World Bank Institute

Estimating the Opportunity Costs of REDD+

A training manual

THE WORLD BANK

CARBON FINANCE ASSIST

FOREST CARBON PARTNERSHIP FACILITY

ASB Partnership for the Tropical Forest Margins

Version 1.3
March 2011

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The World Bank
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Foreword

Over the last years, reducing emissions from deforestation and forest degradation in developing countries, the role of conservation, sustainable management of forests and enhancement of forest carbon stocks (what is known as "REDD+") has arisen as a key issue in the international climate change negotiations and entered into the public media. There are good reasons for this. On the one hand, forest ecosystems, still covering one-third of the earth's land surface, store more carbon than both the atmosphere and the world's oil reserves combined. Forests are the most diverse terrestrial ecosystems, preserve watersheds and soils, regulate local climates and provide wood, energy, food, medicines, fibres and clean water to society, especially to forest-dependent peoples, a large number of whom are poor. On the other hand, ongoing deforestation and forest degradation, which the FAO estimates to amount to 5.2 million hectares net per year (more than the size of Costa Rica), accounts for up to one-fifth of global anthropogenic carbon emissions.

Forests contain more carbon than the atmosphere and the world's oil reserves combined

In December 2005, at the climate negotiations in Montreal, the Coalition for Rainforest Nations introduced the idea of compensating developing countries for reducing national rates of deforestation. Since then governments, international and civil society organizations, indigenous peoples, scientific institutions and private firms have been debating how to integrate REDD+ into a future international climate agreement. The December 2010 Cancun decision on REDD+, under the Ad Hoc Working Group on Long-term Cooperative Action, represents an important milestone in this respect as it recognizes the climate change mitigating role of forests in developing countries and the corresponding need for international financial support.

REDD+ opportunity costs are the difference in net earnings from conserving or enhancing forests versus converting them to other, typically more valuable, land uses

The cost of REDD+ is crucial knowledge for forest countries, donors and buyers of emission reductions in the future. While the transaction and implementation costs of REDD+ can be more readily estimated from similar forest-related activities or when they actually occur, an important cost component may remain hidden: by conserving their present forests, countries and landowners forgo the benefits of potentially more lucrative alternative land uses, such as crops or livestock — this foregone revenue is known as the opportunity cost of REDD+.

This manual is a collective effort of (1) the Facility Management Team of the Forest Carbon Partnership Facility (FCPF), (2) the World Bank Institute Carbon Finance Assist program

(CF-Assist) — the multi-donor trust-funded capacity building program of the World Bank Institute Climate Change Practice (WBI-CC) and (3) the Partnership for the Tropical Forest Margins (ASB) of the Consultative Group on International Agricultural Research (CGIAR).

The manual shares hands-on experiences from field programs and presents the essential practical and theoretical steps, methods and tools to estimate the opportunity costs of REDD+ at the *national* level. The manual addresses the calculation of costs and benefits of the various land use alternatives in relation to their carbon stocks. As required data are generally not readily available, the manual also includes information on data collection, analysis and evaluation techniques. Although sections of the manual are relevant for *sub-national* or *project* analysis, it is not intended to calculate compensation for farmers or landowners at a given site.

The target audience of the manual includes professionals within governments, universities, research institutions, international or non-governmental organizations and program developers who may use the presented methods and tools to estimate opportunity costs and incorporate these costs into recommendations for REDD+ policies and programs. As part of a capacity building objective, a series of training-of-trainer workshops is scheduled for countries participating in the FCPF and UN-REDD Programme in Africa, Asia and Latin America.

The cost of REDD+ is crucial knowledge for governments, donors and buyers of carbon credits

The manual was edited by Pablo Benitez, Marian de los Angeles and Gerald Kapp (World Bank Institute), Benoît Bosquet, Stephanie Tam, Alexander Lotsch (FCPF Facility Management Team), Stefano Pagiola (World Bank Latin America and Caribbean Region) and Carole Megevand (World Bank Africa Region). We are grateful for the dedicated work of the main authors Douglas White and Peter Minang (ASB) and their co-authors Brent Swallow, Fahmuddin Agus, Glenn Hyman, Jan Börner, Jim Gockowski, Kurniatun Hairiah, Meine van Noordwijk, Sandra Velarde and Valentina Robiglio. We also appreciate the contributions of Michael Richards and Simone Bauch. In addition, external reviews from Erick Fernandes, Gregory Frey, Ken Andrasko, Loic Braune, Martin Herold, and Timm Tennigkeit are appreciated.

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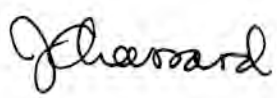

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This is a living document. Please send your comments to the following address:
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Abbreviations and acronyms

AFOLU	Agriculture, Forestry and Other Land Use
AWG-LCA	Ad Hoc Working Group on Long-term Cooperative Action of the UNFCCC
BA	Basal area
BAP	Bali Action Plan
BAU	Business as Usual
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CMP	Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
COP	Conference of the Parties
DBH	Diameter at Breast Height
FAO	Food and Agriculture Organization of the United Nations
FCPF	Forest Carbon Partnership Facility
GHG	Greenhouse Gas(es)
GIS	Geographic Information System
GPS	Global Positioning System
IPCC	Intergovernmental Panel on Climate Change
LAI	Leaf Area Index
LCCS	Land Cover Classification System
LU	Land Use
LULUCF	Land Use, Land-Use Change and Forestry
LUS	Land Use System
MAI	Mean Annual Increment
MRV	Measurement (Monitoring), Reporting, Verification
NBSAP	National Biodiversity Strategy and Action Plan
NAPCC	National Action Plans for Climate Change
NFI	National Forest Inventory
NPV	Net Present Value
POA	Program of Activities
REALU	Reducing Emissions from All Land Uses
REDD	Reducing Emissions from Deforestation and Forest Degradation
REL	Reference Emission Level
RPP	Readiness Preparation Proposal
RS	Remote Sensing
SESA	Strategic Environment and Social Assessment
SBSTA	Subsidiary Body for Scientific and Technological Advice (UNFCCC)
SOM	Soil Organic Matter
tC	Metric ton of carbon (1tC = 3.67tCO_2)

tCO_2	Metric ton of carbon dioxide ($1tCO_2 = 0.27tC$)
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
VHRI	Very high resolution imagery