

Introduction

The UNEP Year Book 2010 reports on new environmental science and recent developments in our changing environment. It looks at progress in environmental governance; the effects of continuing degradation and loss of the world's ecosystems; impacts of climate change; how harmful substances and hazardous waste affect human health and the environment; environmentally related disasters and conflicts; and unsustainable use of resources. The chapters correspond to UNEP's six thematic priorities.

The purpose of the Year Book is to strengthen the science-policy interface. Thus, it presents recent developments and new scientific insights of particular interest to policy-makers. Consistent with the Year Book's established format and style, important issues are examined, referenced, and often illustrated. The main sources of information are peer-reviewed papers in scientific journals, results published by research institutions, news articles, and other reports. While the Year Book brings to the forefront some of the views expressed and progress made in recent months, it does not endorse particular views or indeed any scientific findings.

The Year Book's content is the product of a screening and peer-review process that involved more than 70 experts. Out of more than 100 emerging issues initially suggested by experts, less than one-third have found a place in the Year Book 2010.

Some of the issues included in the Year Book are already well-known, while others are emerging or represent years of research and continuous debate in the scientific community. It is in the nature of scientific research that there is uncertainty or disagreement about some findings. In such cases, the Year Book acknowledges that differing points of view exist.

The first chapter, on *environmental governance*, reports on the acceleration of intergovernmental efforts to reform the United Nations' system of international environmental governance. The chapter also highlights regional dimensions, and the important roles of non-governmental organizations and the private sector.

The chapter on *ecosystem management* presents emerging science on ecosystem thresholds and planetary boundaries. Concerns about how to maintain healthy ecosystems in the face of population pressures and climate change, are emphasized. Food production relies on the capacity of ecosystems to provide water, soils, climate regulation, and other benefits. The loss of these benefits, coinciding with increasing biofuel production in several parts of the world, could reduce the amount of land available for food crops.

The chapter on *harmful substances and hazardous waste* focuses on potential hazards and risks associated with nanomaterials, endocrine disruptors, brominated flame retardants, and some widely used pesticides. The impacts of

international transport of hazardous and electronic waste on human health and the environment are also examined.

The *climate change* chapter discusses the effects of increasing greenhouse gas concentrations on global systems. Trends associated with climate change include decreasing Arctic sea-ice cover, ocean acidification, and the expansion of the tropical belt. This chapter looks at progress made in 'climate attribution', which demonstrates the mechanisms that are held responsible for observed changes in the climate.

The *disasters and conflicts* chapter highlights the importance of sustainable natural resource management in regard to conflict prevention and peacebuilding. It reviews the tools being used, such as threat and risk analysis and mapping that incorporate environmental indicators and local knowledge. This chapter also explores the environmental drivers of disaster risk, and how climate change is affecting disaster risk.

The final chapter, on *resource efficiency*, addresses the fundamental problem of unsustainable production and consumption, which is bringing about natural resource depletion, climate change, and material waste, as well as geo-engineered technological fixes. Although energy-related CO₂ emissions continue to increase, progress is being made in a number of areas with respect to investment in renewable energy sources.

Water is a recurrent theme in this Year Book. Each chapter considers water-related environmental changes, together with a number of challenges and opportunities:

- There are promising developments in regional cooperation to manage transboundary river basins, which cover more than 45 per cent of the planet's land surface and directly affect about 40 per cent of the world population;
- The world's densely populated, and heavily farmed, sinking deltas are receiving increasing attention. Direct human activities have significantly increased their vulnerability;
- The expansion of the tropical belt is a trend associated with climate change. The widening of the tropics will have a cascading effect on large-scale circulation systems. It will impact the patterns of precipitation on which natural ecosystems, agricultural productivity, and water resources depend. Several regions are expected to be increasingly affected by persistent drought and water scarcity;
- Amid growing concerns about water scarcity, which is projected to affect almost half of the world's population by 2030, traditional technologies are finding new applications. The karez or qanat system, traditional in some arid and semi-arid regions, collects groundwater in underground tunnels and distributes it for irrigation and domestic use;
- Wastewater has long furnished water and nutrients for agriculture. Sewage water is estimated to irrigate about half the gardens, roadside verges, and small fields where food is grown in the world's urban and peri-urban areas. A new look is being taken at how to use this traditional resource safely;
- The Year Book also includes a map of extreme water-related environmental events in 2009.

The Year Book 2010 is provided as an information document for the Eleventh Special Session of the UNEP Governing Council/Global Ministerial Environment Forum. It is also a credible source of environmental information for non-specialist audiences, research institutions, universities, and schools. Feedback on the 2010 UNEP Year Book is very welcome, as well as suggestions of emerging issues for consideration in the next edition. We invite readers to use the questionnaire form at the back, or visit www.unep.org/yearbook/2010/