

# Biodiversity and human well-being in Latin America and the Caribbean

A multi-sectoral contribution to the science-policy interface



This document is the result of an extensive multi-sectoral consultation on the relationship between biodiversity and human well-being in Latin America and the Caribbean, which gathered the perspectives of different social actors. The goal is to provide resource managers and decision makers with a synthesis of the priority problems and paths of action that were identified during this process.





## What is biodiversity?

Biodiversity, in its broad meaning used in this document, includes the characteristics, variety and abundance of plants, animals and other organisms, including species, genetic variety and landscape patches.

## Biodiversity in Latin America and the Caribbean: potentialities, challenges and contrasts

**Ecosystem biodiversity is essential for human well-being in all its dimensions.** Therefore we need to understand how it is managed, how it relates to the different societal benefits it provides and how these are distributed among social actors. It is also fundamental that policy and decision-making at different levels begin to take these elements into consideration in an explicit way.

**Biodiversity in Latin America and the Caribbean (LAC) is critical to its people and to all of mankind.** The vast biological wealth of LAC and the accelerated changes it is undergoing, make this region a source of opportunities and challenges. For example, LAC hosts the most extensive forests in the world, with considerable potential to affect climate and atmospheric chemistry. Some of the most important reservoirs of wild and domesticated biodiversity for the preservation of biological wealth and human food security are also found in LAC. The region has provided some of the most visionary examples of ecosystem conservation and sustainable use. In parallel to these opportunities and strengths, LAC presents some of the most extreme cases of destruction of common natural resources, as well as deep internal asymmetries, where the generation of enormous profits from ecosystems coexists with overwhelming poverty. As a result, **connections between biodiversity and human well-being are a priority at the global level, but much more so in our region.**

## LINKING BIODIVERSITY AND HUMAN WELL-BEING THROUGH ECOSYSTEM SERVICES

Many aspects of human well-being depend on biodiversity. This is because, besides its intrinsic value, biodiversity affects **ecosystem services**, which are defined as the benefits that societies derive from ecosystems, and that make human live physically possible and worth living.

Ecosystem services include the supply of food, fiber and building materials and the benefits related to the aesthetic, spiritual and recreational aspects of nature. Other ecosystem services are soil fertility, the regulation of the amount and quality of drinking water and the capacity to respond to pests or extreme climate events.

**This is why, far from being a luxury, adequate biodiversity protection and management are essential for human well-being.**



The amount of water contained in the peat bogs of Tierra del Fuego, in the southernmost part of the continent, is 20 times the volume contained in the glaciers of the region. Peat bogs also accumulate 100 tons C per hectare per year and regulate runoff throughout the year.

Through the pollination of edible plants, such as fruit trees, vegetables, and herbs and spices, many wild organisms such as bees, butterflies, flies and bats, contribute to the food security of 570 million people in Latin America.



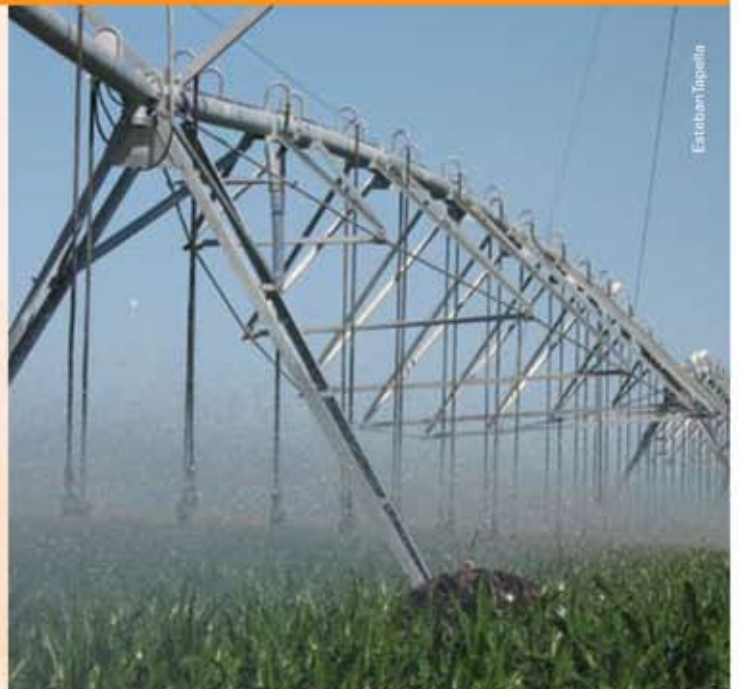
In Costa Rica, nature-based tourism brings in more foreign currency than exports of the three main agricultural products (banana, coffee and pineapple).

# Priority themes for research and action

The themes presented below are based on the close agreement observed between responses to the consultation, and represent complex problems that involve ecological, environmental and social aspects. Those problems span a wide range, from the generation of new scientific knowledge to political action at different levels. This is why they are excellent examples of the kind of challenges and opportunities posed by the interfaces between biodiversity and society and between research and action. This contributes to answering questions through the generation of knowledge, to basing actions on the best knowledge available, and to better matching knowledge and actions to the reality of the region.

## Coordinated and fair planning of large-scale agricultural production and sustained supply of other ecosystem services based on biodiversity.

- **Changes in land use are the main cause for biodiversity loss in LAC.** A key element in this process is the accelerated expansion of industrial agriculture and forestry for large-scale production of food, fiber and fuels at the expense of other ecosystems. This not only threatens unique species, but it also compromises the capacity of ecosystems to provide essential benefits.



- One of the main challenges for the region is to find balance **between the expansion and homogenization of agricultural production** –which play a crucial role in national economies– **and the sustained supply of ecosystem benefits** for societies in the present and future. To achieve this, the first indispensable step is to identify winners and losers within these processes.
- **All biodiversity-related costs and benefits for all involved stakeholders** have to be taken into account -a fundamental starting point to the design of fair planning and negotiation pathways among different social and geographic sectors.

## Relationships between biodiversity and vector-borne infectious diseases in a context of environmental and social changes

- **There are direct and indirect connections between biodiversity and infectious diseases** transmitted by vectors and animal reservoir hosts in LAC. Those connections are affected by **changes in climate and in land use and cover**.
- **One of the most important factors is the expansion of the agricultural frontiers.** For instance, no-till farming is frequently associated with outbreaks of diseases whose main reservoirs are rodents. Deforestation favors the transmission of cutaneous leishmaniasis at the boundary between deforested areas and human settlements. The expansion of agriculture in several areas of the Amazon and plains increases the risk of contact of humans with mosquitoes that transmit yellow fever and with wild triatomines that transmit Chagas disease.
- **It is difficult to make generalizations about those connections that are valid for the entire region.** This is because of the great variety of interactions existing among vectors, pathogens, reservoirs, human settlements and vector control programs in the affected countries. The analysis of how these factors interact in each specific case is fundamental for the establishment of effective and coordinated public health and conservation policies.



## Synergies and conflicts between local and regional provision of ecosystem services and the global strategies for mitigation of carbon emissions



Foto: Sandra Diaz

- **LAC has a strategic position in the world**, because of its biodiversity, its capacities for renewable energy (one of the major current and potential producers of agrofuels) and its effects on climate (one of the greatest terrestrial biological carbon reservoirs and a significant contributor to global emissions due to changes in land use).
- It therefore becomes necessary to **identify conflicts and priorities** among different local stakeholders and between local and international stakeholders, and also document the **best trade-offs and synergies** within each context.
- For instance, the **new international mechanisms for reducing carbon emissions from deforestation and degradation** (REDD and REDD+) discussed in the framework of the United Nations Conventions, provide possibilities for combining carbon storage with several other local and global ecosystem benefits.
- At the same time, they suggest **trade-offs and questions from both ecological and social perspectives**. For example, what land use regimes are most compatible with long-term carbon sequestration? How does carbon sequestration relate with the fight against poverty? How to guarantee that sectors whose livelihoods have been traditionally based on forests will have access to the expected economic benefits derived from initiatives such as REDD and REDD+, in the face of possible administrative and land tenure problems?

## Mutual dependence between agrobiodiversity and traditional rural communities



- **Strong links exist between the development and maintenance of agrobiodiversity and rural subsistence communities.** Agrobiodiversity includes all organisms relevant to crop and domestic animal production. On the one hand, continuity of rural subsistence livelihoods developed over many generations depends on wild and domestic plants and animals. On the other hand, traditional agricultural production by subsistence communities –including varieties of some of the world’s main crops, their wild ancestors and numerous technologies of agriculture, animal husbandry and extractive resource use– are a legacy for future generations in LAC and elsewhere.
- **However, this legacy is vanishing.** The current importance and future potential of agrobiodiversity in LAC are usually underestimated. This, together with the market pressure towards the homogenization of productive systems, contributes to its progressive loss, and to the loss of the associated livelihoods. An adequate management of agrobiodiversity is crucial for long-term sustainable food production in LAC and worldwide, as well as for the conservation of many wild biodiversity components.
- Guidelines and technical innovations are needed to **create and maintain productive and at the same time diverse rural landscapes**, including patches with different management and land use intensities. This will allow traditional agricultural systems –from genes to institutions– to persist and continue evolving.

## The role of biodiversity and its ecosystem services in the adaptation to climate change

- In the face of the challenges posed by climate change, most efforts have focused on its possible impacts on biodiversity and agricultural systems, as well as on mitigation measures. However, the region has **great biological, technological and social potential to adapt** to those changes that appear to be unavoidable even if mitigation measures are implemented.
- **This potential for active adaptation is based on three fundamental elements:** the **natural genetic wealth**, including its capacity for evolution under environmental changes, the **biocultural, technological and social wealth** accumulated by societies in the region, and the **capacity for innovation** of its scientific systems. Such adaptation is feasible and necessary at all levels. Examples include the establishment of networks of green spaces within and around large cities, the protection of watersheds and river margins, the development of monitoring systems, the use of the domestic and wild genetic wealth for food, health and energy generation, and an optimized design of protected natural areas to preserve the capacity of biological populations to migrate and evolve.
- To take maximum advantage of these three types of wealth in the adaptation to climate change, the greatest challenge consists of **designing new social practices and institutions or modifying the existing ones.**



## New ways for action: Interdependence and inter-sectoral communication

In general, the five challenges identified are multi-dimensional, go across administrative units or countries, and involve interests and rights of many stakeholders. To address them effectively, new ways for knowledge generation and management are required, as well as innovative coordination mechanisms among sectors and stakeholders within countries and across regional coalitions.

- **Producing new knowledge.** Each of the priority themes requires new knowledge. Integrating new information from different sources into one single system is important and calls for a concurrent effort to train social sectors in recording, organization and interpretation of information. A balance between institutional memory and innovation is also necessary.
- **Better use of existing information.** Besides producing new knowledge, pre-existing information needs to be rescued and revalued. In many cases, such information is directly related to the problems that need to be solved. The challenge here is to attain access to, and systematization and synthesis of that information.
- **New social and organizational practices of inter-sectoral connection.** To improve such connection, actions are required that will guarantee the relevance -in scale, timing and direction- of the generated knowledge. They should also facilitate an active mutual adaptation between the generated knowledge and its context. In other words, questions change according to changes in context; in turn, the generation and implementation of new answers leads to context changes, in a spiral of mutual learning.
- **Easier access by decision makers to scientific knowledge.** A major obstacle at the interface between the generation of knowledge and the creation and implementation of public policies is the lack of mechanisms for rapid and effective communication among those who generate the knowledge and resource managers, planners, administrators and controllers. Specific strategies and tools need to be identified to improve that flow of information.
- **Transforming or expanding funding mechanisms.** The funding of scientific research and of the activities of social organizations is currently compartmentalized into disciplines, sectors and administrative territorial units. It needs to adapt to the proposed new ways of knowledge generation and action.
- **Inter-sectoral communication and participation.** Informed participation of citizens and public control of ecological common goods are fundamental for a socially, environmentally and generationally transparent and fair management of biodiversity. Thus, all relevant stakeholders should be involved in prioritizing, implementing, monitoring and controlling initiatives for the management of biodiversity and ecosystem services in the region.
- **Recognizing inequities in access.** When analyzing the relationships among human well-being, ecosystem services and biodiversity, unequal physical and legal access to them has to be taken into consideration. Asymmetries may have a direct effect on the effectiveness of management and protection initiatives.

## A multi-sectoral consultation to gather different views and voices

The multi-sectoral consultation on which this document is based involved over 200 people from 16 countries, including the academic, governmental and private sectors as well as grass-roots social organizations and non-governmental organizations at different levels. The consultation concluded with a discussion and synthesis workshop with representatives from the different sectors. The outcome is a **set of research, management and policy-making priorities**, as well as **recommendations** on new institutions and social practices **that will make progress possible on these priority themes**.

Details on the consultation are available at

<http://www.icsu-lac.org/diversitas/diversitas.html>

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[www.nucleodiversus.org](http://www.nucleodiversus.org)

#### Useful links:

Nucleo Diversus

<http://www.nucleodiversus.org>

ICSU-LAC

<http://www.icsu-lac.org>

Multisectoral consultation

<http://www.icsu-lac.org/diversitas/diversitas.html>

Millennium Ecosystem Assessment

<http://www.maweb.org>

DIVERSITAS

<http://www.diversitas-international.org>

IAI

<http://www.iai.int>