

ROUTLEDGE STUDIES IN
ECOLOGICAL ECONOMICS

Ecology and Power

Struggles over land and material
resources in the past, present, and
future

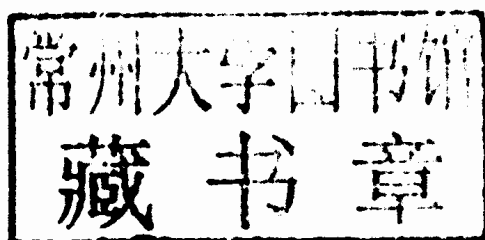
Edited by
Alf Hornborg, Brett Clark, and
Kenneth Hermele



Ecology and Power

Struggles over land and material resources
in the past, present, and future

**Edited by Alf Hornborg, Brett Clark,
and Kenneth Hermele**



First published 2012
by Routledge
2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN

Simultaneously published in the USA and Canada
by Routledge
711 Third Avenue, New York, NY 10017

Routledge is an imprint of the Taylor & Francis Group, an informa business

© 2012 Selection and editorial material, Alf Hornberg, Brett Clark, and
Kenneth Hermele; individual chapters, the contributors

The right of Alf Hornberg, Brett Clark, and Kenneth Hermele to be
identified as the authors of the editorial material, and of the authors for
their individual chapters, has been asserted in accordance with sections 77
and 78 of the Copyright, Designs and Patents Act 1988.

All rights reserved. No part of this book may be reprinted or reproduced or
utilized in any form or by any electronic, mechanical, or other means, now
known or hereafter invented, including photocopying and recording, or in
any information storage or retrieval system, without permission in writing
from the publishers.

Trademark notice: Product or corporate names may be trademarks or
registered trademarks, and are used only for identification and explanation
without intent to infringe.

British Library Cataloguing in Publication Data

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

Library of Congress Cataloging in Publication Data

Ecology and power : struggles over land and material resources in the
past, present and future / edited by Alf Hornborg, Brett Clark and
Kenneth Hermele.

p. cm.

1. Sustainable development. 2. Ecology—Economic aspects.

3. Human ecology. 4. Natural resources—Environmental aspects.

5. Natural resources—Political aspects. I. Hornborg, Alf. II. Clark, Brett.

III. Hermele, Kenneth, 1948–

HC79.E5E257 2012

333.7—dc23

2011040936

ISBN: 978-0-415-60146-7 (hbk)

ISBN: 978-0-203-12281-5 (ebk)

Typeset in Times New Roman

by Wearset Ltd, Boldon, Tyne and Wear

Ecology and Power

Power and social inequality shape patterns of land use and resource management. This book explores this relationship from different perspectives, illuminating the complexity of interactions between human societies and nature. Most of the contributors use the perspective of “political ecology” as a point of departure, recognizing that human relations to the environment and human social relations are not separate phenomena but inextricably intertwined. What makes this volume unique is that it sets this approach in a trans-disciplinary, global, and historical framework.

The twenty-six contributors represent a spectrum of academic fields including anthropology, sociology, geography, economics, economic history, historical archaeology, human ecology, development studies, and sustainability science. In presenting local case studies from all over the world, the contributors develop a global understanding of these politicized environments. They generally apply a broadly conceived world-system approach to issues of land use, resource management, and environmental change. Examples discussed in this book include the cultivation of various crops such as wheat, rice, sorghum, coffee, sugarcane, *Jatropha*, and safflower; the raising of livestock such as llamas and cattle; and other extractive activities such as forestry, mining, energy production, and the trade in guano and ivory.

The volume also adds a deep historical dimension to political ecology. Collectively, it argues that a long-term, historical understanding of how local and global power struggles shape the trajectories of human–environmental relations is crucial to the emergent field of political ecology. This point applies, for example, to the past two centuries of fossil-fuelled capitalism, during which human dependency on land appears to have become less tangible than in pre-industrial times. Against this background, several chapters discuss the implications of the anticipated return to biofuels, which would transform the rationality of conventional land use and regenerate contradictions between food and energy production in regions of the world that have largely been spared such contradictions over the past two centuries.

Alf Hornborg is Professor in the Human Ecology Division at Lund University, Sweden.

Brett Clark is Assistant Professor of Sociology at North Carolina State University, USA.

Kenneth Hermele is a PhD candidate in the Human Ecology Division at Lund University, Sweden.

Contributors

Cristián Alarcón Ferrari (PhD candidate at the Department of Rural and Urban Development, Swedish University of Agricultural Sciences in Uppsala, Sweden) is completing doctoral work in Environmental Communication with a focus on the political ecology and political economy of forest sectors in Chile and Sweden. He has a background in Law and Social Sciences and received a Master's degree in Political Philosophy and Axiology from the University of Chile. He is one of the guest editors of the forthcoming special issue on forest policy in the *Scandinavian Journal of Forest Research*.

Lennart Bångens (PhD in Industrial Marketing at Chalmers University, Gothenburg, Sweden 1998) is Senior Researcher in Energy and Environment at Chalmers University of Technology, Gothenburg. He specializes in energy markets in East Africa. The interplay between local and foreign energy companies to develop sustainable energy systems has been a key focus.

Ragnheiður Bogadóttir is a PhD candidate in Human Ecology at the Human Ecology Division, Lund University, Sweden.

Brett Clark is Assistant Professor of Sociology at North Carolina State University, USA. His areas of interest are Ecology, Political Economy, and Science. His most recent books include *The Science and Humanism of Stephen Jay Gould* (with Richard York, Monthly Review Press, 2011) and *The Ecological Rift* (with John Bellamy Foster and Richard York, Monthly Review Press, 2010).

Eric Clark (PhD in Human Geography, Lund University 1987) is Professor of Human Geography at Lund University, Sweden. He has published on the political economy of space, in particular land rent, gentrification, and urban (re)development, and on island development issues. He has been editor of *Geografiska Annaler B* (1998–2008); he is also co-editor of *Identity Dynamics and the Construction of Boundaries* (Nordic Academic Press, 2003) and guest editor of theme issues of *Cultural Geographies* (Islandings Cultural Geographies, 2011), *Geografiska Annaler B* (Coevolution, 2011; Nature–Society Interactions on Islands, 2003), *European Planning Studies* (Creativity and Cost in Urban and Regional Development in the “New Economy”, 2001) and *Geoforum* (Globalizing Cities, 2000).

John Bellamy Foster is Professor of Sociology at the University of Oregon, USA and editor of *Monthly Review*. His books on ecology include *The Vulnerable Planet* (1994), *Marx's Ecology* (2000), *Ecology Against Capitalism* (2002), *The Ecological Revolution* (2009), *The Ecological Rift* (with Brett Clark and Richard York, 2010), and *What Every Environmentalist Should Know About Capitalism* (with Fred Magdoff, 2011) – all published by Monthly Review Press. He is a recipient of the Distinguished Contribution Award (the career award) from the Environment and Technology Section of the American Sociological Association.

Pernille Gooch (PhD in Social Anthropology, Lund University) is Senior Lecturer and Researcher in Human Ecology at Lund University, Sweden. Her main focus of research is the political ecology of pastoralist human–environmental relations in the Indian Himalayas. Other issues dealt with include gender, peasants, water, and climate change. She has published widely on the Van Gujjar pastoralists and is the author of *At the Tail of the Buffalo: Van Gujjar Pastoralists between the Forest and the World Arena*, and co-editor of *Sustainable Pastoralism in the Himalayas*.

N. Thomas Håkansson is a Cultural Anthropologist and Professor of Rural Development at the Swedish University of Agricultural Sciences, Sweden. He specializes in economic anthropology and long-term changes in the political ecology of intensive cultivation. Håkansson has done extensive field and archival research on the emergence and maintenance of irrigation and permanent agriculture in pre-colonial and colonial Kenya and Tanzania.

Kenneth Hermele holds a Bachelor's degree in Economics (Stockholm School of Economics 1972) and is presently a PhD candidate in Human Ecology, Lund University, Sweden. His publications in Swedish have dealt with development economics, the international financial system and its recurrent crises, Swedish development aid policies, and ecological economics. He is co-author of *A Blighted Harvest: The World Bank and African Agriculture in the 1980s* (James Curry, 1993).

Alf Hornborg (PhD in Cultural Anthropology, Uppsala University 1986) is Professor of Human Ecology at Lund University, Sweden. He has published widely on the cultural and political dimensions of human–environmental relations in past and present societies, particularly from the perspective of world-system analysis and global environmental history. He is the author of *The Power of the Machine* (AltaMira, 2001) and *Global Ecology and Unequal Exchange* (Routledge, 2011) and lead editor of *Rethinking Environmental History* (AltaMira, 2007), *The World System and the Earth System* (Left Coast Press, 2007), *International Trade and Environmental Justice* (Nova Science Publishers, 2010), and *Ethnicity in Ancient Amazonia* (University Press of Colorado, 2011).

Anne Jerneck (PhD in Economic History, Lund University 1995) is Associate Professor of Sustainability Science at Lund University, Sweden. Her research interests include development theory, institutional change, inequality and gender, primarily in transitional and developing societies. She has published on the role of the state and gender inequalities in Vietnam's transition from plan to market, (un)sustainable livelihoods in subsistence farming in Kenya and research methodology in sustainability science. She is co-author of a textbook on politics and development in a globalized world.

Ulf Jonsson is Professor (Emeritus) at the Department of Economic History, Stockholm University, Sweden. The main focus of his research over the decades is the globalization of agriculture and food, ranging from the international division of agricultural labor to small-scale, niche production as a reaction and a defensive strategy of small farmers facing global forces threatening their existence.

Andrew K. Jorgenson (PhD in Sociology, University of California Riverside 2004) is Associate Professor of Sociology at the University of Utah, USA. He has published extensively on the political economy of global environmental change, with research articles appearing in dozens of scholarly journals, including the *American Journal of Sociology*, *Social Problems*, *Social Forces*, *Social Science Research*, *International Sociology*, *Rural Sociology*, *Global Environmental Politics*, *Ecological Economics*, *Organization & Environment*, *Population & Environment*, *Society & Natural Resources*, and *Human Ecology Review*.

Bengt G. Karlsson (PhD in Cultural Anthropology, Uppsala University 1997) is Associate Professor of Social Anthropology at Stockholm University, Sweden. He has been engaged in research on issues concerning the environment, ethnic politics, and indigenous peoples' movements in India during the last two decades. He is the author of two monographs, *Contested Belonging: An Indigenous People's Struggle for Forest and Identity in Sub-Himalayan India* (Routledge, 2000) and *Unruly Hills: A Political Ecology of India's Northeast* (Berghahn Books, 2011), and editor of *Human Rights: Anthropological Perspectives* (Earthworm Books, 2005) and (with T.B. Subba) *Indigeneity in India* (Kegan Paul, 2006).

Andreas Malm is a PhD candidate in Human Ecology at Lund University, Sweden. His main research interest is the role of fossil fuels in capitalist development. Before turning to academia, he was a writer and journalist; he is the author, co-author, or lead author of nine books on the Middle East, Islamophobia, and the political economy of imperialism and climate change, one of which is in English: *Iran on the Brink: Rising Workers and Threats of War* (Pluto Press, 2007, co-authored with Shora Esmailian).

Mats Mogren (PhD in Medieval Archaeology, Lund University 2000) is Lecturer in Historical Archaeology at Lund University, Sweden. Apart from

many years of research on medieval and early modern Scandinavia, he has been working on the colonial impact on Sri Lanka. He is working on books on the archaeology of globalization and on landscape transformations in the plantation areas of Sri Lanka.

Janken Myrdal is Professor of Agrarian History, Swedish University of Agricultural Sciences, Uppsala, Sweden. He has written several books on the medieval history of Scandinavia and the agricultural history of Sweden. He is the main editor of the five-volume *The Agrarian History of Sweden* (in Swedish 1998–2003), and author of the volume on the Middle Ages and the early modern period. This has been published in an abbreviated form as the one-volume *The Agrarian History of Sweden* (Nordic Academic Press, 2010).

E. Gunilla A. Olsson (PhD in Plant Ecology, Lund university 1984) is Professor of Human Ecology at the University of Gothenburg, Sweden. She has been working on biodiversity conservation and landscape ecology issues in agro-ecosystems and cultural landscapes in different parts of the world. Core interests are aspects of land use and ecosystem services related to the sustainability of local and global ecosystems.

Lennart Olsson (PhD in Physical Geography, Lund University 1986) is Professor of Geography at Lund University, Sweden and the founding Director of LUCSUS – Lund University Centre for Sustainability Studies. His research fields include human–nature interactions in the context of land degradation, climate change, and food security in Africa and globally. His current research focuses on the politics of climate change in the context of poverty and food security. He has had research positions in Australia, the United States, and Hong Kong and participated in several international assignments including the IPCC and UNEP-GEO assessment reports. He is currently coordinating lead author for the chapter on livelihoods and poverty in the *Fifth Assessment Report of the IPCC*.

Wilhelm Östberg (PhD in Social Anthropology, Stockholm University 1995) is Associate Professor and Research Fellow at the Department of Human Geography, Stockholm University, Sweden. He has published principally in two fields: natural resource management in East Africa, and African art. He is the author of *The Kondoa Transformation: Coming to Grips with Soil Erosion in Central Tanzania* (Scandinavian Institute of African Studies, 1986), *Ramblings on Soil Conservation* (SIDA, 1987), *Land is Coming Up: The Burunge of Central Tanzania and Their Environments* (Stockholm University, 1995), and editor of *Whose Objects? Art Treasures from the Kingdom of Benin* (Museum of Ethnography, Stockholm, 2010).

Susan Paulson (PhD in Anthropology, University of Chicago 1992) is Hedda Andersson Guest Professor of Human Ecology at Lund University, Sweden, and Professor of Anthropology and Latin American Studies at Miami University, USA. Paulson has enjoyed many years of research in highland

and lowland Latin America, studying the intersection of race, class, and gender with environmental issues. She is principal author/editor of books including *Political Ecology across Spaces, Scales, and Social Groups* (Rutgers University Press, 2004), *Huellas de género en el mar, el parque y el páramo* (Abya Yala, 2009), and *Desigualdad social y degradación ambiental en América Latina* (Abya Yala, 1998).

Michael J. Sheridan (PhD in Sociocultural Anthropology, Boston University 2001) is Associate Professor of Anthropology at Middlebury College, Vermont, USA. His work focuses on the politics of forestry, irrigation, and environmental management in East Africa, with particular attention to the symbolic aspects of political ecology. He co-edited *African Sacred Groves* (James Currey, 2008) on the intersections of religion and conservation.

Huei-Min Tsai (PhD in Geography, National Taiwan University 1999) is Associate Professor of Environmental Education at National Taiwan Normal University, Taiwan. She has published on nature–society co-evolution on islands, small-island sustainability issues, and environmental history in global/local perspectives. She is editor of *Sustainable Development for Island Societies: Taiwan and the World* (Academia Sinica, 2002), *Changing Islands, Changing Worlds: Proceedings of Islands of the World VIII* (2004), *Island Geographies: Proceedings of the Inaugural Meeting of the IGU Commission on Islands* (2007), and guest editor of theme issues of *Geografiska Annaler B* (Nature–Society Interactions on Islands, 2003), *Journal of Environmental Education Research* (Local Sustainability Issues in Taiwan, 2005), and *Asia-Pacific Forum* (Island Environmental Histories and Management in the Asia Pacific Region, 2009).

Marie Widengård is a PhD student in Human Ecology at the School of Global Studies at Gothenburg University, Sweden. She is currently analyzing the issue of agrofuels, particularly from the Foucauldian perspective of governmentality.

Mats Widgren (PhD in Human Geography, Stockholm University 1983) is Professor of Geography at Stockholm University, Sweden. He has researched landscape history from a social science perspective in Sweden, Botswana, Kenya, South Africa, and in a global context. He is the author of *Settlement and Farming Systems in the Early Iron Age* (Almqvist & Wiksell, 1983) and lead editor (with John Sutton) of *Islands of Intensive Agriculture in Eastern Africa: Past and Present* (James Currey, 2004).

Richard York is Associate Professor of Sociology and Environmental Studies, Director of Graduate Studies of Sociology, and the Richard A. Bray Faculty Fellow at the University of Oregon, USA, and co-editor of the Sage journal *Organization & Environment*. His research examines the anthropogenic forces driving environmental degradation and the philosophy, history, and sociology of science. He has published over 50 articles, including ones in

American Sociological Review, *Conservation Biology*, *Sociological Theory*, and *Theory and Society*. He has published three books with Monthly Review Press: *The Critique of Intelligent Design* and *The Ecological Rift*, both with John Bellamy Foster and Brett Clark, and *The Science and Humanism of Stephen Jay Gould* with Brett Clark. He has twice (2004 and 2007) received the Outstanding Publication Award and once (2011) the Honorable Mention for the same award from the Environment and Technology Section (ETS) of the American Sociological Association (ASA). He has also received the Teaching and Mentorship Award (2011) from the ETS of the ASA.

Taylor & Francis

eBooks

FOR LIBRARIES

ORDER YOUR
FREE 30 DAY
INSTITUTIONAL
TRIAL TODAY!

Over 23,000 eBook titles in the Humanities, Social Sciences, STM and Law from some of the world's leading imprints.

Choose from a range of subject packages or create your own!

Benefits for you

- ▶ Free MARC records
- ▶ COUNTER-compliant usage statistics
- ▶ Flexible purchase and pricing options

Benefits for your user

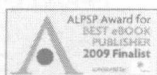
- ▶ Off-site, anytime access via Athens or referring URL
- ▶ Print or copy pages or chapters
- ▶ Full content search
- ▶ Bookmark, highlight and annotate text
- ▶ Access to thousands of pages of quality research at the click of a button

For more information, pricing enquiries or to order a free trial, contact your local online sales team.

UK and Rest of World: online.sales@tandf.co.uk

US, Canada and Latin America:
e-reference@taylorandfrancis.com

www.ebooksubscriptions.com



Taylor & Francis eBooks
Taylor & Francis Group



A flexible and dynamic resource for teaching, learning and research.

Routledge studies in ecological economics

1 Sustainability Networks

Cognitive tools for expert collaboration in social-ecological systems

Janne Hukkinen

2 Drivers of Environmental Change in Uplands

Aletta Bonn, Tim Allot, Klaus Hubacek, and Jon Stewart

3 Resilience, Reciprocity and Ecological Economics

Northwest coast sustainability

Ronald L. Trosper

4 Environment and Employment

A reconciliation

Philip Lawn

5 Philosophical Basics of Ecology and Economy

Malte Faber and Reiner Manstetten

6 Carbon Responsibility and Embodied Emissions

Theory and measurement

João F.D. Rodrigues, Alexandra P.S. Marques, and Tiago M.D. Domingos

7 Environmental Social Accounting Matrices

Theory and applications

Pablo Martínez de Anguita and John E. Wagner

8 Greening the Economy

Integrating economics and ecology to make effective change

Bob Williams

9 Sustainable Development

Capabilities, needs, and well-being

Edited by Felix Rauschmayer, Ines Omann, and Johannes Fröhmann

- 10 The Planet in 2050**
The Lund discourse of the future
Edited by Jill Jäger and Sarah Cornell
- 11 Bioeconomics**
Edited by Mauro Bonaiuti
- 12 Socioeconomic and Environmental Impacts on Agriculture in the New Europe**
Post-Communist transition and accession to the European Union
S. Serban Scrieciu, Takayoshi Shinkuma, and Shusuke Managi
- 14 Global Ecology and Unequal Exchange**
Fetishism in a zero-sum world
Alf Hornborg
- 15 The Metabolic Pattern of Societies**
Where economists fall short
Mario Giampietro, Kozo Mayumi, and Alevgül H. Sorman
- 16 Energy Security for the EU in the 21st Century**
Markets, geopolitics and corridors
Edited by José María Marín-Quemada, Javier García-Verdugo, and Gonzalo Escribano
- 17 Hybrid Economic-Environmental Accounts**
Edited by Valeria Costantini, Massimiliano Mazzanti, and Anna Montini
- 18 Ecology and Power**
Struggles over land and material resources in the past, present, and future
Edited by Alf Hornborg, Brett Clark, and Kenneth Hermele

Contents

<i>List of contributors</i>	x
Introduction: ecology and power	1
ALF HORNBERG, BRETT CLARK, AND KENNETH HERMELE	
PART I	
Theoretical perspectives on historical political ecology	11
1 Accumulation: land as a medium of domination	13
ALF HORNBERG	
2 Techno-fix: ecological rifts and capital shifts	23
BRETT CLARK AND RICHARD YORK	
3 Empire: the comparative study of imperialism	37
JANKEN MYRDAL	
4 Islands: ecologically unequal exchange and landesque capital	52
ERIC CLARK AND HUEI-MIN TSAI	
5 Guano: the global metabolic rift and the fertilizer trade	68
BRETT CLARK AND JOHN BELLAMY FOSTER	
6 Fleece: imperial metabolism in the pre-Columbian Andes	83
RAGNHEIÐUR BOGADÓTTIR	
7 Slaves: inequality and sustainable agriculture in pre-colonial West Africa	97
MATS WIDGREN	

8 Steam: nineteenth-century mechanization and the power of capital	108
ANDREAS MALM	
9 Ivory: socio-ecological consequences of the East African ivory trade	124
N. THOMAS HÅKANSSON	
10 Lawns: botanical garden design as colonial domination	143
MATS MOGREN	
PART II	
Struggles over material resources in the modern world	153
11 Footprints: the division of nations and nature	155
ANDREW K. JORGENSEN AND BRETT CLARK	
12 Water: irrigation and resilience in the Tanzanian highlands	168
MICHAEL J. SHERIDAN	
13 Meat: the new geopolitics of food	182
ULF JONSSON	
14 Trees: conflicts between pastoralists, loggers and conservationists in the Himalayas	194
PERNILLE GOOCH	
15 Grass: from local pastures to global energy markets in eastern Tanzania	206
E. GUNILLA A. OLSSON AND LENNART BÄNGENS	
16 Forests: capital accumulation, climate change and crises in Chile and Sweden	217
CRISTIÁN ALARCÓN FERRARI	
17 <i>Jatropha</i>: a magic bullet filled with oil	228
MARIE WIDENGÅRD	
18 Atoms: nuclear estrangement from Chernobyl to India	239
BENGT G. KARLSSON	
19 Safflower: liberalisation or participation in a Tanzanian village	250
WILHELM ÖSTBERG	

20	Land-claims: racialized environmental struggles in Latin America	262
	SUSAN PAULSON	
21	Smoke: cooking, coughing and collective action in Kenya	274
	ANNE JERNECK AND LENNART OLSSON	
22	Sugarcane: agrofuels and conflicting land uses in Brazil	285
	KENNETH HERMELE	
	<i>Index</i>	300

Introduction

Ecology and power

Alf Hornborg, Brett Clark, and Kenneth Hermele

Power and social inequality shape patterns of land use and resource management. This book explores this relationship from different perspectives, illuminating the complexity of interactions between human societies and nature. Most of the contributors use the perspective of “political ecology” as a point of departure, recognizing that human relations to the environment and human social relations are not separate phenomena but inextricably intertwined (Peet and Watts 1996; Bryant and Bailey 1997; Low and Gleeson 1998; Paulson and Gezon 2005; Biersack and Greenberg 2006; Peet *et al.* 2011). What makes this volume unique is that it sets this approach in a trans-disciplinary, global, and historical framework.

The 26 contributors represent a spectrum of academic fields including anthropology, sociology, geography, economics, economic history, historical archaeology, human ecology, development studies, and sustainability science. They have been recruited from two international research networks recently established by the Human Ecology Division, Lund University, Sweden. The first network includes participants in the international conference *Ecology & Power: Critical Perspectives on Sustainability and Resilience*, organized and hosted by the Human Ecology Division on September 17–19, 2008, with most of the funding from the Bank of Sweden Tercentenary Foundation. The second network involves participants in the research project *Power, Land, and Materiality: Global Studies in Historical Political Ecology as a Framework for Assessing Policies for “Sustainable Development”*, funded by the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (FORMAS). What unites all these researchers from various disciplines is the recognition that power asymmetries and social inequalities shape patterns of land use and the management of natural resources. Together, they apply a variety of interconnected perspectives to this core theme of political ecology. Whether applying concepts and methods of economic historians, sociologists, or geographers, the authors demonstrate how human interactions with the land are intertwined with global, regional, or local power structures. They analyze phenomena that range from the asymmetries of global capitalism, international trade, and empires to the politics of development, ethnic divisions, and even household organization. The spectrum of approaches represented in this book thus