

Biodiversity in LAC/Colombia

Potential and examples

Requirements for cooperation



COLCIENCIAS
Departamento Administrativo de Ciencia, Tecnología e Innovación



**TODOS POR UN
NUEVO PAÍS**
PAZ EQUIDAD EDUCACIÓN



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- LAC's Biodiversity
 - Examples
- Sharing ALCUE-KBBE experience
 - Requirements and constraints
 - Key topics
- REDBIO Foundation as a network for LAC - EU alliances

LAC's Natural Resources



*Latin America and the Caribbean
A Biodiversity Superpower - UNDP*

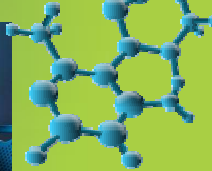
The Latin America and the Caribbean (LAC) region is well known for its immense wealth of natural resources, which are of increasing strategic value for a bio-based world. The region is among the global leaders who are exploiting the benefits of the new biotechnologies

The Latin American and Caribbean region includes seven of the world's most biodiverse countries (Brazil, Colombia, Ecuador, Mexico, Venezuela, Peru and Bolivia, and additionally Costa Rica, Panama, and Guatemala.) as well as the single most biologically diverse area in the world, the Amazon. South America alone has more than 40% of the Earth's biodiversity, and more than 25% of its forests.



Potential Products / services

Biodiversity



Pharmaceutic –
biomedical applications

Cosmetics – toiletry

Agricultural
applications

Food - feed

Environment

Bioenergy

Industrial applications



LAC's Natural Resources

- ✓ The LAC region includes 28 % of the world's arable land -50% of its lands classified as having agricultural potential (CEPAL, 2007)
- ✓ 33 % of its renewable fresh water, and the higher land area per inhabitant.
- ✓ Brazil is considered to have the greatest biodiversity in the world and to be the second in endemic species, with 60% of the Amazon rainforest -10% of the species in the world.
- ✓ The Tropical Andes (Bolivia, Colombia, Ecuador, Perú and Venezuela) is the richest and most diverse region on Earth in terms of biodiversity, one of the major centres of world domestication (first place in the world in diversity and endemism of vascular plants, birds, amphibians, and total vertebrates -excluding fish-

LAC's Natural Resources

- The LAC region constitutes an important, rich and diversified portfolio of bioeconomy based agro-industrial activities that have been generating significant economic value. In the future these activities will only further deepen, both in terms of their economic importance and geographical coverage.
- The diverse forest types in LAC generates a series of goods and services with high potential for economic exploitation in the food, feed, pharmaceutical & chemical sectors, biomass, non timber forest product NTFP, services such as erosion control, flood and climate regulation and recycling of nutrients.

LAC's Natural Resources examples...



- **Brazil: The potential of Native Palms** for producing biodiesel. Several native species such as: *macauba*, *tungue*, *inajá*, *tucumã*, *babaçu*, *buriti*, *coco-baia*, among others

The advantage is their higher productivity yield of oil, and their agro-climatic aptitude and possibility of being planted in different regions

Peruvian cat's claw: traditional jungle climber for global upscale markets an example of what is known as Non-timber Forest Products (NTFP)



Cat's claw (*Uncaria tomentosa*) is a woody vine native to the Amazon rainforest and other tropical rainforests in Latin America.

Traditionally used for centuries to treat health problems including arthritis, stomach ulcers, inflammation, dysentery, and fevers.



Colombia: Not only coffee; flowers too



Florigene Moonshadow™



Colombia is the second flower exporter in the world.

750 companies are exporting more than USD\$ 900M/year.

Orchids are a small part of this market (exported in 2007 + USD\$ 89,000 of fresh cut flowers).

Orchids (near 4000 sp. Ortiz) and other flowers have an enormous potential as a source of income.



Successful experiences in Colombia:

Ecoflora <http://www.ecoflora.com/>



- Ecoflora is a company focusing its strategies in the development of high quality and effective alternatives promoting sustainability, environmental protection, social and economic development based upon their innovations.
- It was established in 1998 by a group of technical entrepreneurs, with experience in agricultural, forestry, biotechnology and biotrade industries.
- COLCIENCIAS has supported several R&D projects since 2002.
- First exports to Ecuador and Peru in 2007
- First patent application in 2008 (12 patent applications for dyes, fungicides, insecticides, surfactants and elicitors -4 approved and 8 in process)
- Partnerships with universities, Government institutions and joint work with companies for R, D & I
- Member of UEBT (Union for Ethical Biotrade)
- Winners of several innovation awards
- In 2011, spin-off of the agro business creating a new Company: Ecoflora Agro



Successful experiences in Colombia

Ecoflora



Ecoflora Agro is a leader in the development of plant extracts for effective and sustainable crop protection.

It is a joint venture with global reach, created in 2011, which combines the innovation capabilities developed by Ecoflora since 1998 with the experience of more than 50 years of Gowan Company, in the registration, development and marketing of solutions for integrated pest and disease management, around the world.

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

Biopesticides: insecticides, repellents, fungicides, miticides, nematocides and molluscicides



Successful experiences in Colombia

Ecoflora



Ecoflora Cares develops natural products and ingredients, providing effective and innovative solutions derived from biodiversity for food, personal, cosmetics, and home care industries, focusing on environmentally sustainable and socially responsible practices.

The supply processes of biodiversity products are held together with ethnic and peasant communities who own the resources, through the establishment of partnerships with community-based organized groups, local traders and NGOs to develop sustainable supply and resource management processes.

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



Home care: 12 products

Personal care: 6 products

Garden: 6 products

Natural dyes, waxes, oils,



Successful experiences in Colombia

Ecoflora



Among their strategies:

- emphasis on native and endemic biodiversity,
 - strengthening of sustainable supply chains;
 - open and disruptive innovation,
 - development of patents and other intellectual property mechanisms;
 - the development of inclusive business models,
 - the use of certifications in fair, sustainable and equitable biocommerce
-
- These strategies together with the strengthening of links with universities and other R&D centers, make this innovative experience a true example of the application of the sustainable use of biodiversity.

LAC's Natural Resources for KBBE

Six pathways for more efficient use of biological products and processes -
connected/overlapped in many cases-

- **Biotechnology products and processes:** industrial micropropagation, MAS, GMO seeds, diagnostics tools, molecular animal improvement, “omics”: industrial GM microorganisms & metabolic engineering for bioindustries (biocatalysts –enzymes- for improved production of energy and bioproducts, antibiotics, vitamins, detergents, lactic acid, biopolymers)
- **Bio-refinery and Bio-energy:** bioethanol, biodiesel, biogas, and different green chemistry oriented activities. Second and third generation biofuels
- **Sustainable use of Biodiversity:** Valorization (domestication, transformation, linking to market ...) of distinctive biodiversity (functional traits related to specific uses and sectors, gene Discovery, new products & processes, market development for local products, etc.)
- **Ecological Intensification:** Agronomic practices for sustainability (bio-inoculants and biopesticides, no-till agricultural practices, precision agriculture, integrated pest and nutrient management, clean technologies)
- **Ecosystem services:** development of carbon credit systems, clean air, water, food and materials, eco-tourism strategies and water management pricing and management mechanisms.
- **Value chain efficiency** improvement: reduction of post-harvest losses, market links

Overview - Natural Resources in LAC

Main results (SWOT in four productive chains)

Major Strengths • Profusion of NNRR in LAC; • Strong S&T capacity, infrastructure - researchers and funding possibilities; • Normative framework in place; • Rapidly growing economies in several countries; Agricultural and environmental country policies encouraging and supporting sustainability • Competitive costs and environmental benefits.	Main Weaknesses • Insufficient capacity for turning developments into profitable products and/or services; • Low capability in market planning and design; • Access to NNRR is restricted and complicated; • Reduced use of the available biodiversity.
Key Opportunities • Awareness of the need to support innovation in KBBE; • Increasing demand of bio-based products & services; • Acceptance of biotechnological developments Technical capability and infrastructure for profitable use of LAC resources; • Awareness of the need to develop new organizational governance forms to create competitive advantages for KBBE.	Major Threats • Difficulty to obtain access permissions for NNRR; • Inequitable sharing of benefits derived from the use of NNRR, discouraging local developments • No reinforcement of laws, or stable and substantial incentives for sustainable exploitation of NNRR; • Impacts of bio-piracy on developments of KBBE and weakness to protect ancient knowledge; • Disadvantages of local communities to negotiate with researchers & industry.

Natural Resources for Bioeconomy in LAC

Conclusions: Needs

- To replace present productive systems with more sustainable long-term practices for more permanent social improvements
- Appropriate and accessible regulations, funding and international S&T cooperation are required.
- To encourage policies offering incentives to second generation technologies, for a better waste conversion and those to recover degraded areas through technological developments
- To enhance the negotiating capacity of countries including the identification of market opportunities. Economic analyses, specifically cost-benefit studies are needed to determine the feasibility of the particular activities
- To strengthen capacities in Best Agricultural and Manufacture Practices and knowledge of international standards
- To implement policies with incentives encouraging bio-trade and sustainability: increase investments on new sustainable technologies enabling the use of the rich biodiversity.
- In order to define concrete actions, and establish the best options, all stakeholders must be involved in a participatory process



Constraints for Bioeconomy in LAC

- Bioeconomy development depends not only on resources quality and availability but also on social, economic and cultural factors.
- Weak capacity for turning developments into profitable products and/or services and for marketing
- BE development requires innovation power, change in attitude and strong defined policies –incentives and rules-, leadership for sustainable social changes
- There is a lack of adequate mechanisms for integrating private and public R&I efforts in a sustained way

Key topics found with greatest potential in LAC

➤ **Bioenergy**

Bio-refineries and bio-products. A priority is the development of second-generation fuels, from non-edible lignocellulosic (LC) biomass (residues of forest management or food crop production or whole plant biomass grown specifically for biofuel purposes).

➤ **Eco-intensification**

Reduced or non-tillage; Integrated crop management; Bioinoculants: biofertilizers, biopesticides; Precision agriculture
Clean technologies; residues & waste microbial treatment

➤ **Valorization of Biodiversity**

Food & feed from native species; pharmaceuticals; flowers; specific traits

➤ **Biotechnology products and processes.**

Biomaterials: enzyme production for industrial uses, biopolymers, nutraceuticals,

- Developing mechanisms for international cooperation.....

Latin American and the Caribbean Biotechnology Network



REDBIO GENERAL OBJECTIVES

- REDBIO is a network of “laboratories” dedicated to biotechnology; the network involves researchers, scientists, students, technicians, authorities, decision makers from the public, private, and mixed sectors , and other stakeholders in LAC countries;
- REDBIO promotes the development and utilization of biotechnology knowledge & tools for addressing challenges/opportunities relevant to the sustainable development of agriculture & forestry in LAC countries;
- REDBIO seeks to utilize information & knowledge diffusion means in LAC through linkages with organizations and institutions worldwide.

Cross Cutting Thematic Areas

Adaptation to climate change – Sustainable Productivity – Food and Nutritional Security –
Human Health – Energy efficacy & Sustainable Mining –
Business round tables - Biosafety

REDBIO ADAPTS TO NEW CHALLENGES AND OPPORTUNITIES IN LAC

> REDBIO, along with other networks in LAC , is an important asset to share knowledge /expertise in S,T & I related to biotechnology (*)

- (i) strengthening knowledge sharing & research networks , and S,T&i biotech platforms;
- (ii) promoting efective collaborative associations and consultation mechanisms for technology development – application.
- (iii) strengthening / establishing communication channels and science-based information in biotechnology research and technology transfer.
- (iv) coordinating biotechnology national-subregional-regional databases.

> Maintaning its main traditional role in the agricultural & forestry sectors , REDBIO is strategically linking to thematic relevant areas in Human Health , Bioenergy, Biomining and Bioeconomy

> REDBIO will link LAC institutions with S&T Platforms and Information Networks by establishing collaborative efforts.

>REDBIO will seek to potentiate LAC countries biotechnology and its supportive sciences considering that the need to incorporate S&T as a key variable for developing competitive natona/ regional productive capacity.

(*) Summary Report : <http://www.fao.org/biotech/abcd/parallel/en> .

• Thank you very much!!

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