

# Contents

## Forewords

<i>Achim Steiner, Executive Director of the United Nations Environment Programme (UNEP) and Under-Secretary-General of the United Nations</i>	V
<i>Konrad Osterwalder, Rector, United Nations University and Under-Secretary-General of the United Nation</i>	VII
<i>Jean-François Bureau, NATO Assistant Secretary General for Public Diplomacy Chairman, Science for Peace and Security (SPS) Committee</i>	IX
<i>Joy Ogwu, Permanent Representative of the Federal Republic of Nigeria to the United Nations in New York</i>	XI
<i>HRH Prince El Hassan bin Talal, The Hashemite Kingdom of Jordan</i>	XIII

<b>Dedications</b>	<b>XV</b>
--------------------	-----------

<b>Acknowledgements</b>	<b>XXVII</b>
-------------------------	--------------

<b>Permissions and Credits</b>	<b>XXXI</b>
--------------------------------	-------------

<b>Prefaces</b>	<b>1</b>
-----------------	----------

The Anthropocene: Geology by Mankind	3
<i>Paul Crutzen, Nobel Laureate for Chemistry Max Planck Institute for Chemistry Department Atmospheric Chemistry</i>	
Connecting Inconvenient Truths: Urgency of Nuclear Disarmament in a World of Pressing Problems	5
<i>Amb. Jayantha Dhanapala, Former UN Under-Secretary General for Disarmament, President, Pugwash Conferences on Science and World Affairs</i>	
Living in and Coping with World Risk Society	11
<i>Ulrich Beck</i>	
Population Prospects and the Challenges of Sustainability	17
<i>Hania Zlotnik</i>	
Towards a Great Land-Use Transformation?	23
<i>Christoph Müller, Hermann Lotze-Campen, Veronika Huber, Alexander Popp, Anastasia Svirejeva-Hopkins, Michael Krause and Hans Joachim Schellnhuber</i>	

<b>Part I</b>	<b>Introduction: Concepts of Security Threats, Challenges, Vulnerabilities and Risks</b>	29
<b>1</b>	Introduction: Coping with Global Environmental Change in the Anthropocene <i>Hans Günter Brauch and Úrsula Oswald Spring</i>	31
<b>2</b>	Concepts of Security Threats, Challenges, Vulnerabilities and Risks <i>Hans Günter Brauch</i>	61
<b>3</b>	Disaster Risk and Vulnerability: Concepts and Measurement of Human and Environmental Insecurity <i>Omar D. Cardona</i>	107
<b>4</b>	Economic Vulnerability and Economic Security <i>Czesław Mesjasz</i>	123
<b>5</b>	Debt Relief, Economic Growth and Poverty Reduction in Low-Income Countries <i>Lidia Mesjasz</i>	157
<b>Part II</b>	<b>Securitization of Global Environmental Change</b>	177
<b>6</b>	Security Threats, Challenges, Vulnerabilities and Risks in the Evolution and Implementation of the European Security Strategy <i>Alyson J.K. Bailes</i>	179
<b>7</b>	NATO's Traditional Security Problems <i>Pál Dunay</i>	191
<b>8</b>	European Responses to Security Threats in the Mediterranean in the Early 21 <sup>st</sup> Century <i>Eduard Soler i Lecha</i>	199
<b>9</b>	Inside/Outside: Turkey's Security Dilemmas and Priorities in the Early 21 <sup>st</sup> Century <i>Mustafa Aydın and Asli Toksabay Esen</i>	207
<b>10</b>	Promoting Democracy as a Security Goal. The 'inward-outward' Paradox of the EU's Foreign Policy <i>Omar Serrano</i>	219
<b>11</b>	Language Games on Security in Finland: Towards Changing Concepts of the State and National Survival <i>Vilho Harle and Sami Moisio</i>	235
<b>12</b>	Security Threats, Challenges, Vulnerabilities and Risks in US National Security Documents (1990–2010) <i>Hans Günter Brauch</i>	249
<b>13</b>	Changes in the Perception of Military Threats, Challenges, Vulnerabilities and Risks in Russia (1991-2009) <i>Alexander Sergunin</i>	275
<b>14</b>	Russian Security Policy in the 21 <sup>st</sup> Century Based on the Experiences of Its First Decade <i>Pál Dunay</i>	291

<b>15</b>	Non-Traditional Security and the New Concept of Security of China <i>Zhongqin Zhao</i>	307
<b>16</b>	Perceptions of Hard Security Issues in the Arab World <i>Gamal M. Selim</i>	313
<b>17</b>	Arab Perceptions of Soft Security Issues <i>Mohammad El-Sayed Selim</i>	327
<b>18</b>	Military Challenges and Threats in West Africa <i>Kwesi Aning and Andrews Atta-Asamoah</i>	339
<b>19</b>	Weak States and Security Threats in West Africa <i>John Emeka Akude</i>	353
<b>Part III</b>	<b>Economic, Social, Environmental Security and Human Threats, Challenges, Vulnerabilities and Risks in the Near East, North and Sub-Sahara Africa and in Asia</b>	369
<b>20</b>	Environmental Challenges and Risks in North Africa <i>Bécher Chourou</i>	371
<b>21</b>	Water Degradation as a Human Security Challenge in Jordan <i>Bassam Ossama Hayek and Nisreen Daifallah Al Hmoud</i>	395
<b>22</b>	Water Scarcity and Degradation in Palestine as Challenges, Vulnerabilities, and Risks for Environmental Security <i>Marwan Haddad</i>	409
<b>23</b>	Social, Environmental and Security Impacts of Climate Change on the Eastern Mediterranean <i>Hilmi S. Salem</i>	421
<b>24</b>	Progressive Development of the Water Resources of Israel and Palestine to Mitigate the Negative Impact of Global Warming <i>Arie S. Issar</i>	447
<b>25</b>	Jerusalem: Where To? In Search for Hidden Opportunities <i>Mohammed S. Dajani Daoudi and Ashraf M. Dajani</i>	459
<b>26</b>	Global Climate Change Impacts for the Mediterranean in the 21 <sup>st</sup> Century: Challenges for Human and Environmental Security <i>Hans Günter Brauch</i>	485
<b>27</b>	Global Environmental Change and Conflict Potential in Central Asia <i>Jennifer Sehring and Ernst Giese</i>	525
<b>28</b>	Impact of Environmental Change on Stability and Conflict Potentials in China <i>Thomas Heberer and Anja D. Senz</i>	535

<b>Part IV</b>	<b>Threats, Challenges, Vulnerabilities and Risks for Urban Centres in Hazards and Disasters</b>	547
<b>29</b>	The Vulnerability of Cities to Disasters and Climate Change: A Conceptual Framework <i>Mark Pelling</i>	549
<b>30</b>	Vulnerability to Natural Hazards: Case Study on Landslide Risks in La Paz <i>Fabien Nathan</i>	559
<b>31</b>	Revealing the Impact of Small Disasters to the Economic and Social Development <i>Mabel C. Marulanda, Omar D. Cardona and Alex H. Barbat</i>	575
<b>32</b>	Climate Change, Natural Hazards and Coastal Ecosystems in Latin-America: A Framework for Analysis <i>Carmen Lacambra and Kaveh Zahedi</i>	585
<b>33</b>	Flood Loss Redistribution in a Third World Megacity: The Case of Mumbai <i>Monalisa Chatterjee</i>	603
<b>34</b>	Coping with Water- and Wastewater-related Risks in Megacity Delhi <i>Reena Singh</i>	613
<b>35</b>	Politics of Displacement and Vulnerability <i>Nanda Kishor</i>	625
<b>36</b>	Linking Oriental and Western Thinking to Mitigate Flood Risk <i>Xiaomeng Shen</i>	637
<b>37</b>	Preparation for an Earthquake in the Megacity Istanbul <i>Sıdıka Tekeli Yeşil</i>	647
<b>38</b>	Risk Management Strategies for the Predicted Earthquake Hazard in Istanbul <i>Ebru A. Gencer</i>	655
<b>39</b>	Urban Vulnerability to Climate Change and Natural Hazards in Nigeria <i>Adeniyi Sulaiman Gbadegesin, Felix Bayode Olorunfemi and Usman Adebimpe Raheem</i>	669
<b>Part V</b>	<b>Coping with Global Environmental Change: Climate Change, Soil and Desertification, Water Management, Food and Health</b>	689
<b>40</b>	Quantifying Global Environmental Change Impacts: Methods, Criteria and Definitions for Compiling Data on Hydro-meteorological Disasters <i>Debarati Guha-Sapir and Femke Vos</i>	693
<b>Section A: Climate Change</b>		
<b>41</b>	Stormy Weather: International Security in the Shadow of Climate Change <i>Steffen Bauer</i>	719

<b>42</b>	Security Risks of Climate Change: Vulnerabilities, Threats, Conflicts and Strategies <i>Jürgen Scheffran</i>	735
<b>43</b>	New Threats? Risk and Securitization Theory on Climate Change and Water <i>Anders Jägerskog</i>	757
<b>44</b>	Dealing With Uncertainties in Climate Change Impacts Assessments: A Case Study on the Nile Basin <i>Carlo Buontempo, Jens Kristian Lørup, Michael Sanderson, Michael Butts, Erika Palin, Rachel McCarthy, Richard Jones, Richard Betts and Mamdouh Antar</i>	765
<b>45</b>	Mapping Areas Affected by Sea-Level Rise due to Climate Change in the Nile Delta Until 2100 <i>Mohamed El Raey</i>	773
<b>46</b>	Vulnerability of Tropical Montane Rain Forest Ecosystems due to Climate Change <i>Hans Juergen Boehmer</i>	789
<b>Section B: Soil and Desertification</b>		
<b>47</b>	Securitizing Land Degradation and Desertification: A Proactive Soil Security Concept <i>Hans Günter Brauch and Úrsula Oswald Spring</i>	803
<b>48</b>	Alternative Livelihoods for Attaining Sustainability and Security in Drylands <i>Uriel N. Safriel</i>	835
<b>49</b>	Societal Vulnerability to Desertification and Policy Response Options <i>Zafar Adeel</i>	853
<b>50</b>	Desertification Process in Egypt <i>Ismail Abd El Galil Hussein</i>	863
<b>51</b>	Impacts of Drought on Agriculture in Northern Mexico <i>Tulio Arredondo Moreno and Elisabeth Huber-Sannwald</i>	875
<b>52</b>	Traditional Knowledge in Coping with Desertification <i>Pietro Laureano</i>	893
<b>53</b>	Prodromes of Desertification in the Oasis of Tafilalet (Morocco) and Specific Local Solutions <i>Monique Mainguet, Frédéric Dumay, Lahcen Kabiri and Boualem Rémini</i>	901
<b>54</b>	Agriculture in Drylands: Experience in Almeria <i>Andrés Miguel García Lorca</i>	921
<b>55</b>	Land-use Changes, Desertification, and Climate Change Impacts in South-eastern Spain <i>Jorge García Gómez, Francisco López-Bermúdez and Juan Manuel Quiñonero Rubio</i>	935

**Section C: Water Management**

- 56** Reconsidering Integrated Water Resources Management: Promoting Economic Growth and Tackling Environmental Stress 947  
*Jakob Granit*
- 57** Coping with Population Growth, Climate Change, Water Scarcity and Growing Food Demand in China in the 21st Century 957  
*Zhanyi Gao and Yaqiong Hu*
- 58** Ensuring Water Security in Rural Areas of Bangladesh under Climate Change and Non-climatic Drivers of Change 969  
*Mohammed Rahman Zillur and Kuntala Lahiri-Dutt*
- 59** Applying Bottom-up Participatory Strategies and Traditional Methods of Water Harvesting in the Thar Desert, Rajasthan 983  
*Kanupriya Harish and Mathews Mullackal*
- 60** Coping with Water Scarcity in the Sahel: Assessing Groundwater Resources in the Western Sahel 997  
*Abdelkader Dodo, Mohamedou Ould Baba Sy and Jihed Ghannem*

**Section D: Coping with Food Security Issues**

- 61** Global Threats, Global Changes and Connected Communities in the Global Agrofood System 1005  
*John Grin and Esther Marijnen*
- 62** Genetically Modified Organisms: A Threat for Food Security and Risk for Food Sovereignty and Survival 1019  
*Úrsula Oswald Spring*
- 63** Natural Disasters and Major Challenges towards Achieving Food Security in the Sahel: The Experience of CILSS 1043  
*Issa Martin Bikienga*
- 64** Responding to Climate Variability and Change: Opportunities and Challenges for Governance 1055  
*Sreeja Nair*
- 65** Coping with Climate Change Impacts on Coffee and Maize for Peasants in Mexico 1067  
*Cecilia Conde*

**Section E: Coping with Health Security Issues**

- 66** The Impact of AIDS on Women's Social Life in a Mexican Rural Community 1081  
*Fátima Flores and Wolfgang Wagner*
- 67** Integrated Assessment of Vulnerability to Heat Stress in Urban Areas 1091  
*Tanja Wolf, Glenn McGregor and Anna Paldy*

<b>Part VI</b>	<b>Coping with Hazards and Strategies for Coping with Social Vulnerability and Resilience Building</b>	1101
<b>68</b>	Regulation and Coupling of Society and Nature in the Context of Natural Hazards <i>Jörn Birkmann</i>	1103
<b>69</b>	Differentials in Impacts and Recovery in the Aftermath of the 2004 Indian Ocean Tsunami: Local Examples at Different Scales in Sri Lanka <i>Katharina Marre and Fabrice Renaud</i>	1129
<b>70</b>	Risks in Central America: Bringing Them Under Control <i>Juan Carlos Villagrán de León</i>	1147
<b>71</b>	Economics and Social Vulnerability: Dynamics of Entitlement and Access <i>Koko Warner</i>	1159
<b>72</b>	Social Vulnerability, Discrimination, and Resilience-building in Disaster Risk Reduction <i>Úrsula Oswald Spring</i>	1169
<b>Part VII</b>	<b>Coping with Global Environmental Change: Scientific, International, Regional and National Political Strategies, Policies and Measures</b>	1189
	<b>Section A: Scientific Research Goals and Strategies for Coping with Global Environmental Change</b>	
<b>73</b>	Coping with Global Environmental Change: Need for an Interdisciplinary and Integrated Approach <i>G.A. McBean</i>	1193
<b>74</b>	Research Agenda and Policy Input of the Earth System Science Partnership for Coping with Global Environmental Change <i>Rik Leemans, Martin Rice, Ann Henderson-Sellers and Kevin Noone</i>	1205
<b>75</b>	The International Human Dimensions Programme on Global Environmental Change – Taking Stock and Moving Forward <i>Louise von Falkenhayn, Andreas Rechkemmer and Oran R. Young</i>	1221
<b>76</b>	DIVERSITAS: Biodiversity Science Integrating Research and Policy for Human Well-Being <i>Bruno A. Walther, Anne Larigauderie and Michel Loreau</i>	1235
<b>77</b>	The International Geosphere-Biosphere Programme's (IGBP) Scientific Research Agenda for Coping with Global Environmental Change <i>Kevin J. Noone, Carlos Nobre and Sybil Seitzinger</i>	1249
<b>78</b>	Climate Information for Coping with Environmental Change: Contributions of the World Climate Research Programme <i>John A. Church, Ghassem R. Asrar, Antonio J. Busalacchi and Carolin E. Arndt</i>	1257

### Section B: Global Strategies, Policies and Measures for Coping with Climate Change

- 79** Key IPCC Conclusions on Climate Change Impacts and Adaptations 1273  
*Martin Parry, Osvaldo Canziani, Jean Palutikof and Clair Hanson*
- 80** Options for Mitigating Climate Change Results of Working  
Group III of the Fourth Assessment Report of the IPCC 1283  
*Peter Bosch and Bert Metz*
- 81** Global Climate Change, Natural Hazards, and the Environment:  
an Overview of UNESCO's Activities 1293  
*Walter Erdelen and Badaoui Rouhban*
- 82** Climate Change and Development: UNDP's Approach to Helping  
Countries Build a New Paradigm 1303  
*Veerle Vandeweerd, Yannick Glemarec and Vivienne Caballero*

### Section C: Regional Strategies, Policies and Measures for Coping with Climate Change

- 83** EU Strategies for Climate Change Policy Beyond 2012 1319  
*Christian Egenhofer, Arno Behrens and Anton Georgiev*
- 84** Coping with Climate Change in East Asia: Vulnerabilities and  
Responsibilities 1333  
*Paul G. Harris*
- 85** Strategies for Coping with Climate Change in Latin America: Perspective  
beyond 2012 1341  
*Ricardo Zapata-Martí*
- 86** Politics of Equity and Justice in Climate Change Negotiations in  
North-South Relations 1355  
*Ariel Macaspac Penetrante*

### Section D: National Strategies, Policies and Measures for Coping with Climate Change

- 87** Climate Change: Long-Term Security Implications for China and the  
International Community 1367  
*Yu Hongyuan and Paul J. Smith*
- 88** Japanese Climate Change Policy: Moving Beyond the Kyoto Process 1381  
*Hiroshi Ohta*
- 89** Implications of Equity Considerations and Emission Reduction Targets:  
Lessons from the Case of Japan's Mid-Term Target 1393  
*Norichika Kanie, Hiromi Nishimoto, Yasuaki Hijioka and  
Yasuko Kameyama*



<b>Part VIII</b>	<b>A Technical Tool: Remote Sensing, Vulnerability Mapping and Indicators of Environmental Security Challenges and Risks</b>	1401
<b>90</b>	Land-use and Flood Risk Changes in Coastal Areas of South-eastern Spain <i>Juan M. Quiñonero-Rubio, Francisco López-Bermúdez, Francisco Alonso-Sarría and Francisco J. Gomariz-Castillo</i>	1403
<b>91</b>	Monitoring Conflict Risk: The Contribution of Globally Used Indicator Systems <i>Jochen Jesinghaus</i>	1415
<b>Part IX</b>	<b>Towards an Improved Early Warning of Conflicts and Hazards</b>	1427
<b>92</b>	Networking Disaster and Conflict Early Warning in Response to Climate Change <i>Patrick Meier</i>	1429
<b>93</b>	Vulnerability Assessment in Sri Lanka in the Context of Tsunami Early Warning <i>Juan Carlos Villagrán de León</i>	1441
<b>Part X</b>	<b>Summary and Conclusions</b>	1451
<b>94</b>	Political Geoecology for the Anthropocene <i>Hans Günter Brauch, Simon Dalby and Úrsula Oswald Spring</i>	1453
<b>95</b>	Coping with Global Environmental Change – Sustainability Revolution and Sustainable Peace <i>Úrsula Oswald Spring and Hans Günter Brauch</i>	1487
	<b>Abbreviations</b>	<b>1505</b>
	<b>Bibliography</b>	<b>1521</b>
	<b>Biographies of Contributors</b>	<b>1711</b>
	<b>Index</b>	<b>1765</b>