



Ecology IN Action

IN THE RAIN FORESTS OF ECUADOR, LOCALS ARE LEARNING HOW TO ACHIEVE LASTING CONSERVATION OF THEIR PRECIOUS NATURAL RESOURCES.

by Chris Kraul

It's five in the morning in Ecuador's coastal rain forest, and the trek led by biologist Jordan Karubian through mist and mud to catch a glimpse of the rare long-wattled umbrellabird has paid off.

As dawn breaks, the group hears the bird's telltale mating sounds: First, a low metallic hum resembling a tuning fork, then a furious rat-a-tat flapping of wings like a snare drum followed by a low rump that is similar to the sound of a basso toad.

Moments later, Karubian points out the magnificent bird hopping from one overhead branch to another, swinging its wattle, a long beard-like feathered appendage, and flaring its crown.

"It's not just a visual treat, it's ecology in action to be able to see this species up close," says Karubian, an assistant professor in Tulane's Department of Ecology and Evolutionary Biology. Nearby is Luke Browne, a second-year doctoral student in evolutionary biology. Watching the bird's displays through binoculars, he gushes: "This is wild, outrageous."

Palms Up

Opposite page: In an Ecuadorean rain forest, Jordan Karubian and local youth examine a sample of fruit from the chapil palm tree.

This page: A long-wattled umbrellabird



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Boots & Binoculars

Karubian ventures into a riverbed as he examines the canopy of the forest.

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The umbrellabird's role in the rain forest goes beyond ornamental. He eats the fruit of the chapil palm tree, a key variety that sustains several bird and mammal species. The umbrellabird then disperses the seeds throughout the forest via defecation or by spitting them out, ensuring the tree's regeneration and that of the animals that depend on it. Without the bird's good offices, the palm might otherwise die out because seeds dropping within the penumbra of the mother tree have almost no chance of reaching maturity.

"It's a flagship species," Karubian says. "As it goes for the umbrellabird, so it goes for the forest. It's a crucial player in the rain forest's ecological web."

The bird has become the symbol of Karubian's award-winning ecology research and community-outreach project situated in northwest Ecuador's Mache-Chindul Ecological Reserve. In simple terms, his aim is to document the interdependence of plant and animal species in the 8,750-acre Bilsa Research Station while educating not just his students but the local communities of the Quininde township on the importance of conservation so that those linkages remain intact.

Karubian's approach to conservation has attracted widespread attention. Last year, he won the prestigious Ernest A. Lynton Award, given annually by the New England Resource Center for Higher Education to a young academic who connects his or her teaching and research to community engagement.

The Los Angeles native's project has received funding support from the U.S. Fish and Wildlife Service, the Disney Worldwide Conservation Fund, National Geographic Society, the National Science Foundation, the Chicago Zoological Society and other institutions. With an annual budget of about \$60,000, Karubian's Tropical Andes Conservation Foundation catalogues plant and animal species and their symbiosis, and funds a community outreach component that instructs high school and elementary teachers in ecology so they can pass that knowledge along to their young charges. Moreover, his three full-time local "environmental ambassadors" have taught 1,000 students the basics of conservation and rain forest ecology in the classroom or on guided tours of the reserve.

"What motivates me personally is the conservation of biodiversity, slowing or even reversing the rate of species loss. And this is a great place to test theories and learn about the processes that generate diversity," says Karubian, noting that the reserve is home to 360 bird species and 18 varieties of palm.

Because of generally lax enforcement of environmental laws in Ecuador, it's critical to work hand in hand with residents to achieve goals. "It's the locals who de facto will determine how things turn out," Karubian says.

Local youth are the focus of the project's outreach program. Later the morning of the umbrellabird sighting, Karubian accompanies staff ambassador Domingo Cabrera as he leads 12 fourth-grade school children on a half-mile hike through the reserve, pointing out various plant, insect, bird and frog species, emphasizing each one's unique role in rain forest ecology. The kids learn about rainfall levels and where seeds floating in the Rompefrente River have come from. They are told about bejuco, the strange vinelike plant that grows upward as much as 80 feet until reaching a tree branch from which to hang.

At one point the students are asked to close their eyes, be silent for a minute and count the different bird calls they hear. "Cinco!," answers 10-year-old Jaime Garces.

A nine-year employee of Karubian's foundation, Cabrera, 46, has helped make the environment part of local classroom curriculum by training 15 teachers in rain forest ecology. As with the two other ambassadors, he follows up with classroom visits in addition to leading rain forest tours.

"Before I joined the foundation I was a hunter in the forest, so I know it pretty well. I used to kill things to survive, to put food on the table for my family. Now I'm trying to help conserve them.

So it's been a radical change," Cabrera says.

With Karubian's encouragement, Cabrera is about to finish studies for his high school diploma and plans to start work on an online university degree this year.

Observing former subsistence farmer Cabrera transform himself into a highly competent field researcher is tremendously gratifying, says Karubian.

The fourth-graders finish their two-hour tour, still energetic after the arduous hike. Karubian says their enthusiasm for learning about conservation is typical of local youths and is a good sign that his programs are working. Another crucial test will come tomorrow, when the foundation holds its first annual environmental fair in the village of La Y de la Laguna, located about eight miles from the research station. Games, music, talks and even a clown performance are scheduled, all to promote the themes of recycling and conservation.

But how many people will show up? Karubian wonders.



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Somewhere in the Branches Above

Domingo Cabrera leads a tour through the Mache-Chindul Ecological Reserve.

“If we’re going to achieve lasting conservation, we’re going to have to work hard with the local residents.”

—Jordan Karubian

LASTING CONSERVATION

Karubian launched his foundation 10 years ago in an area of Ecuador that was in dire need of a conservation initiative.

Due to its geographical insulation, the Choco rain forest, which extends from coastal northwest Ecuador all the way up the Pacific coast of Colombia to the Isthmus of Panama, has been a place where species have traditionally flourished. The Andes to the east, the Peruvian coastal desert to the south and the Pacific to the west served as natural barriers to intrusion by other plant and animal species, resulting in a high rate of species that appear here and nowhere else.

But over the last century, much of the Ecuadorean portion of the Choco in coastal Esmeraldas province has been ravaged by loggers, cattlemen and encroaching population. In more recent times, drug traffickers have cleared scores of acres of jungle to grow coca plants, the base material for cocaine (although on nowhere near the scale of illicit cultivation in neighboring Colombia). Incalculable numbers of plant and animal species have been lost, Karubian says.

During the past two decades, much of the deforested jungle in the Mache Chindul Ecological Reserve has begun to grow back, thanks in part to the Jatun Sacha Foundation then led by U.S. environmentalist Mike McColm, who created Bilsa Biological Station for researchers within the reserve in the early 1990s.

Karubian says only community involvement and education can stem the further loss of species. The greater the appreciation of the rain forest by local children and the better the understanding by their parents of how preserving the rain forest is integrally linked to maintaining their water supply and clean air as well as stemming climate change, the better the chance that conservation will succeed.

“Our only hope is to raise community awareness of the consequences of land management practices, for better or for worse,” Karubian says as he discusses his 2013 outreach goals. “If we’re going to achieve lasting conservation, we have to work hard with local residents.”

Karubian’s scientific research hardly takes a backseat in the foundation’s outreach activities. After identifying every palm tree in a 500-acre section of the Bilsa station’s forest, Karubian and his students now collect an average 1,000 palm seeds a year to pinpoint from which tree they originated and how they were dispersed. By matching tree and seed genetic codes with the aid of an automated DNA sequencer, Karubian is showing how preserving the habitat of the umbrellabird promotes the continued survival of the chapil palm.

In addition to the umbrellabird, Karubian and his students have done original research on other bird species, some of which are at risk of “dropping out” of the Choco, including the Banded Ground Cuckoo, the Brown Wood Rail and the Purple-throated Fruitcrow. Much of that research has been done by his Ecuadorean staff, including Cabrera and his ambassador colleague Jorge Olivo, both of whom Karubian trained to collect data and develop their own analyses. Both attended the Neotropical Ornithology Congress in Cusco, Peru, last year to present scientific findings.

“The important difference is, we’re not just coming here to their forest to extract knowledge but to involve the local community in the scientific process,” said doctoral student Luke Browne.

CRADLES, LAMPSHADES AND FLOWERPOTS

Any doubts Karubian had that the foundation’s environment fair would go over well soon dissipate as he approaches the community center in La Y de la Laguna. Attendance at the Dec. 14 event is an important indicator of local support for and awareness of his project, and it is much better than he expected. Scores of enthusiastic schoolchildren are waiting to enter. Buses clog the public square. Inside, 20 booths manned by local residents and displaying ingeniously crafted recycled goods and artisanal food items attract long lines. All told, an estimated 600 people have showed up.

The fair is organized by Monica Gonzalez, the other member of

Karubian's ambassador troika and the person most responsible for making the foundation's ecology case with local school and government officials of Quininde township. She recruited a corps of student clowns from Quito to do a skit about the importance of proper disposal of electric batteries that have schoolchildren screaming with delight. On a makeshift stage, musical groups sing a locally composed hymn to, you guessed it, the umbrellabird that quickly becomes a sing-along.

Recycled items displayed at the booths include a cradle made from a used tire, lampshades from plastic water bottles and recycled DVDs, flowerpots in the shapes of swans made from newspaper and hats crafted from bejuca fibers.

"I saw a lot of beautiful stuff at the booths, including plastic water bottles converted into decorations," says Karubian when it's his turn to address the crowd. "But I must ask all of you who were around 15 years ago to stop and remind yourselves that back then no one got water out of bottles. You got it from streams that have now disappeared or been polluted because of logging and clearing for cattle pastures. We need to find ways to stop that from happening."

Taking it all in is a surprise guest, Wagner Olarte, provincial director of education for Quininde township.

"This is very impressive," says Olarte. "The fair and the foundation are significant supports for the education of our children, especially in areas of conservation and recycling. It's a good strategy and it's really caught my attention. I would like to adopt his teacher-training methods as permanent policy."

Afterwards, Karubian says the success of the fair has persuaded him that he can replicate the Ecuador project in other countries. First he may launch a similar project in the rain forest of Papua New Guinea. He'll also go to Brazil this year to look into the feasibility of one in that country's northeastern Atlantic coastal forest.

It's a kind of template that Karubian says will work in any area where humans are interacting with nature in a way that is unsustainable.

"We're ready for the next step," he says. ♡

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Art of Recycling

A woman displays a Christmas hat made from salvaged paper and an infant sleeps in a cradle fashioned from an old tire. Approximately 600 people attended an environmental fair hosted by Karubian's group this December.



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