

Ecosystem Services and Global Trade of Natural Resources

Ecology, economics and policies

Edited by
Thomas Koellner



Routledge Explorations in Environmental Economics

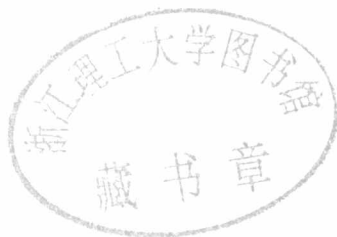
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Ecosystem Services and Global Trade of Natural Resources

The utilization of natural resources to satisfy worldwide growing consumption of goods and services has severe ecological consequences. Aside from the projected doubling of food consumption in the next fifty years, the growing trade of biofuels and other commodities is a global challenge as the economic activities in the primary sector (i.e. mining, fisheries, aquaculture, forestry and agriculture) can damage biodiversity and ecosystem services. This should be taken into account in the decision-making affecting the global value chains linking consumer, retailer, processor and producer in the north and the south.

To cover the topic of ecosystem services and global trade this book is organized into four major parts. Part I gives the theoretical framework from ecological, economic and political perspectives. Part II explores how internationally traded biophysical commodities from agriculture, forestry and fisheries translate into a virtual flow of land, freshwater, and marine ecosystems. Part III describes how two widely used accounting tools (i.e., Life Cycle Assessment and Green National Accounts) deal with international aspects of ecosystem services, and Part IV shows how instruments like labeling, bans, or payments for ecosystem services in the private and public sector can influence trade patterns and the management of ecosystem services.

This collection is a valuable contribution to the global change science dealing with ecosystem services. It illustrates the consequences of international trade on global ecosystem services and provides an overview of accounting tools and of market-based policy instruments to address negative and positive externalities. The book is certainly innovative, because it brings together research findings from distinct disciplines, especially Industrial Ecology and Ecosystem Sciences, as well as Environmental Economics and Political Science.

Thomas Koellner is Professor of Ecological Services at the University of Bayreuth, Germany and associated lecturer and scientist at the chair of Natural and Social Science Interface (NSSI) at the Institute for Environmental Decisions, ETH Zürich.

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Ecology, economics and policies
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Preface and acknowledgements

The book is a contribution to the global change science dealing with ecosystem services. It depicts the consequences of international trade on global ecosystem services and provides an overview of accounting tools and of market-based policy instruments to address negative and positive externalities. This book brings together research findings from distinct disciplines, especially Industrial Ecology and Ecosystem Sciences as well as Environmental Economics and Political Science. I hope that readers find new ways to look at the global problems of trade and ecosystem services, and to implement solutions dealing with them.

This book is a joint work between twenty-five authors mainly from European countries, the United States, Canada and China. Of course, I want to thank all the contributing authors; without their effort this book would not have been possible. In the planning phase of the book I had stimulating discussions with Roland Scholz and Stefanie Engel (both Institute for Environmental Decisions IED, ETH Zurich). Both also provided financial support to realize this book project. In the preparation phase Lena Pieper and Yohannes Ayanu formatted the chapters of this book and helped with all the organizational issues, for which I am very grateful. Thanks also to Patrick Poppenborg for providing feedback on Chapter 3.

Thomas Koellner
Bayreuth, Germany, May 2011

Abbreviations

AIA	Advanced Informed Agreement
AMS	Aggregate Measurement of Support
AoA	Agreement on Agriculture
BDP	Biodiversity Damage Potential
BPP	Biotic Production Potential
BURNED	Burned land area
CBA	Cost–benefit analysis
CBD	Convention on Biodiversity
CDM	Clean Development Mechanism
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COP	Conferences of the Parties
CORINE	Coordination of Information on the Environment
CREM	Centre for Research in Ethnic Minority Entrepreneurship
CRI	Conservation Risk Index
CRP	Conservation Reserve Program
CSP	Carbon Sequestration Potential
CWU	Crop Water Use
DDA	Doha Development Agenda
DEC	Department of Environment and Conservation
DEFOREST	Deforestation rate
E	Evaporation
EBI	Environmental Benefits Index
EC	European Commission
ECM	Energy corrected milk
EDS	Ecosystem Distress Syndrome
EEA	European Environment Agency
EF	Ecological Footprint
EFFCON	Effective Conservation
EPA	Environmental Protection Agency

EPI	Environmental Performance Index
EPIC	Erosion productivity impact calculator
EQIP	Environmental Quality Incentives Program
ERP	Erosion Regulation Potential
ES	Ecosystem services
ESDP	Ecosystem Services Damage Potential
ET	Evapotranspiration
EU	European Union
EUA	European Environment Agency
F.E.E.E.	Federation for Environmental Education in Europe
FCPF	Forest Carbon Partnership Facility
FDI	Foreign Direct Investment
FSC	Forest Stewardship Council
FU	Functional unit
FWRP	Fresh Water Regulation Potential
GAP	Good Agricultural Practice
GAISP	Green Accounting for Indian States Project
GATT	General Agreement on Tariffs and Trade
GHG	Greenhouse gas
GIs	Geographical Indications
GIS	Geographic Information System
GPS	Global Positioning System
GTGP	Grain to Green Program
GVWE	Gross Volume of Virtual Water Export
GVWI	Gross Volume of Virtual Water Import
HES	Human–Environment System
IBES	International Bank for Environmental Settlements
ICT	Information and Communication Technology
IEA	International Environmental Agency
IFC	International Finance Centre
InBIO	Instituto Nacional de Biodiversidad, Costa Rica
InVEST	Integrated Valuation of Ecosystem Services and Tradeoffs
ipBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
IPES	International payments for ecosystem services
IPM	Integrated pest management
IPOs	Initial Public Offerings
IRGC	International Risk Governance Council
IRRSTR	Irrigation stress
ISO	International Organization for Standardization

IUCN	International Union for Conservation of Nature
KMFT	Kodagu Model Forest Trust
KP	Kyoto Protocol
LCA	Life Cycle Assessment
LCI	Life Cycle Inventory
LCIA	Life Cycle Impact Assessment
MA	Millenium Ecosystem Assessment
MEAs	Multilateral environmental agreements
MENA	Middle East and North Africa
MES	Marine ecosystem services
MFN	Most-favored nation
MNEs	Multinational enterprises
MPAs	Marine protected areas
MSC	Marine Stewardship Council
MT	Metric tons [tonnes]
NAMA	Non-agricultural market access
NFCP	Natural Forest Conservation Program
NGO	Non-governmental organization
NPP	Net primary production
OECD	Organization for Economic Co-operation and Development
OIE	International Office of Epizootics
PDF	Potentially Disappeared Fraction of species
PES	Payments for environmental/ecosystem services
PEST	Pesticide regulation
PIC	Prior Informed Consent
PICTET	Privet Bankers of Geneva Switzerland
PIOT	Physical input–output table
PP	Production possibility
PPMs	Process and Production Methods
PROFAFOR	El Programa Face de Forestacion
PSAH	Payments for Hydrological Environmental Services Program
REDD	Reducing Emissions from Deforestation and Forest Degradation in Developing Countries
RUPES	Rewarding Upland Poor for Environmental Services
SCM	Subsidies and Countervailing Measures
SEEA	System of Environmental and Economic Accounts
SETAC	Society of Environmental Toxicology and Chemistry
SAN	Sustainable Agriculture Network
SNA	System of National Accounts
SPS	Sanitary and phytosanitary measures
T	Transpiration

TBT	Technical barriers to trade
TEEB	The Economics of Ecosystems and Biodiversity
TGVWE	Total Global Virtual Water Export
TGVWI	Total Global Virtual Water Import
TRIPs	Trade related aspects of intellectual property rights
UDHR	Universal Declaration of Human Rights
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
UV	Ultraviolet
VBDO	Vereniging van Beleggers voor Duurzame Ontwikkeling [The Dutch Association of Investors for Sustainable Development]
WPP	Water Purification Potential
WRM	World Rainforest Movement
WTO	World Trade Organization
WWF	World Wildlife Fund

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