Sustainable Food Security in the Era of Local and Global Environmental Change

Mohamed Behnassi • Olaf Pollmann
Gabrielle Kissinger
Editors

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Springer

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ISBN 978-94-007-6718-8

ISBN 978-94-007-6719-5 (eBook)

DOI 10.1007/978-94-007-6719-5

Springer Dordrecht Heidelberg New York London

Library of Congress Control Number: 2013942262

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About the North–South Center for Social Sciences

The North–South Center for Social Sciences (NRCS) is a research institution founded by a group of researchers and experts from both Global South and North as an independent and apolitical institution. Based in Morocco, the NRCS aims to develop research and expertise in many social sciences areas with global and local relevance from a North–South perspective and an interdisciplinary approach. As a think tank, the NRCS aspires to serve as a reference locally and globally through rigorous research and active engagement with the policy community and decision-making processes. The NRCS is currently chaired by Mr. Mohamed Behnassi, Doctor Professor of Global Sustainability and Health Politics (www.nrcs-center.org).

Preface

Human activity is increasingly changing the global environment at an unprecedented rate while humanity is facing a range of complex and interrelated challenges: global warming, ecosystem disruption, biodiversity loss and, for many, increasing difficulty in meeting basic human needs for energy, food, water and shelter. As a result, environmental issues are inextricably linked to many aspects of local, regional and global development, and human security and politics.

A series of recent events have generated interest in food security and food systems, particularly the recent news coverage of high food prices which were variously blamed on biofuels, growing demand for meat and dairy products, commodity speculation and climate. Other arguments have arisen about the potential impacts of climate change on food availability and water – as the projections of climate change become even more serious – and about the role of integrated policy and governance in shaping food security. The price increases highlighted the connections between food systems in different places – e.g. drought in Australia and demand for meat in Asia, biofuel policy in the US and Latin America and between the local food movement in Europe and export farmers in Africa. The challenges facing food systems will accelerate in the coming decades, as the demand for food will double within the next 25–50 years, primarily in developing countries, and with the WTO agriculture talks in disarray, making options for reforming trade policy is highly contentious.

Food security and agricultural growth remain high on the science, policy and development agendas. Most research linking global change and food systems focuses solely on the impact of climate change on agricultural production or the impact of agriculture on land use, pollution and biodiversity. However, interactions with other aspects of the food system – such as food processing, packaging, transporting and consumption, and employment derived from these activities – are often overlooked. There are also important new questions about the interactions between the governance of climate and food such as those associated with carbon trading and labeling, and the role of the private sector in carbon mitigation and in the management of food systems.

Technical prescriptions alone will not manage the food security challenge efficiently. Adapting to the additional threats to food security, arising from major environmental changes, requires an integrated food system approach, not just a focus on agricultural practices. Many key issues for the research agenda can be highlighted here: adapting food systems to global environmental change requires more than just technological solutions to increase agricultural yields; tradeoffs across multiple scales among food system outcomes are a prevalent feature of globalized food systems; within food systems, there are some key underexplored areas that are both sensitive to environmental change but also crucial to understanding its implications for food security and adaptation strategies; scenarios specifically designed to investigate the wider issues that underpin food security and the environmental consequences of different adaptation options are lacking; price variability and volatility often threaten food security and more attention needs to be paid to the governance of food systems and to the changing of eating patterns.

Addressing food systems holistically, rather than as separate components such as agriculture, markets or nutrition, demands the engagement of multiple disciplines and researchers to understand the causes and drivers of vulnerability. This volume is a contribution to the construction of this new paradigm.

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Acknowledgements

This book is based on the best Proceedings of the International Conference “Climate Change, Agri-Food, Fisheries and Ecosystems: Reinventing Research, Innovation and Policy Agendas for Environmentally- and Socially-Balanced Growth (ICCAFFE2011)”, organized on May 19–21, 2011 in Agadir (Morocco) by the North–South Center for Social Sciences (NRCS) in collaboration with the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Germany, and the Institute for Research and Development (IRD), France.

I have been honored to share the editorship of this volume with my colleagues Dr. Olaf Pollmann (Senior Scientist, CEO SCENSO – Scientific Environmental Solutions, Germany) and Gabrielle Kissinger (Principal, Lexeme Consulting, Canada) whose commitment and intellectual potential made the editing process a smooth and exciting experience.

On behalf of my co-editors, I would like to gratefully and sincerely thank the members of the Scientific Committee who have actively contributed to the peer-review of the pre-selected chapters. Deepest thanks also go to all participants in ICCAFFE2011 who made this event possible even if not all could contribute to this volume. We are grateful to the institutions for their support of this book project. In particular, we thank the sponsors of the 2011 Conference, which in addition to NRCS include the GIZ and the IRD.

While the real value of this volume should be credited to authors of chapters, whose papers have been accepted for publication after a rigorous peer-review, any shortcomings or omissions remain the editors’ responsibility. However, the editors and the Publisher are not accountable for any statement made or opinion expressed by the chapters’ authors.

Mohamed Behnassi

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List of Abbreviations and Acronyms

AARI	Ayyub Agricultural Research Institute
AIDS	Acquired Immuno Deficiency Syndrome
ANOVA	Analysis of Variance
BAPPENAS	Ministry of Agriculture, Agriculture and National Development Planning Agency
BAU	Business as Usual
BMI	Body Mass Index
CAFO	Concentrated Animal Feeding Operations
CH ₄	Methane
CO ₂	Carbon Dioxide
CRED	Centre for Research on Epidemiology of Disasters
DADO	District Agricultural Development Office
DAS	Days After Sowing
D&D	Deforestation & Degradation
DDS	Dietary Diversity Score
DO	Delivery Orders
DNPI	Dewan Nasional Perubahan Iklim
EAD	Environment Agency Abu Dhabi
EF	Ecological Footprint
EFSA	European Food Safety Authority
Embrapa	Brazilian Agricultural Research Corporation
FAO	Food and Agriculture Organization of the United Nations
FCFA	Franc Central African (West African CFA franc)
FCPF	Forest Carbon Partnership Facility
FFQ	Food Frequency Questionnaire
FGD	Focused Group Discussion
gha	Global Hectares
GCC	Gulf Cooperation Council Countries
GDP	Gross Domestic Product
GHI	Global Hunger Index

GHGs	Greenhouse Gas Emissions
GMO	Genetic Modified Organisms
GS	Gulf States
HDSA	Human Development in South Asia
HLPE	High Level Panel of Experts on Food Security and Nutrition
HIV	Humanes Immundefizienz Virus
ICBA	International Center for Biosaline Agriculture
ICCAFFE	International Conference on Climate Change, Agri-Food, Fisheries and Ecosystems
ICRISAT	International Crop Research Institute for the Semi-Arid Tropics
IDB	Islamic Development Bank
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IFRC	International Federation of Red Cross and Red Crescent Societies
INPE	Brazil's National Institute for Space Research
IPCC	Intergovernmental Panel on Climate Change
IRAD	Institut de Recherche Agricole pour le Développement
ISPO	Indonesian Sustainable Palm Oil Production
IWMI	International Water Management Institute
KISR	Kuwait Institute for Scientific Research
LEAD	Livestock, Environment and Development
LGA	Local Government Area
LULUCF	Land Use, Land Use Change and Forestry
MANOVA	Multivariate Analysis of Variance
MacroZEE	Ecological-Economic Macrozonning initiative
MDGs	Millennium Development Goals
MoARD	Ministry of Agriculture and Rural Development
MRSA	methicillin-resistant Staphylococcus aureus
MRV	Measurable, Reportable and Verifiable
MQVRT	Measurement, Quantification and Verification, with Registration and Transparency
NARCS	National Agricultural Research Systems
NCCR	National Centre of Competence in Research
NCDC	National Climate Data Center
NCHS	National Center for Health Statistics
NEEDS	National Economic Empowerments and Development Strategy
NFC	Nepal Food Corporation
NOAA	National Oceanic and Atmospheric Administration
NGO	Non-Governmental Organization
N ₂ O	Nitrous Oxide
NPC	National Planning Commission
NRCS	North-South Center for Social Sciences
NTFP	Non Timber Forest Product
OAE	Office of Agricultural Economics

OBEPAB	Organic Agriculture in Benin
P	Precipitation
PDDS	Partial Dietary Diversity Score
PET	Potential Evapotranspiration
PEACE	Pelangi Energi Abadi Citra Enviro
PRA	Participatory Rural Appraisal
REDD+	Reduce Emissions from Deforestation and Forest Degradation
R-PPs	Readiness Proposals
RSPO	Round Table on Sustainable Palm Oil
RTS	Return to Scale
RUAF	Resource Centres on Urban Agriculture and Food Security
SEEDS	State Economic Empowerments and Development Strategy
SEUCO	South Eastern University College

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