

4 GLOBAL ENVIRONMENTAL PROBLEMS

At the dawn of the third millennium, a powerful and complex web of interactions is contributing to unprecedented global trends in environmental degradation. These forces include rapid globalization and urbanization, pervasive poverty, unsustainable consumption patterns and population growth. Often serving to compound the effects and intensity of the environmental problems described in the previous section, global environmental challenges require concerted responses on the part of the international community. Global climate change, the depletion of the ozone layer, desertification, deforestation, the loss of the planet's biological diversity and the transboundary movements of hazardous wastes and chemicals are all environmental problems that touch every nation and adversely affect the lives and health of their populations. As with other environment-related challenges, children are disproportionately vulnerable to and suffer most from the effects of these global trends.

Moreover, all of these global environmental trends have long-term effects on people and societies and are either difficult or impossible to reverse over the period of one generation. Unless

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effective global actions are taken early, we will end up plundering our children's heritage and future in an unprecedented way. This chapter describes five major global environmental problems and points to the potential impact on children and future generations.

CLIMATE CHANGE

It is now widely recognized that global warming over the past 50 years is largely due to human activities that have released greenhouse gases into the atmosphere. The most recent assessment report by the Intergovernmental Panel on Climate Change (IPCC) concludes that the global average surface temperature has increased by about 0.6°C during the 20th century.

The seemingly small rise of mean temperature is already showing adverse effects. One of the consequences has been a rise in the global average sea level¹. Another effect has been more frequent and intensified droughts in recent decades in parts of Asia and Africa. Additionally, in most mid and high latitudes of the Northern Hemisphere continents, precipitation has increased by 0.5 to 1.0 per cent per decade in the 20th century².

The world's emissions of greenhouse gases, notably carbon dioxide, continue to increase. The most recent estimates are that atmospheric concentrations of the greenhouse gas carbon dioxide (CO₂) will double or triple pre-industrial levels by the end of this century. As a result, global surface temperature is expected to increase by 1.4 to 5.8 degrees Celsius from 1990 to 2100³.

The repercussions of climate change will disproportionately affect those who are least able to adapt – the poor and the most vulnerable sections of society, including children. For example, scientists project that this level of warming could, among other things:

- Greatly exacerbate the range, frequency and intensity of natural disasters, from flooding, to droughts, to torrential rains, ice-storms, tornadoes and hurricanes;

- Cause sea levels to rise by between nine and 80 centimetres by 2100⁴, due to the expansion of warming waters and the melting of polar icecaps and other glaciers, which in turn may produce deadly flooding in many low-lying areas and small island States, displacing millions from their homes;
- Increase the number of environmental refugees resulting from weather-related disasters;
- Augment the risk of disease migration and disease outbreaks; and
- Render large areas of the world “uninsurable” due to the magnitude of property damage from disasters.

It is widely recognized that climate change, by altering local weather patterns and by disturbing life-supporting natural systems and processes, has significant implications for human health. While the range of health effects is diverse, often unpredictable in magnitude, and sometimes slow to emerge, children remain among the most vulnerable to these threats.

Higher temperatures, heavier rainfall, and changes in climate variability would encourage vectors of some infectious diseases (such as malaria, schistosomiasis, dengue fever, yellow fever and encephalitis) to multiply and expand into new geographical regions, intensifying the already overwhelming threats to children from such diseases.

There is also evidence that El Niño – a vast natural climatic phenomenon that can bring intense floods and droughts in many parts of the globe – is becoming more frequent as a result of global warming and could further aggravate health problems in many parts of the world. Excessive flooding is, for example, a prime cause of cholera and other water-borne and food-borne infections to which children are particularly susceptible.

While heavy rains will become more frequent, there will also be more periods of drought and increased spreading of the deserts. Scientists predict that a lack of rain, warmer temperatures and

increases in evaporation could have severe implications in terms of water availability and food security, reducing crop yields in Africa, further compromising child nutrition⁵.

There are also numerous health effects, both in terms of disease and injury, associated with extreme weather events, such as heat waves, storms and floods. Extreme weather events can exacerbate health issues such as asthma and respiratory problems due to worsening air pollution, precisely those diseases that most significantly burden children.

The international response to this issue is embodied in the 1992 United Nations Framework Convention on Climate Change (UNFCCC) and its 1997 Kyoto Protocol. The Convention sets principles and an agenda for action with the ultimate objective of stabilizing greenhouse gas emissions in the atmosphere at safe levels. It provides for: cooperation and exchange of information; leadership by industrialized countries in modifying long-term emission trends; financial and technological support for the efforts of developing countries; and responses to vulnerability. The UNFCCC has been in force since 1994 and, with over 180 countries having ratified it, is accepted nearly universally. On the other hand, while 80 countries have signed the Kyoto Protocol, which sets legally-binding emissions reduction targets for developed countries (5.2 per cent below 1990 levels on average in the period from 2008 to 2012), fewer than 50 countries have ratified it as this book goes to press. For the Kyoto Protocol to enter into force and become legally binding it has to be ratified by 55 countries, including those industrialized countries representing at least 55 per cent of the total 1990 carbon dioxide emissions from this group. However, of those countries that have currently ratified the Protocol, none are among the world's largest emitters.

Efforts are continuing to have the Kyoto Protocol enter into force as early as August 2002. Headway has been made, particularly following meetings in July 2001 in Bonn, Germany and November 2001 in Marrakesh, Morocco. Governments (with the US declining) agreed to detailed rules for the implementation of

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the Protocol, particularly on dealing with financial and technological support to developing countries, compliance, reporting, and the Protocol's implementing mechanisms, which include emissions trading, joint implementation, and investments in clean technologies in developing countries.

OZONE LAYER DEPLETION

Ozone in the atmosphere's upper layer, the stratosphere, protects humans, animals and plants from the damaging effects of UV-B radiation from the sun. Without it, all life on earth would cease to exist. However, the use of chlorofluorocarbons (CFCs) and other ozone-depleting substances (ODS) are slowly eating away at the stratospheric ozone layer, creating a major potential health hazard. While the concentrations of ODS in the lower atmosphere peaked in about 1994 and is now slowly declining due to worldwide efforts to phase out the use of CFCs and other damaging substances, significant health threats relating to ozone depletion persist.

Past (and current) emissions of ODS result in increases of ultraviolet radiation reaching the Earth's surface which can pose several health effects⁶:

- Increase of melanoma and non-melanoma skin cancers;
- Cause or acceleration of eye cataracts development;
- Reduce effectiveness of the immune system;
- Impact on nutrition (e.g. reduced plant yield);
- Damage to ocean ecosystems and reduced fish yield (by killing microbial organisms in the ocean).

Skin cancer is the most worrisome health impact of ozone depletion. Overexposure to the sun's harmful ultraviolet (UV) light may damage children's skin. Recent studies indicate that excessive sunburns experienced by children 10 to 15 years of age

increase by threefold the chance of developing malignant melanoma, the most deadly kind of skin cancer, later in life⁷. In Europe, evaluations of ultraviolet-related skin cancers suggest that, despite the decline in ODS concentrations, skin cancer incidences will not begin to fall until about 2060.

The international response to this issue is embodied in the Convention for the Protection of the Ozone Layer, which was concluded in Vienna in 1985. The Vienna Convention set an important precedent because nations for the first time agreed in principle to tackle a global environmental problem before its effects were felt. The Convention's 1987 Montreal Protocol on Substances that Deplete the Ozone Layer has been remarkably successful. Production of the most damaging ozone-depleting substances was eliminated, except for a few critical uses, by 1996 in developed countries and should be phased out by 2010 in developing countries. Thanks to these measures, it is currently estimated the CFC concentration in the ozone layer is expected to recover to pre-1980 levels by the year 2050.

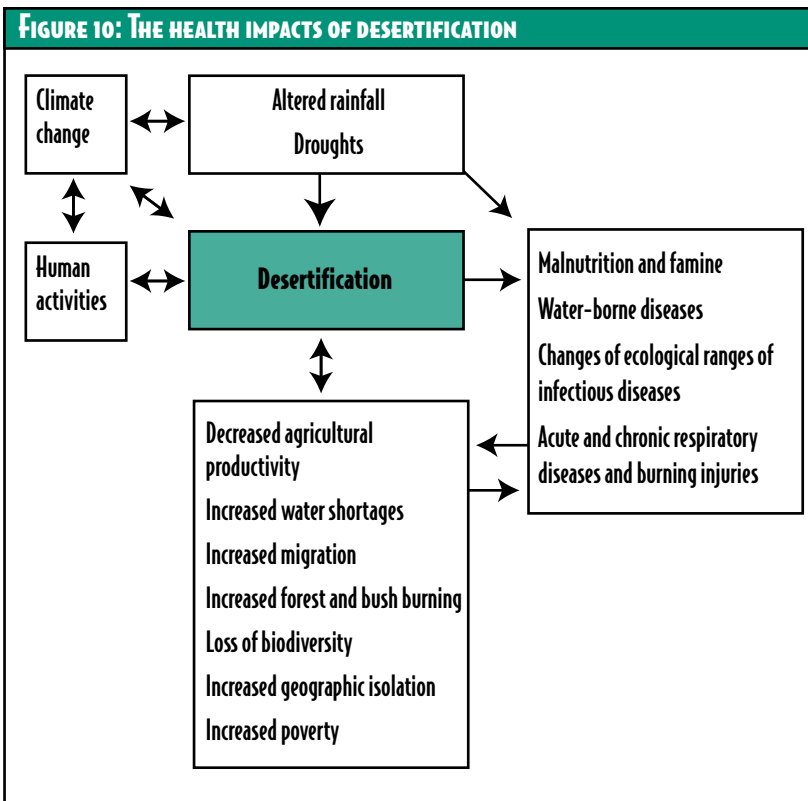
DESERTIFICATION

Desertification, resulting in part from deforestation, is a significant threat to the arid, semi-arid and dry sub-humid regions of the world – which account for 40 per cent of the Earth's land surface. Throughout the world, drylands still provide much of the world's food in the form of grain and livestock, yet close to 70 per cent of the world's drylands are degraded⁸, thus diminishing the productive land per capita and decreasing food security. The most common forms of unsustainable land use are over-cultivation, over-grazing, deforestation and poor irrigation practices. These susceptible soils – mainly located in the savannahs of Africa, the Great Plains and the Pampas of the Americas, the Steppes of southeast Europe and Asia, the outback of Australia and the margins of the Mediterranean – are particularly vulnerable due to the fact that they recover very slowly from disturbances and further deteriorate

due to rain and wind erosion and chemical and physical deterioration of the soil structure.

More than 250 million people are directly affected by desertification and 1 billion people in more than 100 countries are at risk⁹. These people include many of the world's poorest and most marginalized citizens. In Africa, land degradation is threatening economic and physical survival. Recurrent droughts increase soil degradation problems, which, in turn, magnify the effect of drought, both of which enhance the conditions that can cause widespread famines. The consequences of desertification include:

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Menne, B. and R. Bertollini, 'The Health Impacts of Desertification and Drought', WHO in United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (UNCCD), Down to Earth: Newsletter of the UNCCD, No. 14, December 2000.

- Reduction of the land's natural resilience to recover from climatic disturbances;
- Reduction of soil productivity;
- Damaged vegetation cover, such that edible plants can be replaced by non-edible ones;
- Increased downstream flooding, reduced water quality, sedimentation in rivers and lakes and siltation of reservoirs and navigation channels;
- Aggravated health problems due to wind-blown dust, including eye infections, respiratory illnesses, allergies and mental stress;
- Undermined food production; and
- Loss of livelihoods compelling affected people to migrate.

These issues are addressed in the UN Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (UNCCD), which entered into force in December 1996, and to date has been ratified by 179 countries. The Convention is implemented through action programmes, which at the national level address the underlying causes of desertification and drought and identify measures to prevent and reverse it.

DEFORESTATION

More than 110 million hectares of forest, about 11 million hectares a year, disappeared during the 1990s. Most of this loss was in developing countries. About 45 per cent of the world's original forests are gone¹⁰. Major causes of deforestation and forest degradation lie outside the forest sector and include the need to create agricultural land and to harvest fuel wood for food and energy. Approximately half of the wood harvested in the world is used as fuel wood and charcoal, mostly in developing countries. In

developed countries the main uses are for industrial products. The alarming rates of deforestation and the associated loss of environmental resources, social and cultural traditions – alongside the loss of the economic and productive capacity of forestland – account for the fact that forest preservation is now a major priority on the national, regional and global policy and political agendas.

The removal of trees decreases the ability of the soils to absorb and retain water; thus contributing to the depletion of the groundwater aquifers, which supply about one-third of the world's population. Aquifers are the sole source of water for many rural communities worldwide¹¹. Cleared lands stripped of their tree cover also are more susceptible to:

- Erosion, which degrades fertile lands and silts waterways, lakes, rivers and coastal waters, thereby degrades water quality for human consumption and disrupts ecosystem processes by choking fish hatcheries, coral reefs, etc.;
- Decreased groundwater recharge because the barren soils do not infiltrate water as effectively;
- Increased malaria transmission, bearing in mind that 90 per cent of the malaria disease burden is linked with underlying environmental factors¹², and claims some 750,000 children under five annually¹³; and
- Desertification and drought (see previous section).

Deforestation is also intrinsically linked to the loss of biodiversity as original rain forests host numerous species of precious fauna and flora (see next section). The significance of protecting rain forests for children cannot be overemphasized. Food security and sustainability of livelihoods as provided by forests are critical to child development. Forests also offer climatic and water resource conservation benefits that directly impact child health. The rich medicinal resources stored in forests are another link to children's welfare.

International efforts in this realm were undertaken through the Intergovernmental Panel on Forests (IPF) and its successor the

Intergovernmental Forum on Forests (IFF). Recently, the international community decided to establish the United Nations Forum on Forests (UNFF), as a new subsidiary body of the United Nations Economic and Social Council (ECOSOC), which is expected to contribute significantly to advancing consensus-building on the many complex issues related to forests.

Loss of Biodiversity

One hundred and fifty years ago, the Native American leader, Chief Seattle, is reported to have said we humans are but a thread in the web of life. He added, whatever we do to the web, “We do to ourselves.”

The web is unravelling at an increasing rate. Both plant and animal species have been disappearing at 50 to 100 times the natural rate, due to such factors as the large-scale clearing and burning of forests, over-harvesting of plants and animals, indiscriminate use of pesticides, draining and filling of wetlands, destructive fishing practices, air pollution and the conversion of wild lands to agricultural and urban uses. Recent studies suggest that this high rate of extinction will accelerate even faster, taking an increasing number of living plants and animals away from us forever.

This species loss and ecosystem disruption is causing a complex range of circumstances with consequences to human health. In response, governments and communities worldwide are now concerned with the purification of air and water, maintenance of soil fertility, mitigation of floods and droughts, detoxification and decomposition of wastes, maintaining concentrations of vital gases and water vapour in the atmosphere, and controlling infectious agents in the environment. In addition, the loss of biodiversity obstructs the discovery of new medicines to treat various diseases.

Another emerging modern health concern is biosafety and the effects of advances in and increased use of biotechnology to genetically modify foods. Public concern about the health and ecological risks of foods made with biotechnology has intensified in

Europe and has spread rapidly to other parts of the world, including the United States. Proponents contend that biotechnology could help feed the developing world, cut costs, and reduce the need for pesticides. Detractors say the health risks of the emerging technology are unclear and the environmental hazards potentially alarming. Research is proceeding in order to respond to the many health and environmental questions raised and to guide eventual biotechnology regulations.

The United Nations Convention on Biological Diversity (UNCBD), which was adopted at UNCED in 1992 and has since been ratified by more than 175 countries, establishes three main goals: the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits from the use of genetic resources. In May 2000, the Convention's Cartagena Protocol on Biosafety was opened for signature. The Protocol seeks to protect the planet's species and ecosystems from the potential risks posed by living modified organisms, commonly referred to as genetically modified organisms, and to establish an advanced informed agreement procedure for ensuring that countries are provided with the information necessary to make informed decisions before agreeing to the import of such organisms. The Protocol has been hailed as a breakthrough from a health and environment perspective in that it is the first global treaty that formally enshrines the "precautionary approach", as set forth in the 1992 Rio Declaration on Environment and Development, as a principle of international environmental law.