Walter Leal Filho · Amanda Lange Salvia · Rudi W. Pretorius · Luciana Londero Brandli · Evangelos Manolas · Fatima Alves · Ulisses Azeiteiro · Judy Rogers · Chris Shiel · Arminda Do Paco Editors

Universities as Living Labs for Sustainable Development

Supporting the Implementation of the Sustainable Development Goals



World Sustainability Series

Series Editor

Walter Leal Filho, European School of Sustainability Science and Research, Research and Transfer Centre "Sustainable Development and Climate Change Management", Hamburg University of Applied Sciences, Hamburg, Germany Due to its scope and nature, sustainable development is a matter which is very interdisciplinary, and draws from knowledge and inputs from the social sciences and environmental sciences on the one hand, but also from physical sciences and arts on the other. As such, there is a perceived need to foster integrative approaches, whereby the combination of inputs from various fields may contribute to a better understanding of what sustainability is, and means to people. But despite the need for and the relevance of integrative approaches towards sustainable development, there is a paucity of literature which address matters related to sustainability in an integrated way.

More information about this series at http://www.springer.com/series/13384

Walter Leal Filho · Amanda Lange Salvia · Rudi W. Pretorius · Luciana Londero Brandli · Evangelos Manolas · Fatima Alves · Ulisses Azeiteiro · Judy Rogers · Chris Shiel · Arminda Do Paco Editors

Universities as Living Labs for Sustainable Development

Supporting the Implementation of the Sustainable Development Goals



Editors
Walter Leal Filho
European School of Sustainability
Science and Research
HAW Hamburg
Hamburg, Germany

Rudi W. Pretorius Department of Geography University of South Africa Johannesburg, South Africa

Evangelos Manolas Democritus University of Thrace Komotini, Greece

Ulisses Azeiteiro Universidade de Aveiro Aveiro, Portugal

Chris Shiel Department of Life and Environmental Science Bournemouth University Poole, UK Amanda Lange Salvia European School of Sustainability Science and Research HAW Hamburg Hamburg, Germany

Luciana Londero Brandli University of Passo Fundo Passo Fundo, Brazil

Fatima Alves Department of Social Sciences and Management Universidade Aberta Porto, Portugal

Judy Rogers School of Architecture and Design RMIT University Melbourne, VIC, Australia

Arminda Do Paco Department of Business and Economics, Research Unit NECE Universidade da Beira Interior Covilha, Portugal

ISSN 2199-7373 ISSN 2199-7381 (electronic) World Sustainability Series ISBN 978-3-030-15603-9 ISBN 978-3-030-15604-6 (eBook) https://doi.org/10.1007/978-3-030-15604-6

Library of Congress Control Number: 2019934363

© Springer Nature Switzerland AG 2020

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, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

A living labs approach provides good opportunities to improve the environmental sustainability of universities, combining the expertise of staff and students, and encourages the application of knowledge to a real-world context. But despite its relevance and applicability, the use of a living labs approach is not as widely used as it can- or should-be.

This book addresses the need for academic materials related to living labs in a sustainable development context. It contains a set of papers presented at the "4th World Symposium on Sustainable Development at Universities" (WSSD-U-2018), which was held at the Universiti Sains Malaysia (USM) in Malaysia, organised by Manchester Metropolitan University (UK), the Research and Transfer Centre "Sustainable Development and Climate Change Management" of the Hamburg University of Applied Sciences (Germany), and the World Sustainable Development Research and Transfer Centre, in cooperation with the Inter-University Sustainable Development Research Programme (IUSDRP) and the United Nations University initiative "Regional Centres of Expertise on Education for Sustainable Development" (RCE).

The "4th World Symposium on Sustainable Development at Universities" (WSSD-U-2018) focused on "Universities as Living Labs for Sustainable Development: Supporting the Implementation of the Sustainable Development Goals" and provided a contribution to the further development to the debate on the use of a living labs approach as a means to foster the cause of sustainable development at higher education institutions.

This book is structured around three main parts as follows:

Part I: Campus as Living Labs for the SDGs Part II: Education for Sustainable Development Part III: Sustainability Processes and Practices

This publication documents practical experiences on education, research and extension (the so-called 3rd Mission, whereby universities outreach to local communities, industry and other groups) and makes them available to a wide audience.

vi Preface

It outlines many initiatives performed at universities to promote environmental sustainability and many interesting case studies from around the world.

We thank the authors for their efforts in elaborating the manuscripts and the reviewers for the many useful comments provided. We hope this book will inspire further initiatives in this rapidly growing field.

Hamburg, Germany
Hamburg, Germany
Johannesburg, South Africa
Passo Fundo, Brazil
Komotini, Greece
Porto, Portugal
Aveiro, Portugal
Melbourne, Australia
Poole, UK
Covilha, Portugal
Spring 2019

Walter Leal Filho
Amanda Lange Salvia
Rudi W. Pretorius
Luciana Londero Brandli
Evangelos Manolas
Fatima Alves
Ulisses Azeiteiro
Judy Rogers
Chris Shiel
Arminda Do Paco

Contents

viii Contents

Identifying and Overcoming Communication Obstacles to the Implementation of Green Actions at Universities: A Case Study of Sustainable Energy Initiatives in South Brazil João Marcelo Pereira Ribeiro, Aline Autran, Stephane Louise Boca Santa, Ana Valquiria Jonck, Mica Magtoto, Rafael Ávila Faraco and José Baltazar Salgueirinho Osório de Andrade Guerra	103
Mobilising the Sustainable Development Goals Through Universities: Case Studies of Sustainable Campuses in Malaysia Jasmin Irisha Jim Ilham, Malik Hisyam Zaihan, Sakiinah Mahamad Hakimi, Mahamad Hakimi Ibrahim and Shakirin Shahrul	121
Towards a Learning System for University Campuses as Living Labs for Sustainability L. A. Verhoef, M. Bossert, J. Newman, F. Ferraz, Z. P. Robinson, Y. Agarwala, Paul J. Wolff, III, P. Jiranek and C. Hellinga	135
Nurturing the Seeds of Sustainability Governance: Rio+25 Brazilian Higher Education Institution Case Study Ursula Maruyama, Patricia Prado, Aline Trigo and Jose Trigo	151
The Transdisciplinary Living Lab Model (TDLL)	167
Sustainability in Higher Education: Beyond the Green Mirror Amy Walsh, Eleni Michalopoulou, Aisling Tierney, Hannah Tweddell, Chris Preist and Chris Willmore	183
The EDINSOST Project: Implementing the Sustainable Development Goals at University Level Silvia Albareda-Tiana, Jorge Ruíz-Morales, Pilar Azcárate, Rocío Valderrama-Hernández and José Manuel Múñoz	193
Environmental DNA (eDNA) Metabarcoding as a Sustainable Tool of Coastal Biodiversity Assessment. Z. A. Danial Hariz and M. A. Noor Adelyna	211
Visual Displays of the Sustainable Development Goals in the Curricular and Extra-Curricular Activities at Nottingham Trent University—A Case Study Vanessa Odell, Petra Molthan-Hill, Lina Erlandsson and Eleanor Sexton	227
Sustainable Development Goals and Current Sustainability Actions at Politecnico di Torino	247

Contents ix

Achieving Excellence in Sustainable Development Goals in Sunway University Malaysia	265
EDS Integrated Approach for Sustainability (EDS-IA): Campus as a Living Laboratory Experience Liliana Diaz and André Potvin	283
Part II Education for Sustainable Development	
Auditing the University: Promoting Business Education for Sustainability Through Audit-Based Learning	303
Enhancing Student Engagement in a Sustainability Class: A Survey Study Liguang Liu and Lianhong Gao	323
Opportunities and Challenges of Digitalization to Improve Access to Education for Sustainable Development in Higher Education Oliver Ahel and Katharina Lingenau	341
Training Competencies for Sustainable Thinking Through an Educational Nature Trail Supported by a Location-Based Smartphone Game	357
Upcycling for Teaching and Learning in Higher Education: Literature Review	371
Sustainability Practices: The Role of University in Forming Master Students' Perspectives Ana Paula Pessotto, Janaína Macke and Fernanda Frankenberger	383
Interdisciplinary Cooperation and Collaboration in Undergraduate Sustainability-Based Programs: A Canadian Example of Environment and Urban Sustainability (EUS) Michal Bardecki and Andrew Millward	399
Adventure Cards, Process Wheels, and a Vision for Digital Storytelling: Learning from Leonardo	417
Fostering EfS Connections for Community Wellbeing: Working Meaningfully with What We've Got Sherridan Emery, Kim Beasy and Bianca Coleman	435