Understanding Relationships between Biodiversity, Carbon, Forests and People: The Key to Achieving REDD+ Objectives

A Global Assessment Report
Prepared by the Global Forest Expert Panel on Biodiversity, Forest Management and REDD+

Editors: John A. Parrotta, Christoph Wildburger, Stephanie Mansourian

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Preface

This volume is the third assessment report of the Global Forest Expert Panels (GFEP) initiative, following those on adaptation of forests and people to climate change (in 2009), and on international forest governance (in 2011). The mission of GFEP is to support forest-related intergovernmental processes by assessing available scientific information on forest-related issues of high concern in a comprehensive, interdisciplinary, objective, open and transparent way. GFEP is a joint initiative of the Collaborative Partnership on Forests. It is led and coordinated by the International Union of Forest Research Organizations (IUFRO).

Forests harbour a major proportion of the world’s terrestrial biodiversity and provide a wide range of vitally important ecosystem services – including carbon sequestration and storage. Deforestation and forest degradation continue to erode biodiversity and the capacity of forest ecosystems to help mitigate climate change and provide the goods and services that sustain livelihoods and human well-being locally, and globally. Reducing greenhouse gas emissions from deforestation and forest degradation, and enhancing forest carbon stocks in developing countries (REDD+) is a proposed mechanism which has the potential to realise its primary objective – climate change mitigation – with variable impacts, positive and negative, on biodiversity, forests and people. REDD+ is complex, its proposed activities and implementation mechanisms not yet clearly defined, and therefore surrounded by uncertainty. Because of its high relevance to climate change mitigation, the conservation and sustainable use of forests and their biological diversity, the Expert Panel on Biodiversity, Forest Management and REDD+ was established by the Collaborative Partnership on Forests in December 2011 to carry out this assessment.

The Expert Panel included 24 scientists and other experts from a variety of biophysical and social science disciplines relevant to the topics covered in this assessment report. An additional 18 contributing authors added their expertise to the assessment. Each chapter was prepared by a team of Lead Authors and Contributing Authors led by one or more Coordinating Lead Authors. A full draft of the report and its individual chapters was peer-reviewed prior to its completion. The results of this voluntary collaboration between January and October 2012 are presented in the six inter-related chapters comprising this book.

This assessment report evaluates the implications of forest and land management interventions envisaged under REDD+ in a multidimensional and integrated fashion. It summarises the most current scientific literature that sheds light on the relationships between forest biodiversity and carbon (and other ecosystem services), how these complex relationships may be affected by management activities implemented to achieve REDD+ objectives, the potential synergies and trade-offs between and among environmental and socio-economic objectives, and their relationship to governance issues. Based on the main findings of the assessment (summarised in Chapter 6), a policy brief entitled ‘REDD+, Biodiversity and People: Opportunities and Risks’ has been prepared especially for policy- and decision-makers.

Given the broad scope of this assessment, it was not possible to cover all topics in great detail or to the extent that some readers may have wished. However it is my hope that this assessment report provides a sound scientific basis for informed decision-making by policy-makers, investors, donors and other interested stakeholders with respect to REDD+ implementation.

John A. Parrotta
Chair, Global Forest Expert Panel on Biodiversity, Forest Management and REDD+
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We acknowledge and sincerely thank the reviewers of the full report and the various chapters whose comments have greatly improved the quality of this publication: Arun Agrawal, Susan Braatz, Jean-Michel Carnus, Bryan Finegan, Alain Franc, Peter Graham, Robert Jandl, Peter Kanowski, Shashi Kant, Katia Karousakis, David Lamb, Ariel E. Lugo, Robert Nasi, Ravi Prabhu, Michael Pregernig and Francis E. Putz.

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Furthermore, we would like to thank the member organisations of the GFEP Steering Committee for providing overall guidance and generous in-kind support: the International Union of Forest Research Organizations (IUFRO), the Food and Agriculture Organization of the United Nations (FAO), the Secretariat of the United Nations Forum on Forests (UNFF), the Secretariat of the Convention on Biological Diversity (CBD), the Center for International Forestry Research (CIFOR), and the World Agroforestry Centre (ICRAF). Our special thanks go to the team of the IUFRO Secretariat for providing indispensable administrative and technical support to the work of the Panel. We are particularly grateful to the Food and Agriculture Organization of the United Nations (FAO), the Federal Research and Training Centre for Forests, Natural Hazards and Landscape (BFW, Vienna) and to Embrapa Amazonia Oriental (Belém, Brazil) for hosting Expert Panel meetings.

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Panel Chair

Christoph Wildburger
GFEP Coordinator

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Content Editor
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<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>AGB</td>
<td>Above-ground Biomass</td>
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<tr>
<td>AHTEG</td>
<td>Ad Hoc Technical Expert Group</td>
</tr>
<tr>
<td>AMD</td>
<td>African Mammals Databank</td>
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<tr>
<td>ASEAN</td>
<td>Association of Southeast Asian Nations</td>
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<tr>
<td>B-EF</td>
<td>Biodiversity-Ecosystem Functioning</td>
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<tr>
<td>BFV</td>
<td>Federal Research and Training Centre for Forests, Natural Hazards and Landscape</td>
</tr>
<tr>
<td>BGB</td>
<td>Below-ground Biomass</td>
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<tr>
<td>CBD</td>
<td>Convention on Biological Diversity</td>
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<td>CCBA</td>
<td>Climate, Community and Biodiversity Alliance</td>
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<tr>
<td>CDM</td>
<td>Clean Development Mechanism</td>
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<tr>
<td>CSF</td>
<td>Canadian Forest Service</td>
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<tr>
<td>CFUG</td>
<td>Community Forest User Group</td>
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<tr>
<td>CIFOR</td>
<td>Center for International Forestry Research</td>
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<tr>
<td>CLUA</td>
<td>Climate and Land Use Alliance</td>
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<td>COMIFAC</td>
<td>Central African Forests Commission</td>
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<tr>
<td>COP</td>
<td>Conference of the Parties</td>
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<tr>
<td>CPF</td>
<td>Collaborative Partnership on Forests</td>
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<tr>
<td>DFID</td>
<td>Department for International Development</td>
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<tr>
<td>DRC</td>
<td>Democratic Republic of the Congo</td>
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<tr>
<td>EIA</td>
<td>Environmental Impact Assessment</td>
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<td>ES</td>
<td>Ecosystem Service</td>
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<tr>
<td>ESMF</td>
<td>Environmental and Social Management Framework</td>
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<td>EU</td>
<td>European Union</td>
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<tr>
<td>FAO</td>
<td>Food and Agriculture Organization of the United Nations</td>
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<td>FCPF</td>
<td>Forest Carbon Partnership Facility</td>
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<td>FECOFUN</td>
<td>Federation of Community Forest Users, Nepal</td>
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<tr>
<td>FIP</td>
<td>Forest Investment Programme</td>
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<tr>
<td>FLEG</td>
<td>Forest Law Enforcement and Governance</td>
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<tr>
<td>FLEGT</td>
<td>Forest Law Enforcement, Governance and Trade</td>
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<tr>
<td>FPIC</td>
<td>Free, Prior and Informed Consent</td>
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<tr>
<td>FSC</td>
<td>Forest Stewardship Council</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
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<tr>
<td>GEF</td>
<td>Global Environment Facility</td>
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<tr>
<td>GEO BON</td>
<td>Group on Earth Observation Biodiversity Observation Network</td>
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<tr>
<td>GFEP</td>
<td>Global Forest Expert Panels</td>
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<tr>
<td>GHG</td>
<td>Greenhouse Gas</td>
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<td>GPP</td>
<td>Gross Primary Production</td>
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<tr>
<td>HWP</td>
<td>Harvested Wood Product</td>
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<tr>
<td>ICCN</td>
<td>Institut Congolais pour la Conservation de la Nature</td>
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<tr>
<td>ICRAF</td>
<td>World Agroforestry Centre</td>
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<td>ICV</td>
<td>Instituto Centro de Vida</td>
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<tr>
<td>IFAD</td>
<td>International Fund for Agricultural Development</td>
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<td>IFF</td>
<td>International Forum on Forests</td>
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<tr>
<td>IFT</td>
<td>Instituto Floresta Tropical</td>
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<tr>
<td>ILUC</td>
<td>Indirect Land-Use Change</td>
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<td>IPF</td>
<td>International Panel on Forests</td>
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<td>ITTO</td>
<td>International Tropical Timber Organization</td>
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<tr>
<td>IUCN</td>
<td>International Union for Conservation of Nature</td>
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<tr>
<td>IUUFRO</td>
<td>International Union of Forest Research Organizations</td>
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<td>LATIN</td>
<td>Lembaga Alam Tropika Indonesia</td>
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<tr>
<td>MDG</td>
<td>Millennium Development Goal</td>
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<tr>
<td>MEA</td>
<td>Millennium Ecosystem Assessment</td>
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</table>
MRV  Monitoring (or Measurement), Reporting and Verification
NBP  Net Biome Production
NBSAP  National Biodiversity Strategy and Action Plan
NEE  Net Ecosystem Exchange
NEP  Net Ecosystem Production
NGO  Non-Governmental Organisation
NPP  Net Primary Production
NTFP  Non-Timber Forest Product
PA  Protected Area
PEFC  Programme for the Endorsement of Forest Certification
PES  Payment for Ecosystem (or Environmental) Service
PFE  Permanent Forest Estate
PFM  Participatory Forest Management
POWPA  Programme of Work on Protected Areas
PRODEMFLOR  Forest Management Development Programme
PSR  Pressure-State-Response
RECOFTC  Regional Community Forestry Training Centre
REDD  Reducing Emissions from Deforestation and Forest Degradation
RIL  Reduced Impact Logging
R-PP  Readiness Preparation Proposal
SBSTTA  Subsidiary Body on Scientific, Technical and Technological Advice
SD  Standard Deviation
SE  Standard Error
SEA  Strategic Environmental Assessment
SEPC  Social and Environmental Principles and Criteria
SES  Social and Environmental Standards
SESA  Strategic Environmental and Social Assessment
SFM  Sustainable Forest Management
SISA  System of Incentives for Environmental Services
TFAP  Tropical Forestry Action Plan
TNC  The Nature Conservancy
UK  United Kingdom of Great Britain and Northern Ireland
UNDRIP  UN Declaration on the Rights of Indigenous Peoples
UNEP-WCMC  United Nations Environment Programme – World Conservation Monitoring Centre
UNFCCC  United Nations Framework Convention on Climate Change
UNFF  United Nations Forum on Forests
UNPFII  UN Permanent Forum on Indigenous Issues
US  United States of America
VCS  Verified Carbon Standards
VPA  Voluntary Partnership Agreement
WWF  Worldwide Fund for Nature

The International System of Units (SI) is used in the publication.

\[
\begin{align*}
\text{Mg} &= \text{megagram (1 Mg = 10^6 g)} \\
\text{Tg} &= \text{teragram (1 Tg = 10^{12} g)} \\
\text{G} &= \text{giga (10^9)} \\
\text{P} &= \text{peta (10^{15})} \\
\text{ha} &= \text{hectare (100 ha = 1 km}^2\text{)} \\
\text{yr} &= \text{year} \\
\text{W} &= \text{watt} \\
\text{C} &= \text{carbon} \\
\text{CO} &= \text{carbon monoxide} \\
\text{CO}_2 &= \text{carbon dioxide} \\
\text{CH}_4 &= \text{methane} \\
\text{N}_2\text{O} &= \text{nitrous oxide}
\end{align*}
\]