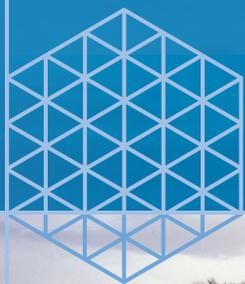


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VOL 5 / HEXAGON SERIES ON HUMAN
AND ENVIRONMENTAL SECURITY AND PEACE



Coping with Global Environmental Change, Disasters and Security

Threats, Challenges, Vulnerabilities and Risks



Foreword

Coping with Global Environmental Change, Disasters and Security – Threats, Challenges, Vulnerabilities and Risks is the fifth volume in the *Hexagon Series on Human and Environmental Security and Peace* and it completes the *Global Environmental and Human Security Handbook for the Anthropocene*.

This handbook addresses scientific issues of utmost importance for UNEP. In calling for a ‘Fourth Green Revolution’ the concluding chapter endorses the Global Green New Deal/Green Economy Initiative (GEI) launched during the unfolding financial and economic crisis of late 2008: At the time, few may have thought that it would gain such rapid traction.

However, it is estimated that around 15 per cent of more than \$3 trillion-worth of stimulus funds are green in nature, with that rising to around 80 per cent in the Republic of Korea. Within a relatively short space of time, terms such as Green Economy and Green Growth have become common parlance in many capital cities and at key international gatherings, including G8 and G20 summits and ministerial sessions of the OECD.

The urgency of the challenges facing all economies, from climate change to ecological losses, allied to the need to deliver growth, overcome poverty and generate employment, are more apparent with every passing year and every new decade. The Green Economy is taking root in diverse economies and geographical locations, all allied by a common need.

More than two dozen governments have requested the UN Environment Programme’s (UNEP) assistance and advice how best to tailor a transition to a low carbon, resource efficient Green Economy within national development strategies and economic planning. In China, UNEP is collaborating with the Ministry of the Environment and relevant institutions to produce a series of sectoral green economy studies, which will feed into the country’s five year development plan.

A Green Economy Initiative for Africa is in preparation and studies are underway in Eastern Europe, the Caucasus and Central Asia looking at the prospects for promoting organic agriculture. In West Asia, priority sectors for catalyzing a Green Economy have emerged following discussions in countries including Bahrain, Dubai and Jordan to Kuwait, Lebanon and Saudi Arabia.

These exciting opportunities dovetail with the acceleration of Technology Needs Assessments under the framework of the UN Framework Convention on Climate Change (UNFCCC). The assessments are being supported by the Global Environment Facility. Up to 45 countries are to be assisted in prioritizing technologies for both mitigation and adaptation to climate change, as well as investigating and overcoming potential legal, financial, policy and other barriers to their uptake.

The first wave of 15 countries have been selected ranging from Cote D'Ivoire and Mali in Africa; Bangladesh, Cambodia and Indonesia in Asia to Argentina and Guatemala in Latin America and Georgia in Europe. With more carbon dioxide in the atmosphere now than at any time in the past 650,000 years, it's evident that these types of measures are imperative to deal with the growing climate crisis.

The Green Economy could be the biggest innovation project in history breaching the divide as the economic models of the 20th century look less and less able to serve a planet of six billion, rising to nine billion by 2050.

This book, looking at global environmental change, details threats to our future wellbeing and our security. We live in a rapidly evolving world. Sixty per cent of the world's largest urban areas, with a population of over 5 million, are located within 100 km of the coast. The current climate footprint from buildings is equivalent to 8.6 billion tons of CO₂ a year, and predicted to almost double to 15.6 billion tons of CO₂ by 2030. Every year an estimated \$2 to \$5 trillion is lost-almost without notice or comment from the global economy, as a result of the degradation and destruction of the planet's nature-based resources.

The public is looking to its leaders and its policy-makers for solutions. It's time to combine policy choices that work long-term, combined with supportive market mechanisms to "green" our economies, lifestyles and jobs. Together we can perhaps provide a route to sustainable development that to date has eluded human-kind. In investment terms, it a low risk, high and sustainable growth investment portfolio for the planet.

So I welcome this volume on *Coping with Global Environmental Change, Disasters and Security - Threats, Challenges, Vulnerabilities and Risks* and its 95 peer-reviewed chapters as an eye-opener to both the challenges but also the opportunities of our age. I hope that private foundations and donors can ensure that its important ideas, debates and essential reading find their way equally onto the library book shelves of the South as well as the nations of the North.

Nairobi, in June 2010

Achim Steiner
UN Under-Secretary General and
Executive Director,
UN Environment Programme (UNEP)



Foreword

This 5th volume of the Hexagon Series on Human and Environmental Security and Peace on *Coping with Global Environmental Change, Disasters and Security – Threats, Challenges, Vulnerabilities and Risks* contributes to the task of the United Nations University to advance knowledge for human security, peace, and development. Written by over 100 experts, it addresses the conceptual linkages between the four key goals of the United Nations system of security, peace, development and the environment.

It also completes the embedded three volumes on *Global Environmental and Human Security Handbook for the Anthropocene* (GEHSHA) within the Hexagon Series.

This book addresses in 95 chapters key environmental and human security issues from the perspective of many disciplines, cultures and world regions. It reviews the ongoing conceptual debate on security threats, challenges, vulnerabilities and risks. It analyses military and political hard and soft security dangers and concerns and assesses economic, social, environmental and human security issues especially in the Middle East, North Africa and Asia. It also includes selected results of a summer academy organized by the Munich Re Foundation and the Institute for Environment and Human Security of the United Nations University (UNU-EHS) on urban centres and agglomerations as vulnerability hot spots. Senior UNU-EHS scientists write on strategies for coping with social vulnerability and resilience building during and after the occurrence of hazard events.

Altogether 28 chapters deal with adaptation to and coping with Global Environmental Change focusing on climate change, soil degradation and desertification, water management and food and health security issues. An additional 16 chapters address scientific, international, regional and national political coping strategies, policies and measures. Finally, the remaining seven chapters deal with remote sensing, vulnerability mapping and indicators of environmental security challenges and risks, with improved early warning of conflicts and hazards and propose a 'political geocology' for the Anthropocene and a new 'Fourth Green Revolution'.

Of the eight editors of this major scientific reference book, two women from Mexico and Kenya and six men from Europe and North Africa, three have been or are associated with UNU-EHS. This book contributes to the mission of the United Nations University system “to resolve the pressing global problems of human survival, development and welfare that are the concern of the United Nations, its Peoples and Member States” by relying on the knowledge generated by the social sciences and humanities as well as natural sciences based on a “holistic approach to the complex problems that affect human security and development”.

This unique compilation of global scholarship is thought provoking, analytical and very comprehensive. It deserves many readers from all walks of life. It, like the other issues of the Hexagon Series, should be available for those seeking in depth knowledge of the complexities and security implications of the linked social-environmental system we live in.

Tokyo, May 2010

Konrad Osterwalder
Rector, United Nations University
Under-Secretary-General of the
United Nations



Foreword

“Coping with Global Environmental Change, Disasters and Security Threats, Challenges, Vulnerabilities and Risks” is a burning issue today.

Climate change is a threat to vital resources and can provoke major social, economic and political problems. As such, it has major security dimensions and could act as a “threat multiplier” by increasing conflict and instability in several regions.

This was already the subject of a workshop that was co-sponsored in 2005 by NATO’s Public Diplomacy Division. The book collates the results and recommendations of this workshop and constitutes a reference to security issues in this field. It raises awareness on global environmental change and its impact on security not only among high-level officials, scientists, but also among citizens. The topics of concern include: environmental security concepts and debates; climate change and security; energy; water; food and health security for the 21st century.

In addition, it will help to identify a roadmap for future multi-disciplinary research to better understand the vulnerability and instability driven by global environmental change.

NATO is looking at the work and discussion related to climate change with great interest. Hence, global climate change is mentioned as a global threat to security in NATO’s long-term study on Future Security Environment conducted by Allied Command Transformation.

As an integral part of public diplomacy activities, NATO’s Science for Peace and Security (SPS) Programme contributes to security, stability and solidarity among NATO and partner countries, including Mediterranean Dialogue countries, by facilitating cooperation, networking and capacity-building. The main objectives of NATO’s SPS Programme are to promote the application of the best technical expertise to problem-solving.

Environmental security has been identified as a key priority for NATO’s Partner and Mediterranean Dialogue countries and, in 2008, NATO members agreed that the Science Security Forum would address this issue in-depth by bringing together internationally-recognized experts. The Forum clearly demonstrated the close link between global security concerns and environmental issues related to climate change, management of shared water resources and energy security.

Indeed, public diplomacy has an important role to play in taking the end results of these deliberations to the public in order to explain how these threats impact on human security.

Brussels, January 2010

Jean-François Bureau
NATO Assistant Secretary General
for Public Diplomacy
Chairman, Science for Peace and
Security (SPS) Committee



Foreword

Coping with Global Environmental Change, Disasters and Security – Threats, Challenges, Vulnerabilities and Risks is the fifth volume in the *Hexagon Series on Human and Environmental Security and Peace*. It completes the *Global Environmental and Human Security Handbook for the Anthropocene*. I am pleased that one of the coeditors is a Kenyan and 16 contributors to the volume are from various parts of Africa, including Egypt, Tunisia, and Mauritania (North Africa), and Nigeria, Ghana, Niger, and Burkina Faso (West Africa). This situation ensures that the diverse security challenges in Africa and how they have been confronted are adequately addressed in the book.

This scientific peer-reviewed volume contributes to crucial global dialogue and learning, based on topical new evidence from several disciplines. In the 20th century, Africa has suffered severely from the effects of global environmental change resulting from desertification, drought, famine, floods and heat waves. Millions of Africans have either been killed or forced to flee their homes.

The fourth IPCC Assessment Report of 2007 estimates that climate change will have several negative impacts on Africa, especially regarding access to clean water, sufficient food, stable health conditions, ecosystem resources, and security of settlements. It further estimates that many semi-arid areas in North and Southern Africa, will become severely water-stressed, and by 2020, between 75 and 250 million people are projected to experience increased water stress. During the same period, yields from rain-fed agriculture in some African countries could be reduced by up to 50 per cent, thus affecting food security and exacerbating malnutrition. Indeed, several African mega-deltas, due to large populations and high exposure to sea level rise, storm surges, and river flooding, will suffer from the impacts of global environmental and climate change. Although Africa has historically contributed little to climate change, the limited adaptive capacity of the countries on the continent has increased the impact of climate change on the continent.

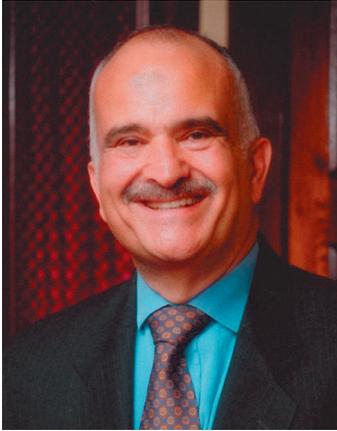
This book, with 95 chapters, reviews the conceptual debate on security threats, challenges, vulnerabilities and risks. It analyses military and political hard and soft security dangers and concerns in West Africa and assesses environmental and human security issues in North Africa. The main parts deal with the challenges of coping with Global Environmental Change, focusing on climate change, soil degradation and desertification, water management, food and health security issues. It also deals with scientific, international, regional and national political remediation strategies, policies and measures. One chapter discusses early warning systems for conflicts in East Africa and two chapters propose a 'political geocology' for the Anthropocene and a new 'Fourth Green Revolution'.

This huge volume of excellent scholarship from all parts of the world helps to sensitize, not only policy makers but also enable the young generation of professors and students globally but specifically, in the most affected countries in the South. It calls for proactive and concerted action and for a global science partnership to reduce the most debilitating

impact of the projected trends in e-business as usual strategies. This book deserves many readers in all parts of the world, even in the countries where university and research libraries are unable to afford such books. It is my sincere hope that this high-quality, multidisciplinary study and reference book, and its key messages will be made available to university and research libraries through the support of private foundations and public donors. The young generation in the South that must cope with these challenges to their security in the 21st century must be availed of this book. I wish the book-aid project success for the benefit of university libraries and research institutes and their readers in Africa, Asia and Latin America.

New York, May 2010

Ambassador Prof. Dr. Joy Ogwu
Permanent Representative of the
Federal Republic of Nigeria to the
United Nations



Foreword

Environmentally induced population displacement resulting from climate change is now indisputable. Simultaneously, as noted by the UN High Commissioner for Refugees, António Guterres, it is becoming increasingly difficult to categorize people as displaced by any single cause: conflict, economic marginalization, environmental degradation, climate change, or any other factor, since their fate may be the result of a combination of all or any of the above. The statistics in the report that follow are alarming: 300,000 deaths and 300 million severely affected each year by climate impacts today; currently, 100 billion US dollars of economic losses annually and over 20 million persons displaced; and as so often is the case, it is the poor that are worst affected, with 99 per cent of climate change casualties taking place in developing countries (Global Humanitarian Forum, 2009).

This is a human tragedy on a massive scale. It is also a major threat to global security and could result in global catastrophe costing millions of lives in climate induced wars and natural disasters. Yet governments procrastinate. This is frustrating for the many of us who know that solutions are available – now. But it requires a move away from the failed unilateral strategies of the past.

The world is facing what amounts to an existential crisis in which we are all wholly interconnected – in everything but policy. The West Asia-North Africa region, the intermediary meeting point of Eurasia, home to the greatest concentration of energy reserves, and one of the most populous, poorest, and arguably, most volatile regions of the world, is at the centre of this global crisis. Yet, with approaches inspired by vision and integrity, which place people at the centre, it can also offer solutions.

The international community has a vital role here. Rather than seek to balance power and influence in the region, global security would be better served by fostering collaboration and inclusion in policy and attitude at every level.

In practical terms, this means forging partnerships which bind the region together while looking outwards across the ‘energy ellipse’ (from the Caucasus to the Straits of Hormuz) and beyond to enable regional stabilization.

It has been universally agreed that we cannot remain dependant on finite fossil fuels, and that the development of alternative energy applications via multilateral consent and cooperation is a way forward.

A regional community employing modern technology could use the region’s deserts to develop clean energy. The jobs created in the fields of water desalination and solar energy, together with their service industries, would go some way towards meeting growing demands for employment – estimated by the World Bank as some 100 million new job opportunities required by 2020. Sustainable governance of shared resources would enable us to replace fossil fuels, help in solving ours and

Europe's energy crisis, reduce carbon emissions, slow climate change, and maximize the carrying capacity of the trans-border area.

Our composite security needs can only be addressed by humanizing globalization. The ambitious trans-regional cooperation, envisaged in the DESERTEC project's high tension grid network that would connect European national grids with the WANA region, would foster a new chapter in terms of international energy trade for 'clean, renewable energy'; could secure international energy stability between the EU-Mediterranean countries and hopefully reinvigorate the Barcelona Process. It could provide the impetus for the establishment of not only a much needed community for energy, water, and climate security for the Mediterranean riparian regions of Europe, the Middle East and North Africa, but in due course for a water and energy authority to oversee both the oil rich countries and those of the hinterland. Resource scarcity, resource wealth, and human resource wealth could thus be transformed from a source of conflict into points of cooperation.

It is with this vision of stabilizing the region on the basis of a thematic and integrated approach that puts people, human dignity, and preventive security at the forefront that I recommend this volume of work on *Coping with Global Environmental Change* and hope it will galvanize decision makers into addressing the challenges we face right now.

Amman, January 2010

HRH Prince El Hassan bin Talal
The Hashemite Kingdom of Jordan

