustainable manner. By granting rights to



RISKY BUSINESS: A lobster diver off the coast of Honduras paddles out to find a spot for diving; then shows off his bounty of spiny lobster

Photo Credit: Nestor Windevoxhel, USAID



“THIS MOU ESTABLISHES AN EFFICIENT WORKING MECHANISM THROUGH WHICH ALL MINISTERIAL REPRESENTATIVES FROM ALL SEVEN COUNTRIES PARTICIPATE IN PROGRAM IMPLEMENTATION,” DR. HASBUN SAID.

PLENTIFUL CATCH: Fisherman coming in from the ocean with the fish he caught in Fortaleza, Brazil.

specific fishermen you allow the fishermen to play a key role in sustainability and teach them how to regulate themselves,” explained Dr. Carlos Hasbun, regional biodiversity specialist for USAID.

“Once you have established clear access rights and ‘ownership’ or tenure over the resources – whether in the form of community territorial rights or individual catch- shares – this promotes stewardship and responsible management of the natural resources,” said Dr. Barbara Best, USAID’s natural resources management/coastal resources and policy advisor. “There are many examples in developed countries, including Australia, New Zealand, Mexico and the U.S., where catch-shares have improved the fish populations, reducing fluctuations and making them more resilient to climate impacts,” she added.

Another way that USAID is fostering best fisheries management is by requiring fishermen to use traps with a hatch that allows baby lobster to escape. The spiny lobster has a longer life cycle than other species, and takes one year to grow from larvae to

juveniles. Juveniles then settle on the sea floor for at least another year and grow to maturity before mating for the first time. “These traps prevent the preferential sale of baby lobsters,” said Mr. Martinez. “A key to restoring the lobster population is allowing lobsters to mate and the females to spawn at least once before they are caught,” he added.

Perhaps MAREA’s greatest accomplishment has been the establishment of a positive rapport among the officials working for the regional and national institutions of environment and fisheries from the seven countries included in the program. “This was challenging because of the intrinsic need to establish a common agenda on sustainable fisheries. It has been a great success to have fruitful discussions between these groups on how to incorporate an ecosystem-based approach into the fisheries management process,” said Dr. Hasbun.

“We are working to strengthen the buy-in from each country in the region in order to incorporate the Program’s overarching goals into their national and



UNSAFE OCCUPATION: Selin Taylor Wood breathes through a mask in the hyperbaric chamber after suffering an embolism while diving at 86 feet.

Photo Credit: Toby Jorrin

regional programs. This will ensure that in the long run MAREA’s goals will be sustainable,” he said.

MAREA staff members have visited a variety of regional, national, and international organizations in an effort to incorporate international affairs ministries into the dialogue on project design and implementation.

These talks led to a declaration of support from the Central American Integration System, whose role is to integrate policies and procedures at the regional level in Central America. On June 24, 2011, OSPESCA and the Central American Commission for Environment and Development, represented by government officials from each country’s fisheries and environment ministries, signed a memorandum of understanding (MOU) outlining their shared focus. “This MOU establishes an efficient working mechanism through which ministerial representatives from all seven countries participate in program implementation,” Dr. Hasbun said.

MAREA continues to face several entrenched challenges including: limited governance capacity in each country, the illegal drug trade along the entire central coastal zone of the Central American Caribbean, a lack of infrastructure, and the allure of

quick money for lobster divers willing to take the risk of diving more than several times each day.

In order to be successful, the program will need to evoke change from all the stakeholders on a number of fronts at the same time.

“The key to success is including all the actors in the value chain to participate actively in the process, from the diver to the retailer to the importer,” said Dr. Hasbun.

Mr. Martinez agreed. “In the end, it is the people who are going to make sustainability a reality.”

C. Cooney



FOR MORE INFORMATION, VISIT:
<http://www.usaid.gov/pa/Information/Documents/USAID%20Fact%20Sheet%20MAREA%20and%20HIV-AIDS%20Regional%20Programs%20-04%2013%2011.pdf>

A WINNING PROGRAM

IN HAITI PROTECTS LIVES AND LIVELIHOODS

In the Cul-de-Sac basin outside Port-au-Prince, a farmer stands next to a fledgling mango tree as he tends his sorghum along the steep mountainside.

In the past there was little to keep his topsoil from eroding and clogging the Rivière Grise in the plains below, but now this tree's tender roots can one day hold the soil in place.

In much of the world, a fruit tree along a mountain ridge would be an unremarkable sight. But in Haiti, this tree is a symbol of hope that USAID's five-year, Watershed Initiative for National Natural Environmental Resources (WINNER) program can help secure the country's food supply by stabilizing selected watersheds using a comprehensive, holistic approach.

Since 2009, WINNER has helped Haiti's farmers protect their land against extreme weather, prevent soil erosion, and improve agricultural productivity through integrated activities across entire watersheds. Since the devastating 7.0 magnitude earthquake in 2010, its effective watershed approach has focused heavily on food security under the Feed the Future Initiative.

About 60 percent of Haiti's nine million people are farmers, but the country still imports more than 50 percent of its food. Haitian food production, processing, and marketing have been in decline for years. According to the Food and Agriculture Organization (FAO), approximately 80 percent of Haiti's population lives below the poverty line, and more than 60 percent cannot access sufficient food to eat due to lack of production and income. Rapid population growth led farmers to cultivate annual crops using traditional farming methods on Haiti's steep hillsides once flat land was no longer available. This caused too much sediment to drop into rivers and irrigation canals below. This clogging of the canals lowered agricultural productivity and made crops more vulnerable to damage and flooding during the Caribbean's long,

FARMING METHODS: Terraced fields dot the landscape around Kenscoff, outside of Port-au-Prince, Haiti.

Photo Credit: Kendra Helmer, USAID

ABUNDANT CROPS: John Atis, WINNER's regional director for Kenscoff, indicates cabbage grown at the Wynne Farm outside of Port-au-Prince, Haiti.

Photo Credit: Kendra Helmer, USAID



“NOW, WATER REACHES MORE FARMS, AND FORMERLY UNCULTIVATED AREAS ARE PRODUCING FOOD. THERE ARE BEANS THERE FOR THE FIRST TIME IN 20 YEARS.”

punishing hurricane season. Haiti's beleaguered watersheds needed attention from top to bottom.

WINNER's innovative, watershed-based approach has done just that. Up in the mountains, long term efforts such as tree and grass planting, and short term efforts to build dry stone walls are beginning to halt the erosion caused by decades of poor management and protect the work in the plains below. Downstream, the massive undertaking to dredge irrigation and drainage canals and re-profile rivers is reversing the damage caused by severe sedimentation. Across the entire watershed, farmers are being trained in modern farming techniques to help them preserve the gains made. The result is that while the watersheds improve, production and incomes increase simultaneously.

“You need to have healthy watersheds upstream to have productive plains downstream,” said Mario Kerby, deputy chief of party for WINNER at Chemonics International, USAID's implementing partner. Working with the Government of Haiti and FAO, USAID's WINNER program taps into a network of more than 200 farmer associations and community-based organizations in the Cul-de-Sac, Cabaret, Mirebalais, and Arcahaie regions.

It is none too soon. “Deforestation and traditional agricultural practices have resulted in loss of soil fertility,” said Mr. Kerby. “Farming on Haiti's steep slopes leads to loss of topsoil, to the point where farmers can no longer grow their crops.” WINNER's reforestation and grass planting efforts will be critical



MAXIMUM YIELD: Lettuce is one of the crops successfully grown through WINNER program, which provides farmers with access to innovative science and technological advances.

Photo Credit: Kendra Helmer, USAID

for stabilizing hillsides and keeping rivers and canals flowing below, complementing the efforts to open up the waterways. WINNER has also introduced vertical agriculture and greenhouses, which use smaller areas to gain higher yields. Therefore, farmers can replant using agroforestry on areas of land no longer required for crops. Eighty percent of the program's new trees bear cash crops like mangoes, giving farmers an incentive to plant the trees and care for them.

WINNER also addresses the gullies formed by the erosion of mountainsides during heavy rains. The program employs simple, cost-effective methods to temporarily conserve soil on hillsides while the reforested trees can take the time to grow strong roots. Local farmers are hired to construct dry stone walls and gully plugs at regular intervals, which slow the flow of water and reduce the runoff that clogs rivers and irrigation systems below. The WINNER project also sets up water catchments to collect the rain, allowing farmers to grow crops year round and earn the income from their sales.

Minimizing erosion upstream protects USAID's work to restore rivers and irrigation canals downstream that were still choked by decades of sedimentation. La Quinte River and several sections of the Rivière



AGRICULTURAL PRODUCTIVITY: A farmer plants leeks at USAID/WINNER's Wynne Farm in Haiti.

Photo Credit: Kendra Helmer, USAID

Grise have been dredged and irrigation canals extended and updated. "Now, water reaches more farms, and formerly uncultivated areas are producing food. There are beans there for the first time in 20 years," said Senior USAID Agronomist, James Woolley. The dredging and enlarging of rivers, such as the La Quinte river, protected the city of Gonaives

from the ravages of hurricane Thomas in 2010. To sustain the program, newly established water user associations collect fees that maintain the canals, keeping them from getting clogged again, he added.

Due to lack of access to improved agricultural production technologies and agricultural inputs, farming techniques have become antiquated, lowering the country's agricultural productivity. Inefficient use of water resources has also led to a decrease in water availability. Through WINNER, farmers are educated in watershed protection at all levels. The project established seven rural centers for sustainable development to demonstrate best farming practices, encourage alternatives to charcoal production, conduct Master Farmer training courses, and provide access to innovative science and technological advances. "If you can produce food locally and bring it to local markets, it increases food security and income for the country's poorest communities," said Mr. Kerby.

With USAID's comprehensive assistance, Haiti's farmers dramatically increased their yields. Total food production on WINNER-supported farms in the spring 2010 planting season increased by 75 percent over 2009. Average production of corn increased by 118 percent, beans by 100 percent, sorghum by 139 percent, and potatoes by 18 percent. In 2011, increases in productivity yielded \$10 million in gross margin for farmers. "I have been a farmer for five years and I used to barely scrape by," said Ronald Champagne, a member of a farmer's association in Duvivier. "I am producing a lot more since I received WINNER assistance, and my products are of better quality. Because my income has increased, I can now plant hot peppers and eggplant that sell very well. Before WINNER, I could not afford to plant these crops. Now I can afford more things for my son. My family is doing much better."

Not all aspects of the project have been easy to implement, however. Getting farmers to change their practices required convincing. For instance, long-established rice growing techniques used large clumps of seeds and vast amounts of water and pesticides. At first, farmers were not willing to stake their farms on new techniques, but demonstration plots proved to be a very effective, risk-free way to show farmers how to gain significantly higher rice yields with half the seeds, dramatically less water, and fewer pesticides. According to Mr. Kerby, rice yields from the new



CULTIVATING CROPS: WINNER's farmers are trained in new farming techniques to help maximize their crop output and increase revenues.

Photo Credit: Kendra Helmer, USAID

System of Rice Intensification are usually more than double the average yields from traditional methods.

Reversing Haiti's environmental and agricultural deterioration requires focused efforts across its watersheds. USAID's WINNER project and its holistic approach were adapted from best practices for watershed management used around the world by Canada, Spain, France, the Inter-American Development Bank, and the United Nations Development Program. The program's agricultural results provide hope that food security is possible.

Today, the mango sapling in the Cul-de-Sac basin is as delicate as the watershed's recovery. But if well-

tended, that tree will bear fruit for centuries. And as it matures, its roots will spread deep and wide, securing everything around it: the soil, the farmer's livelihood, and the future of Haiti's food supply.

A. Gambrill



FOR MORE INFORMATION, VISIT:

http://www.usaid.gov/help/haiti/documents/winner_100408.html

<http://www.youtube.com/watch?v=13WAUvr-8DI>

CURRENTS

Currents provides a brief overview of selected USAID funded programs dedicated to water-related issues in the developing world. Each edition of *Global Waters* will highlight different programs from diverse regions and provide reports of the programs' recent activities, challenges, successes, and/or results. If you know of other USAID-funded programs that we might include in an upcoming edition of *Global Waters* please write to us at: waterteam@usaid.gov.



Photo Credit: Micah Albert, Courtesy of Photoshare

Horn of Africa Crisis Update (December 2011)

Our October issue highlighted the famine crisis as a result of the drought in the Horn of Africa. Below are the most current updates:

On Friday, November 18, FEWS NET and the UN/FSNAU released updated data and analysis on the crisis in the Horn of Africa. The latest information, which is based on retrospective data collected in October 2011, is less dire than previously projected by FEWS NET. These improvements are largely driven by humanitarian assistance, which has significantly improved household food access. Humanitarian assistance also contributes to sharp drops in food prices, which nonetheless remain above average.

This latest report is expected to state that food security conditions have improved throughout southern Somalia. In the regions of Bay, Bakool, and Lower Shabelle, food security classification has improved from Famine (Phase 5) to Emergency (Phase 4). In the Middle Shabelle region and the IDP areas in Mogadishu and Afgoye, conditions have improved but remain classified as Famine. While the number of people at risk of starvation has dropped, the number of people in need of humanitarian assistance will remain at 3 million through March 2012.

With a decline in the level of international assistance and/or new disruptions to humanitarian access or trade, famine conditions could reappear. Moreover, mortality will remain high over the next six months, driven by disease prevalence such as measles, diarrhea, and malaria.

NOTE: This new FEWS/FSNAU data was collected prior to the Kenyan military's initiative to jointly pursue al-Shabaab militants with the Somalia Transitional Federal Government

For More Information, Visit: <http://v4.fews.net/Pages/default.aspx>



Photo Credit: IOM 2011

USAID Disaster Assistance: Thailand

USAID has made a second contribution to the International Organization for Migration (IOM) to aid in the delivery of disaster relief equipment to Bangkok. Seasonal high tides, tropical storms, and monsoons have resulted in massive flooding in the Thai capital, killing 533 people and leaving thousands homeless and living in shelters.

"IOM will use this new funding to procure more boats, outboards, pumps, generators, water purification units and life vests to help Thailand to respond to this ongoing disaster," says IOM Thailand Chief of Mission, Monique Filsnoel.

Widespread flooding and landslides make it difficult to evacuate a city of 12 million, and conflicts over where to channel the flood water persist. The floods have resulted in millions of acres of destroyed farmland, rendered nearly one million residents jobless, and destroyed public buildings and infrastructure

For More Information, Visit: http://www.usaid.gov/our_work/humanitarian_assistance/disaster_assistance/countries/thailand/fl_index.html

Briefing: Increasing Access to Water and Sanitation: Building on Success for Greater Aid Effectiveness

Today, nearly 900 million people lack access to an improved source of drinking water and 2.6 billion people do not have access to improved sanitation. With the large amount of assistance needed and the forthcoming federal budget constraints, leveraging development, innovation, technology, and partnerships is essential to help reach the billions in need.

Congressmen Blumenaur, Fortenberry, and Poe spoke to an audience in October 2011 on the importance of providing WSSH assistance to the developing world. A major component in achieving the ability to provide this assistance is to come up with new, cost-effective ways to deliver it. Pradeep Ramamurthy, senior deputy director for the Office of Innovation and Development Alliances (IDEA) stressed the importance of investing in innovation, trying solutions, evaluating the outcomes, and investing in those that succeed. Jeff Brown, division chief for Development Innovation Ventures (DIV) announced

that \$14.6 million will be awarded in DIV grants to help find solutions to development challenges and foster long-term economic, health, and food growth in developing countries. By investing in problem solving, these new ideas and programs have the ability to change millions of lives.

For More Information, Visit: <http://idea.usaid.gov/organization/div>

Turning poop into power: DIV announces first WASH for Life grant to Sanergy

At an event at MIT's Media Lab on November 30th, USAID's Development Innovation Ventures (DIV) awarded its first WASH for Life grant to Sanergy: a dynamic startup social enterprise, launched from an MIT classroom into an award-winning business that "turns poop into power." The young company runs a network of pay-per-use sanitation centers in Kenyan slums. Each day local employees collect and transport the waste from the latrines to a processing facility, where Sanergy engineers turn it into fertilizer, biogas, and biochar—a byproduct of combustion that sequesters carbon dioxide and acts as a fertilizer.



Photo Credit: Sanergy

Designed by MIT engineers and architects, the modular hygienic toilets cost just \$500 to fabricate and can be assembled in one day. The sanitation centers are franchised to local entrepreneurs and local youth groups, who earn income through fees, membership plans, and sales of complementary products. The 10 million residents of Kenya's slums create a potential \$72 million annual market. Within five years, Sanergy will expand to 3,390 centers, reaching 600,000 slum dwellers – creating jobs and profit, while aiming to reduce the incidence of diarrhea by 40 percent. The \$100,000 stage I grant from DIV will help Sanergy build its network of sanitation center franchises and support the construction of Sanergy's specially designed waste processing facility for the fertilizer and biogas production.

USAID encourages partners with innovative and cost-effective projects to apply at: <http://www.usaid.gov/div/washforlife>.

For More Information, Visit: <http://saner.gy/>



Photo Credit: USAID/IDEA

CURRENTS



Photo Credit: USAID/PERU

Intermittent Rice Irrigation (IRI) for Malaria Control in Peru

The Amazon Malaria Initiative (AMI) is a seven country regional program in the Amazon Basin implemented in Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, and Suriname with the support of the USAID. AMI was launched in 2001 with the overall goal of preventing and controlling malaria in the Amazon Basin.

As a result of the AMI program, as of November 2011, there was a 50 percent reduction in malaria incidents in Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, and Suriname, and some countries have even seen about a 90 percent reduction in malaria cases. For the past 10 years, the AMI has been administering new medical and agricultural treatments to help mitigate, diminish, and prevent cases of malaria in all seven countries. Despite a recent decline in prevalence, malaria continued to pose a significant public health threat in Peru, with an estimated 26 percent

of Peru's population in the coast and jungles at moderate to high ecological risk of transmission. Because of this, introducing intermittent rice irrigation (IRI) was feasible from economic, agricultural, and social standpoints. With IRI, flooded and dry periods in rice pads are alternated, reducing mosquito populations and ultimately, malaria transmission. IRI has many benefits, namely reduction in mosquito larvae, higher rice yields, decreased water consumption, increased availability of water for drinking, preservation of soil fertility, and it provides an alternative to chemical-based agricultural methods.

With its first successes in the Piura region of Peru, IRI has recently been implemented in four more Peruvian regions that have since reported positive results like those in Piura

For More Information, Visit:
http://www.usaid.gov/our_work/global_health/id/malaria/techareas/amazon_resistant.html



Photo Credit: 4th Sector Health

USAID and Procter & Gamble Partnership Ensures Clean and Safe Drinking Water during Emergencies in Central America

Procter & Gamble's (P&G) Children's Safe Drinking Water Program and USAID's 4th Sector Health project have formed an alliance to improve access to clean and safe drinking water during emergencies in Central America. The alliance has pre-positioned P&G's PUR® Purifier of Water in disaster-prone communities in Guatemala, Honduras, and Nicaragua. The Alliance was launched in Managua, Nicaragua, on March 22, 2010, United Nations World Water Day. Since then, alliance results include a total of 7,118 families living in disaster-prone areas received PUR® supply and information on negative effects of consuming unsafe water, appropriate water treatment, usage and storage, and related hygiene promotion topics, such as hand washing.

In October 2011, Central America was hit by heavy rain, causing widespread flooding. In Guatemala, the national emergency management

agency, CONRED, reported more than 47,000 people affected by the rain, including 11,000 evacuated from their homes. Since the flooding, CRS has reported that the communities that had prepositioned PUR® under this alliance were using the product to ensure safe drinking water. The alliance partners are currently exploring ways to ensure a sustained supply of PUR® for future emergencies in the country.

For More Information, Visit:
http://www.pg.com/csdlw/downloads/March_22_2010.pdf

WASH Success in Guatemala

For over five years, USAID has been assisting vulnerable rural families in obtaining access to potable water through a variety of programs. In FY 2011, the Multisector Alliance Program – funded with USAID resources and funds leveraged from the National Association of Coffee in Guatemala – forged a number of public-private partnerships to address this issue. As a result, USAID funded the distribution of 5,000 filters to families without access to clean water. In addition to distributing the filters, USAID also ensured their correct use and maintenance through supporting home monitoring visits to the beneficiaries. The combination of the filter distribution and education regarding proper usage of the filters subsequently led to nine million liters of water being disinfected.

According to testimonies from the beneficiaries, water-borne diseases have been reduced. "In the past, we didn't drink water; what we drank

all the time was coffee," said Yolanda González Vásquez. "Every time my family and I drank water, we'd get a stomachache, while coffee didn't do that to us, as it was always made with boiled water. Once we got the filter, we started drinking water as it is clear, clean and fresh and no longer gives us a stomachache."

Reports from the project show that as a result of using the filters to treat water for consumption and meal/beverage preparation, cases of diarrhea decreased from three per household per month to one per household per month. By reducing the incidence of water-borne diseases that are caused by ingesting contaminated water, this activity also addresses one of the causes of chronic malnutrition in children – the poor absorption of nutrients because of diarrheal disease,

helping to achieve USAID's goal of reducing chronic malnutrition in children under five. In addition, the Coffee Foundation, through a social behavior change communications program, has carried out extensive education and communication campaigns on key interventions such as hand washing to reduce high rates of diarrheal diseases in children. These interventions were being implemented in the area of the country known as the 'Dry Corridor,' the region most affected by droughts and reporting most of the cases of acute malnutrition.

For More Information, Visit:
<http://www.alianzasguatemala.org/>



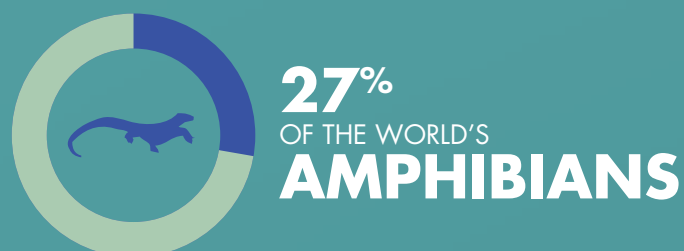
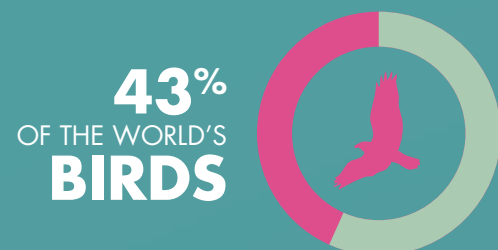
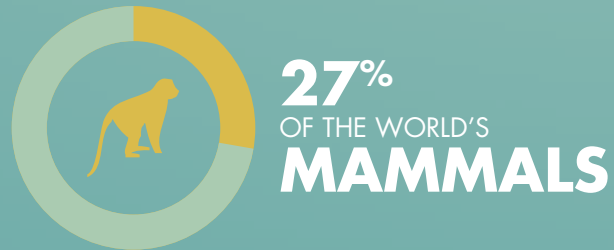
Photo Credit: USAID

WATER TABLES

BIODIVERSITY AT A GLANCE

THE LAC REGION

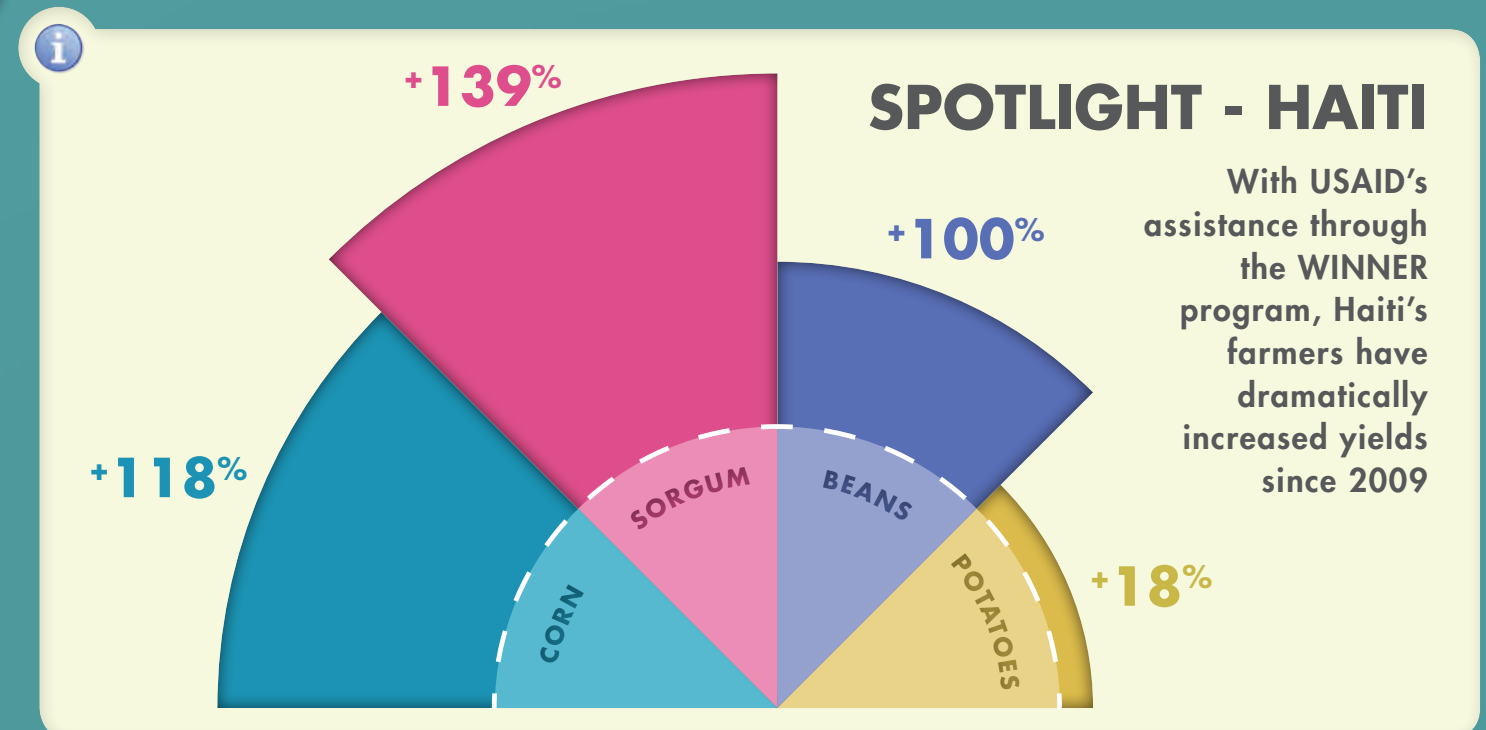
THREATS TO THE REGION



In more than **60%** of the LAC region, coral reefs are threatened and much of the region's mangroves have been lost due to coastal development, overfishing, marine pollution, runoff from deforestation and farming, and industrial and urban pollution.

ECUADOR'S SUSTAINABLE COASTS AND FORESTS PROJECT HAS:

- Placed over **350,000** hectares of biologically significant land and coastal marine areas under improved environmental management
- Trained **1,290** people in best practices for natural resource management
- Provided **4,500** people with increased economic benefits derived from sustainable natural resource management and conservation.



A VIEW FROM THE FIELD

Saving Lake Atitlán

The natural beauty of Lake Atitlán is a tourist staple for the surrounding Guatemalan cities, whose people rely heavily on the hospitality industry to generate their incomes. For the past few years, expansions of industrial growth and tourist activity have polluted Lake Atitlán with garbage, runoff, and wastewater discharge. In 2009, an explosive increase in the overgrowth of a toxin producing blue-green algae had drastic impacts on the tourism and fishing industries, resulting in fewer visitors to the region and an inability to catch and sell the lake's fish.

To help monitor the growth patterns of the algae, scientists implemented the USAID funded Sistema Regional de Visualización y Monitoreo (SERVIR) program. Through the use of the program, scientists were able to identify the key components aiding the algae growth and methods that could be used by community members and local businesses to help decrease it. Through education and training, businesses, such as hotels, installed water saving systems in bathrooms and learned how to properly dispose of waste, resulting in an increase of items reused, recycled, and composted. A waste water treatment center was also installed, helping keep runoff out of the lake, lowering total water usage, and generating less pollution by promoting cleaner production. By teaching tourist-reliant businesses about environmental awareness, algae production has decreased significantly and the outlook for Lake Atitlán's future is vastly improved.

Video link: <http://www.youtube.com/watch?v=sepJkb0KTuo>

FOR MORE INFORMATION, VISIT:
http://www.servir.net/en/contaminacion_lago_atitlan_cianobacteria



RIPPLE EFFECT

USAID IMPACTblog

USAID's IMPACTblog provides an opportunity for the dedicated men and women who serve the agency to discuss their stories of success, failure, and lessons learned in the course of providing service to developing nations around the world. It also provides an opportunity for readers to enter responses to blog postings. We invite you to share your thoughts and comments about Global Waters and USAID's work in the water sector on the Impact Blog or by emailing us at: waterteam@usaid.gov.

The Water Team's efforts are chronicled under the tag: <http://blog.usaid.gov/tag/water/>.

Below is a sampling of one of the team's recent posts:

Water Security in the Horn of Africa

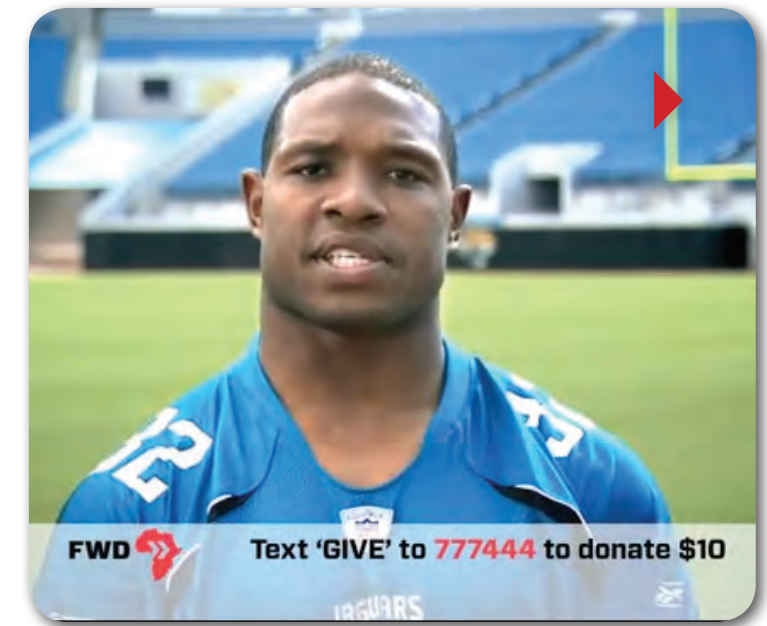
In the Horn of Africa, millions of people face each day without knowing if they will have clean water to drink or food to eat. This uncertainty about access to the basic essentials of life stunts security and growth, and affects all people from young to old.

American assistance to the Horn of Africa is beginning to make a difference, however, and in this series about water security in the Horn, we will showcase how water projects are helping people gain predictable access to clean water as a first step to gaining a foothold on a better life. **Click here to learn more.**



Our last issue of Global Waters announced the start of USAID's FWD Campaign to build awareness of the Famine, War, and Drought that continue to plague more than 13.3 million people in the Horn of Africa. You can help raise critically needed funds for this effort by donating, as well as sharing information about the crisis through Facebook, Twitter, and other social networking sites.

TO LEARN MORE, CLICK ON THE VIDEO OR VISIT:
www.usaid.gov/FWD



UPCOMING EVENTS

If your organization is hosting a water-related event you feel would be of interest to our readership, please provide us with information we can post in our calendar to help promote your event. Event listings will be chosen at the discretion of USAID's water team and the magazine's editors.

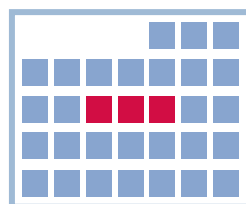


March 12-17, 2012
Marseille, France
6th World Water Forum

Globally known as the world's largest meeting on water, the 6th World Water Forum in France will focus on the theme 'Time for Solutions' in 2012. 800 speakers from more than 180 countries will be present and aim to mobilize creativity, innovation, competence, and compliance to address the world water crisis. The event brings together water professionals and stakeholders from all over the world. A major component of the forum will not only be to map out goals for major water issues, but also develop solutions to reach those goals.

<http://www.worldwaterforum6.org/en/>

March



March 13-15, 2012

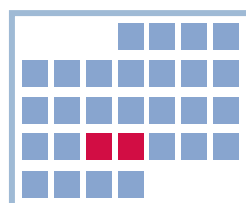
Johor Bahru, Johor Malaysia

International Conference on Marine Ecosystem (INCOMES) 2012

Due to extreme land development and over harvesting, biological diversity in marine ecosystems is constantly being threatened. The International Conference on Marine Ecosystem (INCOMES) will discuss research on the effects of pollution, climate change, new technologies, and the impacts of sustainable management practices in these fragile ecosystems.

<http://www.ukm.my/juneng/incomes2012>

March



March 20-21, 2012

London, United Kingdom

Water & Environment 2012: CIWEM's Annual Conference

The theme of The Chartered Institution of Water and Environment Management's (CIWEM) annual conference is "Green Revolution," which will address 'green' issues across all areas of the global water and environment sector, including: low-carbon living, water and climate change in 'green' food production, water resilience in cities, and water as a driver for sustainable urban development.

<http://www.ciwem.org/events/annual-conference.aspx>



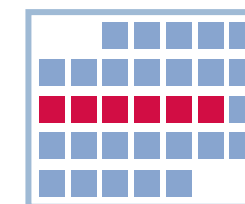
March 22, 2012
Worldwide
World Water Day

This seminal event in the water sector is held annually on March 22 as a means of focusing attention on the importance of freshwater and advocating for the sustainable management of freshwater resources.

The theme of this year's World Water Day is 'water and food security,' and is looking to spread the message that by conserving water and reducing your water footprint, more water is available to produce food. World Water Day's website is a community space for water practitioners all over the world to upload activities, photos, and videos in hopes of raising awareness on water issues. The event is coordinated by the Food and Agriculture Organization of the United Nations (FAO) on behalf of UN-Water members and partners. Visit the site for worldwide events, campaign materials to plan your own event, and to learn about international celebrations.

<http://www.unwater.org/worldwaterday/>

May



May 13-18, 2012

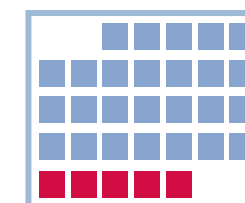
Dublin, Ireland

World Congress on Water, Climate and Energy

With the growing threat of climate change on water resources, cities need to reassess their energy usage and focus on adapting sustainable infrastructure. At the World Congress on Water, Climate and Energy, the role of technology, politics, and the economy will be discussed in relation to the regulatory aspects of water, climate, and energy.

<http://iwa-wcedublin.org/programme/>

May



May 27-31

Ottawa, ON, Canada

National Fish and Wildlife Conservation Congress

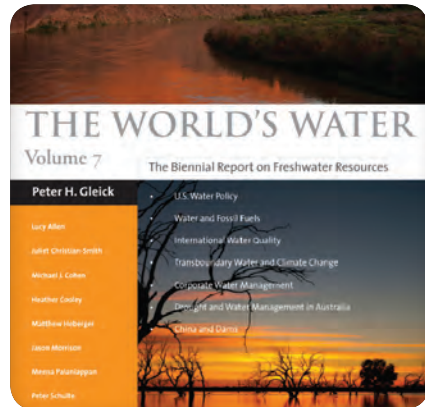
In Canada, fish and wildlife populations are thriving. To help ensure the future of these wildlife resources, restoration programs, workshops, debates, and discussions will be at the center of the National Fish and Wildlife Conservation Congress. Government policies and regulations on Canadian wildlife, and the role of science versus public opinion will also be showcased.

<http://www.nfwcc.com/>



RESOURCE CENTER

IN PRINT:



The World's Water Volume 7 by Peter H. Gleick

Penned by internationally known water expert, co-founder and president of the Pacific Institute in Oakland, California, Dr. Peter H. Gleick along with a host of other contributors, *The World's Water* provides reports on current water trends, events, and data on water resources and their uses. With topics ranging from climate change and its impact on transboundary water resources, to corporate water management, water quality, and Australia's millennium drought, and a number of briefs on bottled water, the Great Lakes, and water in the movies, *The World's Water Volume 7* informs readers of many current and pressing issues in the water sector.

FOR MORE INFORMATION, VISIT:
<http://www.worldwater.org/>



Water History for Our Times

This collection of essays from the International Hydrological Programme (IHP) delves deep into the vast history of water. The text explains how to better understand current water emergencies, the importance of studying the past, and applying that information to finding solutions for current water predicaments. Sections focus on how history can serve as a guide when making informed decisions concerning the future of the water crisis and the development of new technologies. *Water History for Our Times* is the second IHP essay on water history, and accompanies *Water History and Civilization*, a UNESCO reference series.

FOR MORE INFORMATION, VISIT:
<http://unesdoc.unesco.org/images/0021/002108/210879e.pdf>

ONLINE:



Asian Development Bank (ABD) "Water for All"

"Water for All" is the Asian Development Bank's (ABD) vision and policy for the Asia and Pacific region. This portion of ADB's site focuses on videos, news, and features of all things water in the Asia and Pacific region. An up-to-date library of those items as well as coming events, projects, and op-eds are available for review. Stories on water initiatives give insight on water sector reforms in the Asia-Pacific region, and explain the work being accomplished in water financing programs. A more comprehensive explanation and breakdown of each program in the water financing, sanitation, Water Operators Partnerships (WOPs), and critical water issue awareness sectors is also available.

FOR MORE INFORMATION, VISIT:
<http://www.adb.org/Water/default.asp>

ONLINE: [cont.]



WaterAid: Inclusive WASH

This learning portal from WaterAid Australia and the WASH Reference Group is home to a bevy of resources on WASH, learning sessions on a multitude of topics, case studies, and a forum to share personal experiences, insights, and general information. Some of the topics covered include: A learning session on HIV/AIDS and Chronic Illness, scheduled for January 2012; the Poorest of the Poor learning session is scheduled for February 2012 and will focus on those excluded from WASH because of race, religion, caste, ethnic minority, age, and employment.

FOR MORE INFORMATION, VISIT:
<http://www.inclusivewash.org.au/>

ON VIDEO:

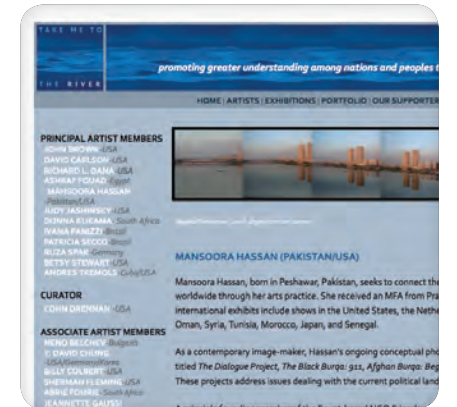


The Water Channel: Sharing Water in Yemen

The Water Channel's series on the crisis in Yemen highlights successful water sharing practices in this video. Yemen's history of scarce water and the needs of a growing population called for a change in the way groundwater in the region was being managed. Local rules such as regulating the drilling of wells, banning water sold from reservoirs, placing security around check dams, and many others have served various parts of Yemen and thousands of residents. Five case studies are presented in the video.

FOR MORE INFORMATION, VISIT:
<http://www.thewaterchannel.tv/en/videos/categories/viewvideo/1140/groundwater/sharing-water-in-yemen>

IN THE ARTS:



Take Me To The River

Featured on our back cover, *The Take Me To The River* (TMTTR) project, an international collective of artists, will present an exhibition of artwork at Le Musée de Tapisseries in Aix en Provence concurrent with the 6th World Water Forum in March 2012. The theme of the artwork in the exhibition is the importance of water, and will feature a wide range of artistic disciplines including video, painting, digital prints, and photography. Prior to the opening of the exhibition TMTTR artists will travel to Aix en Provence to collaborate with an association of women from emerging nations in the creation of a water-related installation. The *Take Me To The River* Project was an official part of the 5th World Water Forum cultural component in Istanbul, Turkey, in 2009.

FOR MORE INFORMATION, VISIT:
<http://www.tmttr.org/index.htm>

THE POETICS OF WATER

'American Herring Gull'
Poem by Kim Roberts

**Down from the shower'd halo,
Up from the mystic play of
shadows twining and twisting
as if they were alive,
Out from the patches of
briers and blackberries,
From the memories of the bird
that chanted to me..."**

--From 'Out of the Cradle Endlessly
Rocking' by Walt Whitman

Beneath a lazy whiptail of cloud,
Beneath that flimsy arc of white,
Under an eighth-month moon,
Where the strand arcs too in a mirror of sky
And each particle of sand grips inward tight and fetal
Inside its hard heart, granite and yellow,
Where the waves arch their backs and collapse,
Where the waves inhale then collapse,
And the wet curve is laid low,
Down from the shower'd halo,

Up from the white foam receding,
Or not receding, leaving its fallen petals on the beach,
Flimsy whiptail cloud-like arcs
Under the wing of a gull hunting her tidbits,
Surveying her beach kingdom, sea
lettuce, limpet, moon shell,
Where any tinfoil glint brings her swoop and dive,
Where any updraft pulls her inland
Over fleabane and wax myrtle, over sumac,
Up where the air is cooler, where the
wind quickens and revives,
Up from the mystic play of shadows
twining and twisting as if they
were alive,

Away from the gnarled, earthbound complexities,
The thickets of hurt feelings
And the petty sparring of fashion;
Up from the hardpan where every foot is muffled



'Out of the Amniotic Sea'
Image by Deirdre Sauder

As if of no consequence, of no history,
She lifts her white wings, slightly tarnished, and carries

Under her hanging pink feet a windfall,
An earthy tidbit brought high and clear
To that place above the gridlock and worries,
Out from the patches of briers
and blackberries

Above the North Atlantic Drift,
Above the hard stretch of yellow sand, the woman
Walking alone there, following the
rick-rack of the tide-line,
following the gentle curve of the shore,
But not really alone, no, beachcombing
for something unnamed
Something just out of reach
But part of her--I should say part
of me, my doppelganger,
The shadow discipled to my transmuted self,
Out of the salty, amniotic sea,
From the memories of the bird that chanted to me...

**This collaborative piece is part of
Take Me To The River, an art and
poetry exhibition centered around
water.** For more information, please see
page 31.