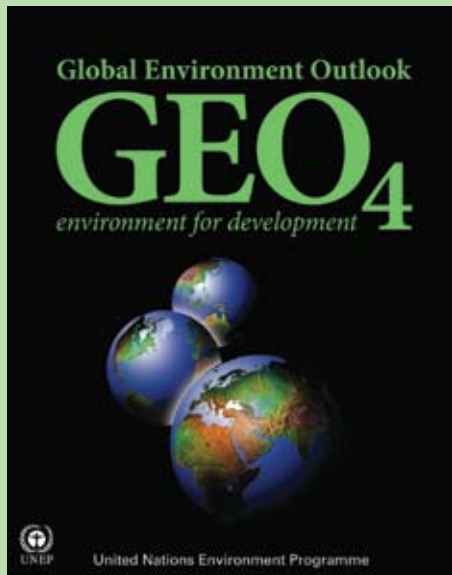


Global Environment Outlook: Environment for development

GEO-4 aims to provide a comprehensive, reliable and scientifically credible, policy-relevant, up-to-date assessment of, and outlook for, the state of the global environment



GEO-4: Theme, Scope and Outline

Theme

Environment for Development is the GEO-4 underlying theme. The report pays special attention to the role and impact of the environment on human well-being and vulnerability.

Scope

- (a) Present global and regional issues in the context of the development of international environmental governance and their relation to the Millennium Development Goals and targets since the World Commission on Sustainable Development (the Brundtland Commission), *inter alia* in the Rio Declaration, Agenda 21, the Millennium Declaration, the Johannesburg Declaration and Plan of Implementation and relevant environmental global and regional agreements.
- (b) Assess the state-and-trends of the global environment in relation to previous GEO reports, analysing human drivers and pressures, and the impact of natural phenomena on the environment, the consequences of environmental change for ecosystem services and human well-being, progress and barriers towards meeting commitments under multilateral environmental agreements, and the effectiveness of policy responses.
- (c) Assess interlinkages between major environmental challenges and their consequences for policy and technology response options, and trade-offs, identifying success stories and lessons learned. It will also assess opportunities for technology and policy interventions for both mitigating and adapting to environmental change.
- (d) Assess challenges and opportunities of certain key cross-cutting issues, particularly as they relate to how environment can contribute to the sustainable development goals and targets, and how environmental degradation can impede progress towards those targets, focusing on vulnerable groups, species, ecosystems and spatial areas.
- (e) Present a global and sub-global outlook, including short-term (up to 2015) and medium-term (up to 2050) scenarios for the major environmental issues and possible policy responses, using examples from the global, regional and local level where possible and appropriate.

GEO-4 Background

The Global Environment Outlook process has over the past 10 years produced a series of global integrated environmental assessment reports aimed at providing comprehensive, reliable, scientifically credible, and policy-relevant assessments on the interaction between environment and society.

In line with its core mandate of "keeping the global environment under review," UNEP has coordinated a series of extensive consultative and participatory processes which have led to the production of three volumes of the comprehensive Global Environment Outlook (GEO) report: *GEO-1* in 1997; *GEO-2000* in 1999 and; *GEO-3* in 2002 prior to the World Summit on Sustainable Development (WSSD). The consultative processes defining the scope of *GEO-4* began in 2004.

GEO-4 is the first of the GEO series of comprehensive reports to enter into a five-year production cycle. The UNEP Governing Council decision 22/1 1B extended the interval between the comprehensive Global Environment Outlook reports from two to five years and requested the fourth report to be published in 2007.



G L O B A L E N V I R O N M E N T O U T L O O K

Keeping the global environment under review

The fourth *Global Environment Outlook – environment for development (GEO-4)* places sustainable development at the core of the assessment, particularly on issues dealing with intra- and intergenerational equity. The analyses include the need and usefulness of valuation of environmental goods and services, and the role of such services in enhancing development and human well-being, and minimizing human vulnerability to environmental change. The *GEO-4* temporal baseline is 1987, the year in which the World Commission on Environment and Development (WCED) published its seminal report, *Our Common Future*. The Brundtland Commission was established in 1983, under UN General Assembly resolution 38/161 to look at critical environment and development challenges. It was established at a time of an unprecedented rise in pressures on the global environment, and when grave predictions about the human future were becoming commonplace.

The year 2007 is a major milestone in marking what has been achieved in the area of sustainable development and recording efforts – from local to global – to address various environmental challenges. It will be:

- Twenty years since the launch of *Our Common Future*, which defined sustainable development as a blueprint to address our interlinked environment and development challenges.
- Twenty years since the UNEP Governing Council adopted the “Environmental Perspective to the Year 2000 and Beyond”, to implement the major findings of the WCED and set the world on a sustainable development path.
- Fifteen years since the World Summit on Environment and Development (the Rio Earth Summit), adopted Agenda 21, providing the foundation on which to build intra- and intergenerational equity.
- Five years since the World Summit on Sustainable Development (WSSD) in 2002, which adopted the Johannesburg Plan of Implementation.

The year 2007 is also the halfway point to the implementation of some of the internationally recognized development targets, including the Millennium Development Goals (MDGs). These and other issues are analysed in the report.

The *GEO-4* assessment report is the result of a structured and elaborate consultative

process, which is outlined at the end of this report. *GEO-4* has six sections and 10 chapters, which provide an overview of global social and economic trends, and the state-and-trends of the global and regional environments over the past two decades, as well as the human dimensions of these changes. It highlights the interlinkages as well as the challenges of environmental change and opportunities that the environment provides for human well-being.

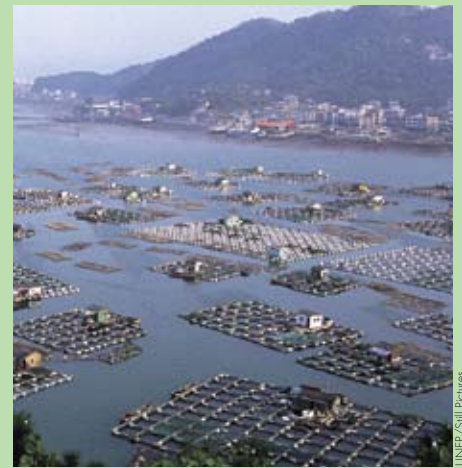
It provides an outlook for the future, and policy options to address present and emerging environmental issues. The following are the highlights of each chapter:

Chapter 1: Environment for Development – examines the evolution of issues since *Our Common Future* popularized “sustainable development,” highlighting institutional developments and conceptual changes in thought since then, as well as the major environmental, social and economic trends, and their influence on human well-being.



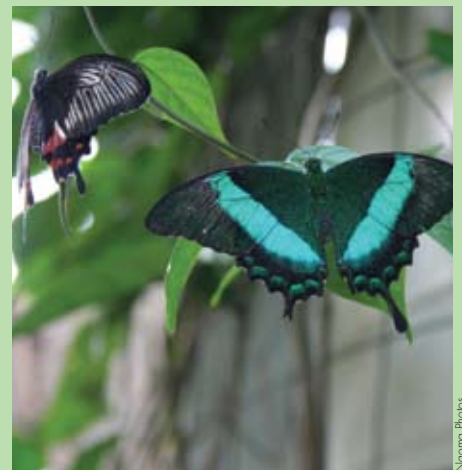
Chapter 2: Atmosphere – highlights how atmospheric issues affect human well-being and the environment. Climate change has become the greatest challenge facing humanity today. Other atmospheric issues, such as air quality and ozone layer depletion are also highlighted.

Chapter 3: Land – addresses the land issues identified by UNEP regional groups, and highlights the pressures of human demands on land resources as causes of land degradation. The most dynamic elements of land-use change are the far-reaching changes in forest cover and composition, cropland expansion and intensification, and urban development.



Chapter 4: Water – reviews the pressures that are causing changes in the state of the Earth’s water environment in the context of global and regional drivers. It describes the state-and-trends in changes in the water environment, including its ecosystems and their fish stocks, emphasizing the last 20 years, and the impacts of changes on the environment and human well-being at local to global scales.

Chapter 5: Biodiversity – highlights biodiversity as a key pillar of ecologically sustainable development, providing a synthesis of the latest information on the state-and-trends of global biodiversity. It also links trends in biodiversity to the consequences for sustainable development in a number of key areas.



Chapter 6: Sustaining a Common Future – identifies and analyzes priority environmental issues between 1987–2007 for each of the seven GEO regions: Africa, Asia and the Pacific, Europe, Latin America and the Caribbean, North America, West Asia and the Polar Regions. The chapter points out that for the first time since the GEO report series was first published in 1997 all seven regions recognize climate change as a major issue.



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Chapter 7: Vulnerability of People and the Environment: Challenges and Opportunities – identifies challenges to and opportunities for improving human well-being through analyses of the vulnerability of some environmental systems and groups in society to environmental and socio-economic changes. The export and import of human vulnerability have grown as a result of phenomenal global consumption, increased poverty and environmental change.



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Chapter 8: Interlinkages: Governance for Sustainability – presents an assessment of the interlinkages within and between the biophysical components of the Earth system, environmental change, the development challenges facing human society, and the governance regimes developed to address such challenges. These elements are interlinked through significant systemic interactions and feedbacks, drivers, policy and technology synergies and trade-offs. Governance approaches that are flexible, collaborative and learning-based may be more responsive and adaptive to change, and therefore, better able to cope with the challenges of linking environment to development.

Chapter 9: The Future Today – builds on previous chapters by presenting four scenarios to the year 2050 – *Markets First, Policy First, Security First and Sustainability First* – which explore how current social, economic and environmental trends may unfold, and what this means for the environment and human well-being. The scenarios examine different policy approaches and societal choices. They are presented using narrative storylines and quantitative data at both global and regional levels. The degree of many environmental changes differs over the next half-century across the scenarios as a result of differences in policy approaches and societal choices.



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Chapter 10: From the Periphery to the Core of Decision Making – Options for Action – discusses the main environmental problems highlighted in earlier chapters, and categorizes them along a continuum from problems with *proven* solutions to problems for which solutions are *emerging*. It also describes the adequacy of current policy responses, and possible barriers to more effective policy formulation and implementation. It then outlines the future policy challenges, pointing to the need for a two-track approach: extending policies that have been demonstrated to work for conventional environmental problems into regions lagging behind, and beginning to tackle the emerging environmental problems through structural reforms to social and economic systems.

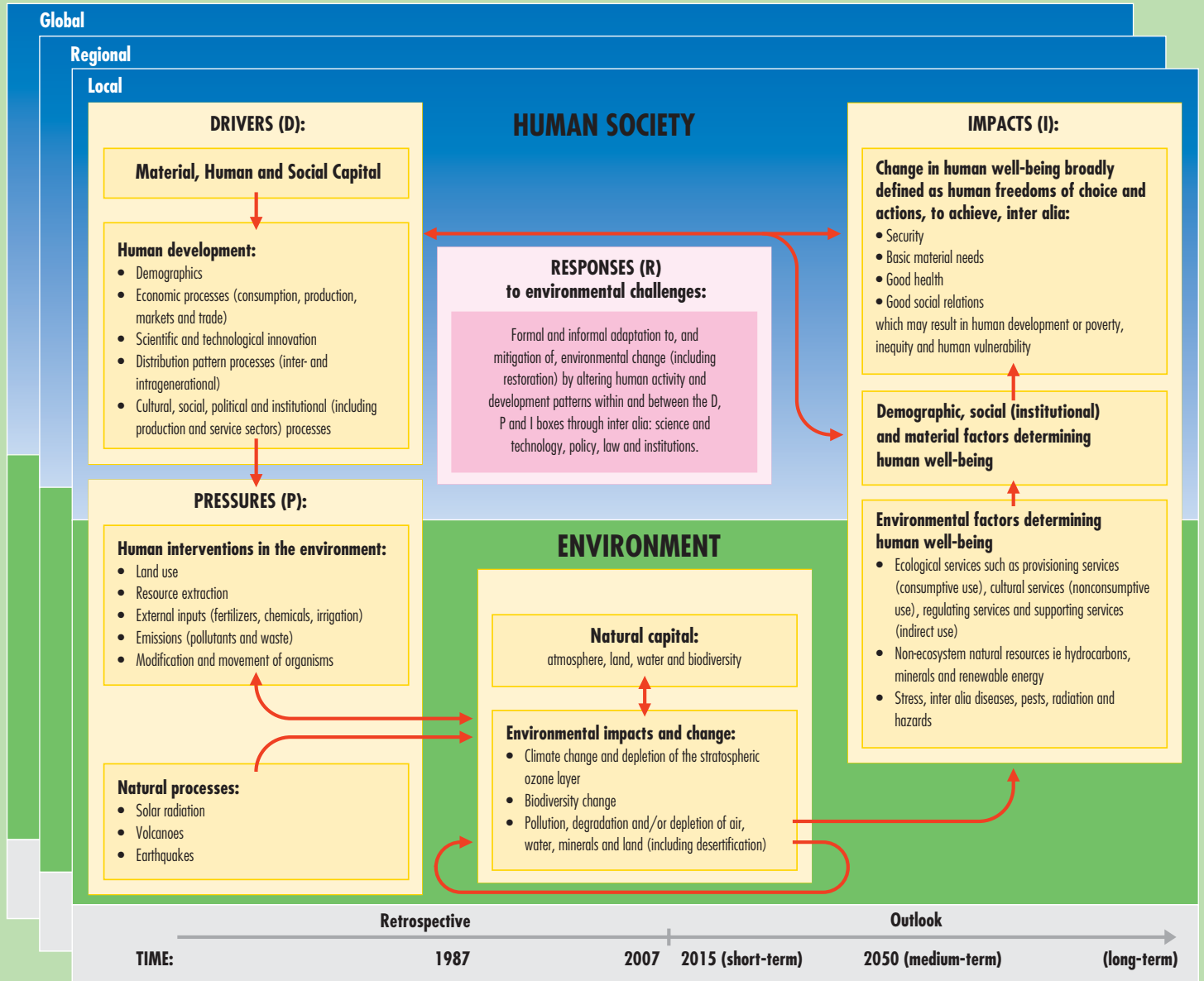
GEO-4 Related Specialist Reports

- (a) Summary for Decision Makers
- (b) Environmental Valuation and Human-Well-Being report; and
- (c) Capacity Building Resource Book includes GEO methodologies and analytical approaches to support capacity building for the development of national level assessment reports.



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Figure 1



GEO-4 conceptual framework

The *GEO-4* assessment uses the drivers-pressures - state -impacts -responses (DPSIR) framework in analysing the interaction between environmental change over the past two decades as well as in presenting the four scenarios in Chapter 9.

The concepts of human well-being and ecosystem services are core in the analysis. However, the report broadens its assessment from focusing exclusively on ecosystems to cover the entire environment and the interaction with society.

The framework attempts to reflect the key components of the complex and multidimensional, spatial and temporal chain of cause-and-effect that characterizes the interactions between society and the environment. The *GEO-4* framework is

generic and flexible, and recognizes that a specific thematic and geographic focus may require a specific and customized framework.

The *GEO-4* conceptual framework (Figure 1), therefore, contributes to society's enhanced understanding of the links between the environment and development, human well-being and vulnerability to environmental change.

The framework places, together with the environment, the social issues and economic sectors in the 'impacts' category rather than just exclusively in the 'drivers' or 'pressures' categories (Figure 1).

The characteristics of the components of the *GEO-4* analytical framework are explained above.

Drivers

Drivers are sometimes referred to as indirect or underlying drivers or driving forces. They refer to fundamental processes in society, which drive activities with a direct impact on the environment. Key drivers include: demographics; consumption and production patterns; scientific and technological innovation; economic demand, markets and trade; distribution patterns; institutional and social-political frameworks and value systems. The characteristics and importance of each driver differ substantially from one region to another, within regions and within and between nations. For example, in the area of population dynamics, most developing countries are still facing population growth while developed countries are faced with a stagnant and ageing population. The resource demand of people influence environmental change.

Pressures

Key pressures include: emissions of substances which may take the form of pollutants or waste; external inputs such as fertilizers, chemicals and irrigation; land use; resource extraction; and modification and movement of organisms. Human interventions may be directed towards causing a desired environmental change such as land use, or they may be intentional or unintentional by-products of other human activities, for example, pollution. The characteristics and importance of each pressure may vary from one region to another, but is often a combination of pressures that lead to environmental change. For example, climate change is a result of emissions of different greenhouse gases, deforestation and land-use practices.

Furthermore, the ability to create and transfer environmental pressures onto the environment of other societies varies from one region to another. Affluent societies with high levels of production, consumption and trade tend to contribute more towards global and transboundary environmental pressures than the less affluent societies which interact in more direct fashion with the environment in which they live.

State-and-trends

Environmental state also includes trends, which often refers to environmental change. This change may be natural, human-induced or both. Examples of natural processes include solar radiation, extreme natural events, pollination, and erosion. Key forms of human induced environmental change include, for example, climate change, desertification and land degradation, biodiversity loss, and air and water pollution. Different forms of natural or human-induced changes interact. One form of change, for example, climate change, will inevitably lead to ecosystem change, which may result in desertification and/or biodiversity loss. Different forms of environmental change can reinforce or neutralize each other. For example, a temperature increase due to climate change can, in Europe, partly be offset by changes in ocean currents triggered by climate change. The complexity of the physical, chemical and biological systems constituting the environment makes it hard to predict environmental change, especially when it is subject to multiple pressures. The state of the environment and its resilience to change varies greatly within and among regions due to different climatic and ecological conditions.



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Impacts

The environment is directly or indirectly affected by the social and economic sectors, contributing to change (either negative or positive) in human well-being and in the capacity/ability to cope with environmental changes. Impacts, be they on human well-being, the social and economic sectors or environmental services, are highly dependent on the characteristics of the drivers and, therefore, vary markedly between developing and developed regions.

Responses

Responses address issues of vulnerability of both people and the environment, and provide opportunities for reducing human vulnerability and enhancing human well-being. Responses take place at various levels: for example, environmental laws and institutions at the national level, and multilateral environmental agreements and institutions at the regional and global levels. The capacity to mitigate and/or adapt to environmental change differs among and within regions, and capacity building is, therefore, a major and overarching component of the response components.

The *GEO-4* framework has been used in the analyses of issues in all the 10 chapters, both explicitly and implicitly. Its utility is in integrating the analyses to better reflect the cause-and-effect, and ultimately society's response in addressing the environmental challenges it faces.



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Chapter Development and Peer Review

GEO is UNEP's report and its sole responsibility. All UNEP divisions have contributed to the *GEO-4* report providing content, review and other kinds of support.

The main strength of the GEO process is that it is consultative, participatory and inclusive; it includes a 'bottom-up' capacity building component and a global network of GEO Collaborating Centres (CCs) and other partners. Throughout its process, GEO aims consistently at a good disciplinary, regional and gender balance among experts. More than 380 regional and global experts were involved in research and drafting of the *GEO-4* report as lead authors. The various partners can be categorized as follows:

GEO-4 Chapter Expert Groups

GEO-4 consists of six sections and 10 chapters. For each of the chapters, an expert group was established. In addition to representatives of GEO CCs, traditionally involved in GEO assessments, a large number of individual experts were invited to participate in the drafting process. Each Chapter Expert Group consisted of at least 15 individuals: scientists, representatives from GEO CCs, experts nominated by governments, policy practitioners, representatives of UN organizations, GEO Fellows and UNEP staff. Expert groups were led by two or three coordinating lead authors in close collaboration with UNEP.

GEO Collaborating Centres

The global network of GEO collaborating centres forms a strong assessment partnership at the core of the process and a focus for building capacity at various levels. More than 50 CCs played an active role in preparing the *GEO-4* report. Three organizations, IUCN, The World Conservation Union, SCOPE and SEI, represent global networks while the rest are regional or specialized centres of excellence. Regional centres were responsible for most of the regional inputs, combining top-down integrated assessment with bottom-up environmental reporting.

Government nominees

A total of 157 experts covering a wide range of thematic, technical and/or policy expertise were nominated by 48 governments. Some of the nominees participated in chapter expert groups. Others were reviewers. A total of 47 governments sent their representatives to *GEO-4* regional consultation meetings.

MEAs Focal Points

Multilateral Environmental Agreements (MEA) secretariats responded to UNEP's



T. Mohr/Still Pictures

request and identified focal points for the *GEO-4* development processes. The focal points have been involved either in chapter expert groups and/or in review of the drafts of the report. Conferences of the Parties to the Convention on Biological Diversity and the Convention on Migratory Species adopted separate decisions on cooperation with the *GEO-4* assessment.

GEO Fellows

The GEO Fellowship initiative was established in August 2005 to bring young and qualified professionals into the *GEO-4* process. A total of 34 fellows representing 27 countries were selected to participate in the *GEO-4* production process as contributing authors.

GEO-4 Reviewers and Chapter Review Editors

Government and expert review was a major component of the *GEO-4* production process. Draft 1 and 2 of the *GEO-4* report underwent comprehensive governmental and scientific review. In addition regional consultations with policy-makers, civil society, scientists and other stakeholders were held in all regions in June-July 2006 as a part of the review process. Over 1 000 individual experts were invited to review the drafts of *GEO-4* and more than 13 000 comments were received. Twenty Chapter

Review Editors were identified to check if the comments had been addressed in the revised drafts.

High-level Consultative Group

The *GEO-4* High-level Consultative Group of 15 high-level individuals from policy, science, business and civil society backgrounds was established. The group was set up to provide strategic guidance on various issues, including the intergovernmental components of the GEO process, the launch 25 October 2007, high-level involvement and outreach for *GEO-4*. The group, among others, discussed key messages of *GEO-4* at its first meeting and the *GEO-4* Summary for Decision Makers – at the second meeting. Some members of the group participated in the second (final) global intergovernmental and multi-stakeholder consultation on the fourth Global Environment Outlook report in September 2007.

Outreach and Engagement

The key to ensuring that *GEO-4* is policy relevant and legitimate is to strengthen the interaction between science and policy making. A well functioning interaction helps define policy challenges and opportunities as well as relevant assessment priorities. Building strong ownership of the report and its findings by involving various groups including the media and private sector, and connecting to global networks is the role of Outreach and Engagement.

An Outreach Working Group (OWG), with specialists from the fields of marketing and communication, science, education and technology, has been formed to support and advise on *GEO-4* outreach and engagement activities.

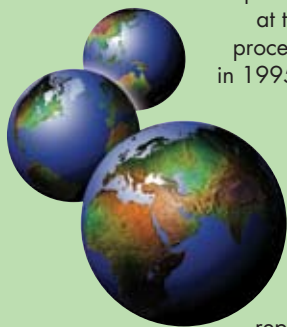


Capacity building has been at the heart of the GEO process since its inception



Audrey Ringler

Capacity building



Capacity building has been at the heart of the GEO process since its inception in 1995. Capacity building achieved through active participation of developing country experts in *GEO-4* as well as hands-on support to governments to produce sub-global reports is supported by:

- (a) development and promotion of the use of integrated assessment tools and methodologies through the GEO Resource Book;
- (b) training and workshops;
- (c) networking and partnerships; and
- (d) *GEO-4* Fellowships awarded to young scholars to work with the GEO process.

A Capacity Building Working Group supports, advises and guides GEO capacity building activities.

Data

Further development of the GEO data component is closely linked to establishing and strengthening cooperation with new and existing authoritative data providers around the world, focusing on new data and indicators that have become available and

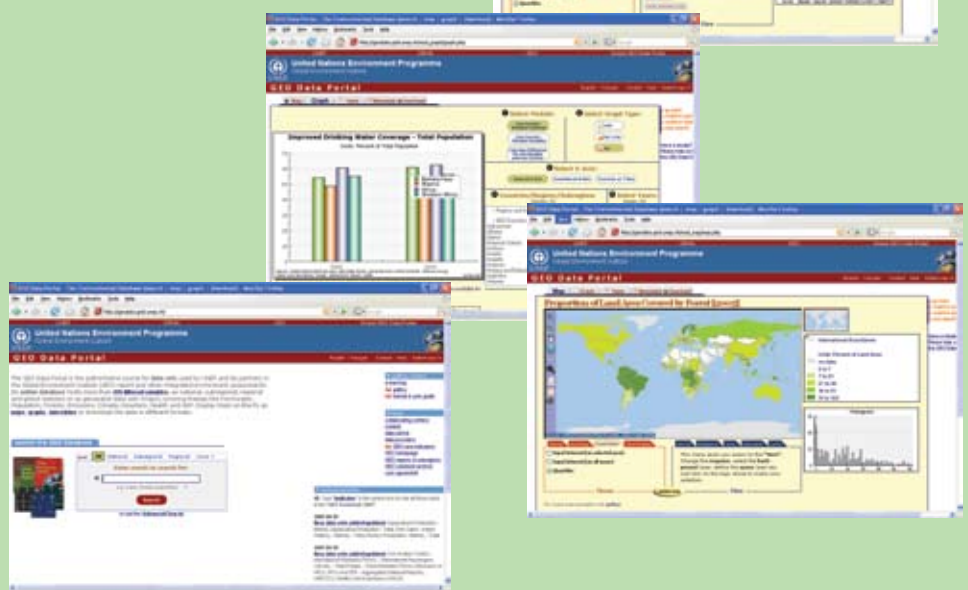
are relevant for *GEO-4*. Promoting active participation of developing country experts and developing GEO data facilities in developing regions is an important component of the activity. It is supported by:

- (a) updating the GEO Data Portal, to include the latest data, trends and indicators, mainly for use in the *GEO-4* chapters on state of the environment, and linking to the Outlook component;

Global and regional GEO Data Portals
<http://geodata.grid.unep.ch>

- (b) developing specific regional GEO Data Portals in developing regions and promoting the use of such tools in GEO and related (sub-)regional integrated environmental assessments;
- (c) developing guidelines, methodological and training materials;
- (d) providing training and workshops, connected to the Capacity Building component of *GEO-4*. The Bali Strategic Plan for Technology Support and Capacity Building is a key policy instrument in this regard;
- (e) networking and establishing partnerships among global and regional data providers and users in UNEP, the UN and beyond.

The GEO Data Working Group supports and guides the GEO data component during the production of *GEO-4* with the main focus on applicable, harmonized and up-to-date data tools, proper use of indicators, strengthening data capacities in developing regions, filling existing and identifying emerging data gaps, and improving data quality assurance and control.



GEO4



in collaboration with

 Arab Centre for the Studies of Arid Zones and Drylands (ACSAD), Syria	 Centro Latinoamericano de Ecología Social (CLAES), Uruguay	 International Institute for Environment and Development (IIED), United Kingdom	 Scientific Committee on Problems of the Environment (SCOPE), France	 United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), United Kingdom
 African Futures Institute, South Africa	 Center for International Earth Science Information Network (CIESIN), Columbia University, United States	 International Institute for Sustainable Development (IISD), Canada	 Scientific Information Center (SIC), Turkmenistan	 Universidad del Pacífico, Perú
 Arab Forest and Range Institute (AFRI), Syria	 Commission for Environmental Cooperation of North America (CECCAN), Canada	 Island Resources Foundation (IRF), US Virgin Islands	 Southern African Research and Documentation Centre (SARDC), Zimbabwe	 Universidad de Chile, Chile
 Arabian Gulf University (AGU), Bahrain	 Development Alternatives (DA), India	 International Soil Reference and Information Centre (ISRIC), The Netherlands	 State Environmental Protection Administration (SEPA), People's Republic of China	 University of Costa Rica Development Observatory (OaD-UCR), Costa Rica
 Asian Institute of Technology (AIT), Thailand	 Environment Agency – Abu Dhabi (EAD)/ Abu Dhabi Global Environmental Data Initiative (AGEDI), Abu Dhabi	 The World Conservation Union (IUCN), Switzerland	 Stockholm Environment Institute (SEI), Sweden, United Kingdom and United States	 University of Denver, United States
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 Centro de Investigaciones de la Economía Mundial (CIEM), Cuba				

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