



2010 Año Internacional de la Diversidad Biológica

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**REPORT ON NATIONAL EVENTS AND ACTIVITIES OF THE
INTERNATIONAL YEAR OF BIODIVERSITY
COLOMBIA**

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According to Emilio Moran “changes in ecosystems caused by man are due to external factors such as technology, economic capital and government policies that encourage development of infrastructure in a given territory”. Incentives aimed at a “better quality of life” through the generation of industries rejecting the value and importance of biodiversity are unrealistic, since it is inevitable that in losing the natural resource and environmental services that they provide, human welfare is compromised.

The challenge faced globally is to begin to generate initiatives which foster the efficient use of natural resources; during this month we have seen increased investment in the use of alternative energies, trying to integrate the everyday needs of mankind in accordance with what the ecosystems can supply.

For this reason, it is of great importance to raise in the human population the need to maintain an optimal state of biodiversity and the appropriate use of natural resources is because man should not be a subject unrelated to ecosystems, but instead should be seen as part of them and understand that human welfare is inseparable from the ecosystem wellbeing.

IYB Academic Calendar – Instituto de Investigación de Recursos Biológicos Alexander von Humboldt

During this year, several conferences have been scheduled referring to the International Year of Biodiversity, in order to integrate the community and increase awareness around diversity, problems, causes and challenges faced in mitigating the negative impacts caused by man. The events held by the Humboldt Institute reports 1851 participants and 215 virtual assistants as of July 31.

During this month interest deepened in issues concerning land use change due to human migration and the understanding of what are the events that have led the tropics to foster megadiversity, focusing on Andean Ecosystems.

The events held in July were:

Thursday July 8, 2010

Human migrations and ecosystem changes

By: Emilio Moran

Profile: PhD. Social anthropology - Anthropology Director, Center for Training and Research on Global Environmental Change. His research has been directed to study the series of changes that have experienced the populations of the Amazon basin, which has led to a transformation of land use.

The construction of the transamazon highway in Brazil and the impact this has had on local populations, has been studied Dr. Emilio Moran, who highlights the interrelationship between man and the environment.

Deforestation in the Amazon and the structure of households is reflected in the changing demographics of the Amazonian populations and the transformation in land use at the lot. Field work done by Dr. Moran, was held in Altamira, where it was shown that households go through specific processes of formation, transformation and aging, as part of the process of migration and border expansion strategies that directly affect land use and environmental change.

This study demonstrated that the migration of the Amazonian populations occurs when settlers note that there is some kind of productive development or where infrastructure is being built. This is driven by the government in order to mobilize people to places where they have some special financial interest. An obvious case of this is the municipality of Altamira, that, in 1972, before the transamazonian road was built, had a secondary road and a population of 5 to 10 people; as the road was being built, the number of people increased. Ten years after, the municipality of Altamira had a population of five thousand people. The government drove the movement of mainly young people or families with teenagers, offering them benefits and guarantees for labor in the construction of the road.

Over time, the household grew in size and attempted to increase capital in several ways; one very common way is to accumulate capital in the form of livestock, which is protected as a family investment. Also, with the construction of the transamazon highway capital accumulation is performed in order to be invested on housing.

The Anthropological Center for Training and Research on Global Environmental Change (ACT) at Indiana University, founded in 1992, deals with interdisciplinary training and research on the human dimensions of global environmental changes. The ACT researchers and collaborators are focused on understanding the dynamics of deforestation using a combination of field studies and use of tools like remote sensing and GIS in topics such as population and environmental and human ecology.

The use of tools such as remote sensing and GIS, allows to take a broader vision of the object of study that integrates all the information such as rainfall, soil, population size, etc. This way, the new tools give results that provide more accurate conclusions as to the understanding of changes in the population and its relationship with deforestation.

Changes in land use are the main source of anthropogenic changes in biogeochemical cycles on the planet, which have a huge impact on biodiversity. The magnitude of changes in land use has been estimated at six million square kilometers of forests transformed into cultivated areas, 4.7 million square kilometers of savanna converted to agricultural uses. A common myth is to blame population growth and poverty for agricultural intensification and deforestation in the tropics; it has been demonstrated that the true cause is determined by technology, capital, globalization and development policies, which allow the expansion of road system and grant concessions to logging companies, causing changes in the trend of land use.

Therefore, deforestation should not be seen only from one perspective, as a result of this study it was found that this problem is caused by all the different factors: social, economic, political, etc. which must be taken into account when formulating policy or development plans.



Dr. Emilio Moran

Thursday July 22, 2010

Where does the megabiodiversity come from?

Sponsored by Ecopetrol

By: Antoine Cleef

Profile: PhD. University of Amsterdam - Member of the the Palaeoecology and Landscape Ecology Group, professor of the Institute for Biodiversity and Ecosystem Dynamics. His research has focused on tropical plant ecology, biogeography and paleoecology. He serves as advisor for scientific projects and programs NWO-WOTRO (Netherlands), Deutsche Forschungs Gemeinschaft (DFG, Bonn), Mata Atlantica SHIFT BMZ (Bonn), CONACYT (Mexico) and COLCIENCIAS (Colombia). He belongs to the External Review Committee of the Alexander von Humboldt Institute, Colombia.

Guest Commentator: Santiago Madriñán

Perfil: PhD. Systematic Botany - Harvard University. Associate Professor Department of Biological Sciences, Universidad de Los Andes. Director of the Systematic Botany Laboratory, Universidad de Los Andes. His research has been directed to study the evolution and biogeography of neotropical plants using molecular methods to reconstruct phylogenies, plant morphology, diversification of flora of páramos and genetic identification of species through DNA barcodes

Colombia is at the top of global biodiversity, being first in birds and amphibians with 669 species and 1768 species, respectively, second in vascular plants with 45000 species and fourth in mammals and reptiles with 471 and 475 species, respectively.

Biodiversity in Colombia can be seen from a cultural perspective, which highlights the useful plants, through traditional crops, mainly from Oxalidaceae and Solanaceae families. Another important aspect of cultural biodiversity is the bio-trading that reflects a community's identity and proper use of natural resources through crafts, artifacts, natural medicines, dyes, fibers, etc.

Megabiodiversity in Colombia has been the product of the dynamics and gene flow of different populations, as in sub-Andean forests, which are listed as one of the most biodiverse ecosystems, reflected in the variety of species. In the páramo ecosystem, biodiversity is a result of its distribution; during the Pleistocene period, wilderness ecosystems occupied three times more territory than they now occupy, and this allowed for a continuous gene flow between populations. However, due to the current distribution, the páramos have lost connectivity and therefore gene flow was interrupted, which led to genetic isolation, causing at the same time high levels of speciation, as is the case of the genus *Draba*, of the Brassicaceae family.

Dr. José Cuatrecasas, studying frailejones, found to *Espeletia* many different genera; one of these is the *Carramboa*, which is also distributed in Venezuela. This type of frailejón comes from a tree species of Andean forest, that, in order to become adapted to the páramo, lost its leaves, forming a column of dead leaves and a rosette of leaves at the end. Perhaps the area where it happened this adaptive variation is between Cucuta and San Cristóbal, where the Tamá páramo is located, and it is likely that some floristic elements have moved to Colombia and others have stayed in Venezuela. Another particular genus is the *Ruilopezia* frailejón, which has a terminal inflorescence very similar to the “puya”. In the Cocuy mountains the *Tamania* genus is known to be endemic to this area.

Flora of páramo as Luteyn (1999) is classified as follows: 52 genera with 352 fern species, 1 genus of gymnosperm with 2 species, 101 genera and 634 of monocots and 346 genera and 2411 species of dicots.

The migration of floristic elements that contributed to the diversity of the páramos and Andean ecosystems, come from warm lands undergoing a process of evolution and adaptation to high mountain ecosystems. Among these elements are *Holarctic* taxa, which come from the north such as the genus *Halenia* (Gentianaceae). Similarly, there are species coming from the south, known as *Austral-Antarctic* taxa, represented by the genus *Oreobolus* (Cyperaceae). On the other hand, the rich biodiversity of the Amazon forests and the Pacific Chocó, have contributed to the Andean and páramo ecosystems biodiversity, considering these contributions as *Neotropical* taxa of lowlands and endemic *Montane neotropical* taxa. Páramo ecosystems also have received migrations of floristic elements from savanna ecosystems, with the taxa taking the name of the same ecosystem, *Savanna* taxa. These adaptive migrations suffered by plants became known as “Ecophysiological Filters”, this being a gradual change which has been confirmed from pollen records.

As for megabiodiversity in the Amazon, some of it has been attributed particularly to the refugia that were generated during ice ages, when a speciation dynamic took place, resulting in a large number of endemic species.

Finally, the great diversity in the tropics and enjoyed by Colombia, has its origins in the Cretaceous, 70 million years ago, when there was the great continent of Gondwana, in which there were tropical forests. On the other hand, Carlos Jaramillo, argues that an important contribution to the megadiversity of this area is a result of two global warming events suffered by the Earth in the Paleocene and Eocene, thus increasing the richness and diversity of species.



Antoine Cleef