

Ecosystem Services

From Concept to Practice

Despite the growing popularity of the concept of ecosystem services, policy-makers and practitioners continue to struggle with the challenge of translating it into practice. Drawing on a range of interdisciplinary perspectives, this volume takes up the challenge to provide a framework for the effective implementation of simple concepts into complex ecosystem-related decision-making.

Addressing the measurement, valuation, and governance of ecosystem services, the book is specifically designed to guide students and policy-makers from definitions and measurements to applications in terms of policy instruments and governance arrangements. Each chapter discusses key methodological approaches, illustrating their applications at various scales by drawing on case studies from around the world. Presenting a range of perspectives from across many fields, this text ultimately considers the crucial question of how ecosystem service delivery can be safeguarded for future generations.

Jetske A. Bouma is Senior Researcher in the field of environmental and development economics at the Institute for Environmental Studies (IVM), VU University Amsterdam and at the Dutch Environmental Assessment Agency (PBL). Her research focuses on the design and evaluation of policy instruments and analysis of the conditions for collective action and self-enforcement. She teaches graduate courses on the governance of ecosystem services.

Pieter J. H. van Beukering is Associate Professor in the field of environmental economics at the IVM. Most of his research work takes place in Asia, the Caribbean, the Pacific and Africa, with a strong focus on natural resource management, economic valuation, and poverty alleviation. He teaches graduate courses focusing on the valuation of ecosystem services and environmental economics.





Ecosystem Services

From Concept to Practice

EDITED BY

JETSKE A. BOUMA

Institute for Environmental Studies, VU University Amsterdam Dutch Environmental Assessment Agency

and

PIETER J. H. VAN BEUKERING

Institute for Environmental Studies, VU University Amsterdam





CAMBRIDGE UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning and research at the highest international levels of excellence.

www.cambridge.org

Information on this title: www.cambridge.org/9781107062887

© Cambridge University Press 2015

This publication is in copyright. Subject to statutory exception and to the provisions of relevant collective licensing agreements, no reproduction of any part may take place without the written permission of Cambridge University Press.

First published 2015

Printed in the United Kingdom by TJ International Ltd. Padstow, Cornwall

A catalog record for this publication is available from the British Library

Library of Congress Cataloging in Publication data
Ecosystem services: from concept to practice / edited by Jetske A. Bouma,
Pieter J. H. van Beukering.

pages cm
ISBN 978-1-107-06288-7 (hardback)
1. Ecosystem services. I. Bouma, Jetske A. II. Beukering, Pieter van. QH541.15.E267.E276 2015
577'.1-dc23

2014032242

ISBN 978-1-107-06288-7 Hardback

Cambridge University Press has no responsibility for the persistence or accuracy of URLs for external or third-party internet websites referred to in this publication, and does not guarantee that any content on such websites is, or will remain, accurate or appropriate.



Contents

	About the authors	page V11
Part I	Introduction	1
1	Ecosystem services: from concept to practice Jetske A. Bouma and Pieter J. H. van Beukering	3
Part II	Measuring ecosystem services	23
2	The role of biodiversity in the provision of ecosystem services Jan E. Vermaat, Jacintha Ellers, and Matthew R. Helmus	25
3	A traits-based approach to quantifying ecosystem services Peter van Bodegom and Timothy Price	40
4	Mapping ecosystem services Willem Verhagen, Peter H. Verburg, Nynke Schulp, and Julia Stürck	65
Part III	Valuing ecosystem services	87
5	Economic values of ecosystem services Pieter J. H. van Beukering, Roy Brouwer, and Mark J. Koetse	89
6	Economic valuation methods for ecosystem services Mark J. Koetse, Roy Brouwer, and Pieter J. H. van Beukering	108
7	Trade-offs and decision-support tools for managing ecosystem services Luke Brander and Pieter J. H. van Beukering	132
Part IV	Paying for ecosystem services	161
8	Market-based instruments for ecosystem services Frans Oosterhuis and Elissaios Papyrakis	163



vi	Contents	
9	Payments for ecosystem services Erik Ansink and Jetske A. Bouma	183
Part V 0	loverning ecosystem services	199
10	Global governance of ecosystem services and related policy instruments Joyeeta Gupta	201
11	Public—private partnerships and the governance of ecosystem services Ayşem Mert and Philipp Pattberg	230
12	Local governance of ecosystems and community co-management Jetske A. Bouma	250
	Index	264



About the authors

Jetske A. Bouma (editor) is Senior Researcher in the field of environmental and development economics at the IVM and at the Dutch Environmental Assessment Agency. Her research focuses on the design and evaluation of policy instruments and analysis of the conditions for collective action and self-enforcement. She teaches graduate courses on the governance of ecosystem services and advises policy-makers on the use of policy instruments and decision-making tools.

Pieter J. H. van Beukering (editor) is Associate Professor in the field of environmental economics at the IVM. His main research interests are natural resource management, economic valuation, and poverty alleviation. He teaches the MSc specialization Valuation of Ecosystem Services and Environmental Economics.

Erik Ansink is a researcher at the Department of Spatial Economics, IVM, VU University Amsterdam. His research interests are water resource economics and cooperative resource management, using a variety of methods including game theory, political economy, and experiments.

Luke Brander is a freelance environmental economist based in Hong Kong. He is affiliated to the IVM as an associate researcher and to the Division of Environment, Hong Kong University of Science and Technology (HKUST) as an Adjunct Assistant Professor. His main research interests are in the design of economic instruments to control environmental problems and the valuation of natural resources and ecosystem services.

Roy Brouwer is Professor and Head of the Department of Environmental Economics at the IVM and also Professor of Water Economics at the Dutch National Research Programme "Living with Water". Roy Brouwer is specialized in economic valuation methods, in particular the role of risk and uncertainty in behavioral models of decision-making.

Jacintha Ellers is Professor and Head of the Department of Animal Ecology at the Faculty of Earth and Life Sciences of the VU University Amsterdam. Her research aims to understand the impact of climate change on species diversity and community composition and she is a member of the Amsterdam Global Change Institute (AGCI).



viii

Cambridge University Press 978-1-107-06288-7 - Ecosystem Services: From Concept to Practice Edited by Jetske A. Bouma and Pieter J. H. Van Beukering Frontmatter More information

About the authors

Joyeeta Gupta is Professor of Environment and Development in the Global South at the group on Governance and Inclusive Development, Department of Human Geography, Planning and International Development Studies of the Amsterdam Institute for Social Science Research, University of Amsterdam and is also Professor at UNESCO-IHE Institute for Water Education in Delft. Her expertise is in the area of environmental law, politics, and policy at multiple levels of governance.

Matthew R. Helmus is a Research Fellow at the Amsterdam Global Change Institute at the VU University Amsterdam. He addresses how evolutionary and ecological processes interact naturally to generate biodiversity, and how humans disrupt those processes.

Mark J. Koetse is Senior Researcher in the field of environmental economics at the IVM. He is specialized in economic valuation methods, including choice experiments and meta-analysis. His research currently focuses on the valuation of ecosystem services, environmental non-use values and payments for ecosystem services.

Ayşem Mert is a post-doctoral researcher at the Centre for Global Cooperation Research at the University of Duisburg-Essen and a research fellow with the Earth System Governance Project. Her research focuses on transformation of democracy and governance as illustrated by public—private—private cooperation mechanisms.

Frans Oosterhuis is an environmental economist at IVM. His recent work is mainly related to EU environmental policy, environmentally harmful subsidies, and the use of market based instruments.

Elissaios Papyrakis is Senior Lecturer in environmental and development economics at the Institute of Social Studies (ISS) of the Erasmus University Rotterdam and at the School of International Development of the University of East Anglia. His research focuses on the economics of climate change, mineral-driven economic growth, and sustainable economic development.

Philipp Pattberg is Associate Professor for Transnational Environmental Governance and the Deputy Department Head of the Department of Environmental Policy Analysis (EPA) at the IVM. Philipp is Chair of the Board of the Global Environmental Change Section of the German Political Science Association (DVPW) and a senior research fellow of the international Earth System Governance Project (ESGP).

Timothy Price is a post-doctoral researcher within the Systems Ecology Group at the VU University Amsterdam. His research focuses on the identification and quantification of ecosystem services of coastal ecosystems, using a traits-based approach.

Nynke Schulp is a post-doctoral researcher within the IVM, VU Amsterdam. Her research focuses on mapping and modeling the supply and demand of ecosystem services at the



About the authors

İΧ

European scale, modeling relations between land use and ecosystem services, and cultural landscapes.

Julia Stürck is a PhD student within the IVM. Her research is focused on land-change processes and ecosystem service flows in Europe.

Peter van Bodegom is Associate Professor of vegetation—environment interactions at the VU University Amsterdam. His research aims at predicting large-scale patterns of species distributions, fluxes, and ecosystem services based on ecological and biogeochemical principles. He is a member of the management committee of the European COST Action Terrabites.

Peter H. Verburg is Professor of Environmental Spatial Analysis and Head of Department at the IVM. His work on regional- and global-scale land-use modeling has resulted in one of the most frequently used land-use models worldwide (CLUE). Peter chairs the Global Land Project of IHDP and IGBP.

Willem Verhagen is a PhD student at the IVM. His research focuses on the role of landscape heterogeneity in the supply of multiple ecosystem services.

Jan E. Vermaat heads the Department of Environmental Sciences (IMV) of the Norwegian University of Life Sciences (NMBU) in Ås. His research interests are water quality, wetlands, catchment biogeochemistry, ecosystem services, and the interface between landscape ecology and social sciences.