Climate Change Management

Series editor

W. Leal Filho, Hamburg, Germany

More information about this series at <http://www.springer.com/series/8740>

Walter Leal Filho

Editor

Innovation in Climate Change Adaptation

Springer

Editor

Walter Leal Filho
Hamburg University of Applied Sciences
Faculty of Life Sciences
Hamburg
Germany

ISSN 1610-2010

Climate Change Management

ISBN 978-3-319-25812-6

DOI 10.1007/978-3-319-25814-0

ISSN 1610-2002 (electronic)

ISBN 978-3-319-25814-0 (eBook)

Library of Congress Control Number: 2016930165

Springer Cham Heidelberg New York Dordrecht London

© Springer International Publishing Switzerland 2016

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made.

Printed on acid-free paper

Springer International Publishing AG Switzerland is part of Springer Science+Business Media (www.springer.com)

Preface

It is widely believed that climate change is one of the most important challenges of modern times. Its origins are global in scope, in the sense that greenhouse emissions, coupled with unsustainable models of development—most of which based on the depletion of natural resources and ecosystems—lead to disruptions in eco-geological cycles and to substantial changes in weather conditions. These, combined with socio-economic problems such as poverty and limited access to technologies, are leading to losses in agriculture production, reductions in water availability, sea level rise and damages to properties due to extreme events, among others.

There are currently hundreds of projects being undertaken around the world, focusing on matters related to climate change. They include both, schemes focusing on mitigation as well as on adaptation. Global expenditures on climate change are well in excess of US\$ 5 billion per year, a substantial proportion of which to fund projects in developing countries. Most of these schemes focus on capital projects on infrastructure, as well as schemes in the field of agriculture, water/rainwater or on research aimed at making fossil energy technologies cleaner and less harmful to the people. This includes photovoltaics, post-combustion capture of CO₂ from engines or power plants, and direct removal of greenhouse gases from the atmosphere, among others. A number of projects have therefore a technological focus, also based on the premise of agencies such as the Organisation for Economic Cooperation and Development (OECD), which believe that technological change is one of the keys to ensuring that climate change can be addressed without compromising economic growth.

But apart from technology-based initiatives, there is a perceived need to find new, innovative ways to pursue climate change adaptation. We need, in other words, more innovation in climate change, especially in respect of adaptation. The problem is that even though innovation on climate change adaptation has proven successful in a number of ways, and that there are many initiatives which show how effective it can be, there are very few publications which have focused on this topic.

This book fills in the gap. It gathers a set of 25 chapters from authors from various continents, which show how innovation in processes, in planning, use of resources or use of existing technologies, can help to foster climate change adaptation.

Bearing in mind the broad field of innovation on climate change, this book is divided into two parts. Part I, with chapters 1–11, deals with a wide range of innovation issues related to climate change adaptation, in different contexts, such as planning, reforms, technology and transformative processes. It also considers the environmental, social and economic elements which are associated with the implementation of some innovative approaches to climate change adaptation here documented, with examples from various parts of the world.

Part II, with chapters 13–25, focuses on innovation in sectorial approaches to adaptation, such as in agriculture and city planning. It also includes the health sector, an area which is often overlooked during discussions on climate change adaptation plans. Moreover, changes in organisations are also outlined in one of the chapters, a pre-condition for successful institutional climate change adaptation plans. Similarly to Part I, the second part of the book also contains examples and case studies from a wide range of countries and contexts.

Among other issues, one of the main lessons from this book is that innovative approaches to climate change adaptation also need to consider the acceptability issue, which varies substantially among countries and social groups and is influenced by various social and cultural factors. We need a greater willingness to adapt and to be creative in finding unconventional ways to use innovation to the advantage of climate change adaptation. Indeed, if innovation on climate change adaptation is to become more common and more widely practised, knowledge and communication gaps between citizens and policy makers also need to be reduced.

I want to thank all authors for sharing their know-how, as well as for the support they provided in producing this book. I hope this publication will provide a valuable support to international climate change adaptation efforts and will foster the use of innovative approaches round the world.

Hamburg, Germany
Winter 2015/2016

Walter Leal Filho

Contents

Part I Innovation in Planning, Reforms, Technology and Transformative Processes

1	Innovative Approaches to Climate Change Adaptation	3
	Walter Leal Filho	
2	Adaptation Planning Process and Government Adaptation Architecture Support Regional Action on Climate Change in New South Wales, Australia	17
	Brent Jacobs, Christopher Lee, Storm Watson, Suzanne Dunford, and Aaron Coutts-Smith	
3	Vulnerability Is Dynamic! Conceptualising a Dynamic Approach to Coastal Tourism Destinations' Vulnerability	31
	Jillian Student, Bas Amelung, and Machiel Lamers	
4	Climate Injustice in a Post-industrial City: The Case of Greater Manchester, UK	43
	Aleksandra Kazmierczak	
5	Reforms that Integrate Climate Change Adaptation with Disaster Risk Management Based on the Australian Experience of Bushfires and Floods	63
	Michael Howes	
6	The CityTree: A Vertical Plant Filter for Enhanced Temperature Management	75
	Peter Sanger and Victor Splittgerber	
7	Mainstreaming Climate Change Adaptation into Development in the Gambia: A Window of Opportunity for Transformative Processes?	87
	Hannes Lauer and Irit Eguavoen	

8	Promoting Climate Smart Agriculture Through Space Technology in Nigeria	99
	Idowu O. Ologeh, Joshua B. Akarakiri, and Francis A. Adesina	
9	Trade-Offs Between Climate Change Adaptation and Mitigation Options for Resilient Cities: Thermal Comfort in Households	113
	Vera Gregório, Sofia Simões, and Júlia Seixas	
10	Adapting to Climate Change: Getting More from Spatial Planning	131
	Jeremy Carter and Graeme Sherriff	
11	Adaptations to Possible Climate Change Impacts: Problem Structuring Based on VFT Methodology	145
	Luiz Priori, Marcelo Hazin Alencar, and Adiel Teixeira de Almeida	
12	Assessing Vulnerability to Support Promotion of Adaptive Agricultural Practices in the Sahel	159
	Alex Apotsos, David Miller, and Brent Simpson	
Part II Innovation in Sectorial Approaches to Adaptation		
13	Adaptation of the Artisanal Fisher Folks to Climate Change in the Coastal Region of Ondo State, Nigeria	177
	Mosunmola Lydia Adeleke and Matthias Wolff	
14	Comparative Analysis of Woody Composition of Farmlands and Forest Reserve Along Afram River in a Tropical Humid Savanna of Ghana: Implications to Climate Change Adaptation	195
	Emmanuel Amoah Boakye, Dibi N'da Hyppolite, Victor Rex Barnes, Stefan Porembski, Michael Thiel, François N. Kouamé, and Daouda Kone	
15	A Stochastic Weather Generator Model for Hydroclimatic Prevision in Urban Floods Risk Assessment in Abidjan District (Cote d'Ivoire)	211
	Jean Homian Danumah, Samuel Nii Odai, Mahaman Bachir Saley, Joerg Szarzynski, Kwaku Adjei, and Fernand Koffi Kouame	
16	Refining NHS Climate Change Adaptation Plans: Central Manchester University Hospitals Foundation Trust (CMFT) Case Study	225
	Oscar Nieto-Cerezo	
17	Strategies for Climate Change Adaptation in Metropolitan Areas: Initiating, Coordinating and Supporting Local Activities: The Approach of Stuttgart Region, Germany	247
	Thomas Kiwitt and Silvia Weidenbacher	

18	Influence of Climate Change on Cocoyam Production in Aba Agricultural Zone of Abia State, Nigeria	261
	C.C. Ifeanyi-obi, A.O. Togun, and R. Lamboll	
19	Between Intention and Action: Psychosocial Factors Influencing Action on Climate Change in Organisations	275
	Nadine Andrews, Stuart Walker, and Kathryn Fahy	
20	The Impacts of Climate Change on the Livelihood of Arable Crop Farmers in Southwest, Nigeria	289
	B.G. Abiona, E.O. Fakoya, and J. Esun	
21	Grassroots Technologies and Community Trust in Climate Change Adaptation: Learning from Coastal Settlements of Bangladesh . . .	297
	Montaj Bintay Khalil, Brent C. Jacobs, and Natasha Kuruppu	
22	Mainstreaming Resilience into Development Programming: A Practitioner's Perspective	313
	Jacobo Ocharan, Ghislaine Guiran, and Alison Wright	
23	Wetlands Biodiversity, Livelihoods and Climate Change Implications in the Ruaha River Basin, Tanzania	327
	Pantaleo K.T. Munishi, Halima Kilungu, Nice Wilfred, Bernadetha Munishi, and Stein R. Moe	
24	Addressing the Financing Gap for Adaptation in Fragile and Conflict-Affected Countries	345
	Fiona Bayat-Renoux and Yannick Glemarec	
25	Evaluating Differences in Barriers to Climate Change Adaptation Between the Poor and Nonpoor in Coastal Tanzania	365
	Frederick Ato Armah, Isaac Luginaah, Herbert Hambati, Ratana Chuenpagdee, and Gwyn Campbell	