



LUND UNIVERSITY

Encyclopedia of Global Environmental Governance and Politics

Pattberg, Philipp H.; Zelli, Fariborz

2015

Document Version:
Other version

[Link to publication](#)

Citation for published version (APA):
Pattberg, P. H., & Zelli, F. (Eds.) (2015). *Encyclopedia of Global Environmental Governance and Politics*. Edward Elgar Publishing Ltd.

Total number of authors:
2

General rights

Unless other specific re-use rights are stated the following general rights apply:

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Read more about Creative commons licenses: <https://creativecommons.org/licenses/>

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

LUND UNIVERSITY

PO Box 117
221 00 Lund
+46 46-222 00 00

ENCYCLOPEDIA OF
**Global Environmental
Governance and Politics**

Edited by

Philipp H. Pattberg • Fariborz Zelli



ENCYCLOPEDIA OF Global Environmental Governance and Politics

'The Encyclopedia of Global Environmental Governance and Politics is an indispensable resource for researchers and students of global environmental governance. With balance and precision, entries by world-leading experts catalogue existing knowledge as well as offer new insights into the concepts, theories, institutions, and actors shaping core debates and issues.'

Peter Dauvergne, University of British Columbia, Canada

'The Encyclopedia of Global Environmental Governance and Politics provides a comprehensive starting-point for understanding the complex and contested nature of global environmental governance. Pattberg and Zelli have assembled an impressive array of contributions written by leading scholars in their fields. The superbly edited volume provides an indispensable knowledge base for understanding – and tackling – the environmental challenges of the emerging Anthropocene.'

Robert Falkner, London School of Economics and Political Science, UK and editor, *Handbook of Global Climate and Environment Policy*

'This volume offers a balanced and differentiated perspective and review of the most relevant issues, methodologies, theories and trends in the study of global environmental governance and politics. In 68 key entries leading scholars introduce, explain and discuss systematically the main concepts, the most important findings and the future outlook. An indispensable compendium for scholars, students, practitioners and libraries engaged in environmental politics and governance around the world.'

Arthur P.J. Mol, Wageningen University, the Netherlands

The *Encyclopedia of Global Environmental Governance and Politics* surveys the broad range of environmental and sustainability challenges in the emerging Anthropocene and scrutinizes available concepts, methodological tools, theories and approaches, as well as overlaps with adjunct fields of study.

This comprehensive reference work, written by some of the most eminent academics in the field, contains 68 entries on numerous aspects across 7 thematic areas, including concepts and definitions; theories and methods; actors; institutions; issue-areas; cross-cutting questions; and overlaps with non-environmental fields. With this broad approach, the volume seeks to provide a pluralistic knowledge base of the research and practice of global environmental governance and politics in times of increased complexity and contestation.

Providing its readers with a unique point of reference, as well as stimulus for further research, this *Encyclopedia* is an indispensable tool for anyone interested in the politics of the environment, particularly students, teachers and researchers.

Philipp H. Pattberg is Professor at VU University Amsterdam, the Netherlands and **Fariborz Zelli** is Associate Professor at Lund University, Sweden.

Edward Elgar
PUBLISHING

The Lyptatts, 15 Lansdown Road, Cheltenham, Glos GL50 2JA, UK
Tel: + 44 (0) 1242 226934 Fax: + 44 (0) 1242 262111 Email: info@e-elgar.co.uk

William Pratt House, 9 Dewey Court, Northampton, MA 01060, USA
Tel: +1 413 584 5551 Fax: +1 413 584 9933 Email: elgarinfo@e-elgar.com
www.e-elgar.com www.elgaronline.com

ISBN 978-1-78254-578-1



ENCYCLOPEDIA OF
Global Environmental
Governance and Politics

Philipp H. Pattberg
Fariborz Zelli

EE
Elgar

EE
Elgar

ENCYCLOPEDIA OF Global Environmental Governance and Politics

Edited by
Philipp H. Pattberg • Fariborz Zelli



ENCYCLOPEDIA OF GLOBAL ENVIRONMENTAL GOVERNANCE AND POLITICS



Encyclopedia of Global Environmental Governance and Politics

Edited by

Philipp H. Pattberg

Professor, VU University Amsterdam, the Netherlands

Fariborz Zelli

Associate Professor, Lund University, Sweden



Cheltenham, UK • Northampton, MA, USA

© Philipp H. Pattberg and Fariborz Zelli 2015

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical or photocopying, recording, or otherwise without the prior permission of the publisher.

Published by
Edward Elgar Publishing Limited
The Lypiatts
15 Lansdown Road
Cheltenham
Glos GL50 2JA
UK

Edward Elgar Publishing, Inc.
William Pratt House
9 Dewey Court
Northampton
Massachusetts 01060
USA

A catalogue record for this book
is available from the British Library

Library of Congress Control Number: 2015940685

This book is available electronically in the **Elgaronline**
Social and Political Science subject collection
DOI 10.4337/9781782545798

ISBN 978 1 78254 578 1 (cased)
ISBN 978 1 78254 579 8 (eBook)

Typeset by Servis Filmsetting Ltd, Stockport, Cheshire

Contents

<i>Alphabetical list of entries</i>	x
<i>List of figures and tables</i>	xiv
<i>List of editors and contributors</i>	xv
<i>Preface</i>	xxx

PART I CONCEPTS AND DEFINITIONS

1 Anthropocene and planetary boundaries <i>Victor Galaz</i>	3
2 Consumerism <i>Jane Lister</i>	9
3 Earth system governance <i>Frank Biermann</i>	16
4 Environment and nature <i>Paul Wapner</i>	22
5 Global environmental governance <i>Philipp Pattberg and Oscar Widerberg</i>	28
6 Inclusive development <i>Joyeeta Gupta, Vincent Cornelissen and Mirjam A.F. Ros-Tonen</i>	35
7 Liberal environmentalism and governance norms <i>Steven Bernstein</i>	45
8 Risk <i>Ortwin Renn</i>	53
9 Sustainable development <i>Joyeeta Gupta and Isa Baud</i>	61

PART II THEORIES AND METHODS

10 Constructivism and sociological institutionalism <i>Gerry Nagtzaam</i>	73
11 Cost-benefit analysis <i>Simon Dietz</i>	81
12 Deep ecology <i>Kate Booth</i>	88
13 Deliberative policy analysis <i>Hayley Stevenson</i>	96

vi *Contents*

14	Feminism <i>Annica Kronsell</i>	104
15	Governmentality <i>Delf Rothe</i>	111
16	Integrated assessment modeling <i>Detlef van Vuuren and Marcel Kok</i>	119
17	Neo-Gramscianism <i>Chukwumerije Okereke</i>	127
18	Neoliberal institutionalism <i>Thijs Van de Graaf</i>	134
19	Qualitative comparative analysis <i>Olav Schram Stokke and Arild Underdal</i>	141
20	Quantitative comparative analysis <i>Sijeong Lim and Aseem Prakash</i>	148
21	Simulations <i>Walter F. Baber and Robert V. Bartlett</i>	156
22	Teaching global environmental governance <i>Maria Ivanova</i>	161
23	World society <i>David John Frank, Ann Hironaka and Evan Schofer</i>	175

PART III ACTORS

24	Civil society <i>Karin Bäckstrand</i>	185
25	European Union <i>Camilla Adelle, David Benson and Andrew Jordan</i>	192
26	Individuals <i>Tom Oliver</i>	200
27	International bureaucracies <i>Bernd Siebenhüner</i>	206
28	Media <i>Marija Isailovic</i>	213
29	Private sector <i>Jonatan Pinkse</i>	218
30	Religious movements <i>Randolph Haluza-DeLay</i>	225

31	Scientists and experts <i>Silke Beck</i>	234
32	States <i>Daniel Compagnon</i>	240
33	United Nations <i>Liliana Andonova and Kathryn Chelminski</i>	248

PART IV INSTITUTIONS

34	Clubs <i>Sylvia Karlsson-Vinkhuyzen</i>	261
35	International organizations <i>Steffen Bauer</i>	269
36	Mega-conferences <i>Sander Ch0an</i>	275
37	Private environmental governance <i>Philipp Pattberg and Marija Isailovic</i>	281
38	Public–private partnerships <i>Ayşem Mert</i>	289
39	Regimes <i>Eleni Dellas</i>	295

PART V ISSUE AREAS

40	Air pollution <i>Jorgen Wettestad</i>	307
41	Arctic <i>Oscar Widerberg</i>	315
42	Biological diversity <i>Kristin Rosendal and Morten Walløe Tvedt</i>	322
43	Biosafety and genetically modified organisms <i>Aarti Gupta</i>	329
44	Chemicals <i>Nils Simon</i>	338
45	Climate change <i>Pier Vellinga</i>	347
46	Desertification <i>Steffen Bauer</i>	356
47	Fisheries and whaling <i>Olav Schram Stokke</i>	364

viii *Contents*

48	Forestry and land use <i>Tobias Nielsen</i>	373
49	Hazardous waste <i>Katja Biedenkopf</i>	380
50	Oceans <i>Jan Stel</i>	388
51	Ozone <i>Sophie Godin-Beekmann</i>	398
52	Phosphorus <i>Dana Cordell and Stuart White</i>	404
53	Renewable energy <i>Kacper Szulecki</i>	415
54	Water <i>Erika Weinthal</i>	422
55	Wetlands <i>Kenneth Genskow and Kyle Magyera</i>	430

PART VI CROSS-CUTTING QUESTIONS AND EMERGING TOPICS

56	Effectiveness <i>Steinar Andresen</i>	441
57	Environmental policy diffusion <i>Per-Olof Busch</i>	447
58	Environmental policy integration <i>Camilla Adelle and Måns Nilsson</i>	454
59	Green economy <i>Ulrich Brand and Miriam Lang</i>	461
60	Institutional fragmentation <i>Fariborz Zelli</i>	469
61	Millennium Development Goals and Sustainable Development Goals <i>Marianne Bøeheim</i>	478
62	Orchestration <i>Kenneth Abbott</i>	487

PART VII BORDERS AND INTERLINKAGES

63	Agriculture <i>Dominic Moran</i>	499
64	Food <i>Jennifer Clapp</i>	504

65	Health <i>Kristina Jönsson</i>	512
66	Poverty <i>Anne Jerneck and Lennart Olsson</i>	519
67	Security <i>Rita Floyd</i>	528
68	Trade <i>Robyn Eckersley</i>	534
	<i>Index</i>	545

Alphabetical List of Entries

Chapter	Author	Nr	Section	Page
Agriculture	<i>Dominic Moran</i>	63	Part VII Borders and Interlinkages	499
Air pollution	<i>Jorgen Wettestad</i>	40	Part V Issue Areas	307
Anthropocene and planetary boundaries	<i>Victor Galaz</i>	1	Part I Concepts and Definitions	3
Arctic	<i>Oscar Widerberg</i>	41	Part V Issue Areas	315
Biological diversity	<i>Kristin Rosendal and Morten Walloe Tvedt</i>	42	Part V Issue Areas	322
Biosafety and genetically modified organisms	<i>Aarti Gupta</i>	43	Part V Issue Areas	329
Chemicals	<i>Nils Simon</i>	44	Part V Issue Areas	338
Civil society	<i>Karin Bäckstrand</i>	24	Part III Actors	185
Climate change	<i>Pier Vellinga</i>	45	Part V Issue Areas	347
Clubs	<i>Sylvia Karlsson-Vinkhuyzen</i>	34	Part IV Institutions	261
Constructivism and sociological institutionalism	<i>Gerry Nagtzaam</i>	10	Part II Theories and Methods	73
Consumerism	<i>Jane Lister</i>	2	Part I Concepts and Definitions	9
Cost-benefit analysis	<i>Simon Dietz</i>	11	Part II Theories and Methods	81
Deep ecology	<i>Kate Booth</i>	12	Part II Theories and Methods	88
Deliberative policy analysis	<i>Hayley Stevenson</i>	13	Part II Theories and Methods	96
Desertification	<i>Steffen Bauer</i>	46	Part V Issue Areas	356
Earth system governance	<i>Frank Biermann</i>	3	Part I Concepts and Definitions	16
Effectiveness	<i>Steinar Andresen</i>	56	Part VI Cross-Cutting Questions and Emerging Topics	441
Environment and nature	<i>Paul Wapner</i>	4	Part I Concepts and Definitions	22

Environmental policy diffusion	<i>Per-Olof Busch</i>	57	Part VI Cross-Cutting Questions and Emerging Topics	447
Environmental policy integration	<i>Camilla Adelle and Måns Nilsson</i>	58	Part VI Cross-Cutting Questions and Emerging Topics	454
European Union	<i>Camilla Adelle, David Benson and Andrew Jordan</i>	25	Part III Actors	192
Feminism	<i>Annica Kronsell</i>	14	Part II Theories and Methods	104
Fisheries and whaling	<i>Olav Schram Stokke</i>	47	Part V Issue Areas	364
Food	<i>Jennifer Clapp</i>	64	Part VII Borders and Interlinkages	504
Forestry and land use	<i>Tobias Nielsen</i>	48	Part V Issue Areas	373
Global environmental governance	<i>Philipp Pattberg and Oscar Widerberg</i>	5	Part I Concepts and Definitions	28
Governmentality	<i>Delf Rothe</i>	15	Part II Theories and Methods	111
Green economy	<i>Ulrich Brand and Miriam Lang</i>	59	Part VI Cross-Cutting Questions and Emerging Topics	461
Hazardous waste	<i>Katja Biedenkopf</i>	49	Part V Issue Areas	380
Health	<i>Kristina Jönsson</i>	65	Part VII Borders and Interlinkages	512
Inclusive development	<i>Joyeeta Gupta, Vincent Cornelissen and Mirjam A.F. Ros-Tonen</i>	6	Part I Concepts and Definitions	35
Individuals	<i>Tom Oliver</i>	26	Part III Actors	200
Institutional fragmentation	<i>Fariborz Zelli</i>	60	Part VI Cross-Cutting Questions and Emerging Topics	469
Integrated assessment modeling	<i>Detlef van Vuuren and Marcel Kok</i>	16	Part II Theories and Methods	119
International bureaucracies	<i>Bernd Siebenhüner</i>	27	Part III Actors	206
International organizations	<i>Steffen Bauer</i>	35	Part IV Institutions	269
Liberal environmentalism and governance norms	<i>Steven Bernstein</i>	7	Part I Concepts and Definitions	45
Media	<i>Marija Isailovic</i>	28	Part III Actors	213

xii *Alphabetical List of Entries*

Mega-conferences	<i>Sander Chan</i>	36	Part IV Institutions	275
Millennium Development Goals and Sustainable Development Goals	<i>Marianne Beisheim</i>	61	Part VI Cross-Cutting Questions and Emerging Topics	478
Neo-Gramscianism	<i>Chukwumerije Okereke</i>	17	Part II Theories and Methods	127
Neoliberal institutionalism	<i>Thijs Van de Graaf</i>	18	Part II Theories and Methods	134
Oceans	<i>Jan Stel</i>	50	Part V Issue Areas	388
Orchestration	<i>Kenneth Abbott</i>	62	Part VI Cross-Cutting Questions and Emerging Topics	487
Ozone	<i>Sophie Godin-Beekmann</i>	51	Part V Issue Areas	398
Phosphorus	<i>Dana Cordell and Stuart White</i>	52	Part V Issue Areas	404
Poverty	<i>Anne Jerneck and Lennart Olsson</i>	66	Part VII Borders and Interlinkages	519
Private environmental governance	<i>Philipp Pattberg and Marija Isailovic</i>	37	Part IV Institutions	281
Private sector	<i>Jonatan Pinkse</i>	29	Part III Actors	218
Public-private partnerships	<i>Ayşem Mert</i>	38	Part IV Institutions	289
Qualitative comparative analysis	<i>Olav Schram Stokke and Arild Underdal</i>	19	Part II Theories and Methods	141
Quantitative comparative analysis	<i>Sijeong Lim and Aseem Prakash</i>	20	Part II Theories and Methods	148
Regimes	<i>Eleni Dellas</i>	39	Part IV Institutions	295
Religious movements	<i>Randolph Haluza-DeLay</i>	30	Part III Actors	225
Renewable energy	<i>Kacper Szulecki</i>	53	Part V Issue Areas	415
Risk	<i>Ortwin Renn</i>	8	Part I Concepts and Definitions	53
Scientists and experts	<i>Silke Beck</i>	31	Part III Actors	234
Security	<i>Rita Floyd</i>	67	Part VII Borders and Interlinkages	528
Simulations	<i>Walter F. Baber and Robert V. Bartlett</i>	21	Part II Theories and Methods	156
States	<i>Daniel Compagnon</i>	32	Part III Actors	240
Sustainable development	<i>Joyeeta Gupta and Isa Baud</i>	9	Part I Concepts and Definitions	61

Teaching global environmental governance	<i>Maria Ivanova</i>	22	Part II Theories and Methods	161
Trade	<i>Robyn Eckersley</i>	68	Part VII Borders and Interlinkages	534
United Nations	<i>Liliana Andonova and Kathryn Chelminski</i>	33	Part III Actors	248
Water	<i>Erika Weinthal</i>	54	Part V Issue Areas	422
Wetlands	<i>Kenneth Genskow and Kyle Magyera</i>	55	Part V Issue Areas	430
World society	<i>David John Frank, Ann Hironaka and Evan Schofer</i>	23	Part II Theories and Methods	175

Figures and Tables

Figures

6.1	Number of scientific publications on 'inclusive development' and 'inclusive growth,' 1998–2013	37
6.2	Conceptualizing inclusive development	39
8.1	The risk governance framework	56
8.2	Adaptive and integrative risk governance model	57
8.3	The risk escalator: a guide to inclusive risk governance	58
9.1	Competing discourses: strong and weak sustainability	62
30.1	Ecospiritualist environmental organizations founded	229
33.1	Contributions to the environment fund (1975–2010)	252
45.1	The greenhouse effect and the role of greenhouse gases	348
45.2	CO ₂ concentration in the atmosphere, the Keeling curve, 1960–2014	348
45.3	Per capita CO ₂ production and consumption, 1995 and 2009	352
45.4	Per capita CO ₂ emissions from fossil fuels for the top emitting nations	354
52.1	Map of various institutional elements governing global phosphorus, including regulations, policy, actors, sectors and discourses or framings	406
52.2	Roles and dominant frames of phosphorus in each key sector related to the phosphorus cycle through the global food system	408
52.3	Breakdown of phosphate rock reserve ownership by country	409

Tables

19.1	The comparative element of research	142
22.1	Overview of global environmental governance-related courses worldwide (up to 2014)	165
22.2	Overview of course content	166
22.3	Sample course objectives, learning outcomes, strategies and assessment	169
22.4	Global environmental governance courses sample	171
61.1	Targets and indicators of MDG7	479

Editors and Contributors

Editors

Philipp Pattberg is professor for transnational environmental governance and deputy department head of the Department of Environmental Policy Analysis, Institute for Environmental Studies, VU University Amsterdam. Within the Netherlands Research School for Socio-Economic and Natural Sciences of the Environment, Pattberg coordinates the research cluster on global environmental governance and politics. He is also chair of the board of the Global Environmental Change Section of the German Political Science Association and a senior research fellow of the international Earth System Governance Project.

Fariborz Zelli is associate professor at the Department of Political Science at Lund University. Prior to this, he worked at the German Development Institute and the Tyndall Centre for Climate Change Research. He is vice-chair of the Environmental Studies Section of the International Studies Association and chair of the board of the Global Environmental Change Section of the German Political Science Association. His publications include a special issue of *Global Environmental Politics* on institutional fragmentation (2013, as guest editor) and *Global Climate Governance Beyond 2012* (Cambridge University Press, 2010, as co-editor).

Contributors

Kenneth Abbott is Jack E. Brown professor of law in the Arizona State University College of Law, professor of global studies in the School of Politics and Global Studies, and senior sustainability scholar in the Global Institute of Sustainability. He is also faculty co-director of the Center for Law and Global Affairs. Abbott is also a lead faculty member of the Earth System Governance Project, and a member of the editorial boards of *International Theory, Regulation & Governance* and *Journal of International Economic Law*.

Camilla Adelle is senior fellow at the Centre for the Study of Governance Innovation at the University of Pretoria, South Africa, where her work focuses on various aspects of environmental governance. She has a particular interest in policy coordination and coherence as well as the international or the 'external' dimension of the EU environmental policy. Previously she was a senior research associate at the University of East Anglia (UK) and a research analyst at the Institute for European Environmental Policy (UK and Belgium).

Liliana Andonova is professor of political science / International Relations and academic co-director of the Center for International Environmental Studies at the Graduate Institute of International and Development Studies, Geneva. She has been named Giorgio Ruffolo fellow in sustainability science at Harvard University and Jean Monnet fellow at the European University Institute. Andonova is the author of *Transnational Politics of the Environment: EU Integration and Environmental Policy in Eastern*

Europe (MIT Press, 2003) and co-author of *Transnational Climate Change Governance* (Cambridge University Press, 2014). Her research and publications focus on international institutions, public–private partnerships, European integration, environmental governance and the interplay between international and domestic politics.

Steinar Andresen is research professor at the Fridtjof Nansen Institute in Norway and Adjunct Professor at the Pluricourts Center of Excellence at the University of Oslo (UiO). He has been professor of political science at the Department of Political Science, UiO and guest researcher at Brookings Institution, Princeton University, the International Institute for Applied Systems Analysis, and the University of Washington, Seattle. He has published extensively, particularly on various aspects of global environmental governance.

Walter F. Baber is director of the Graduate Center for Public Policy and Administration at California State University, Long Beach. He holds both a PhD in political science and a JD in law. He is the author or co-author of four books as well as several dozen journal articles and book chapters. In 2009, he held the Fulbright distinguished chair of environmental policy at the Polytechnic Institute of Turin, Italy. In 2011, he received the International Studies Association Book Award (with Robert V. Bartlett).

Karin Bäckstrand is professor in environmental social science at the Department of Political Science at Stockholm University. Her research revolves around global environmental politics, the role of science in environmental decision-making, the politics of climate change and the democratic legitimacy of global governance. Bäckstrand's work is published in journals such as *Global Environmental Politics*, *European Journal of International Relations*, *Global Environmental Change* and *Environmental Politics*. Her most recent book is the co-edited volume *Rethinking the Green State: Environmental Governance towards Climate and Sustainability Transition* (with Annica Kronsell, Routledge, 2015).

Robert V. Bartlett is the Gund professor of liberal arts and chair of the Political Science Department at the University of Vermont. His previous institutions include Purdue University, Boise State University, Texas Tech University and Indiana University. He has twice been a senior Fulbright scholar (Lincoln University and University of Canterbury, New Zealand, and Trinity College, Ireland). In 2007 he was distinguished Fulbright chair of environmental policies at the Turin Polytechnic Institute and University in Italy. He has published many research articles and ten books, most recently (with Walter F. Baber) *Consensus and Global Environmental Governance: Deliberative Democracy in Nature's Regime* (MIT Press, 2015).

Isa Baud is professor of international development studies at the University of Amsterdam, leading the research program Governance and Inclusive Development. She is president of the European Association of Development Research Institutes, with 160 institutional members. Her interests lie in urban development, digitized spatial knowledge management, environmental management and poverty. She is scientific coordinator of the EU-funded project Chance2Sustain, examining development strategies of medium-size fast-growing cities in the Global South, through the lens expanding use of ICT-GIS-based knowledge management.

Steffen Bauer is senior researcher in the Department of Environmental Policy and Natural Resources Management at the German Development Institute/Deutsches Institut für Entwicklungspolitik (DIE) in Bonn, Germany. His research addresses global environmental governance and sustainable development with a focus on the United Nations and international climate policy. Bauer coordinates the environmental module of the DIE's postgraduate training course and is Germany's science and technology correspondent to the United Nations Convention to Combat Desertification.

Silke Beck is senior researcher at the Department of Environmental Politics, Helmholtz Centre for Environmental Research, Leipzig, Germany. Her research focuses on the relationship between science and governance in global environmental change. Beck has contributed to set up the UFZ Science–Policy Expert Group. This interdisciplinary group has established a leading role in research on science–policy interactions and actively designed and supported such activities in the field of biodiversity and ecosystem services, such as national (stakeholder) contributions to the Intergovernmental Panel on Climate Change and Intergovernmental Panel on Biodiversity and Ecosystem Services.

Marianne Beisheim is senior associate at Stiftung Wissenschaft und Politik, German Institute for International and Security Affairs, an independent research center charged with providing analysis and recommendations to the German parliament and federal government. Her research focuses on global governance issues in the field of sustainable development. She also directs a project on partnerships for sustainable development, funded by the German Research Foundation in the context of the Berlin research center SFB700.

David Benson is lecturer in politics at the University of Exeter. Benson's research, based at the Environment and Sustainability Institute in Penryn, encompasses a range of issue areas at the interface between political and environmental sciences, most notably EU environmental and energy policy, comparative environmental politics and governance, and public participation in environmental decision-making.

Steven Bernstein is professor of political science and co-director of the Environmental Governance Lab at the Munk School of Global Affairs, University of Toronto. His research and publications span the areas of global governance and institutions, global environmental politics, non-state forms of governance, international political economy and internationalization of public policy. He has also been a consultant for the United Nations on institutional reform for the Rio+20 United Nations Conference on Sustainable Development and its follow-up.

Katja Biedenkopf is assistant professor of international and European politics at the University of Leuven, Belgium. Her research focus is on global environmental governance and the external effects of European Union environmental policy, in particular in the areas of chemicals, electronic waste and climate policy.

Frank Biermann is professor of political science at the VU University Amsterdam, the Netherlands, where he heads the Environmental Policy Analysis group at the Institute for Environmental Studies. He is also a visiting professor at Lund University, Sweden, and chairs the Earth System Governance Project, a global transdisciplinary research network. His most recent book is *Earth System Governance: World Politics*

in the *Anthropocene* (MIT Press, 2014). Among other honors, Biermann has won a Societal Impact Award for his 'path-breaking research on global environmental policy.'

Kate Booth is a place theorist and social scientist at the University of Tasmania, with an ongoing interest in environmental philosophy and research methodology. She is particularly interested in how people construct meaning in relation to the places where they live, and how this relates to perceptions and decision-making pertaining to place-based phenomenon such as natural disasters.

Ulrich Brand is professor of international politics at the University of Vienna, where he currently coordinates two research projects on social-ecological governance and transformation and the research cluster Governance, Democracy, Solidarity at the Faculty of Social Sciences. Brand was co-speaker of the Political Economy section of the German Political Science Association (2006–2012) and member of the Enquete (Expert) Commission 'Growth, Well-Being, Quality of Life' of the German Bundestag (2011–2013).

Per-Olof Busch is post-doctoral researcher at the Chair of International Organisations and Public Policy, Faculty of Economics and Social Sciences, University of Potsdam. He is co-editor of a special issue of the *Politische Vierteljahresschrift* on politics and environment and has published articles in *Journal of European Public Policy* and *European Journal of Political Research* as well as various contributions to edited volumes with major university presses. He is member of the management committee of the working group Global Change in the German Association for Political Science.

Sander Chan, PhD, is a political scientist and guest researcher at the Institute for Environmental Studies of VU University Amsterdam, and the German Development Institute. He was also research fellow under the EU Science and Technology Fellowship Program in China, hosted by Renmin University of China. His research interests include the application of public–private partnerships in China's sustainable development, and the role of non-state and subnational initiatives in global climate governance.

Kathryn Chelminski is a PhD candidate in the International Relations/Political Science Department at the Graduate Institute, Geneva, where she also received her MA. Spanning both academic and policy spheres, her research focuses on clean energy technology diffusion, energy and environmental governance, and international organizations. She has also previously worked as a researcher for the International Partnership for Energy Efficiency within the International Energy Agency, as well as UNEP's Post-Conflict and Disaster Management Branch.

Jennifer Clapp is a Canada research chair in global food security and sustainability and professor in the Environment and Resource Studies Department at the University of Waterloo. She is also a Trudeau Foundation fellow. Clapp has written widely on global governance issues at the intersection of food security, the global economy, and environmental issues. Her recent books include: *Hunger in the Balance: The New Politics of International Food Aid* (Cornell University Press, 2012), *Food* (Polity, 2012) and *Paths to*

a Green World: The Political Economy of the Global Environment (with Peter Dauvergne, MIT Press, 2011).

Daniel Compagnon is professor of international relations at Sciences Po Bordeaux, France and holds a PhD from the Université de Pau et des Pays de l'Adour. His research interests include global governance and environmental politics. He contributed to various projects on transnational governance of climate change, biodiversity negotiations, regionalism and public-private partnerships in sustainable development and regime complexes. Besides several books and book chapters on both the environment and African politics, he has published in a number of academic journals.

Dana Cordell, PhD, is research principal at the Institute for Sustainable Futures, University of Technology Sydney, where she undertakes and leads sustainable resource research projects. Cordell co-founded the Global Phosphorus Research Initiative (GPRI) in 2008 with colleagues in Sweden and Australia, as an outcome of her doctoral research 'Sustainability implications of global phosphorus scarcity for food security.' The GPRI now represents six leading research institutes across Europe, Australia and North America. In addition to transdisciplinary research, the GPRI facilitates networking and public debate among policymakers, industry, scientists and the public regarding the risks and opportunities for food systems associated with global phosphorus security.

Vincent Cornelissen is currently doing an internship at the Netherlands' Ministry of Foreign Affairs on the topic of post-2015 Sustainable Development Goals. He has field experience in Ghana and has just completed his Master's degree in human geography from the University of Amsterdam focusing on sustainable and inclusive development. His thesis was about inclusive development related to the post-2015 United Nations development agenda.

Eleni Dellas is PhD researcher at the Department of Environmental Policy Analysis of the Institute for Environmental Studies, VU University Amsterdam. She holds an MSc in political science and global environmental governance from VU University Amsterdam, and a BA in European studies from Maastricht University. Her PhD research examines the allocation of resources in the context of market-based instruments for environmental governance, such as fisheries individual transferable quotas and water quality trading schemes.

Simon Dietz is director of the ESRC Centre for Climate Change Economics and Policy, co-director of the Grantham Research Institute on Climate Change and the Environment and associate professor of Environmental Policy, all at the London School of Economics and Political Science. He serves on the editorial boards of the *Journal of the Association of Environmental and Resource Economists* and the *Journal of Environmental Economics and Management*.

Robyn Eckersley is professor of political science and chair of the discipline of political science in the School of Social and Political Sciences, and an Executive Board member of the Melbourne Sustainable Society Institute, at the University of Melbourne. She is a fellow of the Australian Academy of Social Sciences and co-convenor and treasurer

of the Environmental Politics and Policy Research Standing Group of the Australian Political Studies Association.

Rita Floyd is lecturer and Birmingham fellow in conflict and security at the Department of Political Science and International Studies at the University of Birmingham, UK and a fellow of the Institute for Environmental Security, The Hague. She is author of several peer-reviewed articles and of *Security and the Environment: Securitisation Theory and US Environmental Security Policy* (Cambridge University Press, 2010). Together with Richard A. Matthew she is the editor of *Environmental Security: Approaches and Issues* (Routledge, 2013).

David John Frank is professor of sociology and courtesy professor of education and political science at the University of California, Irvine. He studies changes in the cultural infrastructure of world society, with special focus on global environmental protection, the university and the knowledge society, and the criminal regulation of sex. He holds degrees in sociology from Stanford and the University of Chicago. Before coming to Irvine in 2002, he was on the faculty at Harvard University.

Victor Galaz is associate professor in political science at the Stockholm Resilience Centre (Stockholm University) and acting executive director for the program Global Economic Dynamics and the Biosphere at the Royal Swedish Academy of Sciences. His research interests explore institutional and political dimensions of the Anthropocene era and 'planetary boundaries.' His work has been published in journals such as *Governance* and *International Environmental Agreements*, and he is also the author of *Global Environmental Governance, Technology And Politics: The Anthropocene Gap* (Edward Elgar, 2014).

Kenneth Genskow is associate professor in the Department of Urban and Regional Planning at the University of Wisconsin-Madison, USA. He also serves as state specialist for environmental policy and planning with University of Wisconsin-Cooperative Extension. Genskow's research, teaching, and extension activities address human dimensions of natural resources and environmental management, including strategies for collaboration, understanding the effectiveness of policy tools on voluntary environmental management programs and integration of social and biophysical sciences in planning.

Sophie Godin-Beekmann is senior researcher at Centre National de la Recherche Scientifique and director of Versailles Saint-Quentin en Yvelines Observatory. She is secretary of the International Ozone Commission, a member of the Integrated Global Observation Strategy for Ozone panel and a member of the Global Atmospheric Watch Scientific Advisory Group on ozone at the World Meteorological Organization.

Aarti Gupta is associate professor with the Environmental Policy Group, Department of Social Sciences, Wageningen University, the Netherlands. She is also lead faculty of the Earth System Governance Project and associate editor of *Global Environmental Politics*. Her research focuses on global environmental governance and the role of science, knowledge and transparency therein, in the issue-areas of biosafety, forests and climate. She is the co-editor (with Michael Mason) of

Transparency in Global Environmental Governance: Critical Perspectives (MIT Press, 2014).

Joyeeta Gupta is professor of environment and development in the Global South at the Amsterdam Institute for Social Science Research of the University of Amsterdam and UNESCO-IHE Institute for Water Education in Delft. She is editor-in-chief of *International Environmental Agreements: Politics, Law and Economics* and is on the editorial board of some other journals. She has recently written the *History of Global Climate Governance* (Cambridge University Press, 2014).

Randolph Haluza-DeLay is associate professor of sociology at King's University College in Edmonton Alberta. He has edited two books, *Speaking for Ourselves: Environmental Justice in Canada* (University of British Columbia Press, 2009) and *How the World's Religions are Responding to Climate Change* (Routledge, 2013). His recent research focuses on the sociology of environmental sustainability and social justice. He has published more than two dozen publications, journal articles and book chapters from research on environmental justice, social movements, political ecology and the Alberta oil sands, anti-racism and environmental education.

Ann Hironaka is associate professor of sociology at the University of California—Irvine. She studies environmental sociology, politics and war from a global perspective. Her recent book, *Greening the Globe: World Society and Environmental Change* (Cambridge University Press, 2014), examines the historical emergence of the global environmental regime and its impact on national policy and environmental practices around the world. Her work on environmentalism has appeared in the *American Sociological Review*, *International Organization* and *Social Forces*.

Marija Isailovic is PhD researcher at the Department of Environmental Policy Analysis of the Institute of Environmental Studies at Vrije University in Amsterdam. Her work focuses on examining fragmentation in environmental governance architecture with particular emphasis on the issue of legitimacy from the Global South perspective. In addition, she has a broad experience in conducting research on various sustainability issues in the context of the South and Southeast Asia and small island developing states in the Pacific.

Maria Ivanova is associate professor of global governance and co-director of the Center for Governance and Sustainability at the McCormack Graduate School for Policy and Global Studies at the University of Massachusetts Boston. She was coordinating lead author for the flagship UN environmental assessment *Global Environmental Outlook*, has numerous publications including three short documentaries on global environmental governance and is editor of the Governance and Sustainability Issue Brief Series. She serves on the Scientific Advisory Board of the UN Secretary-General and the Board of UN University.

Anne Jerneck is associate professor of sustainability science at Lund University Centre for Sustainability Studies. She is also principal investigator and PhD advisor at Lund University Centre of Excellence for the Integration of Social and Natural Dimensions of Sustainability. Her research and teaching is oriented toward processes of social, structural and institutional change mainly in relation to poverty, gender inequality

and the politics of sustainability in sub-Saharan Africa. Her methodological contribution to sustainability science centres on knowledge structuring, interdisciplinarity and transdisciplinarity.

Kristina Jönsson is associate professor in political science at Lund University. Her main research interests concern politics, development and international cooperation, with special focus on governance and policy issues in the field of health. Recent publications include 'Legitimation challenges in global health governance: the case of non-communicable diseases' in *Globalizations* (2014), 'Global and local health governance: civil society, human rights and HIV/AIDS' in *Third World Quarterly* (with Christer Jönsson, 2012) and *Politics and Development in a Globalised World* (with Anne Jerneck and Malin Arvidson, Lund: Studentlitteratur, 2012).

Andrew Jordan is professor of environmental policy at the Tyndall Centre for Climate Change Research, School of Environmental Sciences, University of East Anglia, UK. He is interested in many dimensions of the environmental policy, including policy formulation, policy instrumentation and policy dismantling. He has undertaken comparative work on these topics in many substantive policy areas such as climate change, water and sustainable development.

Sylvia Karlsson-Vinkhuyzen is assistant professor with the Public Administration and Policy Group of Wageningen University, the Netherlands and adjunct professor in global environmental governance at Helsinki University, Finland. Her research tries to understand the key determinants of what makes global governance processes with environmental and social implications exert influence and build legitimacy. Karlsson-Vinkhuyzen is senior research fellow of the international Earth System Governance Project and a member of the editorial board of the journal *International Environmental Agreements*.

Marcel Kok is senior researcher at PBL Netherlands Environmental Assessment Agency. He studied policy sciences and environmental sciences at Utrecht University. At PBL he has worked extensively with colleagues on integrated assessment models of global environmental change. This collaboration resulted in various PBL reports including *Roads from Rio+20*—published in the run up to Rio+20 conference—that combines model-based scenario analysis with governance. Furthermore, Kok contributed to global assessment reports including the United Nations Environment Programme's *Global Environmental Outlook* and the *Global Biodiversity Outlook* for the CBD.

Annica Kronsell is professor and researcher in international relations and gender, feminist theory and environmental and climate politics at the Department of Political Science at Lund University, Sweden. Her recent publications include: 'The (in)visibility of gender in Scandinavian climate policy-making,' *International Feminist Journal of Politics* (with Gunnhildur Magnusdottir, 2014), 'Gender and transition in climate governance,' *Environmental Innovations and Societal Transitions* (2013), 'Legitimacy for climate policy: politics and participation in the Green City of Freiburg,' *Local Environment* (2013) and 'Climate change through the lens of intersectionality,' *Environmental Politics* (with Anna Kaijser, 2013).

Miriam Lang is a sociologist who currently works as head of office for the German Rosa Luxemburg Foundation for the Andean Region in Quito. She has coordinated the Permanent Working Group on Alternatives to Development since its creation in 2011. In that group, academics, political activists and politicians from Latin America and Europe work on alternatives to capitalist, patriarchal and colonial power relations, aiming also at building democratic and non-depredative societal nature relations beyond western development paradigms.

Sijeong Lim is postdoctoral fellow in the Department of Political Science at Stockholm University, Sweden, and is part of an empirical project entitled 'Governing the Anthropocene—Environmental Policy and Outcomes in a Comparative Perspective.' She received her doctorate in political science from the University of Washington.

Jane Lister is senior research fellow at the University of British Columbia. Her research focuses on the global environmental governance implications of transnational private regulation including the business and politics of retail-led supply chain sustainability efforts. Her book publications include: *Eco-Business: A Big Brand Takeover of Sustainability* (with P. Dauvergne, MIT Press, 2013), *Corporate Social Responsibility and the State* (University of British Columbia Press, 2011), and *Timber* (with P. Dauvergne, Polity, 2011). She has recently published articles in *Global Policy*, *Global Environmental Change*, *Millennium* and *Organization & Environment*.

Kyle Magyera is wetland policy specialist with the Wisconsin Wetlands Association (WWA). He coordinates development and delivery of local government outreach tools and trainings, supports WWA's policy analysis, and provides assistance to citizens and organizations on wetland protection, restoration and management concerns. Magyera previously worked at the Wisconsin Department of Natural Resources and holds Master of Science degrees in both urban and regional planning and water resources management from the University of Wisconsin-Madison.

Ayşem Mert is postdoctoral researcher at the Centre for Global Cooperation Research/Kaete Hamburger Kolleg, University of Duisburg-Essen and research fellow of the international Earth System Governance Project. Her PhD research focused on public-private partnerships for sustainable development, and is published by Edward Elgar as *Environmental Governance through Partnerships: A Discourse Theoretical Study*. Her current research focuses on transnational cooperation and global discourses of democracy and environment.

Dominic Moran is professor of environmental economics at Scotland's Rural College in Edinburgh. He specializes in applied cost-benefit analysis of environmental and agri-environmental policy. This includes the economics of biodiversity conservation and climate change (mitigation and adaptation in agriculture and related land use). He has consulted widely for the United Nations, World Bank and the Organisation for Economic Co-operation and Development.

Gerry Nagtzaam is senior lecturer at the Faculty of Law, Monash University, Australia. His research interests include the formation and development of ecoterrorist groups; the study of normative development in international environmental treaties; nuclear waste disposal in democratic states with a particular emphasis on environmental justice issues

and biodiversity loss and the critical evaluation of programs and organizations seeking to curtail such activities.

Tobias Nielsen is researcher at the Department of Political Science at Lund University and part of the strategic research area called 'Biodiversity and Ecosystem Services in a Changing Climate.' Nielsen has conducted research on Reducing Emissions from Deforestation and Forest Degradation and on global climate negotiations at the United Nations Framework Conventions on Climate Change. He is also research fellow of the international Earth System Governance Project.

Måns Nilsson is deputy director and research director at Stockholm Environment Institute (SEI) and visiting professor in Environmental Strategies Research at the Royal Institute of Technology in Stockholm. He is interested in energy and climate policy analysis, strategic assessment, innovation, European policy and global governance. He has slipped more than 30 papers past unsuspecting editors of academic journals. Nilsson combines academic achievement with extensive management experience, overseeing SEI's overall research strategy as well as managing multiple research and policy projects and programs including advisory and capacity building projects in Europe, Southeast Asia and Africa. Clients have included the World Bank, the Asian Development Bank, the African Development Bank, the European Commission, the Swedish government, bilateral development agencies and the private sector. He received his MSc in international economics from the University of Lund, Sweden, and his PhD in policy analysis from Delft University of Technology, the Netherlands.

Chukwumerije Okereke is an associate professor in environment and development at the Department of Geography and Environmental Science, University of Reading, UK. He is also a senior visiting fellow at the Environmental Change Institute, University of Oxford. His research interest is in the ethical and political economy dimensions of global climate governance. He was a lead author in the *Fifth Intergovernmental Panel on Climate Change Assessment Report* (Chapter 4, 'Equity and sustainable development').

Tom Oliver is a well-renowned authority on disruptive innovation and holistic thought leader at the best business schools in the world. He founded the Global Leadership Circle at Manchester Business School and contributed to its being ranked as one of the top international business programs. He is the author of the McGraw Hill bestseller *Nothing Is Impossible* and created the most influential peace gathering in history, the World Peace Foundation and World Peace Festival. Oliver is also a singer-songwriter, and music producer.

Lennart Olsson is professor of geography at Lund University. He is the founding director of the faculty independent research center Lund University Centre for Sustainability Studies and the coordinator of the Linnaeus Centre LUCID. Olsson has participated in several international assignments including the Intergovernmental Panel on Climate Change (IPCC) and the GEO assessment reports of the United Nations Environment Programme. He was also coordinating lead author for the chapter on livelihoods and poverty in *IPCC's Fifth Assessment Report 2011–2014*. As regards international experience and networks, he has held research positions in Australia, the USA and Hong Kong.

Jonatan Pinkse is professor of strategy at Grenoble Ecole de Management. He currently manages a research team on energy management. His areas of expertise are climate change, corporate sustainability and renewable energy, on which he has published widely in international journals, including *Academy of Management Review*, *Journal of International Business Studies*, *Research Policy*, *Energy Policy* and edited volumes.

Aseem Prakash is professor of political science, Walker family professor for the College of Arts and Sciences and director of the Center for Environmental Politics at University of Washington, Seattle. He is the founding general editor of Cambridge University Press Series in Business and Public Policy, the co-editor of *Journal of Policy Analysis and Management* and the associate editor of *Business & Society*.

Ortwin Renn is full professor for environmental sociology and technology assessment and dean of the Economic and Social Science Department at the University of Stuttgart, Germany. He directs the Stuttgart Research Center for Interdisciplinary Risk and Innovation Studies at the University of Stuttgart and the non-profit company DIALOGIK, a research institute for the investigation of communication and participation processes in environmental policymaking. Renn also serves as adjunct professor for integrated risk analysis at Stavanger University, Norway and as affiliate professor for risk governance at Beijing Normal University.

Kristin Rosendal is research professor in political science with the Fridtjof Nansen Institute, Norway. She has published extensively on the formation, implementation and interaction of international regimes on environmental and resources management and trade—in particular, issues relating to biodiversity, forestry management, biotechnology and genetic resources. A main research interest is in access and benefit-sharing and property rights to genetic resources in agriculture and aquaculture. Her work includes participation in program boards for the Research Council of Norway, organization of research collaboration with external universities and research institutes, and scientific panels for international conferences.

Mirjam A.F. Ros-Tonen is associate professor at the Governance and Inclusive Development Group of the Amsterdam Institute for Social Science Research, University of Amsterdam. She coordinates the WOTRO integrated program Inclusive Value Chain Collaboration for Sustainable Landscapes and Greater Food Sovereignty among Tree Crop Farmers in Ghana and South Africa and teaches at the Departments of Human Geography, Planning and International Development Studies and Future Planet Studies. She is member of the editorial board of TESS, *Journal of Economic and Social Geography*.

Delf Rothe is research fellow at the Institute for Peace Research and Security Policy at the University of Hamburg. He wrote his PhD thesis on the securitization of international climate politics with a scholarship from the German Heinrich-Böll Foundation. Rothe has published on securitization theory, risk management, global climate governance and discourse theory in journals such as *Security Dialogue*, *International Relations* and the *Journal of International Relations and Development*. He is also co-editor of two recent volumes, *Interpretive Approaches to Global Climate Governance* (Routledge, 2013) and *Euro-Mediterranean Relations after the Arab Spring* (Ashgate, 2013).

Evan Schofer is professor of sociology at the University of California, Irvine. His research addresses the environmentalism, comparative differences in political participation, the global proliferation of voluntary association, and the worldwide expansion of higher education and science. His work, which has appeared in the *American Sociological Review*, the *American Journal of Sociology* and *International Organization*, seeks to develop and extend neo-institutional theory, attending to the central role of world society, international institutions and global culture in shaping social life. Schofer earned his BA, MA and PhD from Stanford University.

Bernd Siebenhüner is professor for ecological economics and vice-president for graduate education and quality management of the Carl von Ossietzky University of Oldenburg, Germany. He is coordinator of the Master's program on sustainability economics and management and was a member of the steering committee of the Earth System Governance Project. Siebenhüner has coordinated numerous research undertakings in the fields of international organizations, global environmental governance, social learning, corporate sustainability strategies, climate adaptation and biodiversity governance, and the role of science in global environmental governance.

Nils Simon is researcher at the German Institute for International and Security Affairs at the Stiftung Wissenschaft und Politik in Berlin. He currently studies transnational partnerships for sustainable development as part of the Collaborative Research Center on Governance in Areas of Limited Statehood. His PhD thesis focused on the management of institutional complexity in the case of global chemicals governance.

Jan Stel is emeritus professor of ocean space and human activity at the International Centre for Integrated Assessment and Sustainable development, Maastricht University, the Netherlands. Stel was trained as a paleontologist at the universities in Groningen and Leiden, the Netherlands. As a science manager he organized the Snellius-II expedition, the Indian Ocean expedition, the first Dutch Antarctic expedition and the first EUREKA/EUROMAR market between industry, government and science. He was actively involved in the development of operational oceanography, developed an international, European consortium for the participation in the Ocean Drilling Program and conceived the notion of 'Partners in Science' for UNESCO/IOC as well as the notion of 'Ocean Space' for outreach. Stel is a popular science writer and consultant.

Hayley Stevenson is senior lecturer in international relations at the University of Sheffield, UK and a future research leader of the Economic and Social Research Council (2013–2016). She has previously worked at the Centre for Deliberative Democracy and Global Governance, at the Australian National University. She is the author of *Institutionalizing Unsustainability: The Paradox of Global Climate Governance* (University of California Press, 2013) and *Democratizing Global Climate Governance* (with John S. Dryzek, Cambridge University Press, 2014), as well as numerous articles on international climate change politics.

Olav Schram Stokke is a professor of political science at the University of Oslo and a research professor at the Fridtjof Nansen Institute. His area of expertise is international relations with special emphasis on institutional analysis, resource and environmental

management, and regional cooperation. Among his recent books are *Disaggregating International Regimes: A New Approach to Evaluation and Comparison* (MIT Press, 2012), *Managing Institutional Complexity: Regime Interplay and Global Environmental Change* (MIT Press, 2011) and *International Cooperation and Arctic Governance* (Routledge, 2010).

Kacper Szulecki is assistant professor at the Department of Political Science, University of Oslo. He is also board director of the Environmental Studies and Policy Research Institute in Poland, and a fellow of the Earth System Governance project. He was previously Dahrendorf fellow at the Hertie School of Governance and a visiting scholar in the Department of Climate Policy of the German Institute for Economic Research (DIW Berlin). He was also a researcher in the Cluster of Excellence EXC 16 at Konstanz University and an intern at the Institute for Environmental Studies (IVM), VU Amsterdam.

Morten Walloe Tvedt is senior research fellow at the Fridtjof Nansen Institute. His main research area is law governing innovation in the bio- and gene technology area. His main focus is patent law, contract law for bioinnovation, genetic resources laws and aspects of constitutional law in the light of international law. He has a special interest in looking at how law can contribute to conservation and sustainable use of biological diversity. Currently he is exploring the discretion for developing countries in implementing their patent law obligations and the manner in which contracts can be used to promote bioinnovation.

Arild Underdal is professor of political science at the University of Oslo and at the Center for International Climate and Environmental Research Oslo. Most of his research has focused on international cooperation, with particular reference to environmental governance. His main current project deals with Strategic Challenges in International Climate and Energy Policy. Underdal has served as rector of the University of Oslo (2002–2005) and as board member/chair of several institutions.

Thijs Van de Graaf is assistant professor for international politics at the Ghent Institute for International Studies, Ghent University. His research covers international energy politics, global governance and international institutions. Van de Graaf is co-editor of *Rising Powers and Multilateral Institutions* (Palgrave, 2015), author of *The Politics and Institutions of Global Energy Governance* (Palgrave, 2013) and co-author of *Global Energy Governance in a Multipolar World* (Ashgate, 2010).

Detlef van Vuuren is senior researcher at the PBL Netherlands Environmental Assessment Agency as part of the IMAGE integrated assessment modeling team. Van Vuuren is also professor at Utrecht University on Integrated Assessment of Global Environmental Change and is involved as editor in the journal *Climatic Change and Earth System Dynamics*. He is also involved in the Integrated Assessment Modelling Consortium, the Working Group on Coupled Models and the Global Carbon Project. Van Vuuren has acted as coordinating lead author and lead author on several environmental assessments, including those by the Intergovernmental Panel on Climate Change, the Millennium Ecosystem Assessment and the Global Environmental Outlook.

Pier Vellinga is professor in climate change, Wageningen University and Vrije Universiteit Amsterdam, and holds a PhD from Delft University of Technology. Vellinga was international advisor on climate change at the Netherlands' Ministry of Environment, active in setting up the International Panel on Climate Change as vice-chairman (1989–1994), helped develop the United Nations Framework Convention on Climate Change, was director of the Institute for Environmental Sciences and chairman of STAP (1994–1998) of the Global Environment Facility. He is now scientific director of the national program 'Knowledge for Climate' (2007–2015).

Paul Wapner is professor of global environmental politics in the School of International Service at American University. He is the author of *Living through the End of Nature: The Future of American Environmentalism* (MIT Press, 2010) and *Environmental Activism and World Civic Politics* (SUNY Press, 1996) and co-editor of *Principled World Politics* (with Lester Ruiz, Rowman & Littlefield, 2000) and, most recently, of *Global Environmental Politics: From Person to Planet* (with Simon Nicholson, Paradigm Publishers, 2014). His interests include: environmental ethics, climate politics and contemplative environmental studies.

Erika Weinthal is the Lee Hill Snowdon professor of environmental policy and associate dean for international programs at the Nicholas School of the Environment at Duke University. She received her PhD in political science from Columbia University. She specializes in global environmental politics with an emphasis on water and energy. Her most recent book is an edited volume entitled, *Water and Post-Conflict Peacebuilding: Shoring Up Peace* (Routledge, 2014). Since 2011, she is associate editor at *Global Environmental Politics*.

Jørgen Wettestad is research professor at the Fridtjof Nansen Institute (FNI) in Oslo, Norway. His most recent book is *EU Climate Policy: Industry, Policy Interaction and External Environment* (with Elin Lerum Boasson, Ashgate, 2013). He has published several books and numerous articles on international and EU environmental policy, with particular attention to emissions trading. He has also led and participated in several EU-funded projects, participated in numerous international research projects and has been program director at the FNI for a long period.

Stuart White is professor and director of the Institute for Sustainable Futures, where he leads a team of researchers who create change towards sustainable futures through independent, project-based research. With more than 30 years of experience in sustainability research, White's work focuses on achieving sustainability outcomes for a range of government, industry and community clients across Australia and internationally. This includes both the design and assessment of programs for improving decision-making and improving resource use. White has written and presented widely on sustainable futures and is a regular commentator on sustainability issues in the media. In 2012, he was awarded the Australian Museum Eureka Prize for Environmental Research.

Oscar Widerberg is researcher at the Institute for Environmental Studies (IVM) at VU University Amsterdam, where he studies global environmental governance, climate policy and network theory. He is an Earth System Governance Project research fellow and holds an MSc in environmental policy and management from Utrecht University,

and a BSc in international relations from the University of Malmö. Widerberg has published in journals including *Global Policy* and *International Environmental Agreements: Politics, Law and Economics* and is a reviewer for *Global Environmental Politics* and *Environmental Politics*, among others. Prior to joining IVM, he worked in the economic research consultancy firm Ecorys and is currently affiliated with Triple E Consulting as (associate) consultant.

Preface

Despite sustained efforts at all levels of governance, from the local to global, the state of the environment is deteriorating in many places of the world. In addition to ‘classic’ environmental problems such as local and regional air pollution and water quality, a new class of problems entered the public debate, systemic problems that undermine the functioning of planet-wide systems such as the atmosphere or biological diversity.

To capture this shift in attention, researchers are more frequently framing environmental challenges within a broader and holistic context, referring to concepts such as the earth system or the emerging Anthropocene. The term ‘Anthropocene,’ for instance, denotes a new geological epoch in planetary history, one that is characterized by the unprecedented impact of human activities on the earth’s ecosystems. Scientists today see overwhelming evidence that the entire earth system operates well outside safe boundaries. Consequently, humanity must revise its course and embark on a deep transformation towards environmental sustainability to avoid critical tipping points that might lead to rapid and irreversible change.

The *Encyclopedia of Global Environmental Governance and Politics* surveys the broad range of environmental and sustainability challenges in the emerging Anthropocene and scrutinizes available concepts, methodological tools, theories and approaches as well as overlaps with adjunct fields of study. With this broad approach, the volume seeks to provide a pluralistic knowledge base of the research and practice of global environmental governance and politics in times of increased complexity and contestation.

The encyclopedia brings together a diverse group of experts from around the world; their 68 contributions are organized in seven parts, reflecting major debates and thematic clusters of global environmental governance and politics. Part I, Concepts and Definitions, surveys foundational as well as emerging and contested conceptualizations, ranging from *SUSTAINABLE DEVELOPMENT* and *GLOBAL ENVIRONMENTAL GOVERNANCE* to the idea of *ANTHROPOCENE AND PLANETARY BOUNDARIES* and *EARTH SYSTEM GOVERNANCE*. Part II reviews a range of theories and methods, including both mainstream and radical theories along with diverse research methods such as *DELIBERATIVE POLICY ANALYSIS*, *QUANTITATIVE COMPARATIVE ANALYSIS* and *SIMULATIONS*. Part III analyzes the main actors in global environmental governance, ranging from *STATES* to the *PRIVATE SECTOR*, *CIVIL SOCIETY* and *INDIVIDUALS*. Part IV scrutinizes the main institutions governing global environmental politics, from *INTERNATIONAL ORGANIZATIONS* to international *REGIMES* and *PRIVATE ENVIRONMENTAL GOVERNANCE* arrangements, while Part V provides a broad overview of key issue areas of global environmental governance, including widely discussed issues such as *CLIMATE CHANGE* along with emerging topics such as *PHOSPHOROUS*. Part VI deals with cross-cutting questions and emerging topics in global environmental governance research such as *ENVIRONMENTAL POLICY INTEGRATION* and *ENVIRONMENTAL POLICY DIFFUSION*. Part VII finally takes into consideration the non-exclusive nature of most environmental problems and reflections on borders and interlinkages with other fields of study (for example *FOOD*, *AGRICULTURE* and *TRADE*).

Some readers may have expected additional or different entries. We are well aware that the book's structure does not address all potential theories, methods or themes in an exhaustive manner—and that such an exhaustive overview is simply not feasible. But we hope that the encyclopedia offers a balanced and differentiated perspective on the diversity of global environmental governance and practices today.

To provide a consistent and accessible format for readers with different kinds of background and previous knowledge on global environmental governance, each chapter follows the same structure: (1) key concepts and definitions, (2) key findings and (3) and a broader outlook, reflecting on the future developments, challenges and emerging research frontier. The *Encyclopedia of Global Environmental Governance and Politics* therefore serves as an indispensable starting-point for anyone interested in surveying the field in more detail. The seven thematic areas allow the reader to quickly identify important debates in and concrete approaches to the study of global environmental governance and politics. The encyclopedia can also be consulted along its alphabetical list of entries, ranging from *AGRICULTURE* and *AIR POLLUTION* to *WETLANDS* and *WORLD SOCIETY*.

This book is the result of three years of intense work, in which we have incurred many debts. Our thanks and sincere appreciation go to all our authors and reviewers for meeting tight deadlines, answering to challenging queries and adhering to intricate formal requirements. Very special thanks go to our editorial assistant, Flávia Dias Guerra, who has spent long hours checking abbreviations, formatting references and making sure everything complies with the formal guidelines. We are very grateful to Alex Pettifer at Edward Elgar Publishing for suggesting this project to us and to Victoria Nicols for assistance throughout the process.

While we believe that the *Encyclopedia of Global Environmental Governance and Politics* can become an indispensable resource for anyone interested in changing course towards a more sustainable future, we sincerely hope that it will become irrelevant as soon as possible, as this would indicate our success in achieving the sustainability transition.

We would like to acknowledge support from the Netherlands Organisation for Scientific Research (CONNECT project on 'Assessing and Reforming the Current Architecture of Global Environmental Governance') and the Swedish Research Council Formas (NAVIGOV project on 'Navigating Institutional Complexity in Global Climate Governance').

Philipp dedicates this book to his children, Aleksandra Elisa and Adam Elias. Fariborz dedicates the volume to his mother Inge and is grateful that they could celebrate her 75th birthday together.

Philipp H. Pattberg and Fariborz Zelli
Amsterdam and Lund, March 2015



- Wichterich, C. (2011), *Kapitalismus mit Wärmedämmung. Feministische Kritik und Gegenentwürfe zur Green Economy: informationen für die frau*, Berlin: Deutscher Frauenrat.
- Wissen, M. (2010), Klimawandel, Geopolitik und 'imperiale Lebensweise': Das Scheitern von 'Kopenhagen' und die strukturelle Überforderung internationaler Umweltpolitik, *Kurswechsel*, 2, 30–38.
- World Bank (2012), *Massive Show of Support for Action on Natural Capital Accounting At Rio Summit*, press release, June 20, www.worldbank.org/en/news/2012/06/20/massive-show-support-action-natural-capital-accounting-rio-summit (accessed November 5, 2014).

Further recommended literature

- Brand, U. and M. Wissen (2014), Strategies of a green economy, contours of a green capitalism, in K. van der Pijl (ed.), *The International Political Economy of Production*, Cheltenham and Northampton, MA: Edward Elgar Publishing.
- EC (2011), *Roadmap to a Resource Efficient Europe*, Communication from the Commission to European Parliament, the Council, the European Social and Economic Committee and the Committee of the Regions, COM(2011) 571 final, http://ec.europa.eu/environment/resource_efficiency/pdf/com2011_571.pdf (accessed November 5, 2014).
- ILO (2011), *Skills for Green Jobs. A Global View*, Geneva: International Labour Organization.
- Spash, C.L. (2012), Green economy, red herring, *Environmental Values*, 21(2), 95–99.

60 Institutional fragmentation

Definitions

For a working definition, I follow Biermann and his colleagues with their broad understanding of fragmentation, stating that many policy domains are marked by a 'patchwork of international institutions that are different in their character (organizations, regimes, and implicit norms), their constituencies (public and private), their spatial scope (from bilateral to global), and their [predominant] subject matter' (Biermann et al. 2009, p. 16).

The concept originated in the international legal community (e.g., ILC 2006; Koskenniemi and Leino 2002), before being adapted by international relations scholars and extended towards transnational institutions and PUBLIC–PRIVATE PARTNERSHIPS.

This established nature and interdisciplinary potential notwithstanding, the term 'fragmentation' is contested, for instance, because it may suggest a preference for order or centrality. In this chapter, however, I treat fragmentation as unbiased with regard to any favored institutional setting: the concept neither implies a preference for a state of universal institutional order nor does it suggest that fragmentation is a negative quality.

When it comes to conceptual diversity, for instance, one may stick to a parsimonious or formal framing that defines the shape of fragmentation according to the number of institutions and the legal coherence among them. Alternatively, one may start from a richer relational concept that incorporates behavioral impacts of fragmentation, or underlying cognitive and discursive structures (see also CONSTRUCTIVISM AND SOCIOLOGICAL INSTITUTIONALISM; GOVERNMENTALITY; NEO-GRAMSCIANISM; WORLD SOCIETY). Their different conceptual choices notwithstanding, most authors agree that institutional fragmentation is an inherent structural characteristic of international relations today. There is no policy domain where all relevant provisions are placed under, or legally linked to, a single institutional umbrella with universal membership (Biermann et al. 2009; Orsini et al. 2013).

Environmental domains are a particular case in point: due to their complex and

crosscutting nature, they often overlap with the subject matters and jurisdictions of institutions from various other issue areas (see also ENVIRONMENT AND NATURE; GLOBAL ENVIRONMENTAL GOVERNANCE; AGRICULTURE; FOOD; HEALTH; POVERTY; SECURITY; TRADE). To take an illustration, the global climate governance architecture is not only made up of those institutional arrangements that predominantly address CLIMATE CHANGE, i.e., the United Nations (UN) climate regime and several new multi-lateral clean technology partnerships. In addition, it includes a large number of further institutions whose agendas have been increasingly touching upon the issue—institutions as diverse as the BIODIVERSITY and OZONE regimes, the World Trade Organization (WTO), the UN Security Council, or the Group of 20 (G20) (Biermann et al. 2009; Keohane and Victor 2011; Zelli 2011a; see also CLUBS; SECURITY; TRADE; UNITED NATIONS).

Fragmentation, thus, is a matter of degree and may vary considerably across issue areas, spanning a continuum from domains with relatively low levels of fragmentation to highly intricate institutional complexes. Among other factors, the degree of fragmentation depends on the delineation and the very framing of the domain or problem structure in question (Biermann et al. 2009, pp. 19–21). The broader an environmental domain under scrutiny—for example, climate change as a whole as opposed to a sub-issue such as carbon trading—the more likely it touches upon more environmental and non-environmental spheres and the associated institutions.

In light of its broad defining features, fragmentation is related to several other concepts that seek to enhance our understanding about the growing institutional complexity in international relations. Given these strong conceptual overlaps, I will also consider findings from these other literatures in this chapter. The first one that deserves mentioning here is institutional interlinkages or interplay. Similar to studies on fragmentation, much of the literature on interlinkages has dedicated particular attention to environmental issue areas (e.g., Chambers 1998, 2008; Oberthür and Gehring 2006; Oberthür and Stokke 2011; Selin and VanDeveer 2003; Young 1996, 2002). Interlinkages and fragmentation differ in terms of their level of analysis: the former refer to overlaps between two or more institutions over specific issues, while the latter relates to the complexity of a whole policy domain.

Distinctions become more difficult—and partly impractical—with regard to other concepts that share with fragmentation the overarching level of analysis in a given issue area. This is particularly the case for the emerging literature on governance experiments (Hoffmann 2011), polyarchic or polycentric governance (Ostrom 2010) and on regime complexes (Orsini et al. 2013; Raustiala and Victor 2004). Regime complexes—or: institutional complexes, as I would prefer calling them to account for the more generic nature of the term ‘institutions’—are defined in a rather additive manner as ‘loosely coupled set[s] of specific regimes’ (Keohane and Victor 2011, p. 7; cf. Alter and Meunier 2009). In this sense, a regime complex is akin to what other authors have termed as ‘governance architecture’ (Biermann et al. 2009).

Key findings

Mappings of fragmentation

The early days of interlinkages and fragmentation scholarship were marked by a series of mappings and typologies (cf. Selin and VanDeveer 2003, p. 14). Based on three

criteria—the level of institutional integration; the extent to which core norms conflict; and the constellation of actors—Biermann et al. (2009) differentiate between ‘synergistic fragmentation,’ ‘cooperative fragmentation’ and ‘conflictive fragmentation.’ Synergistic fragmentation, which can, for instance, mark the issue area of ozone layer depletion, refers to a global governance architecture in which almost all countries participate in the core institution in an issue area, and where this institution ‘provides for effective and detailed general principles that regulate the policies in distinct yet substantially integrated institutional arrangements’ (Biermann et al. 2009, p. 20). There is cooperative fragmentation when there are only loosely integrated institutions and decision-making procedures, when the relationship between norms and principles of these different institutions is ambiguous, and/or when not all major countries participate in the core institution. Global climate governance would be an example for this type of fragmentation. Finally, Biermann and colleagues argue that conflictive fragmentation occurs when the institutions in a given architecture are hardly connected or have very different decision-making procedures, when the principles, norms and rules are conflicting and when the memberships of the institutions overlap in such a way that different actor coalitions accept or advance these conflicts. One example for conflictive fragmentation is the institutional architecture on plant genetic resources (Biermann et al. 2009, p. 20).

Keohane and Victor (2011) offer a similar distinction in their analysis of the regime complex for climate change. They argue that there are on the one end ‘fully integrated institutions that impose regulation through comprehensive, hierarchical rules’ and on the other there are ‘highly fragmented collections of institutions with no identifiable core and weak or nonexistent linkages between regime elements’ (Keohane and Victor 2011, p. 8). Sitting in between is ‘a wide range that includes nested (semi-hierarchical) regimes with identifiable cores and non-hierarchical but loosely coupled systems of institutions’ (Keohane and Victor 2011, p. 8).

While these two influential typologies use rather similar criteria, recent studies employed a broader variety of mapping categories. For instance, Zürn and Faude (2013) distinguish levels of segmentary, stratificatory and functional differentiation. Other scholars have started to apply network approaches to identify levels of institutional centrality and density for fields such as FISHERIES and CLIMATE CHANGE (Hollway 2013; Kim and Mackey 2013; Widerberg 2014).

Explanations of fragmentation

Keohane and Victor (2011) seek to explain the regime complex on climate change in functional, strategic and organizational terms: from a functional standpoint, they hold that the diversity of institutions mirrors the complexity of specific problems involved in regulating such a complex issue as climate change. Strategically, smaller institutional arrangements are oftentimes more suitable and effective for some actors to realize their interests. And from an organizational point of view, the fragmentation of the global climate change architecture rest on path-dependence and timing. Still, Keohane and Victor’s three explanations do not provide substantiated theoretical guidance, but remain at the level of causal pathways (see also the ‘Outlook’ section below).

Other approaches seek to address this theoretical research gap by adopting different strands of institutionalism more profoundly to the study of institutional complexity. Many of these build on earlier explanatory frameworks that had been developed for the

study of institutional interlinkages; for example, Oberthür and Gehring (2006), Rosendal (2001), Stokke (2001). Stokke (2012), for instance, further develops his own explanatory framework for complex institutional constellations, distinguishing behavioral, regulatory and cognitional components of the respective governance problem.

Drawing on Keohane's earlier work on NEOLIBERAL INSTITUTIONALISM, Van de Graaf (2013) develops a theoretically elaborate approach for his analysis of the creation of a new institution in an already fragmented institutional environment: the International Renewable Energy Agency (IRENA). He explains how domestic preferences may lead to an institutional hedging strategy, whereby states deliberately pursue the creation of overlapping institutions (see also RENEWABLE ENERGY). Zelli (2011b) developed a theoretical framework to examine tenets of neorealism and cognitivism, and applied it to overlaps between the global climate and trade regimes. He found that, thanks to the backing of the more powerful coalition of countries, the WTO prevailed in these overlaps, being the arena that produced the dominant legal output on issues like intellectual property rights or border carbon adjustments (Zelli 2010; see also TRADE).

Orsini and colleagues (2013) revisit power-based explanations. They find that institutional fragmentation may qualify former theoretical claims that only powerful actors may influence complexes. Instead, such complexes may also open participatory opportunities for less powerful actors—and ultimately shift the constellation of power in a given environmental domain.

Scholars also refer to critical and discursive theories. Zelli et al. (2013) argue that institutional complexes are embedded in overarching norms that shape their evolution and impact. Building on the theory of liberal environmentalism (Bernstein 2002; see also LIBERAL ENVIRONMENTALISM AND GOVERNANCE NORMS), they hold that the development of institutional architectures on biological diversity, BIOSAFETY, FORESTRY and CLIMATE CHANGE can partly be explained by dominance of global norms promoting economic efficiency and environmental improvements through market-based mechanisms.

Finally, authors such as Faude, Gehring and Zürn build their arguments on functionalist approaches and sociological differentiation theory. Gehring and Faude (2013) suggest that institutional complexes may produce new functional divisions of labor among elemental institutions. They argue that fragmentation with its various institutional choices provides forum-shopping opportunities for actors (Raustiala and Victor 2004), thereby creating competition among institutions that may lead to optimization in goal attainment. In a similar vein, Zürn and Faude (2013) conclude that it is not fragmentation as such that needs addressing as a potentially dysfunctional constellation, but the coordination gaps of fragmented or differentiated institutional architectures.

Effects of fragmentation

A large part of the literature has focused on possible consequences of fragmentation for aspects like cooperation patterns, effectiveness or legitimacy. Drawing on a broad review of different literatures, Biermann et al. (2009) list potential benefits of fragmentation: the provision of further institutional platforms to include a variety of actors and stakeholders (e.g., laggards, vulnerable actors); possibilities to circumvent stalemates or to give new impulses to stalled negotiations, as climate-related decisions of the Group of 8 + 5 (G8+5) meetings have done for UN climate summits; more options for side-payments,

issue-linkages and package deals. As potential drawbacks they identify: new legitimacy gaps, especially due to the evolution of smaller, exclusive clubs and the weakening of universal institutions; coordination gaps between overlapping institutions; regulatory uncertainty, if institutions exhibit different rules and conditions (e.g., for the allocation of funds or for the functioning of carbon markets); and the possibility of forum-shopping that may lead to a regulatory race to the bottom.

Alter and Meunier (2009) identify different types of mechanisms through which institutional complexity may influence the politics of international cooperation. They argue that regime complexity enables 'chessboard politics' in which actors pursue cross-institutional strategies to maximize their interests. Moreover, complexity forces bounded rationality logics on actors, creating 'a heightened role for informers—experts, lawyers, and non-governmental organizations (NGOs)—which help states manage rule and institutional confusion' (Alter and Meunier 2009, p. 18). Finally, institutional complexity may create more small group environments by multiplying the number of competing international venues, 'and thus the occasions for states representatives to interact' (Alter and Meunier 2009, p. 19).

As one result of their large comparative case analysis, Oberthür and Gehring (2006) stress the high numbers of co-existent and synergistic relations they found between institutions. Other studies, in turn, geared their specific case studies towards conflictive constellations. For instance, several scholars found that the creation of the now-defunct Asia-Pacific Partnership on Clean Development and Climate undermined the UN Framework Convention on Climate Change (UNFCCC) process; for example, by providing avoiding a non-binding alternative that circumvents the principle of common but differentiated responsibilities (Karlsson-Vinkhuyzen and van Asselt 2009; McGee and Taplin 2006).

It is particularly international lawyers who, often earlier than their international relations colleagues, put conflictive overlaps among international regimes under scrutiny—particularly, but not limited to, overlaps between WTO law and multilateral environmental agreements (just to name a few: Brewer 2003; Pauwelyn 2003; Young 2013). Van Asselt (2012, 2014) continued this tradition by examining, *inter alia*, interactions between the REGIMES ON CLIMATE CHANGE, BIOLOGICAL DIVERSITY, clean technologies and TRADE. He finds that whether fragmentation leads to institutional conflicts or synergies 'depends on factors that are seemingly under the control of actors participating in the interaction regimes' (van Asselt 2014, p. 248); for example, taking proactive steps towards coordination or deciding on suitable economic incentives to meet cross-institutional objectives.

Yet other studies focused on the consequences that institutional fragmentation may have for questions of inclusiveness and legitimacy. Karlsson-Vinkhuyzen and McGee (2013) draw on tenets from the English School and social constructivism to examine gaps in the legitimacy of 'minilateral' forums and public-private arrangements. They show that, despite these gaps, the support from powerful countries allows these forums to exert a significant impact on global climate negotiations. Orsini (2013) discusses agency in two fragmented institutional settings (forestry and access to genetic resources). Using network analysis and new datasets in combination with qualitative methods, she shows that non-state actors with the capacity to participate in various institutions may significantly enhance their organizational power. She further finds

that such actors use their power for strategic forum-shopping, as well as for integrative attempts of forum linking.

Management of fragmentation

In their edited volume on managing institutional complexity, Oberthür and Stokke (2011) identified first empirical findings on this research theme. Among these results is a comprehensive typology on interplay management by Sebastian Oberthür. He distinguishes four levels of management: efforts made by overarching institutions; joint management by affected institutions; unilateral management by individual institutions; and autonomous management by individual state governments (Oberthür 2009). He further differentiates modes of management: regulatory (based on standards of behavior) and enabling (based on the allocation of information, knowledge and other resources). Oberthür (2009) stresses the need to fit these modes and levels of management to the particular governance conditions of institutional complexes. Altogether, he finds that, unlike unilateral management attempts, joint management initiatives or even a strengthened international environmental organization have a much more limited potential to manage institutional complexity.

Another key finding is that management approaches are confronted with a considerable stability or equilibrium of institutional complexes due to interest- and power-based path dependencies and high transaction costs. Oberthür and Pożarowska (2013), building on core explanatory variables of international relations theories, find such an equilibrium for the domain of access to, and benefit-sharing from, genetic resources, further stabilized by the adoption of the Nagoya Protocol (see also BIOSAFETY AND GENETICALLY MODIFIED ORGANISMS).

In light of these challenges, authors have increasingly moved away from ambitious suggestions such as the creation of a World Environment Organization (Biermann and Bauer 2005). One new and influential approach, suggested by Abbott and Snidal (2010), is ORCHESTRATION, i.e. the idea that an international organization manages the operation of other institutions towards common goals. Building on this idea, van Asselt and Zelli (2013) illustrate how the UNFCCC could serve as an orchestrator for carbon markets, and climate technology initiatives.

Humrich (2013) equally comes to pragmatic conclusions when critically analyzing two different forms of responses that have been proposed to manage the institutional fragmentation in the ARCTIC: a grand proposal of an overarching legal framework, and a more modest attempt to coordinate the existing institutions. He argues that the latter is more feasible and desirable, underlining the inherent limitations to ambitious top-down responses to institutional fragmentation for this case.

Outlook

The body of literature on institutional fragmentation and interlinkages has become quite extensive over the past 10–15 years, especially in global environmental governance research. This common ground and the merits of existing scholarly approaches notwithstanding, there are still major new conceptual, theoretical and empirical grounds to be explored.

Conceptually, the literature could further go beyond additive accounts that are underspecified with regard to the quality of relations among various components of an

institutional complex. Instead, more multi-criteria sets should be developed to assess and compare different degrees of fragmentation across environmental issue areas. Moreover, new methodical ground can be broken following the pioneering examples of different network approaches and mappings (Hollway 2013; Kim and Mackey 2013; Widerberg 2014).

Similarly, more can be done to root the study of institutional fragmentation and interlinkages theoretically (Young 2008, p.134). What Underdal (2006, p.9) observed nearly ten years ago for research on interlinkages also goes for fragmentation research today: the focus of explanatory approaches has been so far 'primarily on interaction at the level of specific regimes and less on links to the kind of basic ordering principles or norms highlighted in realist and sociological analyses of institutions.' Indeed, some of the most influential approaches in the literature on institutional complexity suffice with basic ideas about causal pathways while falling short of more fundamental theoretical approaches that relate to concepts of power, interests, knowledge, norms or other scope conditions (e.g., Keohane and Victor 2011).

Moreover, many studies still attend to the normative question whether a centralized or a polycentric global governance architecture is preferable (Biermann et al. 2009; Ostrom 2010; Keohane and Victor 2011). This entangling of analytical and normative claims may have partly stood in the way of the development and application of more fundamental theoretical frameworks. In fact, most systematic studies so far have concentrated on dyadic interlinkages, while holistic analysis of sets of interactions in a larger fragmented architecture are still lacking.

As Zelli and van Asselt (2013) argue in the introductory article to a special issue on the institutional fragmentation of global environmental governance, causal explanations would not need to reinvent the wheel but could in part be derived from different strands of institutionalism and cooperation theory. This 'institutionalism revisited' could develop and examine assumptions that link the degree of fragmentation in a given issue area of environmental governance to, for instance: the constellation of power, drawing on neorealist perspectives (Benvenisti and Downs 2007); situation structures and constellations of interests, based on NEOLIBERAL INSTITUTIONALISM (Rittberger and Zürn 1990; Van de Graaf 2013); major qualities of the issue area (e.g., the global or local nature of a good; the level of scientific certainty) and the question of institutional fit (Young 2002); conflicts among core norms or the contestation of discourses (Zelli et al. 2013; see also LIBERAL ENVIRONMENTALISM).

Finally, a whole set of empirical themes merits attention of future single case studies or comparative analyses across environmental domains, for example: the interactions between transnational institutions and public institutions (Abbott 2014); the consequences of fragmentation for different types of non-state actors, including further in-depth studies about the legitimacy, accountability and inclusiveness of complex governance architectures (Karlsson-Vinkhuyzen and McGee 2013; Orsini 2013); the impact of fragmentation on the overall EFFECTIVENESS of a global governance architecture, by both QUALITATIVE COMPARATIVE ANALYSIS and QUANTITATIVE COMPARATIVE ANALYSIS; for example, by adopting counterfactual approaches to an entire institutional complex (Hovi et al. 2003; Stokke 2012); the suitability and effectiveness of specific management attempts such as ORCHESTRATION (Abbott and Snidal 2010); the stability or fragility of institutional complexes, including the question whether they move towards a (new)

division of labor (Gehring and Faude 2013) or rather towards new types of positional differences and conflicts (Zelli 2011b).

FARIBORZ ZELLI

List of acronyms

G20	Group of 20
G8+5	Group of 8 + 5
IRENA	International Renewable Energy Agency
NGO	non-governmental organization
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
WTO	World Trade Organization

References

- Abbott, K. (2014), Strengthening the transnational regime complex for climate change, *Transnational Environmental Law*, 3(1), 57–88.
- Abbott, K.W. and D. Snidal (2010), International regulation without international government: improving IO performance through orchestration, *Review of International Organizations*, 5(3), 315–344.
- Alter, K.J. and S. Meunier (2009), The politics of international regime complexity, *Perspectives on Politics*, 7(1), 13–24.
- Benvenisti, E. and G.W. Downs (2007), The empire's new clothes: political economy and the fragmentation of international law, *Stanford Law Review*, 60(2), 595–632.
- Bernstein, S. (2002), Liberal environmentalism and global environmental governance, *Global Environmental Politics*, 2(3), 1–16.
- Biermann, F. and S. Bauer (eds) (2005), *A World Environment Organization: Solution or Threat for Effective International Environmental Governance*, Aldershot: Ashgate.
- Biermann, F., P. Pattberg, H. van Asselt and F. Zelli (2009), The fragmentation of global governance architectures: a framework for analysis, *Global Environmental Politics*, 9(4), 14–40.
- Brewer, T.L. (2003), The trade regime and the climate regime. institutional evolution and adaptation, *Climate Policy*, 3(4), 329–341.
- Chambers, W.B. (ed.) (1998), *Global Climate Governance: Inter-Linkages Between the Kyoto Protocol and other Multilateral Regimes*, Tokyo: United Nations University Press.
- Gehring, T. and B. Faude (2013), The dynamics of regime complexes: microfoundations and systemic effects, *Global Governance*, 19(1), 119–130.
- Hoffmann, M.J. (2011), *Climate Governance at the Crossroads. Experimenting with a Global Response after Kyoto*, Oxford: Oxford University Press.
- Hollway, J. (2013), *Making Waves: RFMO Design & the Evolution of the Global Fisheries Governance Complex*, paper prepared for presentation at the Annual Convention of the International Studies Association, San Francisco, April 3–6.
- Hovi, J., D.F. Sprinz and A. Underdal (2003), The Oslo-Potsdam solution to measuring regime effectiveness. critique, response, and the road ahead, *Global Environmental Politics*, 3(3), 74–96.
- Humrich, C. (2013), Fragmented international governance of Arctic offshore oil: governance challenges and international improvement, *Global Environmental Politics*, 13(3), 79–99.
- ILC (2006), *Fragmentation of International Law: Difficulties Arising from the Diversification and Expansion of International Law. Report of the Study Group of the International Law Commission*, UN Doc. A/CN.4/L.682, Geneva: International Law Commission.
- Karlsson-Vinkhuyzen, S.I. and J. McGee (2013), Legitimacy in an era of fragmentation: the case of global climate governance, *Global Environmental Politics*, 13(3), 56–78.
- Karlsson-Vinkhuyzen, S.I. and H. van Asselt (2009), Introduction: exploring and explaining the Asia-Pacific Partnership on Clean Development and Climate, *International Environmental Agreements*, 9(3), 195–211.
- Keohane, R.O. and D.G. Victor (2011), The regime complex for climate change, *Perspectives on Politics*, 9(1), 7–23.
- Kim, R.E. and B. Mackey (2013), International environmental law as a complex adaptive system, *International Environmental Agreements*, 14(1), 5–24.
- Koskenniemi, M. and P. Leino (2002), Fragmentation of international law? Postmodern anxieties, *Leiden Journal of International Law*, 15(3), 553–579.

- McGee, J. and R. Taplin (2006), The Asia-Pacific Partnership on Clean Development and Climate: a complement or competitor to the Kyoto Protocol?, *Global Change, Peace and Security*, **18**(3), 173–192.
- Oberthür, S. (2009), Interplay management: enhancing environmental policy integration among international institutions, *International Environmental Agreements*, **4**(4), 371–391.
- Oberthür, S. and T. Gehring (eds) (2006), *Institutional Interaction in Global Environmental Governance. Synergy and Conflict among International and EU Policies*, Cambridge, MA: MIT Press.
- Oberthür, S. and J. Pożarowska (2013), Managing institutional complexity and fragmentation: the Nagoya Protocol and the global governance of genetic resources, *Global Environmental Politics*, **13**(3), 100–118.
- Oberthür, S. and O.S. Stokke (eds) (2011), *Managing Institutional Complexity: Regime Interplay and Global Environmental Change*, Cambridge, MA: MIT Press.
- Orsini, A. (2013), Institutional fragmentation and the influence of ‘multi-forum’ non-state actors: navigating the regime complexes for forestry and genetic resources, *Global Environmental Politics*, **13**(3), 34–55.
- Orsini, A., J.-F. Morin and O. Young (2013), Regime complexes: a buzz, a boom, or a boost for global governance?, *Global Governance*, **19**(1), 27–39.
- Ostrom, E. (2010), Polycentric systems for coping with collective action and global environmental change, *Global Environmental Change*, **20**(4), 550–557.
- Pauwelyn, J. (2003), *Conflict of Norms in Public International Law: How WTO Law Relates to Other Rules of International Law*, Cambridge: Cambridge University Press.
- Raustiala, K. and D.G. Victor (2004), The regime complex for plant genetic resources, *International Organization*, **58**(2), 277–309.
- Rittberger, V. and M. Zürn (1990), Towards regulated anarchy in east-west relations. causes and consequences of east-west regimes, in V. Rittberger (ed.), *International Regimes in East–West Politics*, London: Pinter, pp. 9–63.
- Rosendal, G.K. (2001), Impacts of overlapping international regimes: the case of biodiversity, *Global Governance*, **7**(1), 95–117.
- Selin, H. and S.D. VanDeveer (2003), Mapping institutional linkages in european air pollution politics, *Global Environmental Politics*, **3**(3), 14–46.
- Stokke, O.S. (2001), *The Interplay of International Regimes: Putting Effectiveness Theory to Work?*, FNI Report 10/2001, Lysaker: Fridtjof Nansen Institute.
- Stokke, O.S. (2012), *Disaggregating International Regimes: A New Approach to Evaluation and Comparison*, Cambridge, MA: MIT Press.
- Underdal, A. (2006), *Determining the Causal Significance of Institutions. Accomplishments and Challenges*, paper prepared for the Institutional Dimensions of Global Environmental Change Project Synthesis Conference, Nusa Dua, Bali, Indonesia, December 6–9.
- van Asselt, H. (2012), Managing the fragmentation of international law: forests at the intersection of the climate and biodiversity regimes, *New York University Journal of International Law and Politics*, **44**(4), 1205–1278.
- van Asselt, H. (2014), *The Fragmentation of Global Climate Governance: Consequences and Management of Regime Interactions*, Cheltenham and Northampton, MA: Edward Elgar Publishing.
- van Asselt, H. and F. Zelli (2013), Connect the dots: managing the fragmentation of global climate governance, *Environmental Economics and Policy Studies*, **16**(2), 137–155.
- Van de Graaf, T. (2013), Fragmentation in global energy governance: explaining the creation of IRENA, *Global Environmental Politics*, **13**(3), 14–33.
- Widerberg, O. (2014), *Mapping Institutions and Actors in Global Climate Governance: A Network Approach*, presented at the General Conference of the European Consortium for Political Research, Glasgow, September 3–6.
- Young, M.A. (2013), *Trading Fish, Saving Fish: The Interaction between Regimes in International Law*, Cambridge: Cambridge University Press.
- Young, O.R. (1996), Institutional linkages in international society: polar perspectives, *Global Governance*, **2**(1), 1–24.
- Young, O.R. (2002), *The Institutional Dimension of Environmental Change: Fit, Interplay and Scale*, Cambridge, MA: MIT Press.
- Young, O.R. (2008), Deriving insights from the case of the WTO and the Cartagena Protocol, in O.R. Young, W.B. Chambers, J.A. Kim and C. ten Have (eds), *Institutional Interplay: Biosafety and Trade*, Tokyo: United Nations University Press, pp. 131–158.
- Zelli, F. (2010), *Conflicts among International Regimes on Environmental Issues: A Theory-Driven Analysis*, Tübingen: Eberhard-Karls University.
- Zelli, F. (2011a), The fragmentation of the global climate governance architecture, *WIREs Climate Change*, **2**(2), 255–270.
- Zelli, F. (2011b), Regime conflicts and their management in global environmental governance, in S. Oberthür

- and O.S. Stokke (eds), *Managing Institutional Complexity: Regime Interplay and Global Environmental Change*, Cambridge, MA: MIT Press, pp. 199–226.
- Zelli, F. and H. van Asselt (2013), Introduction: the institutional fragmentation of global environmental governance—causes, consequences and responses, *Global Environmental Politics*, **13**(3), 1–13.
- Zelli, F., A. Gupta and H. van Asselt (2013), Institutional interactions at the crossroads of trade and environment: the dominance of liberal environmentalism?, *Global Governance*, **19**(1), 105–118.
- Zürn, M. and B. Faude (2013), On fragmentation, differentiation and coordination, *Global Environmental Politics*, **13**(3), 119–130.

Further recommended literature

- Chambers, W.B. (2008), *Interlinkages and the Effectiveness of Multilateral Environmental Agreements*, Tokyo: United Nations University Press.
- Hale, T. and C. Roger (2013), Orchestration and transnational climate governance, *Review of International Organizations*, **9**(1), 59–82.
- Young, M.A. (ed.) (2012), *Regime Interaction in International Law: Facing Fragmentation*, Cambridge: Cambridge University Press.
- Zelli, F. and H. van Asselt (eds) (2013), The institutional fragmentation of global environmental governance, special issue of *Global Environmental Politics*.

61 Millennium development goals and sustainable development goals

Definitions

The Millennium Development Goals (MDGs), as a global agreement to reduce poverty and to improve human livelihoods, should have been met by 2015; the Sustainable Development Goals (SDGs) are likely to follow them as future goals, being a central part of a broader United Nations (UN) post-2015 development agenda.

The MDGs define—mostly by indicators, base year and target year—what development progress the international community aspired to achieve by 2015. The eight goals with 21 targets and 90 indicators cover a wide array of issues. Their main focus is on eradicating extreme POVERTY and hunger, as formulated in MDG1. MDG1 is also very relevant to environmental governance because—as Indira Gandhi stated at the first UN Conference on the Human Environment (UNCHE) in Stockholm 1972—poverty is the biggest polluter. At the same time, environmental threats such as CLIMATE CHANGE undermine development efforts and affect the poor first. Well-defined policies for environmental protection could support poverty reduction, while the lack thereof may exacerbate poverty. Three of the MDGs deal with HEALTH issues, i.e., reducing child mortality (MDG4), improving maternal health (MDG5) and combating the human immunodeficiency virus infection/acquired immunodeficiency syndrome (HIV/AIDS), malaria and other diseases (MDG6). One goal focuses explicitly on environmental sustainability (MDG7) (see Table 61.1).

MDG8 calls for a global partnership for development, including more effective official development assistance, fairer TRADE rules and better market access, more sustainable debt relief and better access to essential drugs as well as new information and communication technologies. MDG8 stands out as its focus is on means (instead of ends) and it is the only goal that includes targets for industrialized countries.

The outcome document of the Rio+20 or the United Nations Conference on Sustainable Development (UNCSD), which was adopted at the end of June 2012, proposes developing a set of SDGs. During 2014, this new set of goals has been negotiated