

Participant's Guide

Objective and aims

This training course' objectives are to improve the knowledge of health professionals on the associations and implications of climate change on human health and to enhance stronger and more efficient participation of the health sector in addressing climate change challenges.

The training course is designed for public health professionals who are actively involved in the management and decision-making process related to health programmes. The course will also give a good foundation for non-medical professionals involved in addressing the health challenges posed by climate change.

Upon completion of the course the participant will,

1. Comprehend the principles and basic concepts of global warming and climate change.
2. Understand how climate change can impact human health and know the major health effects from climate change.
3. Become aware of the special vulnerability of public health in the South East Asia Region as a result of climate change.
4. Better analyze the health sectors' vulnerability to climate change effects.
5. Have an improved understanding of the epidemiologic methods used to analyze associations between climate change and health outcomes.
6. Be aware of adaptation and mitigation policies to manage the risks of climate change.
7. Develop skills in critical thinking for making management decisions to reduce the potential adverse impacts of climate change on health.
8. Understand the role of the health sector in national, regional and global negotiations and agreements for dealing with climate change mitigation and adaptation.
9. Identify knowledge gaps and know where to find further sources of information.
10. Be in a position to help incorporate the health dimensions of climate change in local and national climate change work plans.
11. Be able to facilitate the training of other health professionals on the basic concepts of climate change and its health effects, as well as on how to programme mitigation and adaptation in the health sector.
12. Enhance stronger and more efficient participation of the health sector in addressing climate change challenges.

Outline of the Training Course

The materials for this course were developed by the manager of this project, Alexander von Hildebrand, Regional Advisor Environmental Health & Climate Change, SEARO who worked in concert with Dr. Kristie Ebi of ESS, LLC, Executive Director of the Intergovernmental Panel on Climate Change Working Group II, with David Mills of Stratus Consulting and with Dr. Hisashi Ogawa, Regional Advisor WHO Regional Office for Western – Pacific (WPRO), to develop the course framework, to identify relevant expert authors of the chapters on particular topics and to edit the final texts. The project had the financial support of SEARO.

The Training Course was reviewed by a number of health experts working mainly in SEARO. See authors' bios and list of reviewers in **Appendix 1**.

The Training Course consists of 19 chapters presented on visual slides with text notes, a "Participants' Guide" and a "Facilitators' Guide" as well as three CD audiovisuals. The associated bibliography for the chapters is also provided (see **Appendix 2**).

The participants of the training course will have a copy of the IPCC 2007 reports to allow them to prepare for the course and to provide some additional supplementary information on the topic of climate change science, impacts, and adaptation..

A list of acronyms used will help avoid misinterpretations (see **Appendix 3**).

Participants' equipment

Each participant should receive the supplies listed below:

- Participant's Guide
- Copies of the IPCC 2007 reports: [AR4 Synthesis Report](#) ; [Working Group I Report: "The Physical Science Basis"](#), the [Working Group II Report: " Impacts, Adaptation and Vulnerability"](#) and the [Working Group III Report: "Mitigation of Climate Change"](#).
- Notebook and ballpoint pen
- A hand bag to keep all the above items
- CD with a copy of the course chapters and supporting information

Introduction to the course

At the very first session the course facilitator will introduce her/himself to the participants.

Each participant should then introduce himself or herself. It might be helpful that the participants group into pairs and exchange names, information about jobs, and hometowns. Each participant can then introduce his or her partner to the whole group. This often has the effect of reducing tension, if any, and promotes a relaxed learning atmosphere.

Then, the course facilitator presents the objectives and aims of the training course, briefly discussing the various topics covered. The role of the course facilitator and the participants should be made clear.

The participants should understand exactly what they are expected to achieve by the end of the course. The participants should keep the course objectives in mind throughout the course and always ask for help if they feel uncertain of having achieved them.

Participants need to communicate expectations of the course and what additional objectives they would like to see added in the course. It is important that the participants agree on the course objectives and that they may match to their own expectations of the course. Later on, the participants may have a re-look and assess it if the objectives have been met with. By setting consensus one provides a mechanism to resolve conflict.

Timetable

The timetable must allow adequate time for evaluation both during and after the course, and for unforeseen situations, such as getting involved into working groups, delays in transportation to the place of training and so on. A suggested timetable for a four day training course is a seven-hour working day, four hours in the morning and three in the afternoon. This may not always be suitable and may have to be modified.

A certain amount of time should be allocated, especially in the morning sessions, to provide scope for further discussion of important topics. Time should be allocated for gathering literature materials in the library to facilitate completing the exercises. These activities can be fitted into "free" periods or as part of the small group exercises.

Evaluation

It is very difficult to make a judgment as whether or not the objectives of the course have been met with. Therefore, it requires an evaluation of the participant by the course facilitator and an evaluation of the course by the participants.

Evaluating the Participant

The evaluation will be based on pre and post-tests as part of the learning experience and should be taken in good spirit rather than taking it otherwise. The purpose is to allow an assessment of the participants' starting level, to correct mistakes and clarify misunderstandings. It should be emphasized that they must read **all** the questions (and any supplementary instructions) very carefully.

Evaluation of the training by the participant

By means of a questionnaire the course facilitator may ask the participants as what do they think about the training and whether it has helped them to improve their knowledge and skill and how the course might be improved. This evaluation takes place at the end of the training period in order to provide as much feedback as possible. Replies to the questionnaire may either be signed or not, but the participant should feel completely free to make suggestions for improvement in the presentation, course dynamics and content.

Feedback provided during the course also helps to assess how well the training is being received and provides a scope to make adjustments during the course. Feedback received at the end of the course helps to improve future training strategies and course material. If the course has been carefully prepared and taught, feedback is likely to be favourable, which should be rewarding both for the course facilitator and for the facilitators.

Enjoy and Good luck!

Chapters	Authors	Scope	Duration
Day 1:			
1. Climate change and health: Introduction and overview	Dr. Kristie L. Ebi, Executive Director of the Intergovernmental Panel on Climate Change Working Group II	Provides an introduction to global environmental change and the issues that will be covered in the course <i>Link to 2007 IPCC reports: Summary Report, Pages 1 to 22 (see list of acronyms in Appendix 3)</i>	1.5 hours
2. Weather, climate, climate variability and climate change	Dr. Kristie L. Ebi, Executive Director of the Intergovernmental Panel on Climate Change Working Group II	Define terms; Discusses climate change and how has it been determined that humans are influencing the climate; Shows some of the climatic changes that have occurred to date; Shows how climate change will affect the weather for decades to centuries <i>Links to 2007 IPCC reports: Working Group II, Summary pages 7 to 22 and page 25.</i>	1.5 hours
3. Population's Health and Climate Change in South- East Asia	Alexander von Hildebrand, Environmental Health and Climate Change, WHO SEARO	South East Asia is disaster prone; The most vulnerable; Climate-sensitive health outcomes; Exacerbating current burden of disease <i>Link to 2007 IPCC reports: Working Group II, Summary pages 59 to 63</i>	0.5 hours
4. Overview of the health impacts of climate change	Dr. Kristie L. Ebi, Executive Director of the Intergovernmental Panel on Climate Change Working Group II	Reviews the major health impacts of climate change, including increases in the frequency and intensity of extreme weather events alterations in the transmission dynamics of food-, water-, and vector borne diseases; and changes in the concentrations of air pollutants <i>Link to 2007 IPCC reports: Working Group II, Chapter 8: Human health; Working Group II, pages 68 to 70</i>	1.5 hours

5. Policy responses to address the risks of climate change	Dr. Kristie L. Ebi, Executive Director of the Intergovernmental Panel on Climate Change WG II.	Review of adaptation and mitigation policies to manage the risks of climate change <i>Links to 2007 IPCC reports: Summary Report, p.44- 53; The Physical Science Basis, p 81 to 91 (T.S 6)</i>	1.0 hours
Day 2:			
6. Analyzing the health impacts of weather, climate and climate change	Dr. Paul Wilkinson, London School of Hygiene and Tropical Medicine, England	Epidemiologic methods for analyzing associations between weather and weather patterns and health outcomes. <i>Links to 2007 IPCC reports: The Physical Science Basis, pages 37 to 43 (T.S 3.1.2 and T.S 3.1.3; FAQ 6.2 page 114</i>	1.5 hours
7. Modeling the health impacts of climate change	Dr. Kristie L. Ebi, Executive Director of the Intergovernmental Panel on Climate Change WG II	Defines and discusses the scenarios used for projecting climate change; and reviews approaches taken for modeling the potential health impacts of climate change. <i>Link to 2007 IPCC reports: The Physical Science Basis, FAQ 8.1 page 117</i>	1.5 hours
8. Estimating the burden of disease from climate change	Dr. Diarmid Campbell-Lendrum, Public Health and Environment, World Health Organization	Outlines steps involved in estimating the burden of disease from climate change; Presents worked examples for several of the health impacts described in the WHO global assessment of the burden of disease from climate change; Presents overall results from this assessment, describes their usefulness, and limitations, for informing policy. <i>Reference: " Climate change: Quantifying the health impact at national and local levels", WHO, 2007</i>	1 hour

9. Thermal extremes	David Mills, Stratus Consulting Inc.	Key concepts; How to identify thermal extremes; Who is vulnerable during thermal extremes; Methods for assessing the health risk and impacts of thermal extremes; Current health impact of thermal extremes; Potential impact of climate change; Potential for adaptation to minimize future health risks and impacts. <i>Link to 2007 IPCC reports: The Physical Science Basis, FAQ 10.1 page 122</i>	1 hour
10. Extreme weather events	David Mills, Stratus Consulting Inc.	Categories of extreme weather events considered; How extreme weather events threaten public health; Nature of public health impacts with extreme weather events; Future risks and potential health impacts. <i>Links to 2007 IPCC reports: The Physical Science Basis, FAQ 3.3 page 107 and FAQ 9.1 page 119</i>	1 hour
11. Thermal extremes	David Mills, Stratus Consulting Inc.	Key concepts; How to identify thermal extremes; Who is vulnerable during thermal extremes; Methods for assessing the health risk and impacts of thermal extremes; Current health impact of thermal extremes; Potential impact of climate change; Potential for adaptation to minimize future health risks and impacts; <i>Link to 2007 IPCC reports: The Physical Science Basis, FAQ 10.1 page 122</i>	1 hour

12. Extreme weather events	David Mills, Stratus Consulting Inc.	Categories of extreme weather events considered; How extreme weather events threaten public health; Nature of public health impacts with extreme weather events; Current health risks and impacts from extreme weather events in South East Asia; Future risks and potential health impacts. <i>Links to 2007 IPCC reports: The Physical Science Basis, FAQ 3.3 page 107 and FAQ 9.1 page 119</i>	1 hour
Day 3:			
13. Water stress, water- and foodborne diseases	Dr. Erin Lipp, University of Georgia, USA	Water quantity and quality; Burden of diarrheal disease; How climate and weather affects diarrheal diseases and food and waterborne pathogens; Season; Temperature; Precipitation (flooding and drought); Sea level rise; <i>Links to 2007 IPCC reports: The Physical Science Basis, page 53, Box TS5</i>	1 hour
14. Vector borne diseases and climate change	Dr. Nicholas Ogden, Université de Montréal, Canada; Dr. Lea Berrang Ford, Dr. Rose Eckhardt, and Dr. Valerie Hongoh, McGill University, Canada	Vector borne and zoonotic diseases of concern; current burden of disease; exposure-response relationships; evidence that the risks have been changing with climate change; projections of future changes in risk <i>Links to 2007 IPCC reports: The Physical Science Basis, FAQ 3.1 page 103 and FAQ 3.2 page 105</i>	5 hours

15. Food security and malnutrition	Dr. Colin Butler, Australian National University, Australia	Defines terms; Food insecurity and its causes; How climate change is likely to affect crop production and food security; How climate change and other forms of global change are likely to affect future crop production and food security; How climate change is already affecting food security; Burden of disease – undernutrition; Causes of food insecurity. <i>Link to 2007 IPCC reports: The Physical Science Basis, FAQ 5.1, page 111</i>	1 hour
16. Global change, air quality and human health	Dr. Patrick Kinney, Columbia University, USA	Introduction to climate and air quality; Characteristics and health effects of major anthropogenic air pollutants; Exposure-response relationships; Global burden of disease due to air pollution; Has climate change affected air pollution?; Observed trends; Integrated modeling; Co-benefits assessment. <i>Links to 2007 IPCC reports: The Physical Science Basis, FAQ 1.1 page 94; FAQ 1.2. page 96; FAQ 1.3 page 98; FAQ 2.1 page 100</i>	1 hour
17. What makes individuals and populations vulnerable to the effects of climate change?	Dr. Alistair Woodward, University of Auckland, New Zealand	Defines terms; Discusses the causes of vulnerability to disease and injury resulting from climate change; Describes current and past examples of vulnerability to effects of heat, famine and storms; Points to opportunities to reduce vulnerability and improve population health.	1.5 hours

Day 4:			
18. Public health adaptation to the health risks of climate change	Dr. Kristie L. Ebi, Executive Director of the Intergovernmental Panel on Climate Change Working Group II	Public health approaches to manage the risks of climate change. <i>Link to 2007 IPCC reports: Working Group II, Summary pages 1 to 23</i>	2.0 hours
19. Early warning systems	Dr. Kristie L. Ebi, Executive Director of the Intergovernmental Panel on Climate Change Working Group II	Use of early warning systems for health outcomes sensitive to climate variability. <i>Reference: Climate change and human health: risks and responses, WHO, 2003 - page 237 to 267</i>	1 hour
20. Regional action plan for South-East Asia	Alexander von Hildebrand, Environmental Health and Climate Change, WHO SEARO	South-East Asia (SEA) countries most vulnerable; Regional consensus on need for climate action; national climate action plans; Conclusions. <i>Reference: Regional framework for action to protect human health from climate change; New Delhi Declaration 2008</i>	1 hour
21. Role of the health sector in international climate change negotiations	Fiona Gore, Public Health and Environment, World Health Organization, Geneva	The UNFCCC and the Nairobi Work Plan; National Adaptation Programmes of Action or NAPAs; Bali Action Plan; The Global Environment Facility or GEF; Health in the Climate Change Negotiations; WHO Global Action Plan 2009. <i>Reference: Submission by the World Health Organization to the UNFCCC, 2009; Climate change and human health: risks and responses, WHO, 2003, Summary 2008</i>	1 hour

Appendix 1: Contributing Authors and List of Reviewers

Dr. Colin Butler, Australian National University

Dr Butler is an Associate Professor at the National Centre for Epidemiology and Population Health, at the Australian National University. He was corresponding author for the chapter on future human wellbeing in the scenarios section of the Millennium Ecosystem Assessment, and has written many papers and chapters relevant to environmental health. Dr. Butler is also co-founder of the non-government organization BODHI, which supports development projects in China and several countries of South Asia.

Dr. Diarmid Campbell-Lendrum, World Health Organization

Diarmid Campbell-Lendrum is a specialist in climate change and health at the World Health Organization Headquarters in Geneva. Diarmid has played key roles in the development of the first quantitative estimates of the overall health impacts of climate change, the 2008 World Health Day on "Health Protection from Climate Change", the 2008 World Health Assembly resolution on this issue, and has developed projects and run multiple workshops to pilot health adaptation to climate change in developing countries. He recently coordinated a new exercise to define an international research agenda on climate change and health, in compliance with the World Health Assembly resolution. He is author or editor of multiple journal papers, reports, book chapters, and books on infectious disease transmission and control, and on the health implications of climate change.

Dr. Kristie L. Ebi, ESS, LLC.

Dr. Ebi has more than 25 years experience evaluating the health impact of environmental stressors with more than 12 years of applied research on the human health impacts of and adaptation to climate change. She was a lead author on the Human Health chapter of the IPCC Fourth Assessment Report, and the Human Health chapter for the U.S. Synthesis and Assessment Product Analyses of the Effects of Global Change on Human Health and Welfare and Human Systems. Dr. Ebi is currently Executive Director of the Intergovernmental Panel on Climate Change Working Group II (Vulnerability, Impacts and Adaptation) Technical Support Unit. Dr. Ebi is also the president of ESS, LCC a consulting firm specializing in public health issues related to climate change impacts and adaptation.

Dr. Rose Eckhardt, McGill University

Dr Rose Eckhardt is a graduate student in Health Geography at McGill University. Her current research focuses on modeling emerging vector-borne disease risk in Canada, with a special emphasis on the role of climate change and human movement patterns. Her past research projects include a study of diarrheal disease in Senegal and a review of HIV/AIDS and social networks. Rose plans to continue to work on research related to disease transmission modeling, spatial epidemiology, and international infectious disease epidemics.

Dr. Lea Berrang Ford, McGill University

Dr. Berrang Ford is an epidemiologist, geographer, and Assistant Professor in the Department of Geography at McGill University (Montreal, Canada). Combining degrees in geography (BSc Guelph), environmental change and management (MSc Oxford), and zoonotic epidemiology (PhD Guelph), her research focuses on the role of environmental change as a determinant of emerging infectious disease and global health. Dr. Berrang Ford's expertise includes spatial epidemiologic analysis, ecosystem and environmental health, climate impacts on infectious disease, and health geography. Dr. Berrang Ford worked previously with the Public Health Agency of Canada on spatial and environmental analysis of zoonotic and vector-borne infections, and continues collaboration with Agency research initiatives. Current projects include collaborative research in Uganda, Peru, and Canada.

Fiona Gore, World Health Organization

Since 2003, Fiona Gore has been coordinating the Global Initiative on Children's Environmental Health Indicators (CEHI). In 2008, she was additionally assigned to working as part of the Climate Change and Health team as the Liaison Officer on tasks related to the UNFCCC Nairobi Work Programme (NWP) and other UN lead climate change related processes contributing towards raising awareness of the health implications of climate change. She has a background in geology and environmental sciences, with a specialization in natural disasters, as well as postgraduate qualifications in epidemiology, public and community health, with particular expertise in water and sanitation linked with nutrition. She has been a Technical Officer in the Public Health and Environment Department at WHO since 2002 and recently joined the Information, Evidence and Research Cluster at WHO.

Valerie Hongoh, McGill University

Valerie Hongoh is currently a M.Sc. student in the Department of Geography at McGill University. She holds a previous B.Sc. in Environmental Science from McGill University as well as a B.Sc. in Computer Science from Concordia University. Her current research is focused on the impacts of climate change on mosquito-borne disease in Canada. Upon completion of her M.Sc., Valerie is interested in pursuing research in the area of environmental change and ecosystem health.

Dr. Patrick Kinney, Columbia University

Dr. Patrick Kinney's teaching and research address issues at the intersection of global environmental change, human health, and policy, with an emphasis on the public health impacts of climate change and air pollution. Dr. Kinney has carried out numerous studies examining the effects of ozone and/or particulate matter on lung health and on daily mortality in large cities. More recently, he developed a new interdisciplinary research and teaching program at Columbia examining the potential impacts of climate change on human health. Dr. Kinney was the first to show that climate change could worsen urban smog problems in the U.S., with attendant adverse health impacts. He also has projected future health impacts related to heat waves in the New York City metropolitan area. Dr. Kinney is currently working with clinicians at Columbia University Medical Center and New York-Presbyterian Hospital to understand how past and future climate may affect pollen-related allergic airway diseases.

Dr. Erin Lipp, University of Georgia

Dr. Lipp is an environmental microbiologist with over ten years of experience working on issues related to climate, water quality and waterborne disease. Most recently she was a contributing author to the Human Health chapter for the U.S. Synthesis and Assessment Product Analyses of the Effects of Global Change on Human Health and Welfare and Human Systems. Dr. Lipp's research focus is the ecology of human pathogens in ambient waters and the role of environmental exposures in disease transmission. Her research incorporates molecular biology, microbial ecology, epidemiology and climate research to better understand the fate of bacteria and viruses introduced from wastewater to aquatic environments and their potential for transmission to humans and other hosts. Currently, she is an associate professor in Environmental Health Science in the University of Georgia's College of Public Health in Athens, Georgia.

David Mills, Stratus Consulting Inc.

Mr. Mills has more than 13 years experience reviewing and synthesizing literature on the potential for climate change to affect human health through various pathways, including extreme weather events, and air pollution. Among other efforts, Mr. Mills was a co-author on the chapter on human health impacts of climate change in the U.S. Climate Change Science Program's report, *Analyses of the Effects of Global Change on Human Health and Welfare Systems*, and managed the development and production of the *Excessive Heat Events Guidebook* produced by the U.S. EPA in 2006. Mr. Mills is a senior analyst with Stratus Consulting Inc. He is based in the firm's Boulder, Colorado office.

Dr. Nicholas Ogden, Université de Montréal

Dr. Ogden qualified as a veterinarian in the UK (University of Liverpool, 1983) and after nearly 10 years in practice returned to university to complete a doctorate in the ecology of Lyme disease (Department of Zoology, University of Oxford, 1996). During six years as a lecturer at the Faculty of Veterinary Science, University of Liverpool, he continued research in the ecology and epidemiology of zoonotic tick-borne diseases in Europe and of tick-borne diseases of veterinary importance in Tanzania. Having moved to Canada, he is now a researcher for the Public Health Agency of Canada investigating the potential effects of climate change on the distribution of Lyme disease in Canada. He is also an associate of the Groupe de Recherche en Épidémiologie des Zoonoses et Santé Publique (GREZOSP) of the Faculté de médecine vétérinaire de l'Université de Montréal.

Alexander von Hildebrand, Regional Advisor in Environmental Health, World Health Organization, Regional Office for South East Asia

Alexander von Hildebrand has over 25 years of experience promoting integrated development in the agricultural, environmental and health sectors through work in South America (Peru), Africa (Madagascar) and in various South East Asian countries including India. He has contributed to national and international programmes and strategic approaches to protect the environment and human health through the sound management of hazardous chemicals and has supported community-based initiatives to improve food safety and reduce the health burden from vector borne diseases. More recently, he has been active in helping create awareness of the need for urgent action to protect human health from climate change-associated risks and impacts.

An engineer by profession, Mr. von Hildebrand has served as a Regional Advisor for Environmental Health, at the South East Asia Regional Office of the World Health Organization since 2001.

Dr. Paul Wilkinson, London School of Hygiene and Tropical Medicine

Dr Paul Wilkinson is Reader in Environmental Epidemiology at the London School of Hygiene & Tropical Medicine. He trained in clinical medicine and public health in the UK, principally in Oxford and London, and began epidemiological research at the National Heart & Lung Institute, before moving to the London School in 1994. He has long-standing research interests in environment and health links, especially in relation to climate change and energy. He is co-director of a WHO Collaborating Centre on Global Change and Health.

Dr. Alistair Woodward, University of Auckland

Dr. Woodward has been Head of the School of Population Health at the University of Auckland since 2004. His first degree was in medicine and he undertook his postgraduate training in public health in the United Kingdom and Australia. His research in environmental health has included tobacco, radio-frequency radiation, and transport and injury. For 15 years he has been studying and writing on climate change and human health. He has been a consultant to WHO, UNDP and other international agencies, and was an author of the 2nd, 3rd and 4th IPCC assessment reports. Currently he is undertaking work on co-benefits of greenhouse mitigation and causes of resilience in communities.

List of Reviewers

Regional Office for South-East Asia (SEARO)

- Chapter 3: Dr. Sattar Yoosuf, Sustainable Development and Healthy Environments
- Chapter 5: Dr Tushara Fernando, Health Systems Development
- Chapter 9: Dr. Habibullah Saiyed, Occupational Health
- Chapter 10: Dr. Roderico Ofrin, Emergency and Humanitarian Action
- Chapter 11 and Chapter 18 : Ms. Payden, Water, Sanitation and Hygiene
- Chapter 12: Dr. Thimarsan Kronthong, Malaria
- Chapter 13: Dr. Kunal Bagchi, Nutrition, Health and Development
- Chapter 15: Dr. Neena Raina, Adolescent Health and Development
- Chapter 16: Dr. Davison Munodowafa, Health Promotion and Education
- Chapter 17: Dr. Gynendra Gongal, Zoonosis

Regional Office for Western Pacific (WPRO)

- All chapters: Dr. Hisashi Ogawa, Regional Adviser, Healthy Settings and Environment

Appendix 2: Bibliography

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Appendix 3: List of Acronyms

ACS	American Cancer Society
AIDS	Acquired Immunodeficiency Syndrome
APF	Adaptation Policy Framework
AVHRR	Advanced Very High Resolution Radiometer
AWG-LCA	Ad Hoc Working Group on Long-Term Cooperative Action
BoD	Burden of disease
BSE	Bovine Spongiform Encephalopathy
BTV	Bluetongue virus
CBD	Convention on Biological Diversity
CC	Climate change
CDC	Centers for Disease Control and Prevention
CDM	Clean Development Mechanism
CEB	Chief Executive Board
CER	Certified emission reduction
CGIAR	Consultative Group on International Agricultural Research
CH ₄	Methane
CIESIN	Center for International Earth Science Information Network
CO	Carbon monoxide
CO ₂	Carbon dioxide
COP	Conference of Parties
COSMIC	Country Specific Model for Intertemporal Climate, Computer Software
CVD	Cardiovascular disease
DALY	Disability adjusted life year
DHF	Dengue hemorrhagic fever
DPRK	Democratic People's Republic of Korea
ENSO	El Nino-Southern Oscillation
ESM	Earth System Model
FAO	Food and Agricultural Organization
GBD	Global burden of disease
GCM	General Circulation Model
GDP	Gross domestic product
GEF	Global Environment Facility
GHG	Greenhouse gas
GIS	Geographic Information System
GISS	Goddard Institute for Space Studies
GLOF	Glacial lake outburst flood
GMO	Genetically modified organism
HIA	Health Impact Assessment
HIV	Human Immunodeficiency Virus
HPAI	Highly pathogenic avian influenza
ICD-10	International Classification of Diseases – 10th Edition

List of Acronyms (continued)

ICESCR	International Covenant on Economic, Social and Cultural Rights
ICIMOD	International Centre for Integrated Mountain Development
IFPRI	International Food Policy Research Institute
IFRC	International Federation of the Red Cross
IPCC	Intergovernmental Panel on Climate Change
ISDR	International Strategy for Disaster Reduction
JE	Japanese encephalitis
LAP	Length of growing period
MARA/ARMA	Mapping malarial risk in Africa
MDGs	Millennium Development Goals
MEA	Multilateral environmental agreement
MIASMA	Modeling Framework for the Health Impact Assessment of Man-Induced Atmospheric Changes
MPH	Miles per hour
NAO	North Atlantic Oscillation
NAPA	National Adaptation Program of Action
NCAR	National Center for Atmospheric Research
NCD	Non communicable disease
NDVI	Normalized Difference Vegetative Index
NO ₂	Nitrogen dioxide
NO _x	Nitrous oxides
NWP	Nairobi Work Program
NYC	New York City
O ₂	Oxygen
O ₃	Ozone
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
OECD	Organization for Economic Co-operation and Development
PAR	Population at risk
Pb	Lead
PDSI	Palmer Drought Severity Index
PM	Particulate matter
ppb	Parts-per-billion
ppm	Parts-per-million
PTSD	Post-Traumatic Stress Disorder
RVF	Rift Valley Fever
SBI	Subsidiary Body for Implementation
SBSTA	Subsidiary Body for Scientific and Technological Advice
SEA	South East Asia
SEARO	South East Asia Regional Office
SIDS	Small island developing states
SO ₂	Sulfur dioxide

List of Acronyms (continued)

SOI	Southern Oscillation Index
SRES	Standardized Reference Emission Scenarios
SST	Sea surface temperature
UKMO	United Kingdom Meteorological Office
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
UN-OHCHR	United Nations Office of the High Commissioner for Human Rights
UVR	Ultra violet radiation
VBD	Vector-borne disease
VBZ	Vector-borne zoonose
VOC	Volatile organic compound
WHA	World Health Assembly
WHD	World Health Day
WHO	World Health Organization
WMO	World Meteorological Organization
WNV	West Nile Virus
YLL	Years of life lost