



Multidimensional Approaches to Impacts of Changing Environment on Human Health

Edited by

Joystu Dutta

Srijan Goswami

Abhijit Mitra



CRC Press

Taylor & Francis Group

Multidimensional Approaches to
Impacts of Changing Environment
on Human Health



Taylor & Francis

Taylor & Francis Group

<http://taylorandfrancis.com>

Multidimensional Approaches to Impacts of Changing Environment on Human Health

Edited by

Joystu Dutta, Srijan Goswami and Abhijit Mitra



CRC Press

Taylor & Francis Group

Boca Raton London New York

CRC Press is an imprint of the
Taylor & Francis Group, an **informa** business

First edition published 2022

by CRC Press

6000 Broken Sound Parkway NW, Suite 300, Boca Raton, FL 33487-2742

and by CRC Press

2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN

© 2022 selection and editorial matter, Joystu Dutta, Srijan Goswami and Abhijit Mitra; individual chapters, the contributors

CRC Press is an imprint of Taylor & Francis Group, LLC

Reasonable efforts have been made to publish reliable data and information, but the author and publisher cannot assume responsibility for the validity of all materials or the consequences of their use. The authors and publishers have attempted to trace the copyright holders of all material reproduced in this publication and apologize to copyright holders if permission to publish in this form has not been obtained. If any copyright material has not been acknowledged please write and let us know so we may rectify in any future reprint.

Except as permitted under U.S. Copyright Law, no part of this book may be reprinted, reproduced, transmitted, or utilized in any form by any electronic, mechanical, or other means, now known or hereafter invented, including photocopying, microfilming, and recording, or in any information storage or retrieval system, without written permission from the publishers.

For permission to photocopy or use material electronically from this work, access www.copyright.com or contact the Copyright Clearance Center, Inc. (CCC), 222 Rosewood Drive, Danvers, MA 01923, 978-750-8400. For works that are not available on CCC please contact mpkbookspermissions@tandf.co.uk

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

Library of Congress Cataloging-in-Publication Data

Names: Dutta, Joystu, editor. | Goswami, Srijan, editor. | Mitra, Abhijit, editor.

Title: Multidimensional approaches to impacts of changing environment on human health / edited by Joystu Dutta, Srijan Goswami, Abhijit Mitra.

Description: First edition. | Boca Raton: CRC Press, 2022. |

Includes bibliographical references and index.

Identifiers: LCCN 2021009269 (print) | LCCN 2021009270 (ebook) |

ISBN 9780367558499 (hbk) | ISBN 9780367558512 (pbk) | ISBN 9781003095422 (ebk)

Subjects: LCSH: Environmental health. | Public health—Environmental aspects.

Classification: LCC RA565 .M85 2022 (print) | LCC RA565 (ebook) | DDC 613/.1—dc23

LC record available at <https://lccn.loc.gov/2021009269>

LC ebook record available at <https://lccn.loc.gov/2021009270>

ISBN: 978-0-367-55849-9 (hbk)

ISBN: 978-0-367-55851-2 (pbk)

ISBN : 978-1-003-09542-2 (ebk)

DOI: 10.1201/9781003095422

Typeset in Times

by Newgen Publishing UK



Dr. Sujit Kumar Dutta

April 24, 1953–December 25, 2020

This book is dedicated to the loving memory of Professor Dr. Sujit Kumar Dutta, a loving soul who left untimely for his heavenly abode after suffering from COVID-19.

He will be remembered forever as a great human being.



Taylor & Francis

Taylor & Francis Group

<http://taylorandfrancis.com>

Contents

Preface.....	xi
About the Editors	xiii
List of Contributors.....	xvii

UNIT I Impacts of Changing Environment on Human Health

Chapter 1 Air Pollutants and Acid Precipitation: Impact on Ecology and Human Health.....	3
<i>Joystu Dutta and Prem Prakash Singh</i>	

Chapter 2 Human Health in a Changing Environment: Exploring the Biological and Socioeconomic Impacts	27
<i>Rajat Shubhro Mukherjee</i>	

UNIT II Impact of Increasing Environmental Pollution on Human Health

Chapter 3 Airborne <i>Staphylococcus aureus</i> and its Impact on Human Health: A Review in an Indian Context.....	43
<i>Madhuri Singh, Maneet Kumar Chakrawarti, Himani Kumari, Sonali Rajput and Kasturi Mukhopadhyay</i>	

Chapter 4 Time Series Analysis of Coliform Bacterial Density in the River Ganges as a Potential Indicator of Water Contamination and Associated Risks to Human Health.....	73
<i>Pritam Mukherjee, Sufia Zaman and Abhijit Mitra</i>	

- Chapter 5** Evaluation of Health Quality in Two Studied Groups of School Children from an Arsenic-Exposed Area of West Bengal, India.....93

Antara Das, Madhurima Joardar, Nilanjana Roy Chowdhury and Tarit Roychowdhury

- Chapter 6** Evaluation of Health Effects and Risk Assessment of Arsenic on an Unexposed Population from an Arsenic-Exposed Zone of West Bengal, India..... 113

Madhurima Joardar, Nilanjana Roy Chowdhury, Antara Das and Tarit Roychowdhury

UNIT III Climate Change and Human Health: A Perspective

- Chapter 7** Climate Insecurity, Health and Well-Being Among Ganga–Meghna–Brahmaputra Delta Communities 137

Debojyoti Das and Upasona Ghosh

UNIT IV Industrial Safety and Occupational Health Issues

- Chapter 8** Occupational Hazards in Alternative Medicinal Industry: An Exploratory Study 157

Abha Arya

- Chapter 9** Silicosis: An Occupational Health Crisis Among Stone Grinders..... 169

Chetan Kumar Joshi, Madhur Mohan Ranga and Surbhi Ranga

UNIT V Food Safety and Impacts on Health and Environment

- Chapter 10** Impact of Climate Change on Food Safety: A Review 185

Rinku Moni Devi

- Chapter 11** Flourishing Amidst Ecological Pressures: Insights from the Experience of the Solegas of Karnataka, India 193
Shreelata Rao Seshadri, Dhanya B., Sheetal Patil and Raghvendra S. Vanjari
- Chapter 12** Evaluation of Arsenic Entry Routes into Rice Grain during Harvesting, Post-Harvesting of Paddy and Cooked Rice Preparation 219
Nilanjana Roy Chowdhury, Madhurima Joardar, Antara Das and Tarit Roychowdhury
- Chapter 13** Ill Effects of Untreated Household Grey Water used in Agricultural Irrigation 247
Sushma and Chandra Shekhar Sanwal
- Chapter 14** Impact of Genetically Modified Organisms on Environment and Health..... 263
Bingshati Sarkar, Ushmita Gupta Bakshi, Chandini Sayeed and Srijan Goswami

UNIT VI *Successful Models of Waste Management*

- Chapter 15** Solid Waste Management Models: Past, Present and Future 277
Rojita Mishra, Amrita Kumari Panda and Satpal Singh Bisht
- Chapter 16** Biomedical Waste Management in Healthcare..... 293
Rehab A. Rayan, Moharana Choudhury, Mohamed Kamal, Arghya Chakravorty, Rinku Moni Devi and Jyoti Mehta

UNIT VII *Pandemics: Challenges and Way Forward*

- Chapter 17** Environment-Friendly Plant-Based Edible Vaccines – A Novel Technique to Fight SARS-CoV-2 and Other Pandemics: A Review 307
Anurag Chanda

- Chapter 18** Exploring the Relationship between the Emergence of Zoonotic Diseases and the Inhuman Touch of Habitat Loss and Wildlife Trade.....317

Nawin Kumar Tiwary, Govind Singh and Asani Bhaduri

UNIT VIII Perspectives on Environmental and Human Health Management

- Chapter 19** Contribution Towards a Greener Environment by Using Specific MAP Species: A Case Study Among the Tribes of Tripura, India.....331

Sujit K. Dutta and Ratul Arya Baishya

- Chapter 20** Creating a Search Engine for a Multidimensional and Personalized Healthcare Solution.....345

C. R. Desai

- Chapter 21** Health Sector Resilience to Climate-Related Disasters: India's Experience of National Health Adaptation Planning.....375

Anil Kumar Gupta, Atisha Sood and Anjali Barwal

- Chapter 22** Monitoring an Environment and Human Health Perspective Using a Geospatial Approach.....389

Shrey Rakholia, Abhinav Mehta and Joystu Dutta

- Chapter 23** Biosensors for Environmental Health: Exploring the Biological and Socioeconomic Impacts403

Ashish Kumar, Rameshwari A. Banjara, Santosh Kumar Sethi, Alka Ekka and Joystu Dutta