

ENCUENTROS



Cultural Ecology in the Americas

Lecture by
Cristián Samper

IDB CULTURAL CENTER

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The IDB Cultural Center was created in 1992 by Enrique V. Iglesias, President of the Inter-American Development Bank (IDB). The Center has two primary objectives: 1) to contribute to social development by administering a grants program that sponsors and co-finances small-scale cultural projects that will have a positive social impact in the region, and 2) to promote a better image of the IDB member countries, with emphasis on Latin America and the Caribbean, through culture and increased understanding between the region and the rest of the world, particularly the United States.

Cultural programs at headquarters feature new as well as established talent from the region. Recognition granted by Washington, D.C. audiences and press often helps propel the careers of new artists. The Center also sponsors lectures on Latin American and Caribbean history and culture, and supports cultural undertakings in the Washington, D.C. area for the local Latin American and Caribbean communities, such as Spanish-language theater, film festivals, and other events.

The IDB Cultural Center *Exhibitions* and the *Concerts and Lectures Series* stimulate dialogue and a greater knowledge of the culture of the Americas. The *Cultural Development Program* funds projects in the fields of youth cultural development, institutional support, restoration and conservation of cultural patrimony, and the preservation of cultural traditions. The *IDB Art Collection*, gathered over several decades, is managed by the Cultural Center and reflects the relevance and importance the Bank has achieved after four decades as the leading financial institution concerned with the development of Latin America and the Caribbean.

CULTURAL ECOLOGY IN THE AMERICAS

Cristián Samper

The Americas are one of the richest regions of the world in terms of their biological diversity. The different species of plants and animals that live in the forests of the Amazon and the Andes have been the fascination of scientists for centuries, dating back to the early explorations of Alexander von Humboldt. Birds like this hummingbird feeding on a passion flower vine, one of three hundred species of hummingbirds that are only found in the New World, or this colorful *Dendrobates* frog from the jungles of Chocó in Colombia, are creatures we have been discovering and are describing and attempting to understand. Many of these species have been domesticated by our ancestors and provide the basis for the cultural diversity of the Americas.

In the 18th century when José Celestino Mutis and his Spanish expedition explored the northwestern area of the South American continent, most of their work focused on the larger plants and animals.

In modern times, we have molecular tools to unveil all kinds of organisms. To give you one example, if you were to take a leaf and look inside it, you'd find that it is absolutely full of fungi growing inside. At the Smithsonian Tropical Research Institute in Panama, we have found that a single species of tree can have several hundred species of fungal entophytes growing inside. It really makes you wonder about our ignorance of the natural world that surrounds us.

When we think about biology and biodiversity, we usually think of the jungles in the Amazon, and some of us think of the Andes Mountains, where I grew up. If you were to board an airplane in Caracas and fly down over the Amazon, you would see hundreds and hundreds of kilometers of lowland jungles; and then, suddenly, you would see the famous *tepuis* (elevated mesas) of Venezuela and Colombia. They are absolutely fascinating rock formations found in the middle of the jungle, and are

part of what is called the Guyana Shield, the oldest rock formation found in that part of South America, formed about six hundred million years ago.

If you were to start hiking up the Tepuyes of Chiribiquete in the Amazonian jungle, you'd suddenly run into pre-historic paintings several hundred meters up that face of stone. They are clearly showing a wealth of plants, deer, fish, birds, and people hunting; you can even see leopards if you look closely. We know very little about the people that created these paintings because there are no settlements in that part of the Amazon today, not even indigenous peoples. To the best of our understanding, it was probably the ancestors of the Carijona Indians that inhabited the base of the *tepuis* and used them as part of their territories. It is clear that they inhabited this area for hundreds, possibly thousands of years, but we do not fully understand where they came from, or where they went; it is just one of those mysteries that we find coming up all over the Americas.

What I would like to share with you today is a little bit of the work that we have been doing to understand how many of the biologically and culturally diverse areas are undergoing substantial transformation. As habitats change, the creatures, plants, animals, and microorganisms are impacted, and with that culture and livelihoods are also changed, sometimes for better, and sometimes for worse.

Biological
Diversity in the Americas

As I mentioned, the rocks of the *tepuis* found in Venezuela are some of the oldest rock formations, about six hundred million years old. About three million years ago North America and South America were different continents; the Isthmus of Panama and Mesoamerica did not exist. Then through the geological process of plates moving from the Pacific and the Atlantic, they clashed and gave rise to the Isthmus of Panama. This year we are celebrating one hundred years of the Republic of Panama, but we are also celebrating three million years of the formation of the Isthmus of Panama.

The Isthmus of Panama created two major impacts: one is, of course, it created a bridge between North and South America, allowing the migration of different plants and animals, north and south. Many of the animals that we take for granted here, such as the opossum, originated in South America; or deer, which originated in North America, then moved south. Migration created an incredible wealth of biological specimens that moved partly through the Antilles, and partly through the Isthmus of Panama. But the other impact was that the rise of the Isthmus of Panama created a barrier between the two oceans that used to flow together in continuous currents. The organisms that lived in these oceans were separated, and that gave rise to different species on both sides. (One of the odd things you can do if you go to a place like Panama, is you can have breakfast on the Pacific and lunch on the Atlantic after a short car drive.)

If you do some collecting, you'll find

sea urchins on both sides that look similar but became different species over a three million year history. There are many ways that we can reconstruct this history, not only with current species, but we can look at fossil plants and fossil animals and learn that many of the creatures that were found in the Americas have already disappeared. You might be surprised to learn that Colombia and Argentina used to have giant sloths that were twelve feet tall.

This whole process of exchange between plants and animals has given rise to very complex interactions, and not surprisingly, the whole area of Mesoamerica, the Andes, parts of Guyana and going down to Brazil, as well as areas of Southeast Asia, are by far the most diverse parts of the world in terms of plant diversity. By far the richest diversity of fresh water fish found anywhere is in the Amazon basin where there are more than three thousand species; no other place on earth has that kind of wealth.

Humans Enter the Scene

Archeologists have found evidence suggesting that the earliest human settlements in the Americas only came about ten thousand years ago. Archeologists and biologists have also been trying to understand how early peoples used the environment and resources. The pre-Columbian people that lived in Panama two to three thousand years ago clearly were using the natural resources that had important significance for them, to the extent that they would take things like the stingray and include it in their artwork.

Archeologists have assembled a remarkable collection of objects carved by pre-Columbian people. For example, our ancestors made beads from seashells, and we can use modern tools to identify the origin of these shells. One of the areas that my colleagues at the Smithsonian Tropical Research Institute have been studying is the coastal zone in Central America, trying to understand how people used the resources for their subsistence and, of course, one of the main food items was fish.

Fish have a couple of convenient features when you are an archeologist. They have bones that are characteristic for each individual species, and there is a little bone in the head of the fish, in the ear, that we call an *otolith*. The great thing is every *otolith* is different in every species of fish, and the size of the *otolith* is correlated to the size of the fish. What that allows you to do on an archeological dig, is that you can actually dig out these bones, and by counting and sorting out the *otoliths* you can reconstruct the diet of the people one thousand years ago, what species of fish they were eating, and how big the fish were. Richard Cooke and his colleagues have shown that pre-Columbian people were using a wide array of natural resources, well over a hundred different species of fish, and we also believe that every species they used is still around today.

It is clear that the indigenous peoples that lived and continue living in many parts of the Americas have had a very close and intimate interaction with their surroundings. They have played a major role in the domestication of many of

the crops that we use today, and that are important pillars in the economies of our countries. Examples include potatoes, which were domesticated in the Andes; corn and beans, that were primarily Mesoamerican, although there is some debate about beans being domesticated in parts of Peru, as well; and cassava, that has become so important in parts of Africa, is originally from the Amazon.

Most of the species that we now think of as traditional and important for our agriculture and our livelihoods were brought in just over the last two to three hundred years. A few examples: wheat and rice were apparently domesticated in Southeast Asia; sugarcane and bananas in New Guinea; coffee is from the Ethiopian highlands; and interestingly, the large species of animals that we consume for food, including chickens, cattle, and pigs, were domesticated outside of the Americas, and brought in over the last few hundred years.

If you were to go through the Andes and look at the agricultural production systems there today, you might not realize that probably 95% of the resources used were introduced from other continents. The introduction of those crops, plants, and animals had a fundamental impact in shaping our early societies, and gave rise to many different settlements and events that have shaped our history. I just challenge you to think, what would Colombia be like if coffee had not been introduced? Or the Caribbean islands in the Antilles without sugarcane and the impact that sugarcane had? They would have been very different

countries, and much of the history of the Americas has been shaped by this biological interchange.

A Biologist in Colombia

Now, I want to tell you a little bit more in depth about some of my own work, and some of the activities that we have been doing in Colombia for the last ten years. How it is that a biologist and a scientist ended up working on environmental issues and conservation as well?

Colombia is in a very interesting geographic position in South America, just below the Isthmus of Panama and the Antilles. It's a crossroads where various species were going back and forth. Then the Andes mountain range came up five or six million years ago, and created a barrier between the Amazonian jungles and the areas of the Chocó. You have three mountain cordilleras, with dry valleys in the inter-Andean regions, and the very complex geography made this area in Colombia one of the most biologically diverse areas anywhere in the world.

As we do so often, we scientists go out to the field and collect specimens, plants, animals, insects, attempting to document life. We are trying to see what is found where and where they come from. We bring some of these samples to museums like the Smithsonian National Museum of Natural History here in Washington. We were just commenting there has been a long tradition, of almost two hundred years, of scientists from the Smithsonian and other institutions going to the Americas for

research, and more recently, many scientists come from countries in the Americas to work at these institutions. These museums are repositories of the biological diversity of the Americas.

Many of the areas where we go are being transformed as they give way to agricultural production. The first time this transformation had an impact on me was when I worked in the Andes of Nariño in Colombia. That area was subsequently cleared when a road was put in, and some of the species that I collected as a young biologist apparently have disappeared. Many biologists go through this experience; the organisms that you loved to study are suddenly no longer found, or their abundance and distribution are being changed through a variety of anthropocentric processes.

Linking Science and Policy

When I was running the National Biodiversity Institute in Colombia, we produced a map showing the rates of transformation of the natural ecosystems in Colombia using remote sensing data. We found that by far the hardest hit area was the Caribbean coast with the tropical dry forest ecosystems; there is less than 3% left today. If you look at the Andes region, about 70% of the original cloud forest in Colombia has been transformed into agricultural systems over the last forty years; these are concentrated in the foothills of the Andes going out into the Amazon, and many of them are tied in with things like illegal crops and coca plantations. If

you look at the Amazon region, the overall impact is not that huge; probably only 15-20% has been transformed.

We are trying to understand not only which areas are important for conservation, but also how can we design policies that will promote conservation, how can we engage the general public in that, and how can we use the biological richness to provide an alternative that will generate income for local populations and development for our countries.

Our scientific understanding of the biological diversity of a country like Colombia is very precarious. This is a map that shows every location where there have been scientific expeditions in the last 150 years in Colombia, based on biological collections. It's not surprising to see that almost all of the collections are done around the big cities, since we biologists tend not to venture too far; we love to collect along roads and rivers. My point is that vast areas, like the Orinoco plains and the Amazon forests, have hardly been documented; there have probably been a few dozen expeditions there in 150 years.

Studies show that some of the plants and animals that we have identified have disappeared, most of them in the last fifty to one hundred years. We scientists are concerned about this so we've produced plant and animal inventories, identified areas that are important for conservation, and tried to establish protected areas. I started doing this back in 1980 as a young student with a group of biologists on the Pacific slopes of Colombia. We found and identified many areas rich in what we call

endemic species— very localized species with small ranges, like this Toucan with a range less than two thousand square kilometers. Some species are continuously endangered as we transform their habitats; others adapt very well to some of the agricultural production systems, but not all of them.

We started designing a system of protected national parks in Colombia, but alongside grew an extremely interesting movement of private natural reserves involving local landowners, foundations, and other scientists. What started out as a reserve back in 1980 is now a network of more of two hundred reserves managed by local communities in different parts of the country. Right after the Earth Summit in 1993, there was a massive transformation of the environmental sector; we completely restructured what has been called the National Environmental System in Colombia. That included the establishment of the National Environmental Council, creating the Ministry of the Environment, and strengthening the national parks system, completely decentralizing the environmental management into thirty-four regional autonomous corporations in different parts of the country. We also recognize, and this is where my own work comes in, that it is extremely important to have solid scientific information to support policy. We felt that it was important to establish a series of research institutes that would provide the scientific information needed to monitor and develop effective policies.

For ten years, I directed the National

Biodiversity Institute, and we brought eighteen Colombian institutions together as members of this institute, including large universities, non-government organizations, the Coffee Growers Association of Colombia, and other key players to pull resources together. We designed a National Biodiversity Policy with three elements: knowledge, conservation and utilization. We feel we need to document and know what we have, take steps to conserve this diversity, and use this richness as the basis for development in developing countries.

We are absolutely committed to the fact that, as we see it, the biodiversity of a country like Colombia is the wealth of the poor, and the economic development of many regions and countries in Latin America will be intimately tied with developing and using natural resources, and integrating them into the economy. There is an analogy that has been used to illustrate this effectively: biological diversity is the largest library that any country has. What you want to do, first of all, is make sure you conserve your books, then you want to make sure that you can read them, and if you have the books and you know how to read them, then you can use that knowledge. What is effectively happening is that we are ripping out the pages from these books, we don't have enough talent that can read the books, and if we don't have those two pieces in place, we cannot use that biological diversity to generate well-being for the local populations.

Let me finish this section with some general thoughts on the whole issue of the links between biodiversity, culture and

sustainable development. As I mentioned before, my own view is that biological richness is the greatest wealth of our countries, and we need to make sure we can use it and integrate it into development activities. These are very exciting times, scientifically, because we have new tools and technologies that are pushing our frontiers. This year we are celebrating fifty years of the discovery of the double-helix structure of DNA. Tools we have are allowing us to create transgenic crops in agricultural sectors, to produce genetically modified organisms that may be, depending on how you see it, positive or negative. But the fact is the pace of change and the tools we have to explore, to understand, to conserve and to use this biological richness are growing everyday and we have an arsenal within reach that is not necessarily available in each of our countries.

Ecosystems and Human Well-being

The livelihoods of people are intimately tied to biological diversity and services provided by ecosystems. There are complex interactions among them, including climate change, food supply and demand, fresh water, forest products and timber, and others. Changes in biodiversity will have an impact in terms of forest productivity, forest cover may have an impact in erosion, and all of these complex interactions are hard to manage with one single policy. We need to gain a better understanding of how we can design policies that will really have a positive effect.

As a human society, we are changing very fast. One of my favorite images of the planet Earth, taken from a space shuttle last year, is where you see the dark line that is the limit between day and night going over Europe. You can just see parts of Africa, Nigeria and others, and you can see Europe, and each of those lights is one of the cities. The rate of change with which things are happening in this world is faster and faster every day, and we notice certain trends that are worrisome. The World Resources Institute produced a report called PAGE (Pilot Assessment of Global Ecosystems). It is a scorecard showing general trends for different kinds of services, including biodiversity, carbon, water quality, food and fiber production, as they're tied in with various kinds of biomes and ecosystems. The chart shows most of the arrows going down but there are few going up, because timber production in certain areas is leading to increases in forest cover and conservation in some forest ecosystems.

A group of us has come together to do a comprehensive assessment of how these things are related, and there is a project that we are working on right now called the Millennium Ecosystem Assessment. This is an enterprise similar to the International Panel on Climate Change (IPCC) where we are bringing together about a thousand scientists from all over the world, including different countries in Latin America.

We have come up with a conceptual framework to try and understand these various trends. We start out with the ecosystem services that this richness can

provide in terms of food, water, climate, also cultural services, all elements that are essential for the livelihoods and cultures in our countries. From these services we derive a whole series of benefits including health, security, freedom, choice and social relations. And there are a whole set of drivers of change that are happening, some of them indirect, and some of them direct, that impact both human well-being and the ecosystem services.

We are carrying out a global assessment, with a series of sub-global and local assessments, to assess the impact of these drivers on the goods and services and the local populations, and to see how to design various interventions that can actually alter the way things are changing. The first product, the conceptual framework, was recently published by Island Press, and the full assessment will be out in 2005. I believe it will be a major contribution in terms of the science and our understanding of some of these drivers, and the well-being connections with biodiversity.

What is clear is that we're slowly becoming more and more aware of our place in the world. One of the covers of *TIME* from last year, leading up to the World Summit on Sustainable Development in Johannesburg, showed planet Earth resting on a daisy flower. I think that image puts things in perspective, shows how fragile the setting is, and shows the responsibility that each of us has in terms of looking at a sustainable future. The important thing for me is that there is a growing awareness of our connection to nature. I see thousands of visitors come to the National Museum

of Natural History every week, and you see their fascination with understanding the world that we live in. These young people will grow up and start influencing various positions in government and in society. They must be taught not only how fragile life is, but also how our own livelihoods and the culture that we cherish is intimately tied in with stewardship of the Earth.

From my perspective, one of the fundamental elements in what we can offer, as scientists working in Latin America, working in institutions like the Smithsonian and others, is the basic knowledge of the setting of where we come from and how we interact with the surroundings. We want to help people developing policies to make better decisions that can achieve sustainability, so that we can actually hang on to our own future and better understand our past.

Thank you very much.

A handwritten signature in dark blue ink that reads "CSamper K." The signature is written in a cursive, slightly slanted style.

Dr. Cristián Samper was born in Costa Rica and raised in Colombia, where he attended the Universidad de los Andes. His undergraduate field studies at La Planada Nature Reserve in Colombia persuaded him to pursue graduate degrees and a career in biology, and he later received his Master's degree and Ph.D. from Harvard. Before coming to Washington, Dr. Samper spent two years leading the Smithsonian Tropical Research Institute in Panama. He served as chief science adviser to the Colombian Ministry of the Environment in the late 1990s, while he was setting up and running the Alexander von Humboldt Institute, a partnership aimed at creating science-based environmental policy. His research interests include the ecology of Andean cloud forests, conservation biology and environmental policy. He was appointed Director of the Smithsonian's National Museum of Natural History in March 2003.

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Lecture by Marcos Aguinis, former Minister of Culture in Argentina, who created the National Program for the Democratization of Culture. Aguinis was awarded the Planeta Prize in Spain, the Grand Prize of Honor by the Argentine Society of Writers.
No. 50b, June 2004.
- *The Difficulty of Telling the Truth*
Lecture by Darío Ruiz Gómez, art and literary critic. He has also published collections of short stories, poetry and a novel, *Hojas en el patio*.
No. 50c, October 2004.
- *Hölderlin and the U'wa: A Reflection on Nature, Culture and Development*
Lecture by William Ospina, essayist, poet, and translator. In 1992 he received the National Literature Award granted by Colombian Institute of Culture, and in 2003 he won the Casa de las Américas Award.
No. 51, July 2004.

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Other articles where Cultural ecology is discussed: human ecology: "cultural properties, it is called cultural ecology." Cultural ecology also has its roots in an earlier cultural anthropology, particularly the study of the geographic and environmental context of culture change. The neo-evolutionist Leslie White reacted to the idealism of the cultural approach, turning his attention to the progress of technology in harnessing "Read More. Humanities. Cultural Ecology- A Brief Overview. Uploaded by. Andrey HC." cultural ecology in studies of land use and the development of agriculture. When dealing with agricultural development a greater number of variables must be taken into account. "Bal Quijano & Immanuel Wallerstein - Americas in the Modern World-System. Uploaded by. Ana Laura Vilela. CULTURAL ECOLOGY. Significant progress came from the development of what came to be known as "cultural ecology," an approach proposed by Julian H. Steward, whose emphasis on behavioral considerations and on the comparative method make this approach among the most robust in the study of environmental anthropology." The scope of environmental anthropology is not dissimilar from earlier approaches known variously as cultural ecology, ecological anthropology, ethno-ecology, human ecology, and so on. It differs from these in its greater concern with questions of more than disciplinary interest and its greater commitment to interdisciplinary questions of urgent significance to life in the biosphere.