

Forests in a Changing Climate: A Sourcebook for Integrating REDD+ into Academic Programmes





Copyright © United Nations Environment Programme, 2014

This publication may be reproduced in whole or in part and in any form for educational or nonprofit purposes without special permission from the copyright holder, provided acknowledgement of the source is made.

UNEP would appreciate receiving a copy of any publication that uses this publication as a source. No use of this publication may be made for resale or for any other commercial purpose whatsoever without prior permission in writing from the United Nations Environment Programme.

Disclaimer

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the United Nations Environment Programme concerning the legal status of any country, territory, city or area or of its authorities, or concerning delimitation of its frontiers or boundaries. Moreover, the views expressed do not necessarily represent the decision or the stated policy of the United Nations Environment Programme, nor does citing of trade names or commercial processes constitute endorsement.

This publication should be referenced as follows:

UNEP (2014) Forests in a Changing Climate: A Sourcebook for Integrating REDD+ into Academic Programmes, United Nations Environment Programme, Nairobi, Kenya

Design/layout/printing

Picture Editor: Suzannah Goss

Design and Layout: Jennifer Odallo/UNON Cover Design: Catherine Kimeu/UNON

Printing: UNON Publishing Services Section – ISO 14001:2004-certified

Cover photos ©: (Above) Primary forest in Gede Pangrango, Indonesia – Ricky Martin/CIFOR (Below left) Eastern gorilla, Congo Basin – Douglas Sheil/CIFOR, (Below, right) Intensive logging activities, Kinabatangan River, Sabah, Borneo – Frans Lanting/ GETTY IMAGES

Back cover ©: Students learning in a forest setting – Storm Stanley

ISBN number: 978-92-807-3392-1 Job number: DEP/1807/NA

UNEP promotes
environmentally sound practices
globally and in its own activities. This
report is printed on paper from sustainable
forests including recycled fibre. The paper is
chlorine free, and the inks vegetable-based.
Our distribution policy aims to reduce
UNEP's carbon footprint

FORESTS IN A CHANGING CLIMATE:

A Sourcebook for Integrating REDD+ into Academic Programmes







UNEP / UN-REDD+ PROJECT TEAM

Mahesh Pradhan, Chief Environmental Education and Training Unit, UNEP

Tim Christophersen, Senior Programme Officer Forests and Climate Change, UNEP – UN-REDD Programme

Pablo Fuentenebro, Associate Programme Officer Environmental Education and Training Unit, UNEP

Julie Greenwalt, Programme Analyst UNEP – UN-REDD Programme

John Erik Prydz, Programme Officer UNEP – UN-REDD Programme

Suzannah Goss, Programme Officer, UNEP – UN-REDD Programme

Jaime Webbe, Consultant, UNEP – UN-REDD Programme

YALE UNIVERSITY PROJECT TEAM

Benjamin Cashore, Professor of Environmental Governance & Political Science Yale School of Forestry & Environmental Studies

Sébastien Jodoin, PhD Candidate Yale School of Forestry & Environmental Studies

LEAD AUTHORS

Kristofer Covey, PhD Candidate Yale School of Forestry & Environmental Studies

Sébastien Jodoin, PhD Candidate Yale School of Forestry & Environmental Studies

Namrata Kala, PhD Candidate Yale School of Forestry & Environmental Studies Katherine Lofts, Associate Fellow Centre for International Sustainable Development Law

Lucía Ruiz Bustos, MEM Graduate Yale School of Forestry & Environmental Studies

Max Tattenbach, MEM Candidate
Yale School of Forestry & Environmental Studies

REVIEWERS

UNEP

Tim Christophersen Julie Greenwalt Niklas Hagelberg John Erik Prydz Thomas Enters Gabriel Labbate

UN-REDD Secretariat

Wahida Patwa-Shah

UNEP FI

Iain Henderson

UNEP-WCMC

Lera Miles Blaise Bodin Lucy Goodman

FAO

Adam Gerrand

UNDP

Kimberly Todd Gaya Sriskantan Claudia von Segesser-Zarate Silje Haugland



Table of contents

FOREWO	RD	V	
INTRODU	ICTION	1	
	GY		
	ucation for sustainable development		
	get Audienceng this Sourcebook		
	D LEARNING OUTCOMES		
	E 1: Forest carbon and climate change		
1.1	Fundamentals: The role of forests in the global carbon cycle		
	1.1.2 Forests as carbon stores		
	1.1.3 Carbon Sequestration and Storage across Biomes		
	1.1.4 Stand Dynamics and Carbon Sequestration in Forests	10	
	1.1.2 The Contribution of Deforestation and Forest Degradation to Climate Change	12	
1.2		12	
	1.2.1 Sustainable Forest Management for Climate Change Mitigation	12	
1.3	3 Case Studies		
	1.3.1 Tropical Deforestation, Fire and Carbon Loss in the Amazon Basin		
	1.3.2 Carbon Sequestration in Wood Products	15	
1.4			
	1.4.1 The role of forests in the carbon cycle		
	1.4.2 Patterns of forest development		
	1.4.4 Deforestation and the carbon cycle		
1.5			
2.1	LE 2: The multiple benefits of forests		
۷.۱	2.1.1 Ecosystem services: linking ecosystems and society		
	2.1.2 Benefits of forests in a REDD+ context		
2.2	Initiatives, Tools & Methodologies	25	
	2.2.1 Mapping benefits		
	2.2.2 Monitoring additional REDD+ impacts	25	
	2.2.3 Methods for valuing economic benefits of forests	25	
2.3	Case studies	27	
2.4	Key issues for discussion	29	
2.5	References	30	
MODULE	E 3: Drivers of deforestation and forest degradation	33	
3.1			
	3.1.1 Recent trends in deforestation and forest degradation		
3.2			
	3.2.1 Measurement of Deforestation and Forest Degradation	34	

		3.2.2	Factors Affecting Deforestation and Forest Degradation – Overview of Methodologies	
		3.2.3 3.2.4	Proximate Causes	
	3.3		rudies	
	5.5	3.3.1	Subnational Differences in Deforestation Drivers – The Case of Thailand	
		3.3.2	Macroeconomic Changes and Deforestation – Structural Adjustment in Ghana	
	3.4	Key iss	ues for discussion	41
		3.4.1	Challenges in the measurement of deforestation and forest degradation	41
		3.4.2	Heterogeneity in the relative importance of and interactions between drivers	
		3.4.3	Future projections of changes in forest cover	
	3.5		nces	
MOE			ions to reverse deforestation and forest degradation	
	4.1		nentals	
	4.2	Initiativ 4.2.1	res, tools and metholodgies	
		4.2.1	Solutions in Related Economic Sectors	
	4.3		tudies	
	4.5	4.3.1	The Nature of Agricultural Technological Change and Impacts on Deforestation: Evidence from the	
			Brazilian Amazon	
		4.3.2	The Potential Role of Forest Certification Programs in Reducing Deforestation and Forest Degradation	50
	4.4	Key iss	ues for discussion	
		4.4.1	Robust evaluation of the drivers of efficacy of solutions	
		4.4.2	Potential for multi-sectoral, multi-level solutions	
	4.5		nces	
MOE			EDD+ _, approach	
	5.1	Fundar 5.1.1	nentals The emergence of REDD+ In the UN climate regime	
		5.1.1	The Features of a Global REDD+ Mechanism within the UNFCCC	
		5.1.3	The Phases of REDD+	
	5.2	Initiativ	res, Tools & Methodologies	57
	5.3		tudies	
	5.4		ues for Discussion	
	5.4	5.4.1	Reasons for the emergence of REDD+	
		5.4.2	The politics of REDD+	
		5.4.3	The effectiveness of REDD+	60
	5.5	Refere	nces	61
MOE	DULE	6: The R	EDD+ Readiness Phase: implementation framework, governance issues & enabling investments	63
	6.1		nentals	
		6.1.1	Elements of the REDD+ Readiness phase	
		6.1.2 6.1.3	Implementation framework, governance issues and enabling investments	
	6.2		res, Tools & Methodologies	
			-	
	6.3		tudies	
	6.4	-	ues for Discussion	
		6.4.1 6.4.2	Learning from REDD+ Demonstration projects	
	6.5		nces	
MOE	OULE	7 : Syste	ms for measurement, reporting and verification of forests	73
	7.1		nentals	
	7.2	Initiativ	es, Tools & Methodologies	73
		7.2.1	Information on Tropical Forest Ecosystems	73
		7.2.2	MRV systems and performance based incentive mechanisms	
		7.2.3 7.2.4	Components of modern MRV systems	
		7.2.5	The role of technology for efficient MRV systems	
	7.3	Case st	udies	
			estions for discussion	
	7.4	7.4.1	Technology transfer around MRV	
		7.4.2	Community-based management systems	
		7.4.4	Tradeoffs in data collection	79
	7 5	Refere	aces.	80

MOD		8: Performance based incentives for reducing deforestation and forest degradation	
	8.1	Fundamentals	
	8.2	Initiatives, Tools & Methodologies	
		8.2.1 Preliminary Institutional Framework	
		8.2.2 Nature of Contracts	
	8.3	Case studies	85
		8.3.1 Cost Effectiveness and Sustainability of PES Programs: Evidence from the Sloping Lands Conversion Program (SLCP), China	OE
		8.3.2 Environmental Effectiveness of PES Programs: Evidence from Costa Rica	
		-	
	8.4	Key issues for discussion	
		8.4.1 Effective Implementation of PES programs in Fragile States	
		8.4.2 Using Scientific and Socio-Economic Data for Site Selection	
	8.5	References	
MOD		9: Social and environmental safeguards	
IVIOL	9.1	Fundamentals	
	J. 1	9.1.1 Social and environmental risks and opportunities offered by REDD+	
		9.1.2 REDD+ Safeguards in the UNFCCC	
	9.2	Initiatives, Tools & Methodologies	
	9.3	Case studies	
	9.4	Key issues for discussion	
		9.4.1 The effectiveness of safeguards	
		9.4.2 Ensuring additional social and environmental benefits from REDD+	
	9.5	References	95
MOD	ULE '	10: The cost of REDD+: concepts, methods and approaches	97
		Fundamentals	
	10.2	Tools, Initiatives and Methodologies	97
		10.2.1 Identifying the costs of REDD+ costs	
		10.2.2 Estimating the costs of REDD+	99
		10.2.3 Components necessary for implementation of REDD+	
		10.2.4 Costs curves of REDD+ interventions	101
	10.3	Case Studies	102
	10.4	Key issues for discussion.	103
	10.4	10.4.1 Limitations of MAC curves	
		10.4.2 Opportunity costs as the basis for REDD+ Payments	
	10.5	References	104
B400		11: Funding for REDD+	
MOD		Fundamentals	
	11.2	Initiatives, Tools & Methodologies	
		11.2.1 International sources for climate finance	
		11.2.4 Opportunities and constraints of carbon markets	
		11.2.5 Funding mechanisms and funding sources	
	11 2	Case studies	
	11.4	Key issues for discussion	
		11.4.1 Compliance carbon markets	
		11.4.3 The establishment of CTFs	
	44 5		
		References	
MOD		12: Beyond REDD+, the green economy transition	
	12.1	Fundamentals	
		12.1.1 Shaping a green development pathway	
		Initiatives, Tools & Methodologies	
	12.3	Case Studies	122
	12.4	Key issues for Discussion	123
		12.4.1 Country-specific economic scenarios	
		12.4.2 Resource scarcity	123
		12.4.3 Governance reforms	123
	12 5	References	124

Foreword

ackling the issues of climate change requires a wide array of expertise and innovative ideas as well as an understanding of both the policy elements and the scientific facts related to the most challenging phenomenon of our time. Despite the overwhelming attention to climate change, it is still a relatively new field of study and it is constantly evolving based on the latest scientific findings, international agreements, national commitments and the realities on the ground.

One important element of the climate change mitigation discussions is the role of forests and specifically the internationally-agreed activities for Reducing Emissions from Deforestation and forest Degradation while promoting conservation, sustainable management of forests and enhancing forest carbon stocks (REDD+). REDD+ encapsulates many of the challenges and opportunities for addressing climate change and the need for increasing expertise in order to do so. For REDD+ programmes to be successfully devised in countries, technical understanding is needed on carbon accounting, national forest inventories, spatial planning and biodiversity. In addition, there is a need for addressing environmental governance, cross-sectorial policies and legal reforms, and stakeholder participation. Some elements are very specific to REDD+ such as the social and environmental safeguards outlined in the UNFCCC Cancun Agreements (2010), and the Warsaw Framework for REDD+ implementation (2013), while others are about a larger paradigm shift in national development strategies, which is not limited to REDD+ or forests but rather address issues related to the transition to an inclusive Green Economy.

This sourcebook is designed to give an overview of the key topics related to forests and climate change, under the overarching and evolving REDD+ narrative; with the purpose of facilitating the integration of this new knowledge domain into academic programmes. The sourcebook provides detailed references for further study in each module, and can be used comprehensively or with a focus on a specific topic of interest or relevance for the course of study.

From a pedagogical point of view, *Forests in a Changing Climate* is aimed at university professors and graduate students from different academic disciplines (forestry, public policy, environmental science, economics, etc.) interested in teaching a course or conducting a lecture on REDD+. The content of the book is largely based on the knowledge generated by the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (UN-REDD Programme). Members of UNEP's Global Universities Partnership on Environment and

预览已结束,完整报告链接和二维码如下:

https://www.yunbaogao.cn/report/index/report?reportId=5 16226

