

THE GIVE AND TAKE OF SUSTAINABILITY

Sustainability strives to meet the needs of the present without compromising the future, but increasingly recognizes the tradeoffs among these many needs. Who benefits? Who bears the burden? How are these difficult decisions made? Are people aware of these hard choices? This timely volume brings the perspectives of ethnography and archaeology to bear on these questions by examining case studies from around the world.

Written especially for this volume, the essays by an international team of scholars offer archaeological and ethnographic examples from the southwestern United States, the Maya region of Mexico, Africa, India, and the North Atlantic, among other regions. Collectively, they explore the benefits and consequences of growth and development, the social costs of ecological sustainability, and tensions between food and military security.

MICHELLE HEGMON has dedicated her career to expanding the reach of archaeology, drawing insights from her own research in the Mimbres region of the US Southwest. She has contributed to archaeological theory, the study of style and ceramics, gender research, and social perspectives on ecology. Currently, she is developing a new paradigm, the Archaeology of the Human Experience (AHE), concerned with understanding what it was actually like to live in the past that archaeologists study. The study of tradeoffs, the hard choices people have to make, is part of that AHE perspective.

NEW DIRECTIONS IN SUSTAINABILITY AND SOCIETY

Series Editors:

CHRISTOPHER BOONE
Arizona State University
 NORMAN YOFFEE
University of Michigan

Editorial Board:

KATRINA BROWN
University of Exeter
 STEWARD PICKETT
Cary Institute
 STEPHANIE PINCETL
 UCLA
 VERNON SCARBOROUGH
University of Cincinnati
 KAREN SETO
Yale University
 DAN SHILLING
Amerind Museum and Research Center

WILLIAM SOLECKI
Hunter College
 CHRISTINE SZUTER
Amerind Museum and Research Center
 KAZUHIKO TAKEUCHI
University of Tokyo
 BILLIE LEE TURNER
Arizona State University
 SANDER VAN DER LEEUW
Arizona State University
 RICHARD WILK
Indiana University

Published in conjunction with the School of Sustainability at Arizona State University and The Amerind Museum and Research Center in Dragoon, Arizona, *New Directions in Sustainability and Society* features a program of books that focus on designing a resilient and sustainable future through a rich understanding of past and present social and ecological dynamics. Collectively, they demonstrate that sustainability research requires engagement with a range of fields spanning the social and natural sciences, humanities, and applied sciences. Books in the series show that a successful transition to a sustainable future will depend on the ability to apply lessons from past societies and link local action to global processes.

For more information about the series, please visit <http://newdirections.asu.edu/>.

Title in the Series:

SUSTAINABILITY IN THE GLOBAL CITY Edited by Cindy Isenhour, Gary McDonogh, Melissa Checker.

The Give and Take of Sustainability

Archaeological and Anthropological Perspectives
on Tradeoffs

Edited by

MICHELLE HEGMON

Arizona State University



Cambridge University Press
978-1-107-07833-8 — The Give and Take of Sustainability
Edited by Michelle Hegmon
Frontmatter
[More Information](#)

CAMBRIDGE UNIVERSITY PRESS

One Liberty Plaza, New York, NY 10006, USA

Cambridge University Press is part of the University of Cambridge.

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

www.cambridge.org

Information on this title: www.cambridge.org/9781107078338

DOI: 10.1017/9781139939720

© Cambridge University Press 2017

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

First published 2017

Printed in the United States of America by Sheridan Books, Inc.

A catalogue record for this publication is available from the British Library.

ISBN 978-1-107-07833-8 Hardback

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

Contents

<i>List of Figures</i>	<i>page</i> vii
<i>List of Tables</i>	ix
<i>List of Contributors</i>	xi
<i>Preface</i>	xv
1. Introduction: Multiple Perspectives on Tradeoffs	1
<i>MICHELLE HEGMON</i>	
2. Diversity, Reciprocity, and the Emergence of Equity-Inequity Tradeoffs	26
<i>JACOB FREEMAN, ANDREA TORVINEN, BEN A. NELSON, AND JOHN M. ANDERIES</i>	
3. Modeling Tradeoffs in a Rural Alaska Mixed Economy: Hunting, Working, and Sharing in the Face of Economic and Ecological Change	52
<i>SHAUNA B. BURNSILVER, RANDALL B. BOONE, GARY P. KOFINAS, AND TODD J. BRINKMAN</i>	
4. Trading off Food and Military Security in Contact-Era New Guinea	84
<i>PAUL ROSCOE</i>	
5. Will Agricultural Technofixes Feed the World? Short- and Long-Term Tradeoffs of Adopting High-Yielding Crops	109
<i>AMANDA L. LOGAN</i>	
6. Tradeoffs in Pre-Columbian Maya Water Management Systems: Complexity, Sustainability, and Cost	125
<i>CHRISTIAN ISENDAHL AND SCOTT HECKBERT</i>	

7. Growth and Inter-Generational Tradeoffs: Archaeological Perspectives from the Mimbres Region of the US Southwest. . . .	148
<i>MICHELLE HEGMON</i>	
8. Vulnerability to Food Insecurity: Tradeoffs and Their Consequences	172
<i>MARGARET C. NELSON, ANN P. KINZIG, JETTE ARNEBORG, RICHARD STREETER, AND SCOTT E. INGRAM</i>	
9. Tradeoffs in Coast Salish Social Action: Balancing Autonomy, Inequality, and Sustainability.	198
<i>COLIN GRIER AND BILL ANGELBECK</i>	
10. Tradeoffs and Human Well-Being: Achieving Sustainability in the Faroe Islands	222
<i>SETH D. BREWINGTON</i>	
11. Household- vs. National-Scale Food Storage: Perspectives on Food Security from Archaeology and Contemporary India. . .	244
<i>KATHERINE A. SPIELMANN AND RIMJHIM M. AGGARWAL</i>	
12. Some Analytical Tradeoffs of Talking about Tradeoffs: On Perspectives Lost in Estimating the Costs and Benefits of Inequality	272
<i>ALF HORNBERG</i>	
<i>Index</i>	285

Figures

- 2.1. The northern frontier of Mesoamerica *page* 27
- 2.2. Maize and agave yield and survival rates in relation
 to rainfall. 34
- 2.3. Famine years versus mean rainfall. 39
- 2.4. Inter-group trust and famines, rainfall = 85. 41
- 2.5. Inter-group trust and famines, rainfall = 70. 43
- 3.1. Conceptual diagram of RASEM. 56
- 3.2. Log home in Venetie, Alaska. 57
- 3.3. Moose. 60
- 3.4. Screen shot of household network model for *Exploratory*
 Scenario. 62
- 3.5. *Exploratory* Scenario. 64
- 3.6. Households with wild food and stored food for scenarios 2–4. . . . 66
- 3.7. Standard deviation of stored food for scenarios 2–4. 68
- 4.1. Warrior dress. 88
- 4.2. Women crossing an old battlefield. 90
- 4.3. Nucleated settlements in the Ommura region. 90
- 4.4. Minimum time by density to rally to site of an attack. 92
- 4.5. The dispersed settlement pattern. 93
- 5.1. Location of Banda region. 116
- 6.1. The Maya Lowlands. 127
- 7.1. Mimbres Black-on-white pottery. 151
- 7.2. The suitability of land for agriculture across the
 Mimbres region. 156
- 7.3. Distribution of settlements during the Mimbres
 Classic period. 158
- 8.1. Vulnerability loads to food shortage for four cases. 179

8.2. Social change and food conditions following climate challenges.	180
8.3. North Atlantic Islands of Greenland, Iceland, and Faroes.	182
8.4. A Norse farm in the Eastern Settlement of Greenland.	183
8.5. Changes in vulnerability load over time in Greenland.	184
8.6. The Mimbres Region in southwest New Mexico.	186
8.7. Change in vulnerability to food shortage in the Mimbres region.	187
9.1. Coast Salish region.	199
9.2. Beach and intertidal lagoon areas.	206
9.3. Clam garden.	207
10.1. The Faroe Islands in the North Atlantic.	223
10.2. Timeline.	224
10.3. The rugged coastline of the Faroe Islands.	225
10.4. Hestur Village.	227
11.1. Annual variability in rainfall in the Salinas region.	251
11.2. Room Cluster 2 at Kiet Siel.	253
11.3. Public food distribution system in India.	259

Tables

3.1. Cumulative design of model scenarios	page 56
7.1. Parameters used to generate the agricultural suitability map . . .	157
8.1. Rare climate challenges	178
8.2. Changes in conditions for each of seven securities, Mimbres . . .	188
9.1. Cultural chronology for the Salish Sea region	203
10.1. Access to material and relational dimensions of well-being	233
11.1. Ethnographic household storage data, Sub-Saharan Africa	256
11.2. Ethnographic storage data, India	262
11.3. India state hunger index and marketed and marketable surplus	265

Contributors

Rimjhim M. Aggarwal

School of Sustainability, Arizona State University.

John M. Anderies

School of Human Evolution and Social Change and
School of Sustainability, Arizona State University.

Bill Angelbeck

Department of Anthropology and Sociology, Douglas College,
British Columbia.

Jette Arneborg

Department for Middle Ages, Renaissance and Numismatics,
National Museum of Denmark, Denmark.

Randall B. Boone

Department of Ecosystem Science and Sustainability,
Colorado State University.

Seth D. Brewington

Department of Anthropology, Hunter College,
City University of New York.

Todd J. Brinkman

Institute of Arctic Biology, University of Alaska Fairbanks.

Shauna BurnSilver

School of Human Evolution and Social Change, Arizona State University.

Jacob Freeman

Department of Sociology, Social Work and Anthropology, Utah State
University.

Colin Grier

Department of Anthropology, Washington State University.

Scott Heckbert

InnoTech Alberta, Edmonton, Alberta, Canada.

Michelle Hegmon

School of Human Evolution and Social Change,
Arizona State University.

Alf Hornborg

Human Ecology Division, Lund University, Sweden.

Scott E. Ingram

Department of Anthropology, Colorado College, Colorado Springs.

Christian Isendahl

Department of Historical Studies, University of Gothenburg,
Gothenburg, Sweden.

Ann P. Kinzig

School of Life Sciences and Julie Ann Wrigley Global Institute of
Sustainability, Arizona State University.

Gary P. Kofinas

School of Natural Resources and Extension and
The Institute of Arctic Biology, University of Alaska Fairbanks.

Amanda L. Logan

Department of Anthropology, Northwestern University.

Ben A. Nelson

School of Human Evolution and Social Change,
Arizona State University.

Margaret C. Nelson

School of Human Evolution and Social Change and Barrett Honors
College, Arizona State University.

Paul Roscoe

Department of Anthropology, University of Maine.

Katherine A. Spielmann

School of Human Evolution and Social Change,
Arizona State University.

List of Contributors

xiii

Richard Streeter

Department of Geography and Sustainable Development, University of
St Andrews, UK.

Andrea Torvinen

School of Human Evolution and Social Change, Arizona State University.

Preface

Tradeoffs are in the news almost daily, and most people experience many tradeoffs in their daily lives. As anthropologists (archaeologists who study the past and ethnographers who study living people) my colleagues and I see many tradeoffs in the situations we study. In some cases we can see people making difficult choices between two important goals; in other cases our long-term perspective allows us to see tradeoffs that develop over time, so that the benefits and losses cross generations. The goal of this volume is to share our insights about tradeoffs with a broader audience so that they may contribute to policy and decision making that affects today's world.

One of the joys of this work, the conference at the Amerind Foundation and the many, many conversations that followed, was the collaboration. So many of the ideas throughout this volume came out of that collaboration. This is especially the case for the introductory Chapter 1; although it was authored by me, it is truly a product of all of our collaborative work. All of the conference participants (including John Ware, then director of the Amerind Foundation, and Frances Hayashida, who attended but was unable to contribute a chapter) should share the credit. Alf Hornborg graciously contributed a post-conference concluding chapter that helped to round out this work, asking us to think about tradeoffs inherent in the very concept of tradeoffs.

This volume is part of the New Directions in Sustainability and Society series, organized and supported by the Global Institute of Sustainability at Arizona State University and the Amerind Foundation, under the guidance of Christopher Boone (Dean, School of Sustainability) and Norman Yoffee (Board of the Amerind Foundation). I am grateful for their guidance and

input every step of the way, from the formulation and revision of the proposal to the final manuscript. A number of anonymous reviewers also provided valuable input on the initial proposal and the final manuscript. And, on behalf of all of the participants, I offer many thanks to the staff at the Amerind Foundation, especially Deb Mechigian, for making us so comfortable and allowing us to focus on our work.