

IEA

Training Manual

*A training manual on
integrated environmental
assessment and reporting*

Training Module 1

*The GEO approach to
integrated environmental
assessment*

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durable



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List of Acronyms

ADB	African Development Bank
AEIN	African Environment Information Network
AEO	Africa Environment Outlook
AIT	Asian Institute of Technology
AMCEN	African Ministerial Conference on the Environment
AMU	Arab Maghreb Union
CILSS	Permanent Interstate Committee for Drought Control in the Sahel
CONACYT	Public Research Center System of the National Science and Technology Council (Mexico)
DEWA	Division of Early Warning and Assessment
ECOWAS	Economic Community of West African States
GC/GMEF	Governing Council/Global Ministerial Environment Forum
GEO	Global Environment Outlook
IEA	Integrated Environmental Assessment
IGAD	Intergovernmental Authority on Development
IISD	International Institute for Sustainable Development
IOC	Indian Ocean Commission
MA	Millennium Ecosystem Assessment
MZMC	Metropolitan Zone of Mexico City
NEC	National Environment Council (Bhutan)
NEPAD	New Partnership for African Development
NORAD	Norwegian Agency for Development Co-operation
OAU	Organization of African Unity
ROA	Regional Office for Africa
ROLAC	Regional Office for Latin America and the Caribbean
SACEP	South Asia Co-operative Environment Programme
SADC	Southern African Development Community
SERI	Sustainable Europe Research Institute
SoE	State of the Environment
UNECA	United Nations Economic Commission for Africa
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNGA	United Nations General Assembly
WSSD	World Summit on Sustainable Development

Overview

The objective of this module is to introduce the integrated environmental assessment (IEA) and reporting approach based on the Global Environment Outlook (GEO) Process of the United Nations Environment Programme (UNEP). You will learn why the IEA approach is an effective way of developing policy relevant recommendations about the state of the environment and its interaction with human development.

We begin with a short description of UNEP, its mandate from the United Nations General Assembly (UNGA) for keeping the global environment under review, and how the GEO process fulfils this mandate. The goal of the GEO process is to ensure that environmental problems and emerging issues of wide international significance receive appropriate, adequate and timely consideration by governments and other stakeholders. As part of the GEO initiative, UNEP is involved in capacity building to help people learn how to carry out integrated environmental assessments at the regional, sub-regional and also national levels.

An IEA is much broader than a traditional state of the environment (SoE) report. It expands on a SoE report by undertaking a critical objective evaluation and analysis of data and information designed to meet user needs and support decision making. It applies the judgment of experts to existing knowledge to provide scientifically credible answers to policy relevant questions. This provides a participatory, structured approach to linking knowledge and action. Over time, GEO has developed an increasingly integrated approach to environmental assessment and reporting. It asks the following questions:

- what is happening to the environment and why?
- what are the consequences for the environment and humanity?
- what is being done and how effective is it?
- where are we heading? and
- what actions could be taken for a more sustainable future?

For *GEO-1*, *GEO-2000* and *GEO-3*, UNEP's comprehensive global integrated environmental assessments were carried out using the **Drivers-Pressure-State-Impact-Response** (DPSIR) framework, which is also used in Module 5 of this training manual. For *GEO-4*, the latest assessment which is expected to be published in 2007, the conceptual framework has been modified, and the differences between this new framework and the DPSIR framework are briefly explained in this module.

Geographically, we can distinguish between the global and sub-global (regional, national and sub-national) GEO assessments. While *GEO-1*, *GEO-2000* and *GEO-3* were global in scope, they were differentiated at regional and sub-regional levels to highlight important variations and the environmental priorities requiring policy attention in different parts of the world. Each GEO assessment covers a specific time period decided by, or relevant to, the policy makers to whom it is targeted.

GEO products include:

- global assessments (*GEO-1*, *GEO-2000* and *GEO-3*);
- GEO yearbooks (2003; 2004/5; 2006);
- regional and sub-regional reports;
- technical reports; and
- educational products.

The module concludes by providing examples of three sub-global GEO assessments: the Africa Environment Outlook (a regional assessment), the Bhutan national GEO and the assessment carried out for Mexico City. These examples show how the processes started and were carried out, their main results and how they have been followed up.



Notes

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Course Materials

1. Introduction and learning objectives

The objective of the module is to introduce the Global Environment Outlook (GEO) integrated environmental assessment (IEA) and reporting process. Throughout this report GEO refers to assessment processes led by the United Nations Environment Programme (UNEP) and the associated products, while IEA is used for assessment processes and products that follow the GEO style.

You will learn why the IEA approach is necessary for making policy relevant recommendations about the environmental state and trends, and links with human development. The material covered in this module highlights the need for an enabling mandate to undertake an environmental assessment; the mandate of UNEP; the objectives of the GEO assessment; the scope and objectives of the fourth GEO assessment (*GEO-4*); and its analytic framework. The module also deals with issues related to international environmental governance and the Bali Strategic Plan for Technology Support and Capacity Building. The Bali Strategic Plan was adopted by the UNEP Governing Council/Global Ministerial Environmental Forum at its 2002 session. Its purpose is to improve the effectiveness of capacity building, and to address capacity gaps and needs identified by assessments of existing activities. Examples of GEO assessments at the global, regional, national and sub-national levels illustrate the approach taken and the kinds of results that can be obtained using the GEO approach.

Successful completion of this module will allow you to do the following:

- understand the mandate and role of UNEP in environmental assessment and reporting, and in capacity building;
- describe the objective and scope of the GEO assessment;
- compare and contrast IEA in the context of the first three GEO reports and the GEO-4 process; and
- become familiar with examples of regional, national and sub-national GEO and IEA processes.

2. UNEP assessment mandate

UNEP derives its mandate from the United Nations General Assembly (UNGA) Resolution 2997 of 1972, which led to the establishment of the organization. The resolution states in part that UNEP should keep the global environment under review. The UN Conference on the Human Environment whose recommendations led to Resolution 2997 highlighted the importance of environmental assessment and reporting (see box below).



Box 1 Decision on environmental assessment at the UN Conference on Human Environment, Stockholm, 1972

One of the early decisions of the international community on environmental assessment and reporting highlighted the following:

- To facilitate the development of social and cultural indicators for the environment, in order to establish a common methodology for assessing environmental developments and preparing reports on the subjects.
- To prepare, on the basis of (the) national reports on the state of, and outlook for, the environment, periodic reports on regional or sub-regional situations and on the international situation in this matter.

Source: UNEP 1981



UNEP's Division of Early Warning and Assessment

The Division of Early Warning and Assessment (DEWA) is one of eight UNEP sub-programmes (divisions) responsible for implementing Resolution 2997. The DEWA mission is to:

“Provide the world community with improved access to meaningful environmental data and information, and to help increase the capacity of governments to use environmental information for decision making and action planning for sustainable human development.”



GEO Assessment

DEWA, in collaboration with other UNEP programmes, and with other partners around the world, implements the UNGA resolution by, among other activities, coordinating GEO, the UNEP flagship assessment reporting process. The first GEO assessment report was initiated in 1995 by UNEP Governing Council in its decision 18/27, which requested UNEP's Executive Director to prepare a new, comprehensive report on the present and future state of the world environment, including possible response measures. Following the establishment of the GEO process and production of the first GEO report, the Governing Council renewed the mandate for GEO in 1997, 1999 and 2003 and 2005.¹ The Governing Council/Global Ministerial Environment Forum (GC/GMEF) decisions in 2003 and 2005 facilitated the preparation of *GEO-4*.



The Bali Strategic Plan for Technology Support and Capacity Building

In 2005, UNEP's Governing Council adopted the Bali Strategic Plan for Technology Support and Capacity Building², which identifies priority areas, including:

- preparation, integration and implementation of environmental aspects of national sustainable development plans;
- support to national and regional institutions in data collection, analysis and monitoring of environmental trends; and
- development of national research, monitoring and assessment capacity, including training in assessment and early warning.

1 See the reports from the UNEP Governing Council: GC19/3; GC20/1; GC22/1/IB; GC23/6

2 Governing Council of the United Nations Environment Programme, UNEP/GC.23/6/Add.1

The objectives of the plan include strengthening the capacity of governments of developing countries as well as of countries with economies in transition, at all levels to:

- comply with international agreements and implement their obligations at the national level;
- achieve their environmental goals, targets and objectives, as well as environment-related internationally agreed-upon development goals, including those contained in the Millennium Declaration, the Plan of Implementation of the World Summit on Sustainable Development and the outcomes of other major United Nations conferences and international agreements; and
- provide a framework for capacity building to ensure the effective participation of developing countries as well as countries with economies in transition in international environmental governance process.

This will help countries to achieve environmental sustainability in their development.

The Bali Strategic Plan provides a mandate for UNEP to be involved in capacity building related to IEA at the regional and national levels. Regional and national IEAs have become common. Many follow the GEO approach, but derive their mandates either from regional or national agreements and laws.

DISCUSSION QUESTIONS

1. UNEP has been mandated since its establishment in 1972 to keep the state of the global environment under review. What is your understanding of the role of GEO in implementing this mandate?

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2. The GEO approach to IEA has constantly evolved since the process started in 1995. In your own analysis, do you think this is an advantage or disadvantage? Please elaborate.

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3 GEO rationale and IEA framework

The goal of the GEO process is to ensure that environmental problems and emerging issues of wide international significance receive appropriate, adequate and timely consideration by governments and other stakeholders.

The overarching objectives of GEO are, as outlined in the UNEP assessment framework (UNEP/GEO4/CP/doc1/draft1), to:

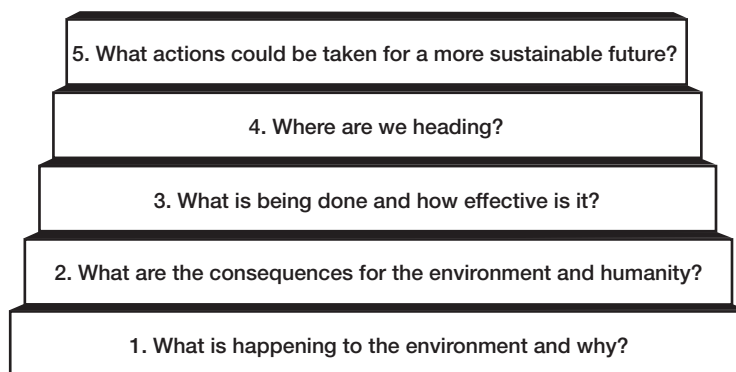


- provide access to the best scientific knowledge for international environmental governance and the mainstreaming of environmental concerns into social and economic sectors, and in support of the internationally agreed development goals;
- facilitate the interaction between science and policy through multi-scaled and multidimensional integrated assessment processes and products of high legitimacy, credibility and utility; and
- build geographic and gender-balanced partnerships and capacity for environmental assessments.

As an integrated environmental assessment, GEO provides answers to the five key questions illustrated in the step diagram below. Most “traditional” environmental assessments consider the first question; very few take an integrated perspective that considers all five questions.



Figure 1: Key questions to be answered by State of the Environment (SoE) Assessment and Policy Analysis in the IEA Framework.



The world is faced with major environmental challenges, which have complex causes and consequences. This requires a structured process of dealing with environmental issues and their interactions with society, including political processes and the economic system. It needs to use knowledge from a wide range of scientific disciplines and stakeholders, so that integrated insights are made available to decision-makers. This process is referred to as an assessment (Box 2)³.

³ There is a considerable amount of literature defining and characterizing assessment processes. See for example www.millenniumassessment.org



Box 2: What is an assessment?

An assessment is the entire social process for undertaking a critical objective evaluation and analysis of data and information designed to meet user needs, and to support decision making. It applies the judgment of experts to existing knowledge to provide scientifically credible answers to policy relevant questions, quantifying where possible the level of confidence.

Source: <http://www.unep.org/geo/pdfs/TowardsGeo4.pdf>

Integrated Environmental Assessment provides a participatory, structured approach to linking knowledge and action. Over time, GEO has developed an increasingly integrated approach to environmental assessment, the use of indicators and reporting. The “integrated approach” to answering the questions illustrated in Figure 1 above is an umbrella term for:

- linking the analysis of environmental state and trends with the policy analysis;
- incorporating global and sub-global perspectives;
- incorporating historical and future perspectives;
- covering a broad spectrum of issues and policies; and
- integrating the consideration of environmental change and human well-being.



Policy-makers often face a growing list of environmental challenges. Many of these are complex, have a direct or indirect effect on human well-being, and require enhanced understanding to support effective response measures and action. The GEO integrated environmental assessment approach has strengthened the accessibility of reliable environmental data and information for improved policy-making at different levels. Today, there is greater investment by the international community and governments in environmental assessments, both in terms of human and financial resources. However, despite the availability of considerable information on state and trends of the global environment, there is still a lack of adequate and relevant data, and there is a loss of capacity of monitoring and data collection systems.

EXERCISE

In small groups, choose an environmental issue in your country (such as air quality, water quality, soil erosion or desertification) and discuss why an **integrated** approach is needed to address this issue. If you chose not to use an integrated approach, what approach would you follow, and how would that be weaker? What policy sectors need to be addressed (energy, agriculture, trade, transport, health, etc.)? How is the problem linked to events at the global level (e.g., UN Framework Convention on Climate Change, World Trade Organization or other UN conventions)? How could this issue evolve over the coming two decades?



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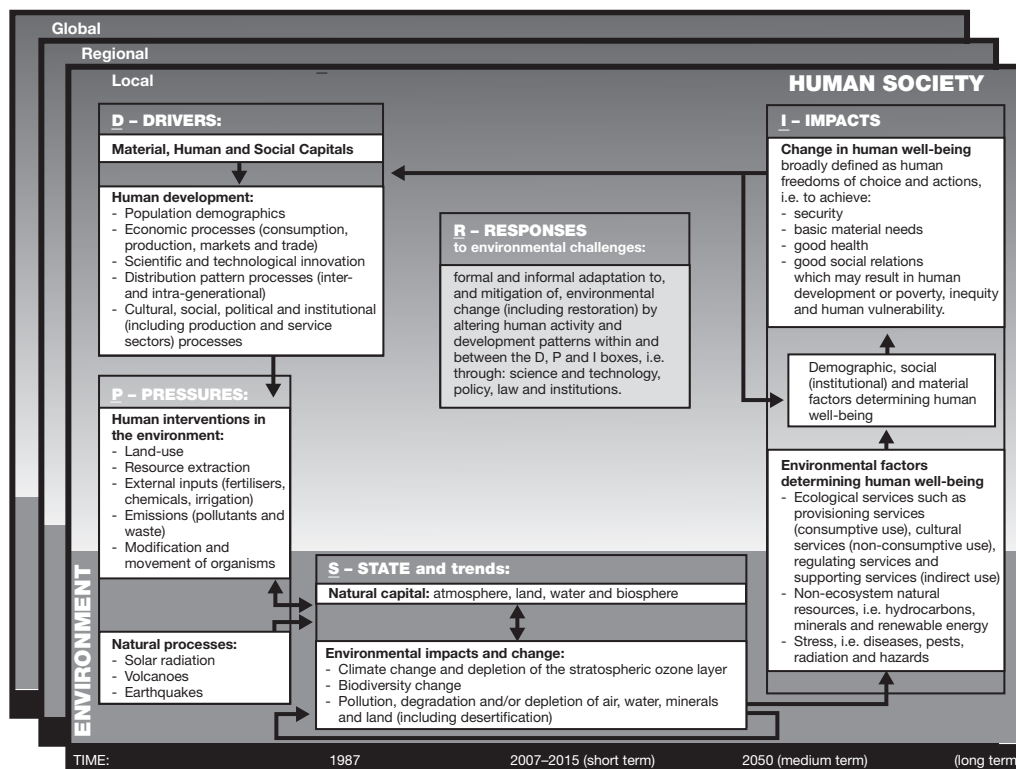
The framework for the integrated environmental assessment being carried out in *GEO-4* is illustrated in Figure 2. The diagram recognizes two key domains of the Earth System: human society and the environment. It considers five basic elements: Drivers, Pressures, State and trends, Impacts and Responses.

Drivers (including demographic changes, economic and societal processes) lead to more specific pressures on the environment (including land use change, resource extraction, emissions of pollutants and waste, and modification and movement of organisms). These pressures lead to changes of the state of the environment, which are in addition to those that result from natural processes. The environmental changes include climate change, stratospheric ozone depletion, changes in biodiversity and pollution or degradation of air water and soils. These changes lead to changes of the services that the environment provides to humankind, such as the provision of clean air and water, food and protection from ultra-violet radiation. As a result of changes in services and mediated by demographic, social and material factors, there are impacts on human well-being (health, material assets, good social relations and security). Responses include both formal and informal attempts to either adapt to the changes in environmental services or to reduce the pressures on the environment.

The layering of the global, regional and local levels in the *GEO-4* framework emphasizes the fact that drivers, pressures, state, impact and responses are at these different levels, sometimes predominantly at one level, and that the levels also interact. As illustrated by the bar at the bottom of the diagram, changes in human society and the environment unfold on different, short, medium- and long-term time scales.



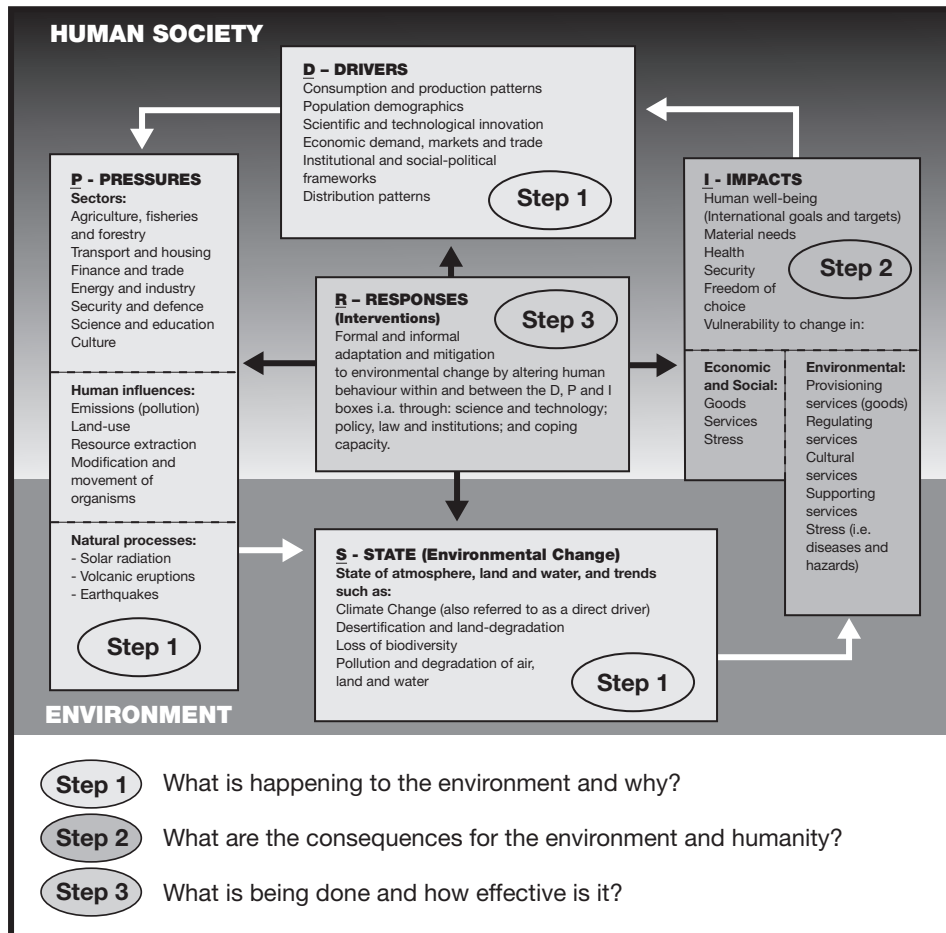
Figure 2: The Conceptual Framework of GEO-4



For training purposes, this training manual uses a graphically simplified framework (see, in particular, Module 5) taking into account experience with *GEO-1*, *GEO-2* and *GEO-3*, as well as a number of sub-global assessments. While the logic is the essentially the same, the diagram shown in Figure 3 makes it easier in a training setting to navigate through the steps of the analysis from drivers to responses. The basic structure of the diagram is also similar to what has been developed by

the European Environment Agency (Smeets and Weterings 1999)⁴. The same basic elements—Drivers, Pressures, State, Impact and Responses—are illustrated in Figure 3. Since this training manual focuses on Integrated Environmental Assessment primarily at the national level, it is less critical to show multiple levels, although the assessments would obviously reflect national level implications of global processes, and go into sub-national detail. Figure 3 also shows how the elements of the framework are linked to the questions illustrated in Figure 1.

Figure 3: Simplified analytic framework for integrated environmental assessment and reporting



4 Smeets, E. and R. Weterings. 1999. *Environmental Indicators: Typology and Overview*. Copenhagen: European Environment Agency. <<http://reports.eea.europa.eu/TEC25/en>>



EXERCISE

In your small groups, take the same environmental issue from your country that you used above. Identify drivers, pressures, state (and trends), impacts and responses. Discuss which of the drivers and pressures are at the national level and which are at the global level. Discuss what specific impacts on ecosystem services and human well-being are most relevant for the environmental issue of concern.



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Experience has shown that the entire IEA process requires training accompanied by resources to build capacity in order to improve the skills to develop and use environmental information for decision making. Increased capacity through learning-by-doing can be considered a concrete objective and benefit of a participatory IEA process.

There is also a need for gender mainstreaming in the process and products. This has been addressed by Seager and Hartmann (2005), who show that gender mainstreaming is best understood as a continuous process of infusing both the institutional culture and the programmatic and analytical efforts of agencies with gendered perspectives. They illustrate best practices, assess successes and failures, review four areas of gendered environmental research (i.e., water, poverty, security/conflict, and vulnerability/disaster) and review the treatment of gender in GEO.



DISCUSSION QUESTION

What are important gender aspects of the environmental issue discussed above? Think, for example, about whether some of the drivers have a particular gender differentiation, and whether men and women are differentially exposed to the impacts.

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4 The GEO process

The global GEO process is described on the website (www.unep.org/geo). Module 2 shows how this process can be modified for the purpose of national IEAs.

GEO is first and foremost a **participatory process** for environmental assessment; it aims to facilitate the interaction between science on the one hand and policy and decision making on the other. Participation by a broad range of stakeholders has been increasingly recognized as an essential element of assessment processes dealing with complex issues, where there is a lot of uncertainty and where societal awareness is necessary to ensure effective implementation of response options. An example is the worldwide network of GEO Collaborating Centres with regional mandates or thematic expertise, that forms a strong assessment partnership at the core of the process, and helps in building capacity at various levels. Comprehensive peer review and consultative mechanisms with governments, non-governmental organizations, the private sector and scientific institutions are other integral components. Advisory groups provide guidance on conceptual approaches and methodology development. For *GEO-4*, there are advisory groups on capacity building, data and outreach, as well as expert groups writing individual chapters. The process is underpinned by a dedicated, interactive, online data portal (<http://www.geodata.grid.unep.ch>). This participatory and consultative process gives GEO assessments scientific credibility, accuracy and authority. The process targets a wide audience by providing information to support environmental management, decision making and policy development. In addition to the stakeholders being active participants, they are also a major target audience and potential GEO spokespeople. Through their own organizations and networks at global and regional levels, these GEO stakeholders help to spread the word on GEO's key findings and policy messages.

Following the establishment of the GEO process and production of the first GEO report, UNEP's Governing Council renewed the mandate for GEO in 1997, 1999 and 2002⁵. The latest of these Governing Council decisions extended the interval between the GEO reports to five years, and added an "annual GEO statement."

In addition to producing a five-year GEO report, UNEP also has a mandate for capacity building, which is an integral part of the GEO process and works at different levels, using a range of mechanisms. At the level of global GEO reports, Collaborating Centres and other contributors advance their IEA skills through a learning-by-doing approach, working with leading international experts and producing assessment content for the main report. At the regional, national and sub-national level the target group includes practitioners and managers in charge of relevant assessment and reporting processes. These sub-global IEAs, often mandated and led by governments adopt elements of the GEO approach, building consistency and strengthening the global process.

Each GEO assessment is multi-dimensional in scope, incorporating environmental, policy, geographic and temporal perspectives. Environmental dimensions include:

- thematic (related to the state and trends of land, atmosphere, water and biodiversity);
- functional (related to the provision of environmental goods and services);
- sectoral (the relationships between the environment and activity areas such as energy use, industry, tourism, agriculture and trade);
- cross-cutting (relating to issues such as production, consumption, gender, poverty, human security and vulnerability); and
- interlinkages within and among all of the above.

Geographically, we can distinguish between the global GEO assessment and sub-global (regional, national and sub-national) assessments. While *GEO-1*, *GEO-2*, *GEO-3* and *GEO-4* are global in scope, they are differentiated at regional and sub-regional levels to highlight important spatial variations and the environmental priorities warranting policy attention in different parts of the world.

⁵ GC19/3; GC20/1; GC22/1/IB



Each GEO assessment covers a specific time period decided by, or relevant to, the policy makers to whom it is targeted. *GEO-3*, for example, was requested by the UNEP Governing Council to be a “30-year after Stockholm” (1972–2002) report. The outlook is an important part of the time scale. As well as covering the period since 1972, *GEO-3* looked forward to the next 30 years. *GEO-4* is looking in particular at the 20-year period since the Brundtland Report “Our Common Future” (1987) and forward to the year 2050.



DISCUSSION QUESTIONS

1. What benefits does a strong mandate bring to an assessment process? Think for example, about needs for financial support, policy relevance and the potential for getting recommendations implemented.

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2. What do you think are the most urgent capacity needs for carrying out an integrated environmental assessment in your country? Are there enough trained scientists, policy makers, managers and analysts? Do potential users have enough understanding of causes and consequences of and responses to environmental change?

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5 The GEO-4 process

In 2004, preparations started for *GEO-4*, which is to be published in 2007. As noted above, the process modified the framework for integrated environmental assessment to take into account, among others, new knowledge in environmental assessment and the findings of the UNEP Science Initiative (<http://science.unep.org>). Some elements were strengthened, and new ones were introduced into the process, including:

- a series of regional consultations at the start of the process to identify regional priorities for the next assessment;
- a strengthened and comprehensive peer review process using chapter review editors to increase the scientific credibility and legitimacy of the process;
- an intergovernmental consultation to discuss the content of the assessment report and the design of the assessment process;
- nominations by governments of experts to be included in the assessment process;
- an expert group on human well-being, and chapter expert groups to draft chapters;
- a structured process for developing regional scenarios; and
- consideration of the methodology and results of the Millennium Ecosystem Assessment (MA) in the design and implementation of the *GEO-4* assessment.

DISCUSSION QUESTION

How can intergovernmental and regional consultations support the GEO process?

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6 GEO products

As of 2007, GEO products are available on the Internet (www.unep.org/geo) and include:

- Global assessments (*GEO-1*, *GEO-2000* and *GEO-3*)
- Regional and sub-regional Reports (see Box 2)
- Technical Reports
- GEO education products

UNEP has published three volumes of the comprehensive GEO report series: *GEO-1* in 1997, *GEO-2000* (*GEO-2*) in 1999 and *GEO-3* in 2002 prior to the World Summit on Sustainable Development. The IEA process based on the GEO approach has been used for many regional, sub-regional, national and sub-national assessments. The findings of the GEO assessment have also been used to produce youth and meeting reports, capacity building materials and associated products responding to specific user needs. The wide range of IEA outputs reflects the diversity and reach of the GEO assessment process. The GEO Cities reports underscore the “portability” of the GEO approach to other levels and to cover both ecosystem and socio-economic contexts. This portability to different spatial and organizational scales underlines the robust nature of the GEO approach that is unique among global environmental assessment approaches.

The compilation of core global data sets is a crucial element of the long-term GEO strategy, because reliable and accessible data must be the basis for integrated environmental assessments. The GEO Data Portal, which is the authoritative source for the global data sets used in UNEP’s GEO reports, has been developed by DEWA-Europe in consultation with DEWA HQ, guided by the GEO Data Working Group (<http://www.geodata.grid.unep.ch>).

The portal, discussed in more detail in Module 4, provides online access to more than 400 statistical and geographical data sets at national, sub-regional, regional and global levels. The data sets are compiled mostly from primary sources, and cover a broad range of environmental and socio-economic themes. State-of-the-art functionality for online data visualization and exploration is available for creating graphs, tables and maps. Initiated in 2000, the GEO Data Portal is continuously maintained, updated and improved. Regional adaptations of the global portal are being developed.



Box 2: Regional Reports

Regional Reports

2006

Africa Environment Outlook 2

2005

- Atlantic and Indian Oceans Environment Outlook
- Caribbean Environment Outlook
- Pacific Environment Outlook

2003

- Andean Environment Outlook
 - Latin America and the Caribbean Environment Outlook 2003 (English/Spanish)
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2002

- Africa Environment Outlook
- North America's Environment
- Brazil Environment Outlook
- Caucasus Environment Outlook

2000

- Latin America and the Caribbean Environment Outlook

1999

- Western Indian Ocean Environment Outlook
- Pacific Islands Environment Outlook

Indirect products of the GEO process include a worldwide network of collaborating centres, and working groups to support the process on issues such as data, capacity building and policy analysis.

DISCUSSION QUESTIONS

1. Which regions have received the most/least coverage in regional GEO processes? What are possible reasons for the different levels of coverage?

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2. Why is it important to have a GEO process dedicated to and involving young people?

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7 Assessment and reporting related to IEA

GEO and IEAs represent a relatively recent trend in exploring environment-society interactions, but they are not without precedent. Understanding what these precedents are, and how they relate to IEA can help ensure that it builds upon and can learn from other processes that have a similar purpose.

Some of the assessment and reporting practices have similar purpose and methods to IEA, but UNEP's GEO process itself has also been replicated on different sub-global levels. Examples of both are provided below.

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7.1 IEA in the context of other types of assessments

Many practices similar to IEA are probably familiar to you; they include state of the environment (SoE) reporting, environmental impact assessment (EIA), strategic environmental assessment (SEA), integrated assessment (IA) and others. While these methods all have their niches, they share the need to turn scientific and technical information into terms that address policy issues and reaches a wide range of non-expert audiences.

The relationship between an IEA and other, similar processes can vary, depending on their purpose and approach. Earlier SoE reporting experience and structures can serve as a basis for IEA. EIAs can help identify environmental risks and vulnerabilities related to specific projects; those projects might serve, for instance as case studies to illustrate broader tendencies in an IEA. A SEA can point to the role of policy in shaping environmental conditions either in the present or in a hypothetical future.

In order to help you reflect on these linkages, we provide a brief review of key aspects of the following practices:

- SoE reporting
- EIA
- SEA

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State of Environment (SoE) Reporting

State of the Environment (SoE) reporting has been largely the responsibility of government, through departments or ministries mandated to report to parliament, government or to provide information to the public. Traditional SoE reporting provides information on the environment and trends. It is mainly focused on the biophysical environment than the pressures humanity exerts on it. This information is very useful and may be used to analyse trends in key variables of the environment.

- Organizational structure for reporting and governance
- Process design
- Expert and stakeholder participation
- Priority environmental issues and policies covered
- Information sources and tools
- Communication and impact strategies

Environmental assessment reports have been developed for many parts of the world and a selection is shown in Table 1.

Table 1: Examples of environmental assessment reports from around the world

Region	Example	Scale	Year	Reference
Africa	Africa Environment Outlook-2	Regional	2005	http://www.unep.org/dewa/africa/docs/en/AEO2_Our_Environ_Our_Wealth.pdf
	Egypt	National	2004	http://www.eeaa.gov.eg/English/info/report_soe2005.asp
	Lebanon	National	2001	http://moe.gov.lb/Reports/SOER2001.htm
	South Africa	National	1999	http://www.environment.gov.za/soer/nsoer/index.htm
Asia-Pacific	Asian Environment Outlook	Regional	2001	http://www.adb.org/Documents/Books/AEO/2001/Highlights/default.asp
	Tajikistan	National	2001	http://enrin.grida.no/htmls/tadjik/soe2001/eng/
Europe	Europe's Environment – The Third Assessment	Regional	2003	http://reports.eea.eu.int/environmental_assessment_report_2003_10/en/tab_summary_RLR
	Norway	National	Ongoing	http://www.environment.no/templates/TopPage___3142.aspx
Latin America and the Caribbean	GEO Latin America and the Caribbean	Regional	2003	http://www.unep.org/geo/pdfs/GEO__lac2003English.pdf
	Caribbean	Regional	2005	http://www.unep.org/geo/pdfs/Caribbean_EO.pdf
	GEO Central America	Sub-regional		
	GEO Bahamas	National	2005	http://www.best.bs/Webdocs/DRAFT%20GEO%20Bahamas%202005%20-%20(Feb2005).pdf
	GEO Cities in the Andes	Municipality		
North America	The North American Mosaic	Regional	2002	http://www.cec.org/soe/index.cfm?varlan=english
	The State of the Nation's Ecosystems: Annual Update 2003	National	2004	http://www.heinzctr.org/ecosystems/intro/updates.shtml
West Asia	State of the Environment in the Arab Region	Regional	2003	http://www.unep.org/bh/Publications/DEWA%20Final/State%20of%20Environment%20in%20the%20Arab%20Region.pdf



Environmental Impact Assessment (EIA)

In contrast with SoE reporting, an EIA is a tool or framework used to assess environmental impacts of an activity (Harding 1998). EIA is a process for evaluating possible risks or effects on the environment of a proposed activity or development. The purpose of an EIA is to inform decision-makers and other stakeholders of potential environmental impacts, and to suggest ways to reduce or minimize impacts that would arise from proposed activities. An EIA is intended to drive decisions in the context of a given project. Its quality depends on its rigorous application of a systematic approach and the quality of its science.



Strategic Environmental Assessment (SEA)

Various users define the term SEA in different ways. According to one commonly referenced, a SEA can be defined as the systematic and comprehensive process of evaluating at the earliest possible stage, the environmental effects of a policy, plan or programme and its alternatives (adapted from Théritel and Partidário 1996).

SEA represents a body of practice and methodology directly relevant to the policy analysis component of an IEA, but does not explicitly involve the regular reporting requirement. SEA also may focus solely on a single policy or programme, while an IEA must by definition involve scanning the entire spectrum of relevant policies. Further, an IEA will single out priority policies for detailed analysis, but also provide an overview of the entire policy landscape.

The key concept in this comparison is that the SEA process focuses on assessing all types of potential environmental impacts of proposed policies, plans, or programmes, and seeks to incorporate environmental considerations into the development of public policies. Its basic function is to facilitate policy learning and adaptation in an early phase, before policies are formalized, interests are entrenched and potential significant, irreversible damages occur.

SEA is ideally undertaken before policies, plans, and programmes are put in place. It extends the policy analysis to alternatives that may be proposed as a result of the assessment process, including impacts of withdrawing the proposed policy. SEA also considers the environment as part of a system, looking at impacts on the interface between the environment and socio-economic conditions.

The SEA approach is comprehensive because it broadens the policy target from individual decisions to the sequence of associated plans and programmes. It identifies and involves all major actors on multiple scales; it assesses potential direct and indirect impacts; and it considers both short- and long-term environmental consequences (Pintér, Swanson and Barr 2004).

[EXERCISE]

Working in groups of 3–5, describe a past or ongoing environmental reporting initiative in your country, using the format below.



1. Name of initiative	
2. Organization responsible for initiative	
3. Frequency with which analysis is repeated	
4. Geographic coverage	
5. Main steps of the reporting process	
6. Key participants involved (mark as applicable)	<ul style="list-style-type: none"> • Government: • Business: • Academia: • NGOs/civil society groups: • Others:
7. Conceptual framework used	
8. Key sections in the report	
9. SoE products (mark and comment as applicable)	Main report: Thematic reports: Website: Newsletter: Database: Others:
10. How information in the report is used in policy development or analysis (if known)	



7.2 Africa Environment Outlook-2



Mandate

The Africa Environment Outlook (AEO) assessment was initiated in 2000 by the African Ministerial Conference on the Environment (AMCEN). The first report, AEO-1, was launched during the AMCEN 9th session in Kampala in July 2002, where it was acknowledged as a flagship assessment in Africa. It was subsequently used as the primary background document in the preparation of the NEPAD Environment Action Plan (NEPAD-EAP), showing strong links between environmental assessment and policy making. The 10th AMCEN session, in June 2004, reaffirmed its endorsement of the AEO assessment as a valuable monitoring and reporting tool for sustainable environmental management and a framework for national, sub-regional and regional integrated environmental assessment and reporting in Africa.

During the 22nd session of the UNEP Governing Council/Global Ministerial Environment Forum in February 2003 in Nairobi, the AMCEN decision on the AEO process was endorsed under decision GC 22/9, which recommended that UNEP continue to support the process.

Geographical scope

The *Africa Environment Outlook* assessment covers the continent including its sub-regions, as illustrated in Figure 4 below.



Figure 4: Africa and its sub-regions in the Africa Environment Outlook



When it was done

In May 2003, the UNEP Division of Early Warning and Assessment (DEWA) launched the *Africa Environment Outlook 2 – Our Environment, Our Wealth* (AEO-2) assessment. This involved consultations at regional and sub-regional levels was participatory, with inputs by scientists and other experts from national and sub-regional institutions in Africa. The Collaborating Centres, using their national networks and capacities built through the Global Environment Outlook (GEO) process, coordinated inputs and the peer reviews in their sub-regions.

AEO Members of the assessment team

The AEO-2 assessment was based on wide consultation and participation, involving UNEP and various partners in the Africa region. It reflected a variety of sub-regional perspectives and priorities. The AEO process involved partnership with six GEO Collaborating Centres responsible for producing sub-regional state of the environment and policy retrospective reports for Central Africa, Eastern Africa, Northern Africa, Southern Africa, Western Africa and the Western Indian Ocean Islands. Participating CCs engaged individual and institutional experts at the national and sub-regional level to provide inputs into the process. Experts from specialized organizations⁶ were

⁶ They included, among others, The UN Economic Commission for Africa (UNECA), African Development Bank (ADB), the Organisation for African Unity (OAU), Southern African Development Community (SADC), Intergovernmental Authority on Development (IGAD), Economic Community of West African States (ECOWAS), Permanent Interstate Committee for Drought Control in the Sahel (CILSS), Arab Magreb Union (AMU) and the Indian Ocean Commission (IOC).

also involved in providing inputs for sections of the report and in its review to ensure sub-regional balance, scientific credibility and comprehensiveness. Throughout the process, the AMCEN Inter-Agency Technical Committee (IATC) provided policy guidance. The committee reviewed and approved the proposed structure of the report in March 2004. In February 2005, IATC endorsed the draft recommendations of the report for approval by the AMCEN special session which met in Dakar in March 2005. The final draft report was presented to IATC for a final review and approval for publication in November 2005. The AEO-2 assessment was launched in June 2006 and endorsed by the AMCEN ministers a few weeks later.

Major environmental issues assessed

The range of environmental issues for assessment in the AEO-2 process was far more than could be comprehensively addressed in the report. Therefore, stakeholders had to select the most important early in the process. Important issues differ at different levels of analysis (regional, sub-regional, national, sub-national, and community level). For example, a detailed analysis of the coastal marine environment may be a critical issue for Southern Africa as a sub-region. At the national level, however, it may be of great importance to Mauritius but not to Botswana which is a land-locked country. The selection of the issues, therefore, had to be common across most of the countries in a sub-region and also of importance to Africa, as a region, in the context of the NEPAD environmental action plan.

In the development of issues important for AEO-2, a consultative group on data and issues was formed which identified a long list of broad potential issues. This list was then sent to national level stakeholders who either added or eliminated thematic areas proposed depending on their importance to the national environment, and they gave details of variables they wanted addressed in each broad theme. The assessment analyses environmental change in the context of atmosphere, land, freshwater, forests and woodlands, coastal and marine environments, and biodiversity. It discusses the main human drivers of environmental change and considers how these impact on human well-being and development. It covers demographic change, poverty, social change, including gender and the division of labour, health and education. The integrated and multidimensional discussion of livelihoods and environment sets the basis for evaluating and determining policy. The report also highlights emerging issues such as invasive alien species, chemicals, genetically modified crops and the environment as a key factor for peace and regional cooperation.

Conclusions

The AEO-2 assessment provides a comprehensive assessment of environmental state-and-trends, and the implications of this for human well-being and development. It includes an analysis of policy responses and the opportunities available to policymakers to maximize the benefits offered by the environment. It addresses five consecutive and inter-related questions:

- How and why is the environment important from a human perspective?
- How is the environment changing, and why, and what opportunities does it hold?
- Are there special issues, which affect the environment and development, that require immediate attention and new approaches?
- How will different policy choices affect the future?
- What can be done to ensure that environmental value is retained and the lives of people are improved?

Capacity building

The AEO assessment builds capacity in all aspects of IEA, including SoE reporting, policy analysis and scenario development at national, sub-regional and regional levels in Africa. Capacity-building workshops were organized at sub-regional level for national experts and non-government organizations (NGOs) on the methodologies of state of the environment/policy retrospective



reporting using the DPSIR framework, including methods of data management. A scenario development workshop was also held.



Impact and follow-up

The AEO assessment reports has had political impact at the highest level. As highlighted above, the first report was used as background document in the development of the New Partnership for African Development (NEPAD) Environment Action Plan, which was adopted by the African Union Heads of State summit in 2003. It was also endorsed in Chapter 8: Africa in the World Summit on Sustainable Development (WSSD) Plan of Implementation. In addition, it stimulated a number of additional resolutions at the AMCEN sessions. Because of data problems encountered in the preparation of the report, AMCEN also approved the Africa Environment Information Network (AEIN) to enhance data and information access and infrastructure in Africa. About 10 countries were involved in the pilot phase, and at least five of them have produced draft national environment outlook reports. The second phase will extend forward from 2006 and the number of countries involved will increase. By the end of 2007, more than 30 countries (out of 53) are likely to have produced national IEA reports because such reports are one of the required AEIN outputs at the national level. Overall, more countries are using the AEO/GEO methodology than ever before.

The Opportunities Framework, which was used in the second report: *Africa Environment Outlook 2. Our Environment, Our Wealth (AEO-2)* has also been embraced in the region with other assessment processes highlighting it. The report itself has been adopted by AMCEN. The 24th Session of the UNEP Governing Council/Global Ministerial Forum held in February 2007 acknowledged the AEO-2 in linking sustainable development and poverty reduction.



7.3 National example – Bhutan

Mandate

The Bhutan State of Environment Report (UNEP RRC.AP 2001) was prepared as a response to the recommendations in Agenda 21 of the Earth Summit. The process was initiated by UNEP in association with the South Asia Co-operative Environment Programme (SACEP) and the Royal Government of Bhutan, with the financial support of the Norwegian Agency for Development Co-operation (NORAD). The National Environment Council (NEC), under the Royal Government of Bhutan, was the national focal government agency for the implementation of the project. Because of lack of institutional capacity and human resources, The Energy and Resources Institute (TERI) from India, a GEO Collaborating Centre was involved in the preparation of the Bhutan SoE report. The report's objective was to identify the key priority environmental issues, provide guidelines for environmental planning and policy development, and identify alternative actions as options to offset negative environmental trends.



Geographical scope

Figure 5: Location of Bhutan



When it was done

The IEA process in Bhutan was started in mid-1999 and the report was launched in August 2001.

Members of assessment team

Bhutan's members of the assessment team came from the National Environment Council Secretariat and from a number of ministries. TERI was represented by 11 team members.

Major environmental issues assessed

- Rural urban migration
- Land degradation
- Air pollution
- Water pollution
- Solid waste management



Conclusions

Bhutan has made remarkable progress in human as well as economic development. The government of Bhutan is committed to maintaining a harmony between economic forces, spiritual and cultural values and the environment through its “middle path” approach. However, with the expansion of industry, agriculture and urbanization, the country faces a number of challenges.

Land degradation is a priority issue in Bhutan. It can be attributed to deforestation, unsustainable fuel wood extraction, shifting cultivation, encroachment into forests, forest fires, overgrazing and non-adoption of adequate soil conservation measures. The strong conservation ethic of the Bhutanese people and the political will of its government are having an impact on the preservation of forests. The national assembly has mandated that at least 60 per cent of Bhutan remain under forest cover.

Deforestation is taking place mainly due to infrastructure development, expansion of industrial and agricultural activities, and increasing urbanization. The strong conservation ethics of the Bhutanese people and the political will of its government are the greatest contributing factors to the preservation of the forests. The National Assembly has mandated the country to maintain a minimum of 60 per cent of the land area under forest cover for all times. Different acts and programmes have been prescribed by the Royal Government of Bhutan to minimize the rate of deforestation.

Urbanization is another important challenge. Rural-urban migration increases pressure on urban infrastructure and services and poses environmental problems.

Air pollution in Bhutan can be attributed to rapid urbanization, increasing industrial activities and vehicles emissions. The burning of wood in bhukharis and the use of diesel vehicles are the main sources of air pollution.

Fresh water is abundant in Bhutan. At present, river water quality is reasonably good since no polluting industries are located upstream. But rapid urbanization and industrialization could create pressure on valuable water resources.

Solid waste management is an emerging issue in most urban areas in Bhutan. The magnitude of the problem is small in rural areas, but is growing significantly in urban areas. To minimize solid waste problems in the future, reduction in waste generation would be an important factor.

While economic development is important to improve quality of life, strong policies, planning and institutional mechanisms, in addition to political will, are essential to preserve socio-cultural and biological diversity. Systematic integrated planning needs to include environmental issues, policy, technological intervention and institutional mechanisms. This requires a coordinated and integrated planning process to ensure maximized positive socio-economic impacts and minimized negative environmental impacts. There is a need for an effective IEA to inform this process.



The SoE preparation process not only provided useful training on reporting and data collection for Bhutanese officials, but also helped the public in Bhutan understand the importance of SoE reports and their implications for the day-to-day decision making process.

Capacity building

The initiative has enhanced know-how in Bhutan to carry out IEA. The exercise helped pilot and formalize environmental assessment and reporting in Bhutan. The tools for assessment and reporting employed in the process were seen to have potential in the day-to-day work of public agencies and since the report was published, the Government of Bhutan has made use of these enhanced capacities.



Impact and follow-up

The IEA helped the Royal Government of Bhutan realize the importance of environmental data for the decision making. A project supported by the Danish International Development Agency was designed to establish an environment information system in the National Environment Council, intended to strengthen environment assessment and reporting. This project is currently being implemented.

In recognition of the importance of the SoE report, the Royal Government has started and is partly funding a 2nd SoE report. This time, all the resource persons and institutions involved are from Bhutan.



DISCUSSION QUESTION

Discuss some of the important lessons learned from Bhutan's example of a national GEO assessment. What role do you think that government participation played in the assessment process? What do you see as the most successful elements of this assessment? Why do you feel that way?



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7.4 Sub-national example – GEO Mexico City



Mandate

The GEO Cities initiative in Latin America and the Caribbean (LAC) started in 2000 in response to calls by UNEP's Governing Council and Global Ministerial Environment Forum (GC/GMEF), the Initiative for Sustainable Development in the Latin America and Caribbean region, the LAC Forum of Ministers, and the Millennium Development Goals (Goal 7 on Environmental Sustainability). The GEO Cities initiative extends the Global Environment Outlook assessment and reporting process and the underlying IEA methodology to the municipal level.



The major objectives of the GEO Cities initiative are:

- to establish an integrated environmental assessment process that acknowledges the links between environmental conditions and human activities;
- to contribute to local capacity development on IEA in the urban environment;
- to establish a consensus on the most critical environmental problems in each participating city, and to formulate and implement urban strategies and plans to help cities improve urban environmental management; and
- to promote the creation of networks of institutions in each city assessed.

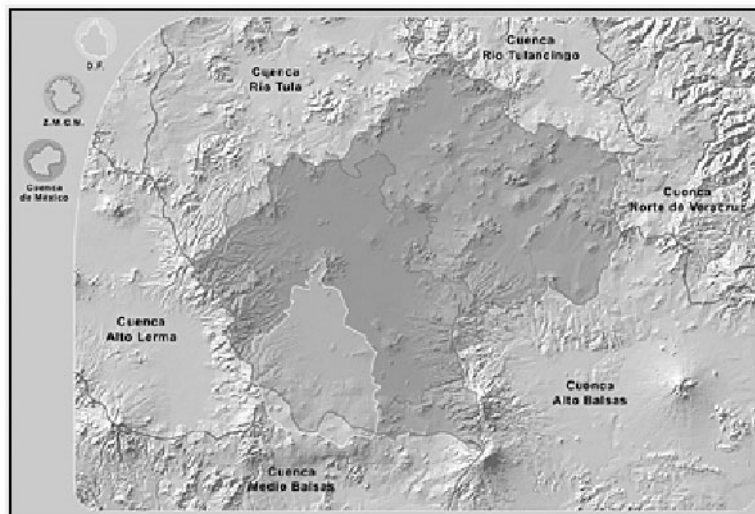
Today, the GEO Cities initiative in LAC includes more than 30 cities. In Africa, Asia and the Pacific and Europe, discussion and consultations are underway to initiate similar environmental reporting for selected cities, possibly including Nairobi, Lusaka, Dakar, Dhaka, Kathmandu and Shenzhen (China).

The *GEO Mexico City Environment Outlook* responds to Decision 11 (Environment Indicators) of the Forum of Ministers of Environment of Latin America and the Caribbean, which requested UNEP to continue the development of sectoral and targeted assessments using the GEO approach, especially in the assessment of urban areas.

Geographical scope

The Mexico City report (PNUMA and CentroGeo 2003) is an example of a municipal level IEA in the GEO Cities initiative. The reporting program covers the Metropolitan Zone of Mexico City (MZMC), the biggest urban area in Latin America and the Caribbean. The MZMC is located in the middle of three great mountain ranges that unite in the center of Mexico, the Sierra Madre Oriental, the Sierra Madre Occidental, and the Neo-volcanic mountain range.

Figure 6: Mexico City



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When it was done

The GEO Mexico City initiative started in November 2001 and was completed in November 2003. The initial results of the assessment were reviewed by specialists at a workshop held in November 2002. That was followed by a consultation on the final draft conducted in September 2003 involving governmental officials, academics, representatives of NGOs and representatives of the private sector.

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Members of assessment team

The assessment was led by UNEP, *Centro de Investigaciones en Geografía y Geomática “Ing. Jorge L. Tamayo” (CentroGeo)*, which is part of the Public Research Center System of the National Science and Technology Council (CONACYT), with the support of the local and the national governments of Mexico.

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Major environmental issues assessed

Urbanization in Mexico City has taken place in an accelerated and unorganized fashion with serious effects on the environment. The urban area, which occupied close to 12 000 hectares in 1940, grew to 148 000 hectares by 2000. The expansion has taken place at the expense of the land reserved for conservation.

All the bodies of water in the basin have suffered serious damage, and the performance of the hydrological system is at serious risk. Almost all the rivers have been diverted into pipelines, and the springs have stopped flowing naturally. Aquifers have been exploited beyond their capacity, and water must be brought in from other basins. The overexploitation of Mexico City's aquifer, which supplies 70 per cent of the water consumed, causes sinking of land in various places, as well as cracks and fractures in pipes. The city is sinking 5–40 centimetres each year in some areas, weakening building foundations and making them more vulnerable to earthquakes.

While levels of the atmospheric levels of sulphur dioxide and lead have been reduced considerably in recent years, the situation is still critical in terms of other air pollutants (especially ground-level ozone and suspended particulates), exceeding limits 80 per cent of the time, and creating serious health risks. Dealing with air pollution in Mexico City is a complex problem because of the 3.6 million private vehicles, combined with geographic and climatic conditions that trap air pollutants in the mountain basin.

Each inhabitant generates an average of more than 1.2 kg of trash daily, resulting in more than 21 000 tonnes of solid waste per day. There is not enough space for final waste disposal sites and the existing ones are reaching the limits of their capacity. This also means that solid waste management conflicts are sure to arise between the Federal District and surrounding municipalities.

Over 20 per cent of the urban land is covered by public and private green areas, of which 55.9 per cent has trees, and the rest have lawns and/or shrubs. There is a total of 20 m² of green area per inhabitant, a reasonably good amount compared to other places in the world. However, the number drops to only 7 m² if one only takes into account those areas that are under some form of management.

Conclusions

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The problems identified by the first Mexico City IEA are related to the existing urban environmental public agenda, which is resulting in:

- the effects of the loss of natural capital and the degradation of environmental services, which increases the vulnerability of diverse segments of the population;
- risks resulting from inappropriate land use and technology;
- daily impacts on health and well-being caused by air pollution, problems of access to water and sanitation, a limited number of green areas, long commutes mainly using private vehicles, inadequate public transport, and invasion and deterioration of public spaces; and
- trends in population dynamics, in unplanned land occupation, in demand for water and the consumption of energy.

The report described a series of possibilities, conditions and impediments for the development of more effective public urban environmental policies, and priorities focused on the urban environmental agenda.

Lessons learned

Significant efforts were made to develop effective spatial analyses to provide a better vision of the distinct aspects and interactions between urban development and the environment. The final result of these efforts was the preparation of a complementary product to the GEO Mexico City Report, referred to as the *geotext* of geospatial information. Its principal characteristics are:

- a modelling process that defines the main messages to be communicated and from which the organization of information, texts, graphics, photographs and other multi-media resources are derived;
- hyperlinks enabling navigation through the report, and activating the cartographic viewer tool;
- an easy display and overlay of thematic maps and shapes, each with its relevant meta-data;
- a friendly, interactive platform accessible to any user;
- interactivity that allows the user to incorporate new knowledge and data;
- the end product in the form of a CD-ROM; and
- an Internet version as an important complementary resource.

It is a tool that could be adapted to make scenarios, and to incorporate and update information.

Capacity building

The GEO Mexico City process successfully built capacity in state of the environment reporting, policy analysis and integrated reporting at a sub-national level. Capacity-building workshops were held on the methodologies of state of the environment/policy retrospective reporting using the Pressure, State, Impacts and Responses (PSIR) framework, including methods of data management. These workshops involved people from local governmental offices, academic institutions, the private sector, local experts and NGOs.

Impact and follow-up

Dissemination of the Mexico City report continues with impacts such as:

- inclusion of the report and its findings in work and learning processes for different groups, such as academic, public and private institutions, through workshops;
- towards the end of 2005, presentations were made in national meetings on Local Urban Observatories, with the support of UN-HABITAT, and in national seminars on the use of urban land;
- the environmental Ombudsman of Mexico recognizes the GEO Mexico City report and its findings as one of the principal sources of information and knowledge (NEXOS Magazine, January 2006);
- the Secretary of Environment used GEO Mexico City as a basic source to elaborate the city's Local Agenda 21 proposal;
- the United Nations Development Programme (UNDP) is using the GEO Mexico City report as a source of information for the elaboration of its new Human Development Report; and
- the "Special report on the violation of human rights to a healthy environment and ecologically balanced by the deterioration and disappearance of the conservation land of the Federal District" acknowledges the contribution of the GEO Mexico City report and its findings.

As a complementary tool and to provide wider outreach, the *geotext* is to be available on the CentroGeo's web page, providing an important collection of thematic cartography through its digital map-library.

As a result of these processes, other initiatives have been proposed in collaboration with academic and public sectors. These initiatives aim to reinforce public policies related to Mexico City's expansion.





DISCUSSION QUESTION

Taking the example of GEO Mexico City, discuss how you would design a GEO Cities process for the country where you live. What would be the geographical scope? Who would provide the mandate for such an exercise? Who would represent the audience and the decision making context for such an effort? What would be the main environmental issues to be addressed? Who would participate in the assessment process? How would it differ from a national GEO process? How could the results be best communicated? What kind of follow-up would you expect? How would the exercise build capacity?

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