



21 Issues for the 21st Century

Results of the
UNEP Foresight Process on
Emerging Environmental Issues

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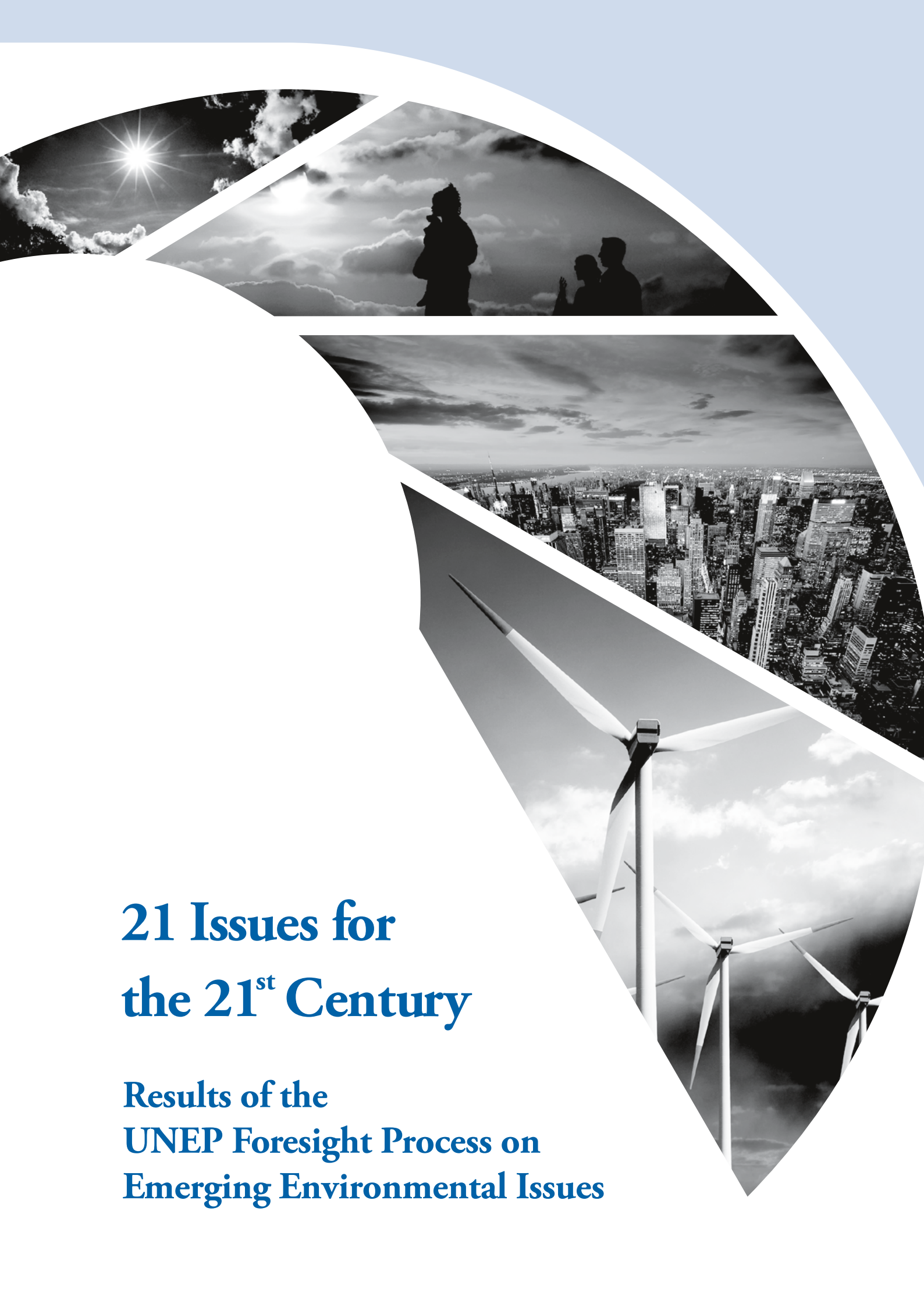
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Sound science is critical to UNEP's work in terms of advising governments on the challenges and the opportunities of a rapidly changing world.

In order to achieve sustainable development, nations and their citizens need to know how the policies of the past are impacting the present: equally the judgements and assessments of likely future trends need to be kept high on the international radar screen.

In 2010, in support of the road to Rio+20 and UNEP's work towards an inclusive Green Economy, a unique and transformational consultative process was instigated to answer a set of critical scientific questions on what will be the big emerging issues over the coming years.

The UNEP Foresight Panel, involving over 20 distinguished scientists from around the world, spent close to a year discussing and consulting with some 400 other scientists and experts globally via an electronic survey.

The goal was to deliver an international consensus and a priority list of the top emerging environmental issues alongside options for action.

Emerging environmental issues were defined as "issues with either a positive or negative global environmental impact that are recognized by the scientific community as very important to human well-being, but not yet receiving adequate attention from the policy community".

The issues chosen were termed as "emerging" based on newness, which can be the result of: new scientific knowledge; new scales or accelerated rates of impact; heightened level of awareness; and/or new ways of responding to the issue.

This report is the outcome of that process and presents the identified issues titled: *21 Issues for the 21st Century*. These issues cut across all major global environmental themes including food production and food security; cities and land use; biodiversity, fresh water and marine; climate change and energy, technology and waste issues.

Meanwhile, another cluster of issues were chosen that essentially cut across sectors and individual themes.

These address questions surrounding such issues as the governance required to more effectively tackle 21st century sustainability challenges, including the urgency to bridge the gap between the scientific and policy communities and the relevance of social tipping points to sustainable consumption.

The findings of the report, which was coordinated by the Office of the UNEP Chief Scientist and the UNEP's Division of Early Warning and Assessment, are aimed at all sectors of society committed to realizing a more intelligent, decisive and forward-looking response to challenges of our times.

While the initial focus was to inform the Rio+20 Summit taking place in Brazil in 2012, *21 Issues for the 21st Century* will be clearly relevant to environmental policy-making and scientific priority setting for many years to come as well as the trajectory of UNEP's future work programme.

A handwritten signature in black ink, reading 'Achim Steiner'.

Achim Steiner

United Nations Under-Secretary-General, and
Executive Director United Nations Environment Programme

Executive Summary

The purpose of the UNEP Foresight Process is to produce, every two years, a careful and authoritative ranking of the most important emerging issues related to the global environment. UNEP aims to inform the UN and wider international community about these issues on a timely basis, as well as provide input to its own work programme and that of other UN agencies, thereby fulfilling the stipulation of its mandate: “keeping the global environment under review and bringing emerging issues to the attention of governments and the international community for action”.

The concept of ‘emerging issues’ is subjective. It is used in this report to describe issues that are recognized as very important by the scientific community, but are not yet receiving adequate attention from the policy community. Definitions of ‘very important’ and ‘adequate’ are left open to those identifying the issues. Emerging issues are further defined as those that are:

- ❑ Critical to the global environment. The issue can be either positive or negative but must be environmental in nature, or environmentally-related.
- ❑ Given priority over the next one to three years in the work programme of UNEP and, or, other UN institutions and, or, other international institutions concerned with the global environment.
- ❑ Have a large spatial scale. Issues should either be global, continental or ‘universal’ in nature (by ‘universal’ we mean an issue occurring in many places around the world).
- ❑ Recognised as ‘emerging’ based on newness, which can be the result of: new scientific knowledge; new scales or accelerated rates of impact; heightened level of awareness; and, or, new ways to respond to the issue.

The UNEP Foresight Process has been designed so as to encourage the creative thinking of participants and to be inclusive at the same time. At the core of the process is a Foresight Panel consisting of 22 distinguished members of the scientific community from 16 developing and industrialized countries, covering all world regions and internationally recognized because of their expertise in one or more environmental or related issues.

Important steps in the process included:

- ❑ A canvass of ideas from the UNEP community to obtain a first list of emerging issues.
- ❑ Two facilitated meetings, during which the Foresight Panel expanded, debated and ranked the list of issues in a structured and systematic process. Some issues were combined and redefined, resulting in the selection of 21 priority issues.

- ❑ An extensive electronic consultation of scientists worldwide, in which more than 400 scientists provided feedback on the preliminary issues selected by the Panel during their first meeting.

The Issues: 21 Issues for the 21st Century

The output of the UNEP Foresight Process is a ranked list of 21 emerging issues described in a way that reflects their linkages to the various dimensions of sustainable development. The issues relate to the major themes of the global environment, as well as important cross-cutting issues. Below, a summary description of the issues is provided according to the different clusters rather than their ranking.

Cross-cutting Issues

001: Aligning Governance to the Challenges of Global Sustainability (Ranked #1). The current system of international environmental governance, with its maze of interlocking multilateral agreements, evolved during the 20th century, and is believed by many to be unsuitable for the 21st century. Some commentators believe that this system lacks the necessary representativeness, accountability and effectiveness for the transition to sustainability, and that a much higher level of participation and transparency is needed. New models of governance are being tested, ranging from public-private-community partnerships to alliances between environmentalist and other civil society groups. However, the effectiveness of novel governance arrangements is unclear and requires further scrutiny.

002: Transforming Human Capabilities for the 21st Century: Meeting Global Environmental Challenges and Moving Towards a Green Economy (Ranked #2). Adapting to global change and attaining a green economy will require a variety of new capabilities, in particular new job skills, modes of learning, management approaches and research efforts. Action is needed to close the skills gaps in the green sector; update educational institutions to better meet educational needs for sustainability work; train managers to better identify and respond to global environmental change; and encourage research to address the sustainability challenge.

003: Broken Bridges: Reconnecting Science and Policy (Ranked #4). To cope with global environmental change, our society needs strategies and policies that are underpinned by a strong science and evidence base. But many believe the linkage between the policy and science communities is inadequate or even deteriorating, and that this ‘broken bridge’ is hindering the development of solutions to global environmental change. This problem requires a new look at the way science is organized and how the science-policy interface can be improved.

004: Social Tipping Points? Catalyzing Rapid and Transformative Changes in Human Behaviour towards the Environment (Ranked #5). New social science research has articulated the way in which damaging human behaviour

can be transformed by public policy in a positive direction within a relatively short period of time. An example is the transformation of the public view of cigarette smoking which switched from being a fashionable activity to a dangerous health hazard within one generation in many countries. Can these insights also be applied to transforming habits of consumption that lead to destructive environmental changes? What public incentives – economic, informative or prohibitions – would work best to achieve this transformation?

005: New Concepts for Coping with Creeping Changes and Imminent Thresholds (Ranked #18). Many human interactions with the natural environment cause a slow, incremental and cumulative degradation of the environment; e.g., stratospheric ozone depletion, acid rain, tropical deforestation, mangrove destruction, and biodiversity loss, among others. Ironically, these ‘creeping changes’ are typically overlooked in their early stages when they can be most easily addressed. They only become noticeable when their negative consequences appear, by which time they are irreversible or more costly to mitigate. Hence, effective early warning monitoring systems are needed to spot them early on, before they become environmental “hotspots”.

006: Coping with Migration Caused by New Aspects of Environmental Change (Ranked #20). A growing body of studies suggests that environmental change will become an increasingly important factor in the displacement of people. Environmental change includes both rapid-onset events, such as more frequent or intense coastal and river flooding, and slow-onset processes such as land degradation and sea level rise. Among the response options to environmental migration are: improving prediction of migration, incorporating plans for coping with migration into national adaptation plans, extending national and international immigration policies to include environmental migrants, and trying to mitigate the underlying causes of environmental migration.

Food, Biodiversity and Land Issues

007: New Challenges for Ensuring Food Safety and Food Security for 9 Billion People (Ranked #3). Although food security is a longstanding issue, the world needs to confront a new set of challenges such as climate change, competition for land from bioenergy production, heightened water scarcity,

and the water cycle); and the other, the interrelationship between biodiversity and economics (valuation of ecosystem services; the role of biodiversity in underpinning economic activities). It is time to act on these new scientific insights and treat biodiversity as more than a nature conservation issue. It is time to fully integrate the issue of biodiversity into the global environmental and economic agendas.

009: Boosting Urban Sustainability and Resilience (Ranked #11). The issue of sustainability of cities has to do with both the environmental quality within cities that city residents have to live with, and the environmental changes caused by cities outside of their borders. Today neither aspect is particularly sustainable, especially in developing countries. The key to sustainability lies in the concept of ‘green cities’ or ‘eco cities’ which differ from conventional cities in that they are more compact, have a vital mix of land uses within their boundaries, provide many different low-energy transportation opportunities, and produce some of their own renewable energy. Such cities would provide their citizens with a high level of environmental quality and liveability, and have a lower environmental footprint outside their borders.

010: The New Rush for Land: Responding to New National and International Pressures (Ranked #12). Concerns over future energy and food supplies have led to a new rush for acquiring lands in developing countries by both foreign and national investors. Research shows that the rate of land acquisition has greatly accelerated over the past few years. There is a need to better understand the scale of the phenomenon, the main countries at risk, and the trade-offs involved. It is also important to grasp how this trend will affect livelihoods, food security, ecosystem services, and conflicts. Putting safeguards in place, such as assessing the potential environmental, economic and social impacts of land deals before they are finalized, could minimize the drawbacks to the host country while allowing the investing countries to gain the food and energy security they aim for by acquiring land.

Freshwaters and Marine Issues

011: New Insights on Water-Land Interactions: Shift in the Management Paradigm (Ranked #6). Recent scientific research has provided a new view on how water and land interact, locally to globally. For example, scientists now

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