



**Governing Council
of the United Nations
Environment Programme**

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Global Ministerial Environment Forum**
Nairobi, 16–20 February 2009
Item 4 (a) of the provisional agenda*
Policy issues: state of the environment

**State of the environment and contribution of the United Nations
Environment Programme to addressing substantive
environmental challenges**

Report by the Executive Director¹

Summary

The present report contains a summary of issues emanating from the activities of the United Nations Environment Programme (UNEP) in the area of assessment, monitoring and early warning. It covers several key aspects of the work performed by UNEP in keeping under review the world environmental situation and describes the multifaceted environmental challenges that face the United Nations and its Member States. The report also summarizes the services that UNEP is providing to Governments and other stakeholders to build capacity in scientific environmental assessment and information for decision-making through the implementation of the Bali Strategic Plan for Technology Support and Capacity-building and the “Delivering as one” approach within United Nations development assistance frameworks.

At its twenty-fifth session, the Governing Council/Global Ministerial Environment Forum will have before it a significant body of recent scientific assessment findings and a comprehensive overview of the international assessment landscape (UNEP/GC.25/4/Add.1), which represent challenges with potential implications for Member States. Many of the challenges are described in more detail in related documents, to which references are made in the present report.

Keeping the environment under review through scientifically credible monitoring and assessment is a foundation upon which UNEP intends to build to deliver through the programme of work on the medium-term strategy’s six cross-cutting thematic priorities. This approach aims to promote the role of science in setting priorities and informing decision-making, to help identify data and research needs, and promote initiatives to meet those needs. Cutting-edge scientific research, enhanced accessibility of timely and appropriate data and information and policy-relevant indicators serve as the foundation for the medium-term strategy and will continue to inform UNEP programme and policy development.

* UNEP/GC.25/1.

¹ The mention of firm names and commercial products does not imply the endorsement of the United Nations.

I. Suggested actions by the Governing Council

1. The Governing Council may wish to consider the adoption of a decision along the lines suggested below:

25/[...] World environmental situation

The Governing Council,

Pursuing its functions and responsibilities, as outlined in General Assembly resolution 2997 (XXVII) of 15 December 1972, including to keep under review the world environmental situation in order to ensure that emerging environmental problems of wide international significance are prioritized and receive appropriate and adequate consideration by Governments, and to promote the contribution of the relevant international scientific and other professional communities to the acquisition, assessment and exchange of environmental knowledge and information,

Recalling its decision 22/1 of 7 February 2003 on early warning, assessment and monitoring; decision 23/6 of 25 February 2005 on keeping the world environmental situation under review; and decision SS.X/5 of 22 February 2008 on the Global Environment Outlook: environment for development,

Recalling also General Assembly resolution 60/30 of 29 November 2005 on oceans and the law of the sea, by which the General Assembly decided to establish a regular process under the United Nations for the global reporting and assessment of the state of the marine environment, including socio-economic aspects, to be jointly implemented by the United Nations Environment Programme and the Intergovernmental Oceanographic Commission of the United Nations Economic, Social and Cultural Organization, and General Assembly resolutions 61/222 of 20 December 2006 and 62/215 of 22 December 2007,

Recalling further the findings and recommendations of the fourth Global Environment Outlook,

Noting the findings contained in a number of other environmental assessment reports and publications released since the twenty-fourth session of the Governing Council/Global Ministerial Environment Forum, in particular, those prepared by the United Nations Environment Programme in cooperation with partners,

Noting also the findings contained in reports on the state of the international assessment landscape,

Expressing concern that the documented environmental degradation and widespread changes resulting from human activity together with natural processes and the loss of ecosystem services are barriers to the attainment of internationally agreed development goals,

Welcoming with appreciation efforts made by the United Nations Environment Programme to build regional and national capacities for environmental data collection, information and assessment, performed in cooperation with other United Nations entities, national governments, non-governmental organizations and other partners,

Recognizing that the United Nations Environment Programme bears the sole responsibility within the United Nations system for keeping under review the world environmental situation to ensure that emerging environmental problems of wide international significance are prioritized and receive appropriate and adequate consideration by Governments and that the Global Environment Outlook is currently the only integrated and cross-cutting global assessment of environmental change,

Recognizing also the importance of building on the experiences gained and lessons learned from other assessment processes and the findings from the fourth Global Environment Outlook evaluation process together with other recent developments aimed at strengthening the scientific base of the United Nations Environment Programme,

Welcoming the options presented by the Executive Director on the possible development of a scientifically credible and policy-relevant global assessment of environmental change and its implications for development, including the option that embeds a structured set of integrated and thematic assessments within the framework of the medium-term strategy spanning its six cross-cutting thematic priorities,

A. Scientific findings of recent assessments

1. *Urges* Governments, United Nations agencies, financial institutions, the private sector and civil society to consider key environmental assessment findings, especially those related to agriculture and climate change, in the light of the growing awareness of the complexity of those challenges and their links to human well-being and development goals;

2. *Calls upon* Governments to demonstrate strong leadership individually and collectively and to implement effective policy responses including, where appropriate, economic instruments and market mechanisms to regulate and manage the environment, ecosystems and their services, and to continue to cooperate within the framework of multilateral processes that aim to reverse environmental degradation;

3. *Urges* Governments and other interested parties, taking note of the “assessment of assessments – Progress report” endorsed by the Ad Hoc Steering Group for the “assessment of assessments” of the regular process for global reporting and assessment of the state of the marine environment, including social and economic aspects, at its third meeting and submitted by lead agencies to Member States, to contribute financially to enable the completion of the “assessment of assessments” and its submission to the United Nations General Assembly at its sixty-fourth session, to be held in 2009;

B. International assessment landscape

4. *Also urges* Governments to improve the scientific basis of their own environmental management and decision-making and to strengthen public support for environmental action through regular assessment and reporting on the state of the national environment, in accordance with national legislation and multilateral environmental agreements, while contributing to subregional, regional and global assessment and reporting processes as appropriate;

5. *Requests* the Executive Director, through the programme of work, to maintain oversight of the international assessment landscape, to work with other partners in efforts to streamline and improve coherence in international environmental assessment and reporting processes, to assist in developing assessment processes that are credible, relevant and legitimate to enhance their influence, to strengthen the capacities of countries that are not meeting their environmental assessment and reporting obligations, to facilitate access to environmental assessments and reports through an online depository, and to report back to the Governing Council/Global Ministerial Environment Forum on improvements in this area through the regular report of the Executive Director on the state of the environment;

6. *Also requests* the Executive Director to assist countries, as appropriate, through the programme of work, to harmonize their national legislation relevant to environmental assessment and reporting so that the thematic coverage and periodicity of reporting is relevant and timely;

C. Future global assessment of environmental change

7. *Requests* the Executive Director, through the programme of work, to continue to conduct comprehensive and integrated global environmental assessments to support decision-making processes at all levels, in the light of the continuing need for up-to-date, scientifically credible, policy-relevant information on environmental change worldwide, including analyses of cross-cutting issues;

8. *Also requests* the Executive Director, through the programme of work, to engage all relevant stakeholders in conducting global environmental assessments to support and strengthen further their scientific credibility, policy relevance and legitimacy;

9. *Further requests* the Executive Director, through the programme of work, to undertake the following policy-relevant global assessment of environmental change, in accordance with the option that embeds the global assessment within the framework of the medium-term strategy.

II. Keeping the world environmental situation under review: documents for the information of the Governing Council at its twenty-fifth session

2. The aim of the present report is to provide a basis for the deliberations of the Council/Forum under agenda item 4 (a), policy issues: state of the environment, and agenda item 6, budget and

programme of work for the biennium 2010–2011 and the Environment Fund and other budgetary matters.

3. The present report is intended to update the Council/Forum, and member States on developments in the global environmental situation and on the various activities undertaken and processes under way to keep the world environmental situation under review and to facilitate informed discussion and action. It responds to various decisions of the Governing Council and relates to UNEP activities in environmental assessment, monitoring and early warning.

4. It contains a summary of recent global environmental assessments and an overview of the services that UNEP is providing to Governments and other stakeholders to build capacity in scientific environmental assessment through the implementation of the Bali Strategic Plan and the “Delivering as one” approach within United Nations development assistance frameworks.

5. The international community has provided financial resources, Governments have made in-kind contributions and thousands of experts worldwide have contributed collectively to the assessment reports, which were finalized in the period between the twenty-fourth and twenty-fifth sessions of the Governing Council. Their findings bring to the fore numerous options and recommendations for Governments and the international community. The Executive Director has, accordingly, taken the findings into account in implementing the programme of work for the transitional period 2008–2009 and in preparing the medium-term strategy 2010–2013 and the programme of work 2010–2011. Governments may wish to consider the key findings and identify appropriate ways to respond to them individually or collectively, through the appropriate international mechanisms, including the Governing Council/Global Ministerial Environment Forum at its twenty-fifth session in 2009.

6. It should be noted that the Governing Council/Global Ministerial Environment Forum at its twenty-fifth session has before it a number of associated documents to inform its deliberations, including:

(a) The *UNEP Year Book 2009* is presented in document UNEP/GC.25/INF/2. The year book draws attention to recent scientific findings that relate to the six cross-cutting thematic priorities of the UNEP medium-term strategy 2010–2013, including on the cumulative effects of climate change and ecosystem stress that result in the loss of sequestered carbon; ecosystem degradation that increases human vulnerability to weather and geological hazards; intensive agricultural practices and mismanagement of harmful substances that lead to ecosystem damage; agricultural resource inefficiencies that combine with changing climate to erode soils and contaminate water resources; and climate change-related ice melt that releases hazardous substances into rivers and ecosystems;

(b) A synthesis of global environmental assessments entitled “Environment for development – policy lessons from global environmental assessments” is presented in document UNEP/GC.25/INF/11. The report was prepared by the Netherlands Environmental Assessment Agency at the request of UNEP;

(c) An overview of the international environmental assessment landscape is contained in document UNEP/GC.25/4/Add.1. Detailed findings of studies on the environmental assessment landscape at the national, regional and global levels are contained in information documents UNEP/GC.25/INF/12/Add.1 and UNEP/GC.25/INF/12, respectively;

(d) The initial impact review of the fourth report in the Global Environment Outlook series, *Global Environment Outlook: Environment for Development (GEO4)*, is contained in document UNEP/GC.25/INF/13 and annexed thereto is a summary of the Outlook self-assessment survey;

(e) Options for the possible development of a scientifically credible and policy-relevant global assessment of environmental change and its implication for development, including a cost analysis and an indicative benefit analysis for each option, are presented in document UNEP/GC.25/4/Add.1 and a recommendation is made for a preferred option.

10. Several of these interrelated reports highlight challenges with potential implications, including for Member States, which are reflected in the suggested action by the Governing Council set out in chapter I of the present report. It should be noted that the Council/Forum has before it a report by the Executive Director on strengthening the scientific base of UNEP through the Environment Watch strategy (UNEP/GC.25/INF/20), which aims for improved coherence between, and effectiveness of, activities for keeping the environment under review.

III. Keeping the world environmental situation under review: summary of findings of global assessments conducted since the twenty-fourth session of the Governing Council

7. While the assessments that have been reviewed consider various issues, most focus on the relationship between the environment and sustainable development. The global assessment processes presented below are those in which UNEP has been closely involved.

8. The focus and findings of several of the assessments referred to in the present document are closely linked to the six cross-cutting thematic priorities defined by the UNEP medium-term strategy. The report of the Intergovernmental Panel on Climate Change and the reports on ice and snow and on global glacier changes, for example, have focused on the impacts of climate change, among other matters. Others reports, such as the International Assessment of Agricultural Knowledge, Science and Technology for Development, the World Resources Institute 2008 report, *World Resources 2008: Roots of Resilience – Growing the Wealth of the Poor*, and the report on the world's protected areas, have explored important aspects of ecosystem management and related environmental governance. The most recent evaluations by the United Nations Scientific Committee on the Effects of Atomic Radiation on sources of ionizing radiation and its effects on human health and the environment, provide an improved knowledge base for UNEP activities in the context of proposed future subprogrammes on harmful substances and hazardous wastes and on disasters and conflicts.

A. Fourth Assessment Report of the Intergovernmental Panel on Climate Change

9. Development of the fourth assessment report² began in 2003 with the Panel's approval of the outlines of three Panel working group reports and the selection of lead authors, and finished in Valencia, Spain, in November 2007, at the twenty-seventh session of the Panel, where the summary for policy makers of the Panel fourth assessment synthesis report was approved and the complete synthesis report was adopted.

10. The synthesis report was presented for consideration by the Subsidiary Body for Scientific and Technological Advice to the United Nations Framework Convention on Climate Change at its twenty-seventh session held in Bali, Indonesia, from 3 to 11 December 2007, and to the Conference of the Parties to the Framework Convention on Climate Change at its thirteenth session, held in Bali, Indonesia, from 3 to 15 December 2007, which subsequently adopted a decision on the Fourth Assessment Report.³ By that decision, the Conference of Parties, among other things, recognized that the report represented the most comprehensive and authoritative assessment of climate change to date, providing an integrated scientific, technical and social and economic perspective on relevant issues; urged Parties to the Convention, and invited Parties to the Kyoto Protocol, to make use of the information contained in the report in their discussions under all relevant agenda items, including those pertaining to negotiations on future action on climate change; and further encouraged Parties to draw, as appropriate, on the information contained in the report in the development of their national policies on climate change.

11. According to the report, "warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level"; "most of the observed increase in globally-averaged temperatures since the mid-20th century is very likely, due to the observed increase in anthropogenic GHG concentrations in the atmosphere"; and "anthropogenic warming over the last three decades has likely had a discernible influence at the global scale on observed changes in many physical and biological systems".

12. The report provides projections for the future emphasizing that "there is high agreement and much evidence that with current climate change mitigation policies and related sustainable development practices, global GHG emissions will continue to grow over the next few decades" and "continued GHG emissions at or above current rates would cause further warming and induce many changes in the global climate system during the 21st century that would very likely be larger than those observed during the 20th century". Moreover, it stresses that "anthropogenic warming could lead to some impacts that are abrupt or irreversible, depending upon the rate and magnitude of the climate change".

2 <http://www.ipcc.ch/ipccreports/assessments-reports.htm>

3 Decision 5/CP.13.

13. Based on its findings and projections, the fourth Assessment Report suggests that society should strengthen adaptation and mitigation efforts. The report concludes that “a wide array of adaptation options is available, but more extensive adaptation than is currently occurring is required to reduce vulnerability to climate change” and that “there is high agreement and much evidence of substantial economic potential for the mitigation of global GHG emissions over the coming decades that could offset the projected growth of global emissions or reduce emissions below current levels” and “a wide variety of policies and instruments are available to governments to create the incentives for mitigation action”. Stabilization of GHG concentrations in the atmosphere can be achieved by deployment of a portfolio of technologies that are either currently available or expected to be commercialised in coming decades. On the other hand, “there is high confidence that neither adaptation nor mitigation alone can avoid all climate change impacts; however, they can complement each other and together can significantly reduce the risks of climate change”. The Panel concludes that “delayed emission reductions significantly constrain the opportunities to achieve lower stabilisation levels and increase the risk of more severe climate change impacts”.

14. The report’s findings have been widely recognized, had a significant impact on policymakers and catalysed action at all levels. The Secretary-General, in his address to a high-level event on climate change, held in New York on 24 September 2007, said: “Today, the time for doubt has passed. The United Nations Intergovernmental Panel on Climate Change has unequivocally affirmed the warming of our climate system, and linked it directly to human activity. The scientists have very clearly outlined the severity of the problem. Their message is quite simple: we know enough to act; if we do not act now the impact of climate change will be devastating; and we have affordable measures and technologies to begin addressing the problem right now”.⁴

B. Global Outlook for Ice and Snow

15. In cooperation with the UNEP Global Resource Information Database office in Arendal, Norway (GRID-Arendal), UNEP prepared the Global Outlook for Ice and Snow⁵ at the outset of the International Polar Year 2007–2008. The report was launched during World Environment Day 2007 held in Tromsø, Norway. Among its key findings, the Global Outlook for Ice and Snow report indicates that:

(a) The largest recent increases in annual temperatures for the planet are over the North American Arctic, North-Central Siberia and on the Antarctica Peninsula. Overall, Arctic temperatures have been increasing at almost double the global rate. Over the past three decades there have been declines in the extent of Arctic sea ice of 8.9 per cent per decade in September and 2.5 per cent per decade in March. Increasing melting of sea ice in combination with increased freshwater influx from melting glaciers and ice sheets may result in major changes to ocean circulation. The rate of sea-level rise is now 3.1 mm per year; the average for the twentieth century was 1.7mm per year;

(b) Annual total loss of mass from the Greenland Ice Sheet more than doubled in the last decade of the twentieth century and may have doubled again by 2005. In Antarctica, there is uncertainty concerning recent overall change in the ice sheet mass, however, ice shelves are thinning and some are breaking up. Glaciers that feed the ice shelves are observed to accelerate, as much as eightfold, following ice-shelf break-up;

(c) Permafrost temperatures have increased over the past 20–30 years in almost all the areas in the northern hemisphere. The upper layer of the permafrost is estimated to contain more organic carbon than is currently contained in the atmosphere. Thawing of permafrost results in release of this carbon. It also has significant impacts on ecosystems, potentially changing habitats completely from boreal forest to wetlands, for example. Warming of permafrost is also reported in mountainous areas where it may increase slope instability;

(d) Impacts of changes in ice and snow are already major concerns to many communities around the world. In the Arctic, examples of local impacts include damage to coastal infrastructure from thawing permafrost and increased storm surges, and loss of access to subsistence resources for indigenous people. Expansion of shipping and oil and gas development will bring both local opportunities and the potential for negative economic and social effects. Most individual communities currently lack the capacity to cope effectively with these stresses. Responses to these challenges are likely to reflect variations in political and legal systems among Arctic States.

4 SG/SM/11175, GA/10619, ENV/DEV/950.

5 http://www.unep.org/geo/geo_ice/.

C. Global Glacier Changes: Facts and Figures

16. A joint publication on worldwide glacier changes was prepared by the World Glacier Monitoring Service in Zurich, Switzerland, in cooperation with UNEP, and was launched in Geneva at the twenty-ninth session of the Intergovernmental Panel on Climate Change on 1 September 2008. This report, *Global Glacier Changes: Facts and Figures*,⁶ is based on the global distribution of glaciers and ice caps and focuses on the available long-term front variation and mass balance series in the various regions.

17. The report shows that, in 2006, a new record annual mass loss was measured on the reference glaciers under long-term observation. The average annual melting rate of mountain glaciers appears to have doubled after the turn of the millennium in comparison with the already accelerated melting rates observed in the two decades before. The previous record loss in the year 1998 has already been exceeded three times, in 2003, 2004 and 2006, with the losses in 2004 and 2006 being almost twice as high as the previous 1998 record loss.

18. Early mass balance measurements indicate strong ice losses as early as the 1940s and 1950s, followed by a moderate ice loss between 1966 and 1985, and accelerating ice losses until present. The global average annual mass loss represents twice the ice loss of the previous decade (1986–1995) and over four times the rate of the decade from 1976 to 1985. Prominent periods of regional mass gains are found in the Alps in the late 1970s and early 1980s and in coastal Scandinavia and New Zealand in the 1990s. Under current Panel climate scenarios, the current trend of worldwide and rapid, if not accelerating, glacier shrinkage on the century timescale is most likely to be of a permanent nature, and may lead to the deglaciation of large parts of many mountain ranges in the twenty-first century. These changes have impacts on global sea level, natural hazard situations and on societies dependent on glacial meltwater.

D. International Assessment of Agricultural Knowledge, Science and Technology for Development

19. The International Assessment of Agricultural Knowledge, Science and Technology for Development⁷ undertook one global and five subglobal assessments of the role of agricultural knowledge, science and technology in reducing hunger and poverty, improving rural livelihoods and facilitating equitable, environmentally, socially and economically sustainable development. UNEP was one of seven co-sponsors of the assessment together with the Food and Agriculture Organization of the United Nations, the Global Environment Facility, the World Bank, the United Nations Development Programme, the United Nations Educational, Scientific and Cultural Organization and the World Health Organization.

20. The report, which represents a three-year endeavour by some 400 experts worldwide, concluded that continuing with current trends of agricultural production would exhaust the planet's resources and jeopardize the future of the next generation. To make agricultural knowledge work for the people, policymakers must accept and act on the fact that the status quo can no longer be maintained and that a "business-as-usual" approach is unacceptable. Key findings are as follows:

(a) *Global*: The way in which the world grows its food will have to change radically to meet development and sustainability goals. Modern agriculture has engendered significant increases in food production, but its benefits have been spread unevenly and have come at an increasingly intolerable price, paid by small-scale farmers, workers, rural communities and the environment. Meeting these challenges requires the putting in place of institutional, economic and legal frameworks that protect and conserve natural resources. Investment in agricultural science, education and training and extension to farmers has decreased at a time when it is most needed. Creating market-based opportunities for processing and selling agricultural products that ensure a fair share of value addition for small-scale producers and rural labourers is critical to meeting development and sustainability goals;

(b) *Central and West Asia and North Africa*: Water and land resources are becoming limited and the pressure on water, soil and biodiversity is further exacerbated by high population growth rates, increased life expectancy, climate change and unsustainable use. The report identifies options for making agricultural production systems, trade and research priorities more likely to advance equitable development, improve health, reduce poverty and hunger and achieve food and livelihood security while preserving natural resources. Required is an enabling environment that would include good

6 <http://www.grid.unep.ch/glaciers/>.

7 www.agassessment.org.

governance, increases in investment, coordination and policy coherence, and compliance with food safety and quality assurance;

(c) *East and South Asia and the Pacific*: A business-as-usual approach will fail to feed this region in an environmentally and socially sustainable way. Changes are needed that recognize the key role played by small-scale production in sustainable development and the multiple functions and roles of agriculture in the region. The report recommends using agricultural knowledge to help to arrest the loss of forests and grasslands, tackle land and water degradation, conserve biodiversity and both mitigate and adapt to climate change. With conflicts increasing over natural resources and anxieties evident in disputes over fishing rights and water-sharing, there is a need to develop regional cooperation and conflict-resolution systems;

(d) *Latin America and the Caribbean*: Over the past 60 years, the agricultural knowledge, science and technology system successfully generated knowledge and produced technological innovations that were adopted and used by some producers. These helped to boost productivity and agricultural production and enhance the competitiveness of market and export-oriented systems in the region. The system did not, however, prioritize, or allocate adequate resources to, issues related to the environment, social inclusion, reducing hunger and poverty, equity, and cultural diversity. Indigenous and traditional systems have not been included on its agenda, while agroecology has remained peripheral. The system will have to undergo swingeing change in the region to move toward a system of innovation and inclusive development that incorporates small-scale, agroecological and indigenous producers;

(e) *North America and Europe*: The development and application of the agricultural knowledge, science and technology system have been successful in enhancing land and labour productivity and production. The models of agricultural and rural development have not, however, fully eradicated hunger and rural poverty nor ensured sustainable ecosystem goods and services, equity across gender and social divides and sustainable rural livelihoods for those dependent on agriculture. In addition, climate change, energy demands, the concentration of land ownership and agribusiness control, together with trade and markets regimes that create uneven playing fields, frustrate attempts to meet sustainable development objectives. A more holistic view of agriculture is needed, which recognizes its multiple functions, and states that successfully meeting development and sustainability goals requires three basic enabling strategies: reshaping knowledge systems; improving policy and governance; and increasing public and private investment in agricultural knowledge, science and technology.

(f) *Sub-Saharan Africa*: Increasing agricultural productivity remains a priority, given the extremely low yields and widespread hunger, poverty and malnutrition. Technology development is a recommended area of action, together with continued crop, tree, fish and livestock improvement and sustainable practices for using water, other natural resources and energy. A second area of action is organizational capacity and policy and institutional development. Increased investments in agricultural knowledge, science and technology, particularly if complemented by supporting investments in rural development (for example, infrastructure, telecommunications and processing facilities), can have high economic rates of return and reduce poverty. Increasing the involvement of women in research, extension work and policymaking, in addition to providing them with equitable access to education, credit and secure land tenure, will be critical to improving the outlook for all citizens.

E. World Resources Report

21. World Resources 2008: Roots of Resilience – Growing the Wealth of the Poor⁸ is the twelfth volume in the report series developed by the World Resources Institute in conjunction with the United Nations Development Programme, UNEP and the World Bank. This volume focuses on the world's poor – those who survive on less than \$2 per day. Some 75 per cent thereof, almost 2 billion people, live in rural areas and largely depend on natural resources for their livelihoods. The main message of World Resources 2008 is that properly designed, nature-based enterprises can improve those livelihoods and, in the process, create resilience – economic, social, environmental – that can cushion the impacts of climate change, keep communities rooted and help to provide needed social stability.

⁸ World Resources Institute in collaboration with the United Nations Development Programme, United Nations Environment Programme and World Bank. 2008. *World Resources 2008: Roots of Resilience – Growing the Wealth of the Poor*. Washington, DC: WRI. <http://www.wri.org/publication/world-resources-2008-roots-of-resilience>.

22. The report builds on a previous report, *World Resources 2005: The Wealth of the Poor*, which demonstrated that ecosystems can become the focus of a powerful model for nature-based enterprise that delivers continuing economic and social benefits to the poor, even as it sustains the natural resource base. Evidence shows that poor rural families empowered with secure resource rights can increase their income stream from nature significantly with prudent ecosystem management.
23. The report identifies critical measures for Governments and development agencies to take that grant legitimate ownership of local resources and a sense of self-interest to the community; provide the rural poor with the technical and business skills that they need to become more resilient and support networks – formal and informal – between communities and the organizations working with them to help the rural poor to manage sustainably natural resources and generate income.
24. When these three elements are present, communities can begin to unlock the wealth potential of ecosystems in ways that actually reach the poor. In so doing, they can build a base of competencies that extends beyond nature-based enterprises and supports rural economic growth in general, including the gradual transition beyond reliance on natural resource income alone.
25. Giving communities the right to manage local natural resources themselves can be a critical catalyst for improving well-being. Governments committed to putting an end to poverty can begin to break down barriers to rural enterprises, such as lack of competitive markets, transportation infrastructure and financial services.
26. The insight that ecosystems are valuable assets that can be owned and managed for sustained benefits builds the foundation of ecological resilience. Together, these three dimensions of resilience support the kind of rural development whose benefits persist in the face of a wide variety of challenges, whether environmental or of another nature.

F. The World's Protected Areas

27. With more than 114,000 sites, protected areas cover 19 million km², equivalent to 12.9 per cent of the Earth's land surface. Protected areas have been established worldwide as a means to protect nature and the species and livelihoods that rely on a particular ecosystem. Protected areas also safeguard water supplies, prevent erosion, replenish fish stocks, offer places of solace and recreation and store a treasure trove of genetic diversity for future pharmaceuticals and crops.
28. The World's Protected Areas report,⁹ based on input from more than 100 experts and published in 2008 in association with the UNEP World Conservation Monitoring Centre by the University of California Press, examines the relationship between people and protected areas, cites the history of protected areas, investigates threats and opportunities, provides expert conservation advice and celebrates the success of protected areas around the world.
29. Nevertheless, the authors point out that even protected areas are not free from danger. The report considers the catalogue of threats that are affecting protected areas, from mismanagement to alien species invasions. As is so often the case, climate change is also likely to have a significant impact on these habitats. Freshwater systems are a particular source of concern. Although large areas of wetlands, lakes and rivers appear to be incorporated within existing protected areas, they remain vulnerable to external influences such as dams, irrigation and pollution, which are degrading rivers and lakes worldwide. Other ecosystems singled out for concern include tropical dry forests, temperate grasslands, cold deserts and semi-deserts and Mediterranean ecosystems.
30. A new online version of the World Database of Protected Areas,¹⁰ that enables scientists to monitor more easily the world's national parks and protected areas, was launched on 6 October at the fifth World Conservation Congress in Barcelona, Spain. The new product, a partnership between the World Conservation Monitoring Centre and the World Conservation Union, also enables users to zoom in, fly over and explore over 100,000 sites via Google Earth.

9 <http://www.ucpress.edu> .

10 <http://www.wdpa.org>.

G. Effects of Atomic Radiation

31. The United Nations Scientific Committee on the Effects of Atomic Radiation, which undertakes broad assessments of the sources of ionizing radiation and its effects on human health and the environment, adopted at its fifty-sixth session, held from 10 to 18 July 2008 in Vienna, a report to the General Assembly,¹¹ summarizing the findings of its most recent evaluations:

- (a) *Human exposure to ionizing radiation*: Humans have always been exposed to ionizing radiation from natural sources, principally from cosmic radiation and natural radionuclides in soil and rocks;
- (i) Exposures as a result of inhalation of the radioactive gas radon account for about half of the average human exposure to natural sources, but vary dramatically by locality and building type;
 - (ii) The global radioactive fallout from atmospheric nuclear weapons tests conducted over the periods 1952–1958 and 1961–1962 represents a source of continuing exposure even today, albeit at extremely low levels except in nuclear test areas where radioactive residues are considerable at some sites. Populations are also exposed near sites at which nuclear materials and weapons were produced. The military use of depleted uranium has raised concerns about residual contamination; however, radiation exposures are generally negligible;
 - (iii) Medical exposures predominate among peaceful uses of radiation. They continue to increase worldwide, with some 3.6 billion radiological examinations conducted every year. In countries with high levels of health care, the exposure from medical uses is on average now about 80 per cent of that from natural sources;
 - (iv) Generation of electrical energy by nuclear power plants has grown steadily since 1956. Doses to members of the public are generally small and decrease markedly with distance from a specific facility. Discharges from power reactors and the associated exposures of local and regional populations have fallen with time;
 - (v) A small number of accidents associated with the nuclear fuel cycle have attracted widespread publicity. More than 100 accidents have, however, occurred with industrial and medical sources, especially when “orphaned” (i.e., outside regulatory control), that have caused injuries among workers or members of the public. Reports of accidents with orphan sources and those related to medical uses of radiation (involving errors in radiotherapy) have become more frequent and are still likely underreported.
- (b) *Health effects as a result of radiation from the Chernobyl accident*: The 1986 Chernobyl accident was the most severe in the history of civilian nuclear power. Hundreds of thousands of workers were involved in recovery operations. Among those exposed to higher radiation doses in 1986–1987, there are some reports of increased incidence of leukemia and of cataracts; otherwise to date there is no consistent evidence of other radiation health effects. The radioactive cloud deposited substantial radioactive material over large areas of the former Union of Soviet Socialist Republics and other parts of Europe, contaminating land, water and biota, and causing particularly serious social and economic disruption for large populations in Belarus, the Russian Federation and Ukraine. Among people who were children or adolescents in affected areas in 1986, more than 6,000 thyroid cancers have since occurred (to date only a small number have been fatal), of which a substantial fraction could be attributed to drinking milk contaminated with the short-lived radionuclide, iodine-131. In the longer term, the general population was also exposed to low-level chronic radiation, but there has been no consistent evidence as yet of any other radiation health effects in the general population.
- (c) *Effects of ionizing radiation on non-human biota*: In an assessment concluded in 1996, the Committee had evaluated the rates of radiation exposure below which effects on populations of species other than humans were unlikely. The Committee has since reviewed the approaches to evaluating radiation doses to other species, and new scientific information on radiobiological effects on plants and animals (in particular from the continuing follow-up of the environmental consequences of the Chernobyl accident). It concluded that there was no evidence to support changing its 1996 conclusions.

IV. Keeping the world environmental situation under review: Sub-global assessments – providing services to Governments and other stakeholders

32. Issues such as the impacts of climate change and deterioration of ecosystem functions and services, which are taken up by the global scale assessments, are also extremely relevant at the regional and local levels. While the global environmental assessments are crucially important in shaping the global policy agenda, however, the linkage between knowledge and action is easier to establish at the sub-global level. In this regard, regional integrated environmental and more targeted assessments play a significant role in developing and implementing adequate policies at the subregional level, indicating priority environmental issues and suggesting action, elaborating on regional implications of global environmental change and warning of emerging issues of regional significance.

33. Regional environmental assessments are intended to help Governments and other stakeholders to view the region as an interconnected natural system, report on environmental issues in a comparable way and help the countries of the region to bring their priorities collectively to the attention of the rest of the world. The reports produced at the regional and subregional levels, such as *Africa: Atlas of Our Changing Environment*,¹² *Carpathians Environment Outlook*¹³ and a number of national and city reports,¹⁴ in which UNEP was closely involved, have provided regional policymakers with findings and recommendations on regional priority environmental issues and response options.

34. UNEP activities to build capacity in scientific environmental assessment and information for decision making in the regions (implementing section F of the Bali Strategic Plan for Technology Support and Capacity-building) have focused on applying integrated environmental assessment as a powerful tool to generate policy-relevant information, contributing to “Delivering as one” approach efforts within United Nations development assistance frameworks in roll-out countries, developing integrated assessment tools to help national stakeholders to assess impacts of, and vulnerability to, climate change and improving availability and supply of data and indicators for assessment.

35. UNEP work on capacity-building benefits from modern information and communication technologies and partnership with lead providers of communication services. For example, case studies from atlases of environmental change are being released in the “Global Awareness” layers of Google Earth for visualization of changes in environment. The partnership with Google Inc. is providing unparalleled global outreach as Google Earth software is already being used by over 300 million users around the world.

36. *Africa: Forest loss and fragmentation, urban growth, aridification of lakes and drained wetlands* are some of the examples of rapid environmental change illustrated in *Africa: Atlas of Our Changing Environment* launched in June 2008 during the twelfth session of the African Ministerial Conference on the Environment in Johannesburg, South Africa. Covering significant environmental issues in all 53 African countries, the Atlas also has a special focus on transboundary environmental issues that require international cooperation. The Atlas has already catalysed action at the national level with a number of countries (Kenya, Rwanda, South Africa and Uganda) initiating activities to prepare national atlases to support national planning processes.

37. Water resources are in the centre of concern in Africa. For example, Lake Faguibine in Mali has completely dried up since 1970, jeopardizing the future of more than 170,000 people living in the vicinity of the lake and depending on it for their livelihoods. Water vulnerability assessments, focused on selected river basins in North, West, Central, Eastern and Southern Africa, including Africa’s island States, were conducted by UNEP and partners. The reports have highlighted the increasing impact of climate change on water resources in the basins of riparian countries and the importance of assisting Governments in planning adaptation measures within integrated water resources management and development.

12 <http://www.unep.org/dewa/africa/AfricaAtlas/>.

13 <http://www.grid.unep.ch/activities/assessment/KEO/index.php>.

14 See <http://www.unep.org/DEWA/africa/publications/publications.asp>,

<http://www.roap.unep.org/program/early.cfm>, <http://www.grid.unep.ch/>,

http://reports.eea.europa.eu/state_of_environment_report_2007_1/en and <http://www.unep.org/dewa/WestAsia/> for detail.

38. UNEP, in conjunction with African Governments, regional economic communities and partner institutions, experts of the New Partnership for Africa's Development, the African Development Bank and other United Nations agencies, has developed a consolidated list of 100 environmental indicators and statistics for environmental assessment, monitoring and reporting for Africa. The list is designed to mainstream into national statistical systems and to improve monitoring of national, subregional and regional environment policies and programmes, together with the implementation of the action plan of the Environment Initiative of the New Partnership for Africa's Development and the Millennium Development Goals.

39. The integrated environmental assessment approach is in high demand at the national and municipal levels. UNEP is supporting the three "One United Nations" pilot countries (Mozambique, Rwanda and United Republic of Tanzania), to prepare their national or city (Dar es Salaam, United Republic of Tanzania) environment outlook reports as part of the implementation of the development assistance frameworks. UNEP, in conjunction with the United Nations Human Settlements Programme, supported the city councils of Nairobi and Lusaka to produce city environment outlook reports, which are being used to mainstream environmental sustainability into urban development strategies.

40. Asia and the Pacific: Overall, the main findings of assessments show that environmental change, notably climate change, land use change and alteration of water availability, presents a major threat to human well-being, while regional capacity to implement environmental policies and to enforce environmental legislation is inadequate. Currently there is limited access to green technology and a knowledge base on efficient use of natural capital, such as land, water, biological and mineral resources.

41. Regional priority environmental issues are closely linked to food, energy and water security, which will be complicated by the challenge of striking the correct balance between the growing demand for biofuels and sustainable land use for food production, and the quest for climate change adaptation and mitigation measures.

42. South-South cooperation, through experience-sharing between national Governments, municipal authorities and Global Environment Outlook collaborating centres, is a key element in capacity development for integrated environmental assessment in the region. For example, the assessment methodology has been incorporated into the regular national and State-level environmental assessment and reporting in India with the assistance of a centre.

43. In 2007–2008, 10 environmental assessment reports were produced at the subregional level (Bhutan, Cambodia, China (Shenzhen), Iran (Islamic Republic of), Kyrgyzstan, Lao People's Democratic Republic, Mongolia (Ulaanbaatar), Nepal (Kathmandu), Sri Lanka and Turkmenistan) with technical support provided by UNEP. The conclusions and findings of the Shenzhen Environment Outlook, for example, were used for the city development strategy and plans.

44. Together with Global Environment Outlook collaborating centres and other subregional partners, UNEP has conducted integrated environmental assessments and reporting processes in Central Asia, the Greater Mekong and South Asia. Findings and recommendations of the Central Asia assessment have been used to revise the regional environmental action plan, to ensure a solid scientific base for the subregional sustainable development strategy being developed by the Central Asian Inter-State Commission on Sustainable Development, and to provide comprehensive assessment of all current and emerging issues for development of the Framework Convention on Environmental Protection for Sustainable Development in Central Asia.

45. UNEP has pioneered integrated climate change assessment at the national and city levels. With the support of leading climate scientists from the Asia-Pacific region, a manual for the development of national and city assessment reports on climate change has been produced. The manual was piloted in Mongolia, Thailand and Viet Nam in 2008.

46. Europe: In spite of progress on air emissions and improvements in water quality, air (fine particles and tropospheric ozone) and water pollution continue to contribute to various environment-related health concerns and significant human health impacts. Overuse of marine resources and pressures on coastal environments not only continue but appear to be increasing, with the expected negative consequences. The impacts of climate change on both the (semi-)natural environment and human society are already being felt across much of, if not the entire, European region.

47. Climate change adaptation and mitigation measures, reducing material flows and improving resource efficiency, further reducing air and water pollution, strengthening biodiversity protection and reducing land conversion and safeguarding marine resource stocks are now high on the environmental policy agenda in Europe. Recent assessment findings also point at emerging issues such as the need to assess and monitor mountain and forest ecosystems, the Arctic region in relation to climate change

impacts and reducing emissions from deforestation in developing countries (in terms of land use and land cover changes).

48. UNEP coordinated the preparation of the Carpathians Environment Outlook report, involving experts from the seven countries of this mountain and plateau region (Czech Republic, Hungary, Poland, Romania, Serbia, Slovakia and Ukraine). This report was launched at the Environment for Europe ministerial conference in Belgrade in October 2007. The report concluded that, while the region has enormous potential, it currently faces rapid environmental, social and political changes. Increasing its sustainability will require adapted, responsible actions, taking into account global, regional and transboundary contexts and linkages. More environmentally friendly practices will need to be implemented, along with appropriate policies to support sectoral developments such as renewable energy sources, sustainable forest management, sustainable tourism, organic farming and improved public transport.

49. Cities in the Eastern Europe, Caucasus and Central Asia region have a particular need for environmental monitoring and improvement as they are newly independent States, and therefore are a priority area for UNEP capacity-building efforts. The pilot cities were Belgrade, Donetsk (Ukraine) and Yerevan. Integrated assessments were organized in the region and the Global Environment Outlook reports on cities were launched at the above-mentioned ministerial conference in October 2007.

50. Latin America and the Caribbean: Deforestation is a persistent problem in the region and, although its causes and effects are known, in some parts, the loss of natural forests is intensifying, particularly in South America. Fragmentation and intensified exploitation outside areas used for cultivation exacerbate problems caused by deforestation.

51. Other priority regional issues are degradation of coastal environments owing to pollution from sewage, the destruction of habitats such as reefs and mangroves and overfishing. Solid and hazardous wastes are an especial issue in some Caribbean island States that have little space to dispose of growing volumes of waste. The frequent lack of effective waste treatment is aggravating the problem of freshwater availability owing to pollution of water storage facilities. These issues, together with mitigation of and adaptation to climate change, decrease of vegetation cover owing to the expansion of the agricultural frontier, urban settlements, infrastructure and tourism, require immediate attention by policymakers and other stakeholders.

52. At the same time, assessment conclusions emphasize, among other problems, the lack of data and environmental indicators standardized for use at the regional level; lack of enforcement of existing environmental regulations; lack of appropriate land use planning policies; and marginalization of environmental issues at the government level. Even for the areas that appear to be well studied (such as the Amazon), existing data and information are scattered between various sectors and entities, and a special initiative, such as an assessment, is needed to organize properly information for decision-making.

53. During 2007 and the first half of 2008, several countries in Latin America and the Caribbean completed or initiated national environmental assessment processes using the integrated environmental assessment methodology. The first of the Global Environment Outlook national series for Brazil, the country's water assessment, was launched in March 2007, and other thematic assessments in the same series are under way. In 2007, Saint Lucia completed its national assessment, and the Global Environment Outlook report on Uruguay was launched in June 2008 with substantial support from the United Nations country team as a part of the "Delivering as one" approach.

54. At present, over 40 cities in the region have joined the cities project assessment network. In 2007, three cities went through the Global Environment Outlook process and launched their integrated environmental assessments reports: Santo Domingo, San Miguel de Tucumán (Argentina) and Panama City. By June 2008, three more cities had finished their assessments and launched their reports: Loja (Ecuador), Rosario (Argentina) and Chiclayo (Peru). In addition, three new cities began the assessment process: Córdoba (Argentina), Canelones (Uruguay) and Colonia (Uruguay).

55. North America: A comprehensive regional assessment, released in June 2008 by the Commission for Environmental Cooperation,¹⁵ highlighted significant impacts of climate change and emphasized the crucial importance of tackling anthropogenic greenhouse gas emissions immediately. Other environment-related issues such as urban sprawl, freshwater availability and quality, consumption patterns, biodiversity loss and invasive species require a balanced response, including environmental, economic and social constituents. More environmental issues, such as the melting of Arctic ice and the

15 See <http://www.cec.org/soe/>.

environmental impacts of exploitation of bituminous sands, come to the fore and require a political response.

56. West Asia: Assessment findings and conclusions reflect an inextricable relationship between the environment and economic development. Countries in West Asia rely heavily on the exploitation of natural resources (oil, water, land and coastal and marine resources), and these activities have an extensive impact on the environment. In addition, the environment is under pressure from rapid population growth and rampant urbanization. Rapidly transforming lifestyles and consumption patterns are further aggravating water and urban air quality, and leading to land degradation and desertification, coastal degradation and marine pollution, loss of biodiversity and damage to habitats. In spite of government efforts to prevent and reduce environmental degradation, many of the above-mentioned problems persist and new problems are emerging. Those may include impacts of biofuels on food security, hazardous substances that require an immediate management response and impacts of climate change that require adaptation policies to be developed and implemented.

57. Since 1972, environmental awareness has progressed significantly in the region, as demonstrated by the increased attention paid to national and international environmental legislation. Nevertheless, many countries continue to deplete their natural resources at rates well above sustainable levels. Weak institutional capacity, lack of access to environmental data and information, inadequate financing of the environmental sector and lack of strong and sound environmental investments are key challenges in achieving sustainable development.

58. Within West Asia, Bahrain, Jordan, Qatar, Syrian Arab Republic, United Arab Emirates and Yemen have adopted the integrated environmental assessment methodology to prepare national assessments, with technical assistance from UNEP. In addition, UNEP is helping to coordinate regional and subregional assessments that will provide regional organizations, such as the League of Arab States, the Council of Arab Ministers Responsible for the Environment and the Cooperation Council for the Arab States of the Gulf with the basis for sound environmental decision-making.

V. Continuing assessment processes

A. Millennium Ecosystem Assessment follow-up and intergovernmental science-policy platform on biodiversity and ecosystem services

59. A global strategy has been initiated to follow up on the Millennium Ecosystem Assessment launched in 2006. The four components of the follow-up strategy are: to build the knowledge base; to integrate the ecosystem service approach into decision-making at all levels; to enhance outreach and dissemination of the Assessment; and to explore the needs and options for future global ecosystem services assessments. The strategy is being carried out in partnership with several institutions.

60. Together with Assessment follow-up partners, UNEP is implementing this strategy through a three-year project on implementing the Millennium Ecosystem Assessment findings and recommendations. Activities have focused primarily on sub-global assessments. The first follow-up meeting in that regard was held in April 2008. The sub-global assessment secretariat has issued a call for proposals for additional assessments and continues to follow up on current assessments and funding issues. In response to feedback, technical material is being developed to help assessments with ecosystem assessment methodology. The Assessment follow-up process is also creating internet and intranet websites.

61. UNEP has also been actively involved in, and facilitating, consultations with Governments and other stakeholders on the proposed intergovernmental science-policy platform on biodiversity and ecosystem services. The platform concept seeks to build on the work of the Assessment and the international mechanism of scientific expertise on biodiversity. From the first platform meeting, held in November 2008 in Putrajaya, Malaysia, UNEP has been requested to undertake a gap analysis and prepare a second meeting to explore and discuss in more depth mechanisms to improve the science-policy interface for biodiversity and ecosystem services. A report of the preliminary gap analysis is being made available for review at the twenty-fifth session of the Council/Forum.

B. Towards a regular process for the global reporting and assessment of the state of the marine environment, including social and economic aspects

62. Following commitments made at the 2002 World Summit on Sustainable Development, the United Nations General Assembly by resolution 60/30 decided to launch a start-up phase towards the establishment of a regular process for global reporting and assessment of the state of the marine environment, including social and economic aspects.¹⁶ This preparatory stage, which builds on existing regional assessments, is referred to as the “assessment of assessments”. UNEP and the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization were invited to lead this process jointly.

63. The process is overseen by an ad hoc steering group comprising representatives of member States from each of the United Nations regional groups, together with representatives from the Food and Agriculture Organization of the United Nations, World Meteorological Organization, International Maritime Organization, International Seabed Authority, UNEP and the Intergovernmental Oceanographic Commission of the United Nations Educational, Cultural and Scientific Organization. The Division for Ocean Affairs and the Law of the Sea and the Department of Economic and Social Affairs of the United Nations participate as observers.

64. The “assessment of assessments”, which began in 2007, is being undertaken by a group of experts and covers all coastal and marine regions. As a whole, the group concludes that, while assessment capabilities are strong in many regions, there is a clear need for continued efforts to develop greater expertise and infrastructure around the globe in the technical aspects of marine environmental assessment work. In addition, there are three major areas that need immediate, concerted and continuing attention; ensuring that assessment processes are well designed and conducted to the highest standards; improving the data access and interoperability so that assessments can be extended and integrated within and across regions, and developing integrated ecosystem assessments that can inform on the state of systems rather than just individual sectors.

C. Stratospheric ozone

65. The 2006 report by the World Meteorological Organization and UNEP on scientific assessment of ozone depletion¹⁷ prepared by the Scientific Assessment Panel of the Montreal Protocol on Substances that Deplete the Ozone Layer and published in 2007 still provides the latest, most authoritative and widely assessed information on the scientific aspects of the state of the stratospheric ozone layer. The next assessment is due in 2010.

66. It is widely recognized now that the implementation of the Montreal Protocol has benefited overall global climate protection. When expressed in CO₂-equivalent, the avoidance of emissions of ozone-depleting substances through the implementation of the Montreal Protocol is significantly larger in magnitude compared to the greenhouse gas emission reduction required by the Kyoto Protocol to the United Nations Framework Convention on Climate Change.

67. In 2007, the Parties to the Montreal Protocol agreed to accelerate the phase-out of hydrochlorofluorocarbons (HCFCs). The phase-out dates for developed and developing countries have been brought forward by 10 years to 2020 and 2030, respectively, and additional reduction steps have been added to the phase-out schedule. These adjustments are accompanied by the principle of climate protection. The Parties decided that projects for HCFC phase-out to be funded by the Multilateral Fund should focus on, among other things, “substitutes and alternatives that minimize other impacts on the environment, including on the climate, taking into account global-warming potential, energy use and other relevant factors...” For the first time, climate protection has been formally included as a consideration under the Montreal Protocol. Accelerated HCFC phase-out may result in a further significant contribution to climate protection.

16 More details on the process are available at: <http://www.unga-regular-process.org/>.
17 http://ozone.unep.org/Assessment_Panels/SAP/Scientific_Assessment_2006/.