

# Focus on Your World

Photographs from the  
United Nations  
Environment Programme



# Focus on Your World

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The pictures in this book show some of the devastating effects of global warming. This mainly occurs as the result of the build-up in the atmosphere of carbon dioxide and other "greenhouse" gases. Scientists have identified global warming as a major threat to the future of life on earth.

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This book grew out of a concept developed by Mark Edwards, founder of Still Pictures, 199 Shooters Hill Road, London SE3 8UL. Still Pictures is the leading source of photographs illustrating environmental issues.

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United Nations  
Environment Programme

Edited by Mark Edwards



**Canon**



**Canon**

### **Acknowledgments**

UNEP would like to thank all those involved in the Focus on Your World project from 1992 through 2002. Our main sponsor, Canon Inc. and the dedicated staff at Dentsu Inc. have been our partners for many years and for all three International Photographic Competitions on the Environment.

Additional support was provided by the National Geographic Society, Time, Japan Airlines and Television Trust for the Environment (TVE).

The entire United Nations family backed the photographic competitions through the UN Department of Public Information and the Joint United Nations Information Committee. Thanks also to the judges, collection centres, partner photo agencies, and all those who helped us to organise and sponsor numerous exhibitions worldwide.

Most of all we would like to express our gratitude to the tens of thousands of individuals from virtually every country in the world who responded by submitting their images to UNEP. Their participation, their personal visual message, made the world's largest photo competitions possible. So thank you, photographers, for contributing your time and vision of your world. Together, your photographs compose a remarkable visual documentation of our planet and help us work towards a sustainable future.

UNEP welcomes your participation in our next Focus on Your World competition. Please visit our web site at [www.unep.org](http://www.unep.org).

**Tore J. Brevik**, Director

**Steve Jackson**, Audio Visual Coordinator

Division of Communications and Public Information (DCPI)

United Nations Environment Programme (UNEP)

### **Message from the Sponsor**

As a company whose corporate philosophy is based on *kyosei* – living and working together for the common good, Canon Inc. is pleased to support the UNEP International Photographic Competitions on the Environment.

The 21st century is often called the century of the environment. Through the photographs that focus on the present and future of our earth, we believe that the Focus on Your World competitions are an important way to raise interest in environmental issues.

Photography is a universal language. We are confident that these photographs will touch the hearts of people everywhere and convey our hopes for the global environment.

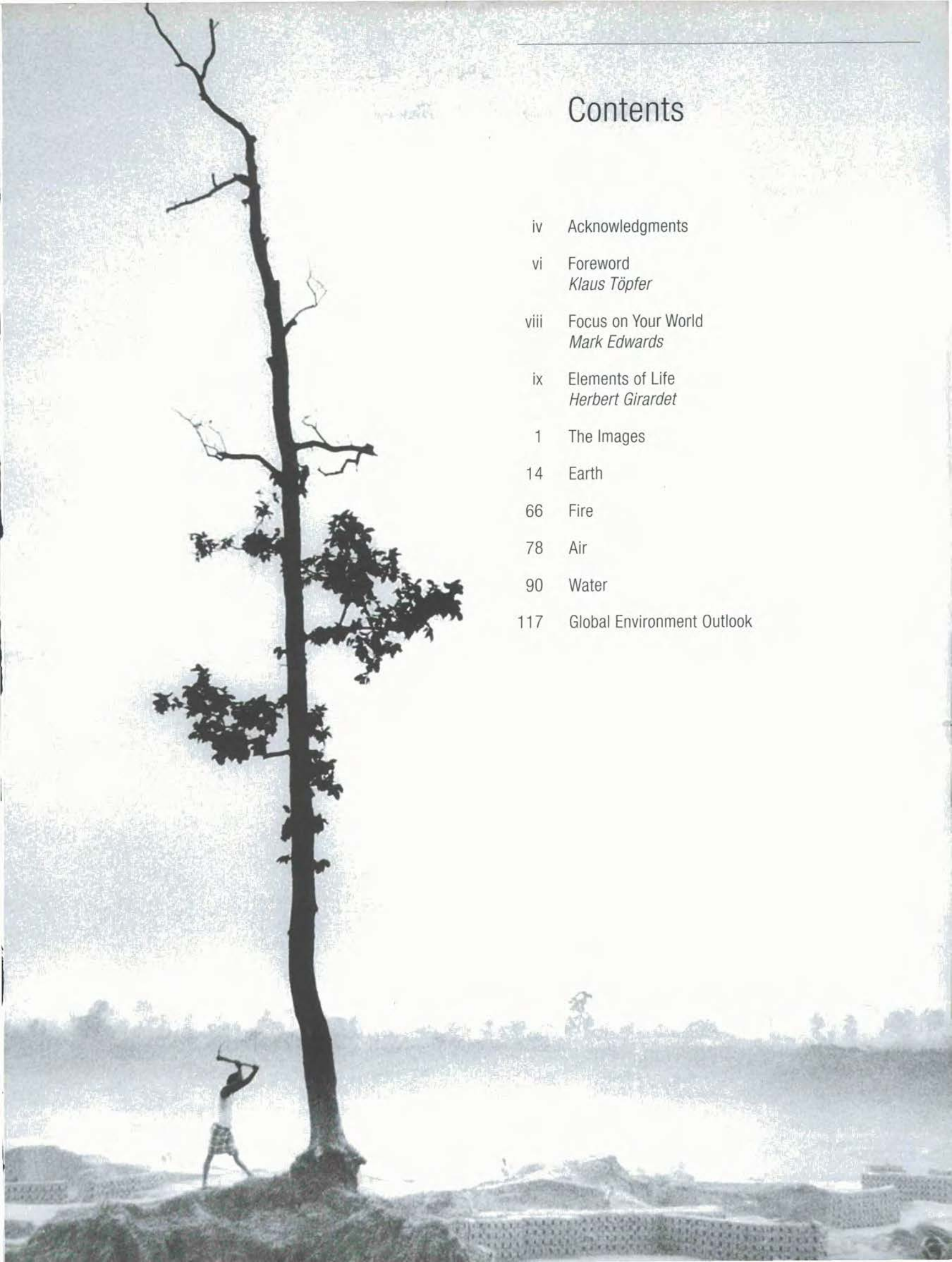
I would like to express our gratitude to all the contestants from over 160 countries who submitted such powerful photographs.

**Fujio Mitarai**, President and C.E.O, Canon Inc.

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# Foreword

**Klaus Töpfer**, UNEP Executive Director

Images have, since primitive times, been sources of inspiration and contemplation able to reveal the joy and the tragedy of mankind's place in the world. From the pre-historic cave paintings of Lascaux in the French Pyrenees, the rock art of ancient Sahara, the carvings of the Inuits, the tattoos of the Maoris, and the photos and newsreels of more recent times, they have chronicled our relationship with nature, the spiritual world and with ourselves.

An image, be it of a beautiful butterfly on the artist's canvas or the digital photograph of the modern camera, can serve many purposes. Some, like the faded snaps of a family holiday, are merely historical footnotes, cherished nostalgic memories of childhood days, of loved ones long gone, reminders that we are not the first to step out on this earth, not the first to travel this road.

Others shed light on our dark corners, be they Picasso's twisted, cubist images of the Spanish Civil War or the photograph of a young, naked Vietnamese girl, arms outstretched – an enduring symbol of the inhumanity of war, demonstrating the truth that it is the vulnerable who suffer most during times of strife.

This collection of 225 photographs, the cream of some 100,000 individual entries, bears witness to the changes made in the ten years since the Rio Earth Summit of 1992. They reveal and they celebrate. They also shed light on those other dark places where too many people eke out squalid, unfulfilled lives, cut off from the beauty and prosperity that is possible in this modern world of relative plenty.

It is a record of what has been done to the environment and the many things that have been left undone. While some children swim in refuse, grub around in the parched Sudanese soil for food or are discarded into a rubbish bin at birth, others are born in the safety of a high-tech maternity hospital, free from starvation, free from disease.

The image of a leaping polar bear or the

majesty of a gray whale breaking the surface remind us of the apparent power and timelessness of the natural world. Yet even these great mammals, the summits of evolution, are fragile and all too easily damaged by the excesses of the modern world which too often prizes commercial gain above good stewardship of the planet's resources.

See the beheaded ape, served up on a plate – a stark reminder of how war, poverty and the disintegrating social fabric in many parts of the developing world are leaving the delicate balance teetering, unsustainably, on the brink.

The wrinkled face of an elderly Guarani woman tells, more eloquently than any words can, of the failing fortunes of many traditional cultures in the face of a globalised one.

The richness and the vitality of cultural diversity, with its links to food security, stability and harmony with nature, is underscored in the dance of the Guatemalan conquistadors or the quiet simplicity of the Mauritanian child strolling home, daintily holding four small fish.

To restore planet earth, its wildlife, ecosystems and people back to health certainly requires science, assessments and policies. But it also requires an unleashing of the human spirit, with its capacity for compassion, fairness and respect.

As leaders gather in Johannesburg for the World Summit on Sustainable Development (WSSD), I hope our photographers' images can give them pause for reflection and quiet contemplation and can help them see, with new eyes, beyond the towers of documents and national self-interest to the greater good of the majority. Only then will we find that inspiration and the kind of creativity illustrated by the photographers of this international photographic competition. These qualities are needed to chart a new course for our world so that in ten years' time our images may be dominated less by misery and doubt and more by hope, and the fulfilment of the promises made in Rio.

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# Focus on Your World

**Mark Edwards**, Still Pictures

**T**hese pictures illustrate the issues that will define the 21st century. The effect of this book is unlike any statement yet made about the environment by governments, NGOs, UN organisations or journalists. Anger, sorrow, joy, despair, and more surprisingly, humour (something rare in the environmental movement) triggered these photographs, and as you look through the pages you may well share the photographers' feelings.

The United Nations Environment Programme (UNEP) is sending this book to Heads of State around the world – the first photo essay to be distributed in this way. We hope these pictures will accompany the men and women responsible for world security to the debate at the Earth Summit. If they do, they will have served part of their purpose: to connect reality to the complex decision-making process at this crucial meeting.

The archive grew out of three photographic competitions organised by UNEP in the 1990s called Focus on Your World. The invitation to participate was simple: comment on the environment through the medium of photography. Camera owners from every continent and almost every country responded with over 100,000 images. They reflect the concerns of ordinary people all over the world rather than those of environmental experts. The men, women and children who took the photographs see them as a means to support action to bring real, long-term environmental security to people around the world. As we all know, this is easily said, but very difficult to achieve.

Photography conveys reality in a relatively direct and sometimes disturbing way – many of the pictures in Focus on Your World show us problems through the eyes of people who experience the environmental crisis "first hand"

in their daily lives. But this photo essay does not only portray our problems. Other images show the beauty of nature, and the animals that live in unspoilt habitats oblivious to their uncertain future.

In spite of our dependence on nature's extraordinary diversity, our activities continue to destroy countless species. We now know that when we harm nature, we are harming ourselves.

The contrast between the elegance of the natural world and the difficulties of many aspects of the human world is powerfully illustrated on these pages. Ultimately public opinion will play a crucial role in deciding the measures governments are able to adopt in response to the challenge. Environmental problems demand a radically new, worldwide approach. These pictures illustrate the urgent need for individuals, industry and governments to make the concept of sustainable development central to their thinking. If we lose sight of this challenge, the future of humanity is clear – it has no future.

I spent much of last summer editing the Focus on Your World archive. It was a revelation and an education. This book is a personal choice from the 50 boxes of photographs that were delivered to Still Pictures. I am most grateful to UNEP for giving me this opportunity and to Steve Jackson, Head of Audio Visual for his help and support. I have made what I hope is a valid and meaningful selection.

These pictures are also proof of the extraordinary reach and power of photography. They can be viewed without translation by anyone, from any background – rich or poor, literate or illiterate. This makes photography uniquely well suited to presenting issues of deep concern to the whole of humanity.

*London, March 2002*



# Elements of Life

Herbert Girardet

To know the earth is the unique privilege of people alive today. In the past, human cultures were deeply familiar with their own particular corners of the planet and the relatively few people that did travel gained knowledge about places away from home. But being able to acquire a global viewpoint – an earth perspective – is a very novel experience for humanity.

Herbert Girardet is an ecologist, writer and filmmaker. He is chairman of the Schumacher Society UK, visiting professor at Middlesex University, patron of the Soil Association, honorary fellow of the RIBA and a recipient of UNEP's Global 500 Award for outstanding environmental achievements. He has (co)-authored eight books, including *The Gaia Atlas of Cities*, *Creating Sustainable Cities*, *Earthrise* and *Blueprint for a Green Planet*. He has 50 TV documentaries to his credit, most recently the six-part series *The People's Planet* for CNN and NHK, Tokyo. He regularly lectures to diverse audiences in the UK and at international conferences.

However, in 1969, there was that unforgettable image of the azure earth floating in space, as photographed from the moon. Since then, innumerable pictures of the earth have been taken from space satellites. Now we have *Focus on Your World*, this unique book of earth images taken by hundreds of inspired people all over the world. Taken together, these pictures present a unique mosaic of the state of our world.

In the last 200 years humanity has experienced extraordinary changes. Until then the world's diverse cultures largely depended for their living on the resources of soil, water, air and sun as found locally. All that changed with the industrial revolution, when the increasing use of vast subterranean stores of fossil fuels started to challenge the sun as our primary energy source. Solar energy and firewood had been used primarily for heating, now there was fuel for transport, farming, manufacturing and electricity generation.

At the start of the new millennium it is worth reminding ourselves just how different life is today compared with past human experience. Modern technology has superseded the long established lifestyles of many local cultures across the planet. We have turned night into day, we have replaced muscles with machine power, and we can fly around the planet in a day. Technology has made us into "amplified" creatures of enormous power and with unprecedented impacts. But its ubiquitous use has raised concerns about both resource depletion and pollution.

This book is, above all else, an expression of this concern in the face of the endangered magnificence of the natural world. The adventures of the human eye, as shown in *Focus on Your World*, are informed both by local experience and new insights gained from the earth sciences. The photographers here portray the enormity of the changes that have occurred; with their images they plead with the world's decision makers and with all of us to deal gently with this fragile world.

The fact is that our unprecedented use of

fire has given us the power literally to take over the earth. In the last 100 years human numbers have risen fourfold from 1.5 to 6 billion, but economic activity and urban growth have increased no less than 15-fold, transforming the earth in the process. Not surprisingly, during the last 30 years there has been much talk about "limits to growth". Today these limits are defined not so much by concern about resource shortages, as by the huge environmental impacts of our uses of technology and non-renewable resources.

### From Stockholm to Rio

These many varied problems of our own making have led to much concern and to substantial efforts to find solutions. The world's first UN conference on the environment, in Stockholm in 1972, was primarily focused on the enormity of the new human impacts. In Stockholm, first attempts were also made to define environmental sustainability and to link it with social justice issues.

The 1992 UN Rio Earth Summit was a further effort to deal with the increasingly precarious relationship between people and planet. The concept of "sustainable development", formulated by the Brundtland Commission in 1987, was a great global compromise. It is about meeting the needs of all people, now and in the future, while ensuring that the biosphere can maintain itself and the diversity of life. It also suggests that people in developing countries should get a fairer deal, with better living standards, whilst the developed countries should curtail their impacts to ascertain the integrity of the natural world and the opportunities of future generations.

In the run-up to the Rio Earth Summit, intuition about the deteriorating state of the global environment increasingly turned into scientific understanding. With much careful research, earth scientists were able to quantify the threats of deforestation, species loss, soil erosion, desertification, acid rain damage, climate change and pollution of all kinds. Agenda 21, agreed by the world's nations after epic nego-



A. Detrich/UNEP  
Tree growing through  
abandoned car  
USA

tiations, became the first international agreement to deal with both human impacts on the planet as well as development issues.

A rich mix of over 40,000 people attended the Rio Summit – politicians, business people, scientists, NGO representatives and journalists. Several key agreements were concluded: the Biodiversity Convention, the Forestry Principles and the Climate Change Convention and, above all else, Agenda 21, a vital tool designed for implementing sustainable development worldwide. It was a remarkable achievement to get this far. However, since Rio it has become apparent that there is a large gap between international agreements and action: the world's governments and corporations have continued to prioritise economic growth at almost any cost, with only limited concern for its detrimental environmental and cultural impacts.

The mega-trends of economic globalisation that have emerged in recent years are not easily dislodged. Even though millions of people all over the world have worked since Rio to try to implement sustainable development – locally, nationally and internationally – most global trends are still getting worse. Inequalities within societies and between nations have widened: for a few there is greater wealth than ever before, but for many there is grinding poverty.

Z. Xue/UNEP  
Newborn babies in a  
maternity hospital  
China



10 per cent of humanity consumes some 70 per cent of the world's resources. 1.2 billion people go hungry most nights, ironically about the same number as those suffering from obesity. And the relationship between humans and nature remains similarly out of joint: today one single species, out of tens of millions of species, claims half of nature's annual production, as well as all the world's mineral resources for itself. Species are disappearing or suffering losses faster than ever before. According to WWF we have lost a third of the natural world in the last 30 years, and UNEP's Global Environment 2000 Report highlights similar losses to the earth in almost all spheres of life.

Meanwhile our ecological footprints – the land areas required to sustain our lifestyles – are getting ever larger. If the whole world were to adopt western consumption patterns, the resources of three earths would be required rather than the one we actually have to live on today.

### **From Rio to Johannesburg**

In the summer of 2002, ten years after Rio, the world is holding another great summit: the UN World Summit on Sustainable Development in Johannesburg. Approximately 60,000 people

are meeting to try and find answers to a central question of our time: how an urbanising, industrialising and globalising humanity can develop a sustainable relationship with the earth. Once again the countries of the South will focus on development and poverty alleviation, and those of the North, on protecting the natural world. Ironically it is the northern countries that are still responsible for the greatest impacts on the biosphere.

Many of the warnings from the 1970s are now being realised: man-made toxins are accumulating in the food chain. Epidemics of new diseases are threatening. Climate change is upon us with a vengeance. Ice in glaciers and the northern and southern ice shelves is melting. Temperatures this century are likely to rise by 6 degrees centigrade and sea levels by up to a metre. Soil abuse is unprecedented: salinisation is affecting ever larger areas of irrigated land. 6 tonnes of soil per person, a total of 24 billion tonnes a year, are eroding from the world's land surfaces, due to forest clearance, farming on steep, marginal lands and inappropriate methods of food production.

There is growing separation and inequality between the high-consumption minority and a poor, yet marginalised majority, many of whom are eking out a meagre existence from depleted ecosystems. Across the planet life-support systems are becoming severely destabilised – climate, rainforests, oceans and soils. There is little doubt that in our victory against nature we will find ourselves on the losing side. Despite being able to see the whole of the earth for the first time, humanity is in danger of jettisoning its long-held understanding of the importance of nature's vital functions. Clearly, there is a great urgency to find new directions for human thought and action.

### **The Challenges of the Johannesburg Summit**

Since 1992 several other major global summits have been held – on cities, women's rights, social change, population growth, global trade, debt relief and climate change. The UN Summit

2002 will be a unique opportunity to initiate action on these and other issues such as environmental protection and restoration. Will they, at last, get the priority they deserve?

The Johannesburg Summit will be the first opportunity in the 21st century to highlight what is necessary and what is possible. It could be a last great chance to direct the course of history on to a sustainable path. There are some interesting successes to draw on; the Montreal Convention on CFCs has been widely implemented and the Antarctic Treaty has prevented the militarisation and minerals exploitation of the southernmost continent. Solutions to the many problems cited above require implementation at the Summit. For this purpose it needs to be infused with the spirit of a new generation of young people who consider inheriting a ruined planet unacceptable. The world's governments need jointly to equip themselves with tools suitable for solving the great problems before us.

In fact, the issues we need to deal with go beyond the realm of government to the quest for a new earth-centred worldview. To realise sustainable ways of living appropriate for the 21st century, we need to draw on the rich diversity of human knowledge in cultures around the world. The health of the earth and its interconnected community of living species – including our own – is essential for our physical, psychological and spiritual well-being. Yet a broad range of human actions still threatens this web of life. It needs the protection of a new system of international jurisprudence that can benefit all species, present and future, including our own. But work on this has hardly begun.

For the last 30 years, the movement for sustainable development has been insisting that there are other measures for human development than ever rising consumption of the earth's resources. It is demanding new, resource-saving taxation systems and incentives to help regulate human activities. The energy technologies of the industrial revolution need to be superseded by new, renewable energy technologies – such as solar, wind, wave,

bio-mass and fuel cells. Most of these have now matured into viable options to be implemented globally, in combination with measures to achieve high levels of energy efficiency.

Restoration of depleted forests needs to be funded and undertaken in many places, rather than in a few isolated locations. Farming has to get onto a sustainable footing. The oceans and life within them need to be treated with respect. Cities, where the majority now live, have to implement measures for sustainable resource management and social development. And business has to learn that social and environmental sustainability need to be taken seriously – in its



R, Novak/UNEP  
Car lights under  
the moon  
Canada

own vital interest. With over 6 billion humans now living on this planet, perhaps the greatest challenge is assuring justice, sustainable livelihoods and environmental security for all. Hopefully, unprecedented communications links between people all over the world will help facilitate this vital process.

The 2002 UN World Summit on Sustainable Development is a historic moment for linking acute awareness of problems with implementation of practical, long-term solutions. Let us trust that the world community is ready to meet that challenge.

“If you have no relationship with nature you have no relationship with man. Nature is the meadows, the groves, the rivers, all the marvellous earth, the trees, and the beauty of the earth. If we have no relationship with that, we shall have no relationship with each other.”

*J. Krishnamurti*

Photographer credits and caption information supplied by World Spotlight



015-1 L. Phuong/UNEP  
Land mine victim farming drought-affected land  
Vietnam



016-1 A. Detrich/UNEP  
Tree growing through abandoned car  
USA



017-1 S. Compoint/UNEP  
Capping oil well set on fire during Gulf War, 1991  
Kuwait



018-1 B. Bhagat/UNEP  
Felling last tree at brickworks. Wood is used to fuel the furnaces that bake the bricks  
India



018-2 N. Ding/UNEP  
Chain hung over valley. Chinese lovers visit this site and add their lock to the chain to let the mountain witness their love  
China, Huang Shan, An Hui Province



018-3 T. R. Cooke/UNEP  
Children protesting against destruction of their forest by a mining company. This tree was cut down a few hours after the photograph was taken  
Solomon Islands, Guadalcanal



019-1 D. Stanfill/UNEP  
UNESCO World Heritage Site – Huangshan in Anhui Province  
South-eastern China



020-1 D. Riva/UNEP  
Landscape in early morning with factory  
Italy



021-1 L. Chen/UNEP  
Off-road racing  
USA



021-2 S. Vriend/UNEP  
Lovers amongst discarded drinks cans  
The Netherlands



022-1 N. Dang/UNEP  
Riverboats on the Mekong River  
Vietnam



023-1 J. Pteska/UNEP  
Half moon



023-2 R. Novak/UNEP  
Car lights under the moon  
Canada



024-1 K. Armann/UNEP  
Dead baby chimpanzee, *Pan troglodytes*. It died while being illegally smuggled out of Africa



024-2 F. Fournier/UNEP  
Gypsy encampment  
Romania



024-3 P. Colychoun/UNEP  
Traditional festival: Dance of the Conquistadors  
Guatemala



025-1 R. N. Wilson/UNEP  
**Portrait of Celebes apes, *Macaca nigra***  
Indonesia, Sulawesi



025-2 Demi/UNEP  
**Child carrying fish**  
Mauritania



025-3 S. Morgan/UNEP  
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Russia



025-4 K. Armann/UNEP  
**Head of a gorilla, *Gorilla gorilla*, being sold at market**  
Africa



026-1 D. Pham/UNEP  
**Children in a forest that has been burnt to enlarge agricultural land**  
Vietnam



026-2 H. Schwarzbach/UNEP  
**Starving children looking for ants to eat**  
Sudan



027-1 T. Nebbia/UNEP  
**Child standing in sewage pipe outflow**  
Ecuador



027-2 Rengifo/UNEP  
**Child working in gold mine**  
Colombia



027-3 Rengifo/UNEP  
**Child at work**  
Colombia



028-1 P. Senanunsakul/UNEP  
**Kayan women with neck rings**  
Thailand



028-2 F. Ertung/UNEP  
**Children dancing around wood pile that will be turned into charcoal**  
Turkey



028-3 N. Dickinson/UNEP  
**Flood survivors**  
Philippines, Leyte Island



029-1 L. Stone/UNEP  
**Child born to mother who was exposed to Agent Orange during the Vietnam War**  
Vietnam



030-1 Z. Xue/UNEP  
**Newborn babies in a maternity hospital**  
China



030-2 K. Oksnes/UNEP  
**Pregnant woman**  
Norway



031-1 M. Sodre/UNEP  
**Newborn baby abandoned in rubbish skip**  
Brazil, Bahia



032-1 J. Araiyo/UNEP  
**Football crowd**  
Brazil



032-2 J. Dago/UNEP  
**Bread is thrown to Kosovan refugees, prevented from entering the Former Yugoslav Republic of Macedonia**  
Kosovo



033-1 L. Yong/UNEP  
**Crowded street**  
China



033-2 Kin/UNEP  
**Crowds**  
China



033-3 Ducek/UNEP  
**Open-air concert**  
Germany



034-1 B. Kreis/UNEP  
**Homeless street children**  
Latin America



034-2 Florence/UNEP  
**Child carrying cabbage harvest**  
USA



035-1 M. Put/UNEP  
**Man and baby**



035-2 T. Ketkaew/UNEP  
**Tribal women harvesting crop**  
Thailand



036-1 Jareunsri/UNEP  
**Children blowing bubbles**  
Thailand



036-2 Pramkaew/UNEP  
**Children running through forest**  
Thailand



037-1 M. Elhasan/UNEP  
**Shoeshine boy cleaning shoes while talking on mobile telephone**  
Lebanon



037-2 D. X. Yuan/UNEP  
**Peace demonstration in St Peter's Square**  
Italy, Rome



038-1 G. Hind/UNEP  
**Elephant, *Loxodonta africana*, and lion, *Panthera leo*, at waterhole before thunderstorm**  
Namibia, Etosha National Park



038-2 B. Dilley/UNEP  
**Cheetah cub, *Acinonyx jubatus*, with its paw caught in trap set by a farmer**  
Namibia



039-1 Brunner/UNEP  
**Family of cheetahs, *Acinonyx jubatus***  
Africa



039-2 A. Matos Dos Santos/UNEP  
**Illegally hunted jaguar, *Panthera onca*, being skinned**  
Brazil, Amazon



040-1 W. Szwey/UNEP  
**Red deer stag, *Cervus elaphus*, caught in snare. Trapping takes place partly for meat, partly for fur and partly to rid farmland of perceived pest species. It is an effective but cruel way of killing wild animals. Widely practised in the Third World, in the developed world, however, the job of trapper is dying out. For example, natural resource managers in Michigan, USA, estimated that there were about 5,000 state residents actively trapping in 1999, down from a high of nearly 16,000 in 1980**  
Poland



040-2 Sip Li/UNEP  
**Dogs cooked for restaurant trade**  
China



041-1 S. Rath/UNEP  
**Wild boar, *Sus scrofa*, hunt**  
Germany



041-2 X. Zhen/UNEP  
**Herding cattle**  
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042-1 A. Djakov/UNEP  
**Slaughter of caribou, *Rangifer tarandus***  
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042-2 B. Jordan/UNEP  
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Canada, Nova Scotia, Cape Breton



042-3 S. Fongmoon/UNEP  
**Eco-tourists on elephants, *Elephas maximus***  
Thailand



043-1 A. Lyskin/UNEP  
**Arctic seal cull**





043-2 Y. Kozyrev/UNEP  
**Arctic seal cull**  
Russia



043-3 L. Nakaswa/UNEP  
**Sea lions and seals are among the many marine animals that are killed when they become tangled in discarded fishnets. They may also die slowly from injuries caused by boat engines and naval sonar equipment**  
USA



044-1 O. Ismail/UNEP  
**Indigenous people hunting with blowpipes**  
Malaysia



044-2 M. Nimsiri/UNEP  
**Muslim girls being educated**  
Thailand



045-1 B. Thanomsooksan/UNEP  
**Taking ducks to paddy fields to feed**  
Thailand



045-2 B. Paton/UNEP  
**Land mine victims**  
Angola



046-1 S. Graham/UNEP  
**Car light trails at night with lightning**  
USA



047-1 J. Guang/UNEP  
**Car dump**  
China



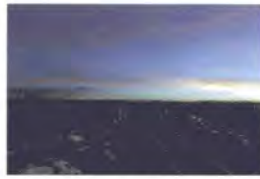
047-2 Stepanow/UNEP  
**Car dump**  
Australia



048-1 P. Soni/UNEP  
**Steam train crossing crowded road**  
India, Jodhpur



048-2 Y. Hachiro/UNEP  
**Cars stacked at scrapyard for recycling**  
Japan



048-3 R. Dwidle/UNEP  
**Rail track**  
Bolivia



049-1 S. Shiarng/UNEP  
**Child roller-skating in front of traffic jam**  
Taiwan



050-1 Dahlquist/UNEP  
**Burning sugar cane**  
USA, Hawaii



050-2 T. Oshima/UNEP  
**Spraying vegetables with pesticides**  
Japan



051-1 Voltchev/UNEP  
**Sand dune threatens to engulf oasis in desert**  
Libya, Sahel



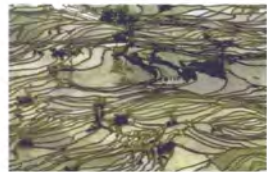
051-2 Z. Yi/UNEP  
**Deforestation**  
China



052-1 C. Petrat/UNEP  
**Rubber tappers in early morning**  
Thailand



052-2 S. Nazan/UNEP  
**Log stack**  
Iran



053-1 C. K. Au/UNEP  
**Rice terraces**  
China



053-2 L. Hong/UNEP  
**Rice terraces**  
China



054-1 A. Vohra/UNEP  
**Aluminium cans on rubbish dump**  
USA



054-2 J. Tanodra/UNEP  
**Plastic bottles collected for recycling**  
Philippines



055-1 P. Van Peenen/UNEP  
**Chemical warfare dump. Countries all over the world face the problem of disposing of unwanted, obsolete or banned chemical weapons, from the crude mustard gas of the First World War to the latest nerve gases. Burying them is so far the only answer**  
Canada



055-2 V. Lenguzin/UNEP  
**Tin cans dumped in woodland**  
Russia



056-1 Kittprempool/UNEP  
**Monk washing clothes at dawn**  
Thailand



056-2 Boonsiri/UNEP  
**Buddhist monks walking to temple**  
Thailand



057-1 A. Dua/UNEP  
**Couple walking in forest**  
India



058-1 H. Yonehana/UNEP  
**Death Valley**  
USA



058-2 W. Wu/UNEP  
**Desert**  
China



058-3 A. Gloor/UNEP  
**Desert**  
Namibia, Sossusvlei



059-1 Cummins/UNEP  
**Circumpolar star trails**  
USA, Arizona



059-2 Cummins/UNEP  
**Circumpolar star trails**  
USA, Arizona



059-3 G. Thibault/UNEP  
**Antelope Canyon**  
USA



060-1 D. Arndt/UNEP  
**Wild flower meadow above fjord**  
Norway



060-2 S. Kiyohiro/UNEP  
**Lake Akan in winter**  
Japan



061-1 M. Harrison/UNEP  
**Man and wallaby on beach**  
Australia



061-2 S. Chamnanrith/UNEP  
**Drought in deforested area**  
Thailand, Chiang Mai



062-1 W. Ming/UNEP  
**Sandstorm**  
China



062-2 F. Ardito/UNEP  
**Boat stranded on dried-up Aral Sea**  
Uzbekistan



062-3 Van Cappellen/UNEP  
**Shipbreaking**  
Pakistan



063-1 Silva/UNEP  
**Mount Roraima**  
Venezuela



063-2 S. Rocha/UNEP  
Landscape showing dense forest on one side of the river and forest cleared to expand agricultural land on the other Brazil



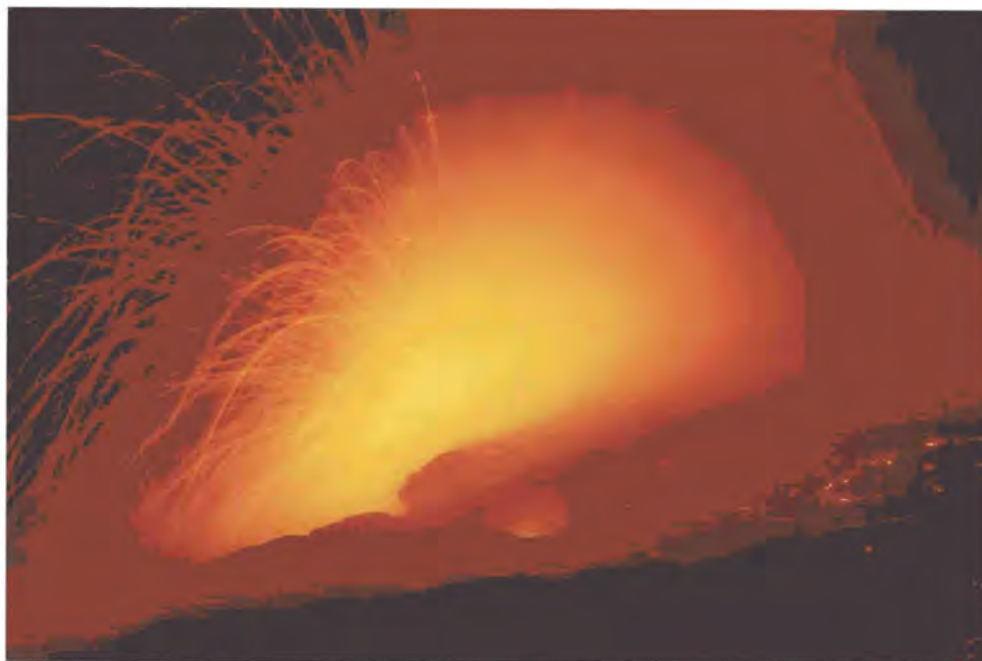
063-3 P. Magalona/UNEP  
Forest clearance for road building Philippines



064-1 J. Demulder/UNEP  
Coal slagheap and housing Belgium



065-1 M. Goncalves/UNEP  
Elderly Guarani woman Brazil



067-1 D. Reymond/UNEP  
Volcanic eruption USA, Hawaii



068-1 Ben/UNEP  
Sunrise



069-1 S. & D. O'Meara/UNEP  
Kilauea Volcano. Heat from lava flow ignites tree, 23 October 1999 USA, Hawaii



070-1 M. Farmer/UNEP  
Crater caused by H-bomb test USA, Nevada



070-2 P. Senanunsakul/UNEP  
Monks at Buddhist temple Thailand



070-3 V. Bujaldon/UNEP  
Sequence of eclipse of the sun Spain



071-1 H. Windeck/UNEP  
Chernobyl three days after explosion of nuclear reactor Ukraine



071-2 H. Windeck/UNEP  
Chernobyl three days after explosion of nuclear reactor Ukraine



071-3 H. Windeck/UNEP  
Chernobyl three days after explosion of nuclear reactor Ukraine



071-4 V. Vyatkin/UNEP  
Child suffering from radiation sickness after Chernobyl nuclear accident Ukraine



072-1 D. Juntawonsup/UNEP  
**Egrets flying past burning forest under a full moon**  
Thailand



074-1 D. Reymond/UNEP  
**Lava from Pele Volcano pouring into the sea**  
USA, Hawaii



075-3 H. More/UNEP  
**Smoking opium**  
India



077-2 P. Menzel/UNEP  
**Burning oil fields after Gulf War, 1991**  
Kuwait



072-2 S. Belon Lopez/UNEP  
**Burning discarded car tyres – a major cause of air pollution**  
Spain



074-2 Y. Tolertmongkol/UNEP  
**Dumping molten slag**  
Russia, Siberia



076-1 P. Gleizes/UNEP  
**Oil smoke over Kuwait City during Gulf War, 1991**  
Kuwait



077-3 Z. Jovanovic/UNEP  
**Toxic smoke from fire at chemical plant**  
Yugoslavia



073-1 J. Ledesma/UNEP  
**Stricken oil tanker leaking burning oil into the sea**  
Gulf of Mexico



074-3 S. Compoint/UNEP  
**Cattle herders prepare for the night**  
Thailand



076-2 K. Bry/UNEP  
**Capping oil wells set on fire during Gulf War, 1991**  
Kuwait



073-2 Z. Jovanovic/UNEP  
**Toxic smoke from fire at chemical plant**  
Yugoslavia



075-1 A. Moslehy/UNEP  
**Conscripts washing in makeshift wash tubs**  
Iran



076-3 J. Rajab/UNEP  
**Burning oil fields after Gulf War, 1991**  
Kuwait



073-3 M. Rougier/UNEP  
**Fighting forest fire threatening to engulf housing**  
France



075-2 M. Prado/UNEP  
**Child charcoal labourers**  
Brazil



077-1 J. Devera/UNEP  
**Burning oil fields after Gulf War, 1991**  
Kuwait



079-1 A. Doto/UNEP  
**Children protest against traffic pollution by wearing smog masks**  
Italy, Turin



080-1 A. Zhdanov/UNEP  
**Russian couple protest against pollution by wearing chemical masks during wedding ceremony**



081-1 Peres/UNEP  
**Child caught in vehicle exhaust**  
Portugal, Lisbon



082-1 O. Mazzucchelli/UNEP  
**Aerial crop spraying**  
Spain



082-2 M. Dnoraczyk/UNEP  
**First Holy Communion in industrial Russia**



082-3 B. Yoshida/UNEP  
**Industrial pollution**  
Japan, Osaka



082-4 R. de Ridder/UNEP  
**Cooling towers of nuclear power station with moon**  
Belgium



083-1 M. Watabe/UNEP  
**Smog trapped over Osaka due to thermal inversion, a layer of cool air that traps airborne pollution**  
Japan



083-2 A. Singh/UNEP  
**Smoking chimneys**  
India, Chennai (Madras)



083-3 M. Harris/UNEP  
**Smog**  
Japan, Beppu



084-1 K. Shinde/UNEP  
**Children playing with toy windmills in front of wind turbines**  
India



084-2 J. Kamien/UNEP  
**Child in front of cooling towers**  
France



084-3 J. Haas/UNEP  
**Nuclear power station cooling towers**  
USA



084-4 P. Turnen/UNEP  
**Tree killed by industrial air pollution**  
Russia



085-1 A. Hurtig/UNEP  
**Oil-fired power station**  
Sweden, Orebro



085-2 P. Fessel/UNEP  
**Coal-fired power station**  
Germany, Duisburg



085-3 R. Oggiono/UNEP  
**Industrial pollution**  
Italy



086-1 R. Kawakami/UNEP  
**Egret**  
Japan



086-2 R. Meyerriecks/UNEP  
**American blue jay, *Cyanocitta cristata***  
USA



086-3 H. Ohara/UNEP  
**Egret**  
Japan, Lake Biwa



086-4 D. Nielsen/UNEP  
**Bee collecting flower pollen**  
USA



087-1 Say Boon Foo/UNEP  
**Brown-throated sunbird, *Anthreptes malacensis*, feeding its young**  
China



087-2 G. Blackie/UNEP  
**American bald eagle, *Haliaeetus leucocephalus***  
USA



087-3 S. Nielsen/UNEP  
**Migrating Canada geese, *Branta canadensis*, silhouetted against moon**  
USA



087-4 Say Boon Foo/UNEP  
**Yellow-vented bulbul, *Pycnonotus goiavier*, feeding its young**  
South-East Asia



088-1 Chung-Wah/UNEP  
**Passenger airliner flying over residential housing**  
Hong Kong



088-2 A. Zhigailov/UNEP  
**Disabled nuclear bombers**  
Russia



089-1 S. Odabe/UNEP  
**Swan in flight**



091-1 T. Wolke/UNEP  
**Scrapped bicycle in lake**  
Germany



092-1 M. Rogers/UNEP  
**Bus driving across flooded plateau**  
Bolivia, High Andes



093-1 S. Ferry/UNEP  
**Swimming pool in front of polluted bay**  
Panama, Panama City



094-1 D. Rodrigues/UNEP  
**Oiled bird**  
Brazil



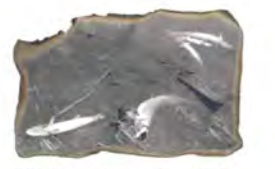
094-2 M. Flores/UNEP  
**Fish poisoned by sewage leaking into city lagoons**  
Brazil



095-1 M. Tristao/UNEP  
**Fish stunned by dynamited explosion are collected by fishermen**  
Brazil, Lagoa de Marcia



095-2 P. Durand/UNEP  
**Seabird caught in oil slick**  
Saudi Arabia, Khafji



095-3 N. Gyngazou/UNEP  
**Dead fish**  
Russia, Siberia



095-4 D. Rodrigues/UNEP  
**Oiled bird**  
Brazil



096-1 M. Rahman/UNEP  
**Children playing during monsoon rainstorm**  
Bangladesh



096-2 I. Uwanaka/UNEP  
**Boy drinking rainwater from banana leaf**  
Nigeria



096-3 S. Rang-Klan/UNEP  
**Kayan women washing in river**  
Thailand



097-1 B. Ling/UNEP  
**Communal bathing**  
China



097-2 A. Grachtchenkov/UNEP  
**Mother and babies in water tub**  
Russia



097-3 D. Juntawonsup/UNEP  
**Mother feeding and washing her child**  
Thailand



098-1 H. Schwarzbach/UNEP  
**Children collecting floating waste for recycling**  
Philippines, Manila Bay



098-2 H. Schwarzbach/UNEP  
**Children collecting floating waste for recycling**  
Philippines, Manila Bay



099-1 M. Cerrah/UNEP  
**Algal bloom, or eutrophication**  
Italy



099-2 C. Thompson/UNEP  
**Doll floating in toxic industrial waste stored in disintegrating leaking drums**  
Ireland



099-3 A. Fernandes/UNEP  
**Fishermen hauling in catch polluted by oil**  
Brazil



100-1 P. Tiraweerakajorn/UNEP  
**Children in waterfall**  
Thailand



100-2 M. Shteinbock/UNEP  
**Holidaymakers sunbathe by leaking sewage pipe**  
Russia, Norilsk beach



100-3 Wang Jian Min/UNEP  
**Crowded beach**  
China, Quing Dao



101-1 K. Adam/UNEP  
**Chemical outflow pipe**  
New Zealand



101-2 R. Blume/UNEP  
**Chemical outflow pipe**  
Germany



101-3 D. Nayak/UNEP  
**Workers sitting on factory outflow pipe**  
India



102-1 R. Smith/UNEP  
**Contaminated beach**  
USA



102-2 A. Ishokon/UNEP  
**Children collecting water during drought**  
India



102-3 P. Frischmuth/UNEP  
**Flooded town: postman in waterproof trousers delivers mail**  
Germany, Werteim am Main



102-4 J. Juntawonsup/UNEP  
**Monkey drinking Coca-Cola from can**  
Thailand



102-5 A. Appelbe/UNEP  
**Flooded shanty town on the edge of Pasig river**  
Philippines, Manila



103-1 J. Vallespir/UNEP  
**Geothermal energy**  
Iceland, Blue Lagoon



103-2 J. Moran/UNEP  
**Eyes of alligators, *Alligator mississippiensis*, reflecting sunlight at dusk**  
USA



104-1 Jin Huei Luo/UNEP  
**Communal hot spring**  
China, Tibet



104-2 J. White/UNEP  
**Man and heron fishing**  
USA



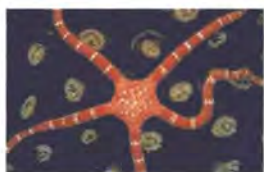
105-1 Lim Eng Geen/UNEP  
**Illegal immigrants from the Philippines living on stilt houses. They are prevented from going ashore in Malaysian territory and so are forced to remain in these homes**  
Malaysia



105-2 R. Gomes/UNEP  
**Children jumping into the sea**  
Brazil, Rio de Janeiro



105-3 A. Jemik/UNEP  
**Children playing in the sea**  
Caribbean



106-1 J. Croop/UNEP  
**Ruby brittle starfish, *Ophioderma rubicundum***  
Bahamas



106-2 J. Szentpeteri/UNEP  
**Eye of fully grown amur sleeper, *Percottus glehni*, with young nearby**  
Hungary



107-1 S. Davis/UNEP  
**School of grunts**  
USA



107-2 J. Kassanchuk/UNEP  
**Coral reef**  
Dutch Antilles, Bonaire



107-3 C. Mazqjiana/UNEP  
**Coral shrimp on anemone**  
Indian Ocean



107-4 F. Naumann/UNEP  
**Professor S. Ekaratue mapping coral reef killed by sea temperature rise**  
Sri Lanka, Hikkaduwa



108-1 N. Rosing/UNEP  
**Polar bear, *Ursus maritimus*, in ice drift**  
Canada, Churchill



108-2 H. Baesemann/UNEP  
**Starving polar bear, *Ursus maritimus*. Food supplies for polar bears have been reduced by global warming**  
Arctic



108-3 N. Asanis/UNEP  
**Polar bear, *Ursus maritimus***  
Arctic



108-4 E. Mocarski/UNEP  
**Grizzly bear, *Ursus arctos*, catching salmon**  
USA, Alaska



109-1 Seng/UNEP  
**Diving kingfisher**  
Malaysia



109-2 D. Watersun/UNEP  
**Pelicans**



109-3 D. Juntawonsup/UNEP  
**Fishermen by industrial complex**  
Thailand





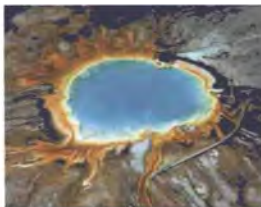
109-4 R. Pennartz/UNEP  
**Pelican with noddy tern on its head**



110-1 Vasstrand/UNEP  
**Ice climber**  
Norway



110-2 Masahiro Haba/UNEP  
**Waterfalls of Shirato**  
Japan



110-3 R. Harris/UNEP  
**Grand prismatic thermal pool**  
USA, Yellowstone National Park



111-1 Truchet/UNEP  
**Bora Bora**  
French Polynesia



111-2 Foto/UNEP  
**Wave**  
USA, Hawaii



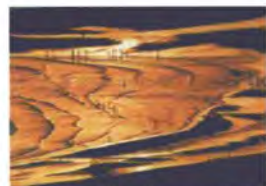
111-3 R. Bernardo/UNEP  
**Ice cave**  
Arctic



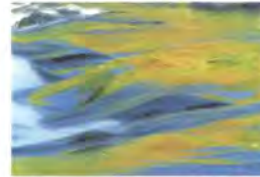
112-1 Hiromichi Tokitsu/UNEP  
**Reflections**  
Japan



112-2 Chak Tao Lau/UNEP  
**Reflections**  
China



112-3 Huang De Wen/UNEP  
**Sunset on the ocean**  
China, Yang Jian City, Guang Dong Province



112-4 Rob Stimpson/UNEP  
**Reflections**  
Canada, Spanish River, Ontario



113-1 C. Bacinello/UNEP  
**Whale watcher kayaking alongside whale**  
USA



113-2 D. Fleetham/UNEP  
**Eco-tourists watch gray whale, *Eschrichtius robustus***  
Mexico



113-3 M. Wanner/UNEP  
**Boy standing in front of dolphins in aquarium**  
USA



114-1 D. Seifert/UNEP  
**Sperm whale, *Physeter macrocephalus***  
Portugal



114-2 D. Seifert/UNEP  
**Sperm whale, *Physeter macrocephalus***  
Portugal



114-3 D. Seifert/UNEP  
**Sperm whale, *Physeter macrocephalus***  
Portugal



115-1 D. Fleetham/UNEP  
**Gray whale, *Eschrichtius robustus***  
Mexico

الماء / الهواء / النار / الأرض

土 / 火 / 風 / 水

**EARTH** / FIRE / AIR / WATER

**TERRE** / FEU / AIR / EAU

**ЗЕМЛЯ** / ОГОНЬ / ВОЗДУХ / ВОДА

**TIERRA** / FUEGO / AIRE / AGUA

पृथ्वी / आग / हवा / पानी

**TANAH** / API / UDARA / AIR

地 / 火 / 氣 / 水

**ERDE** / FEUER / LUFT / WASSER

**TERRA** / FUOCO / ARIA / ACQUA

땅 / 불 / 공기 / 물

**DUNIA** / MOTO / UPEPO / MAJI

**LUPA** / APOY / HANGIN / TUBIG

ဧကန် / .ဧကန်ไฟ / ဧကန်လမ် / .ဧကန်ဂ

زمین / آگ / هوا / پانی

**SOUF** / SAFFARA / NGEHLAAW / NDOH

**UMHLABA** / UMLILO / UMOYA / AMANZI

**TERRA** / FOGO / AR / AGUA

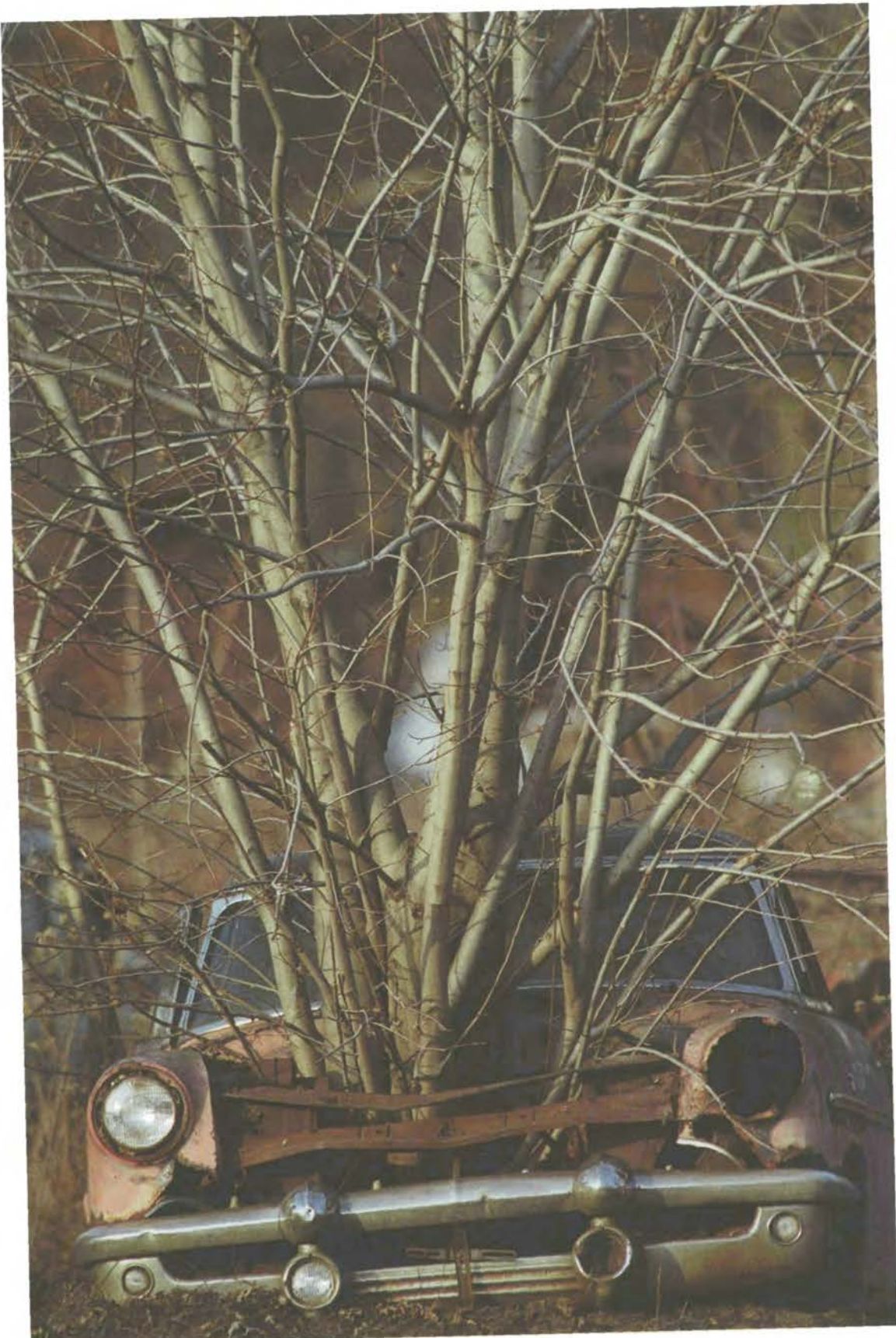
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**JORD** / BRANN / LUFT / VANN

**JORD** / ILD / LUFT / VAND



015-1 L. Phuong/UNEP



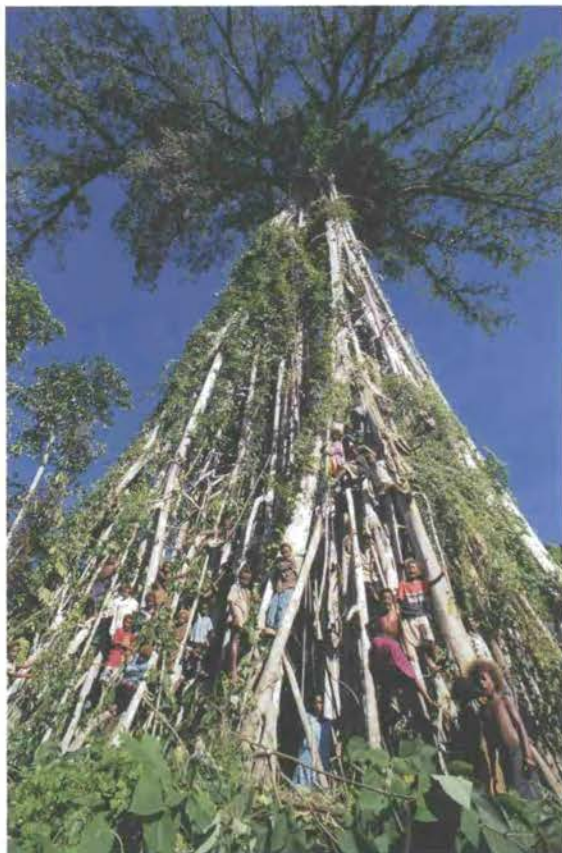
016-1 A. Detrich/UNEP



017-1 S. Compoint/UNEP



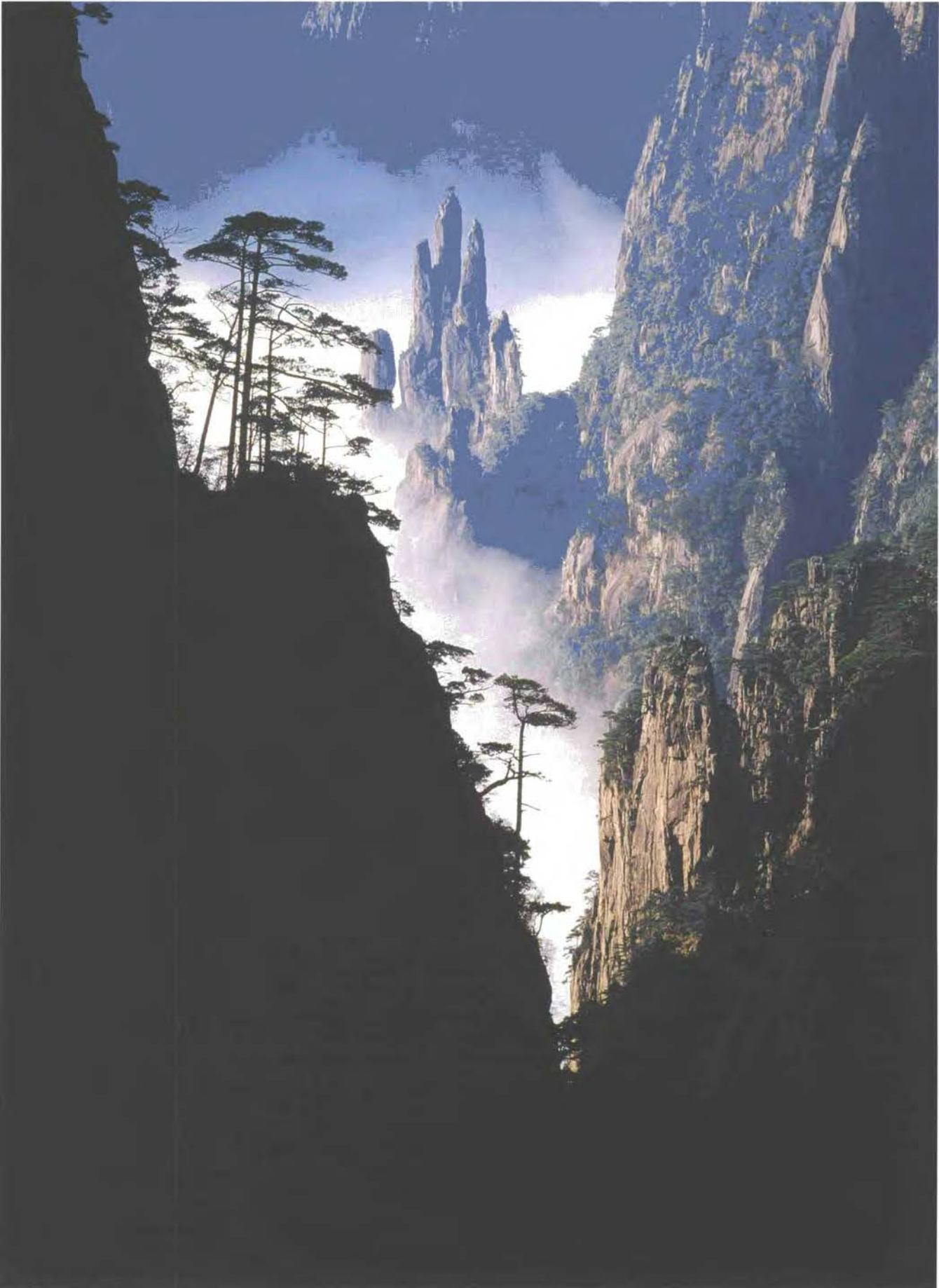
018-1 B. Bhagat/UNEP



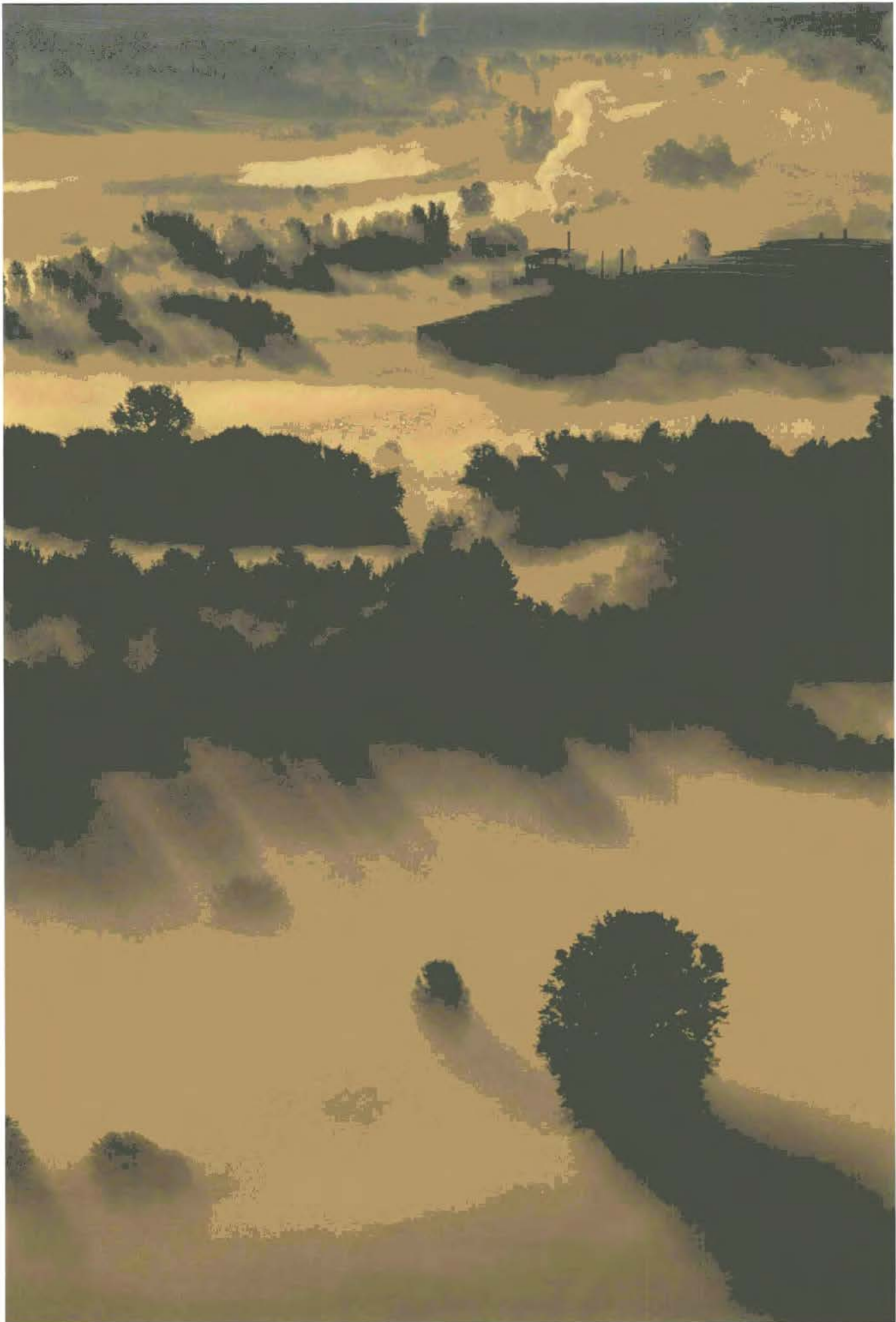
018-3 T. R. Cooke/UNEP



018-2 N. Ding/UNEP



019-1 D. Stanfill/UNEP



020-1 D. Riva/UNEP





021-1 L. Chen/UNEP



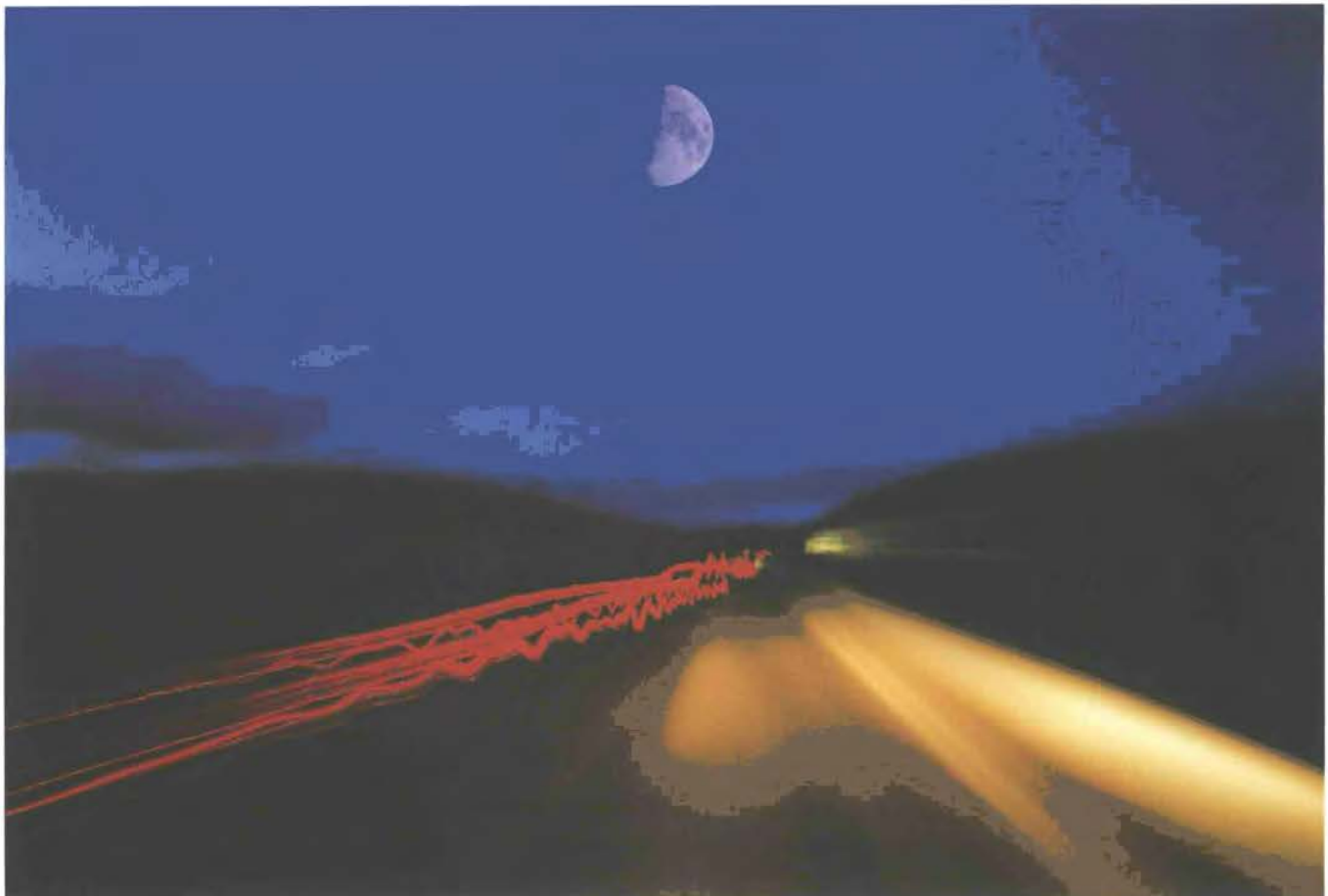
021-2 S. Vriend/UNEP



022-1 N. Dang/UNEP



023-1 J. Pteska/UNEP



023-2 R. Novak/UNEP



024-1 K. Armann/UNEP



024-2 F. Fournier/UNEP



024-3 P. Colychoun/UNEP



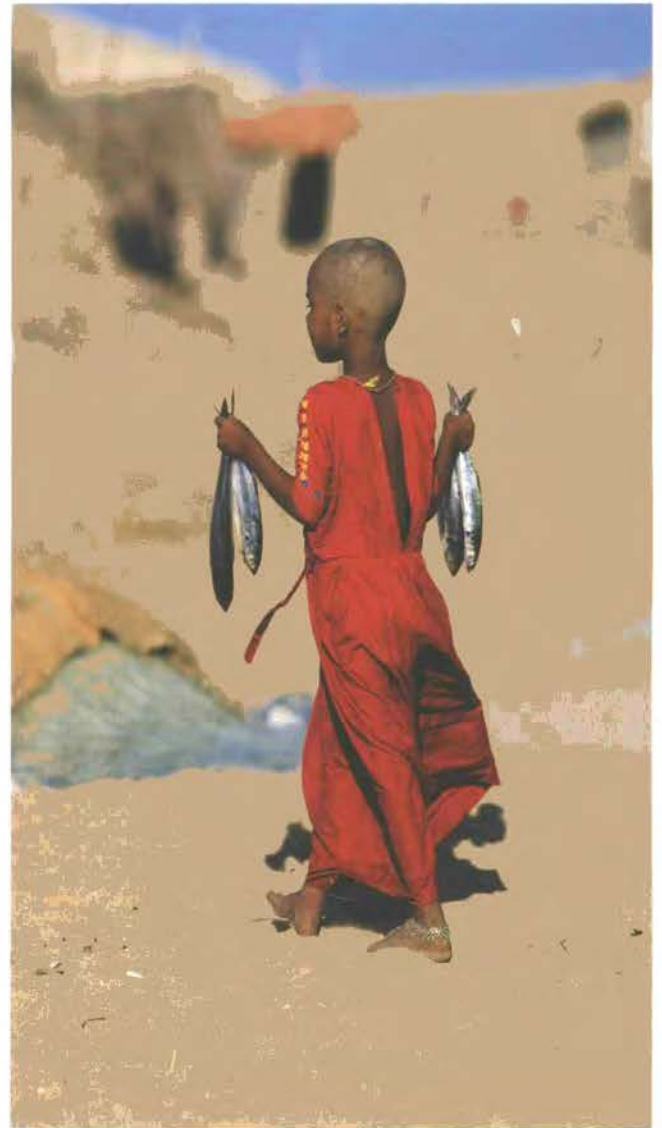
025-1 R. N. Wilson/UNEP



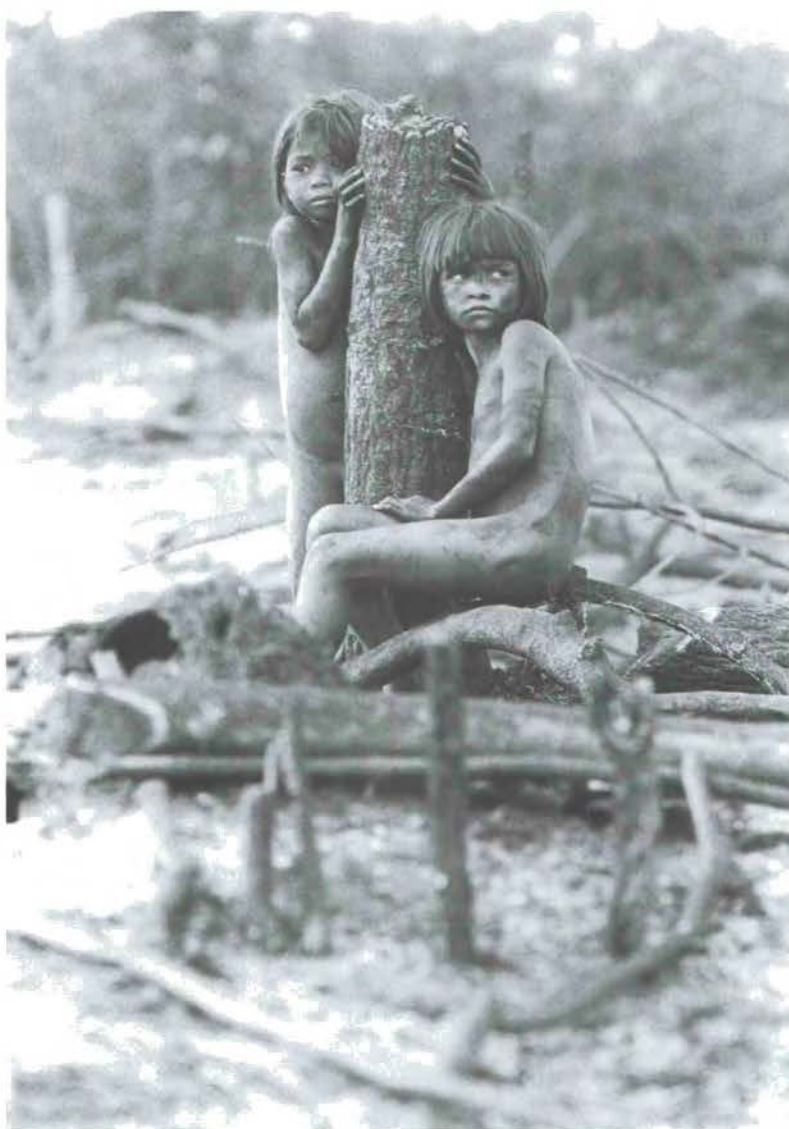
025-4 K. Armann/UNEP



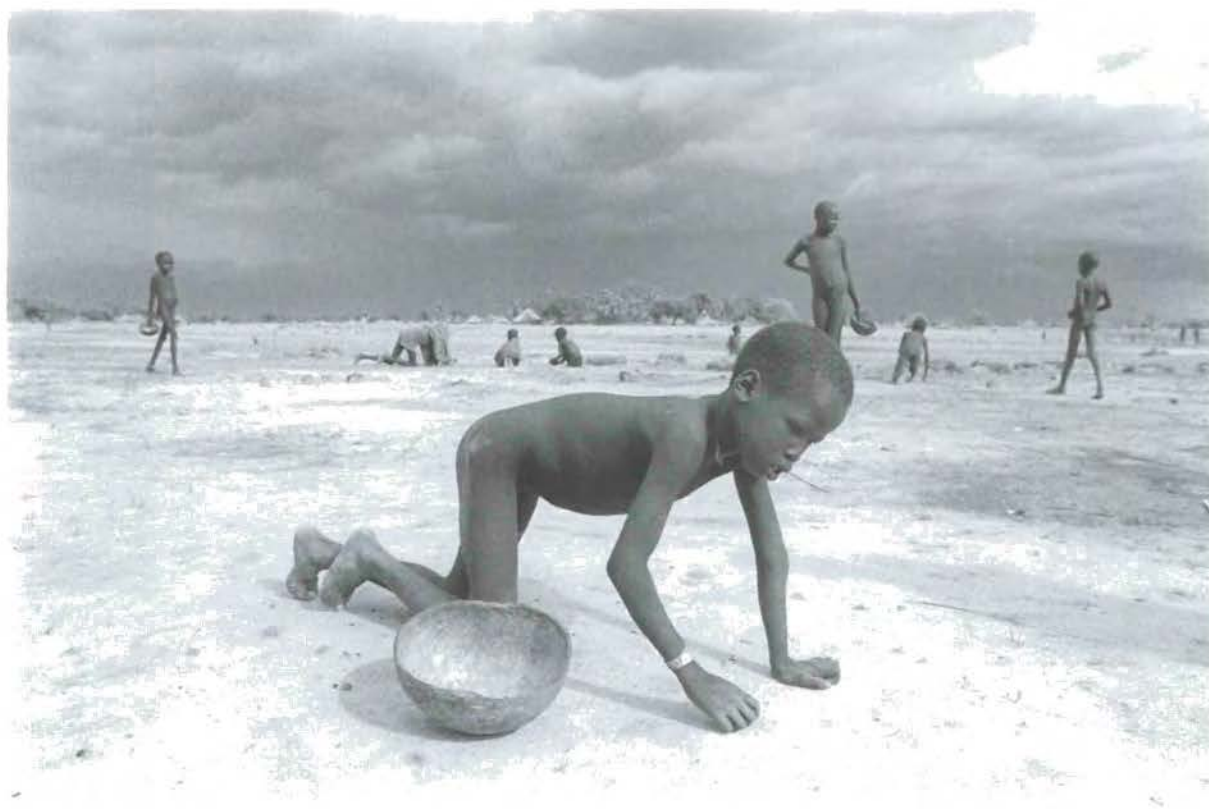
025-3 S. Morgan/UNEP



025-2 Demi/UNEP



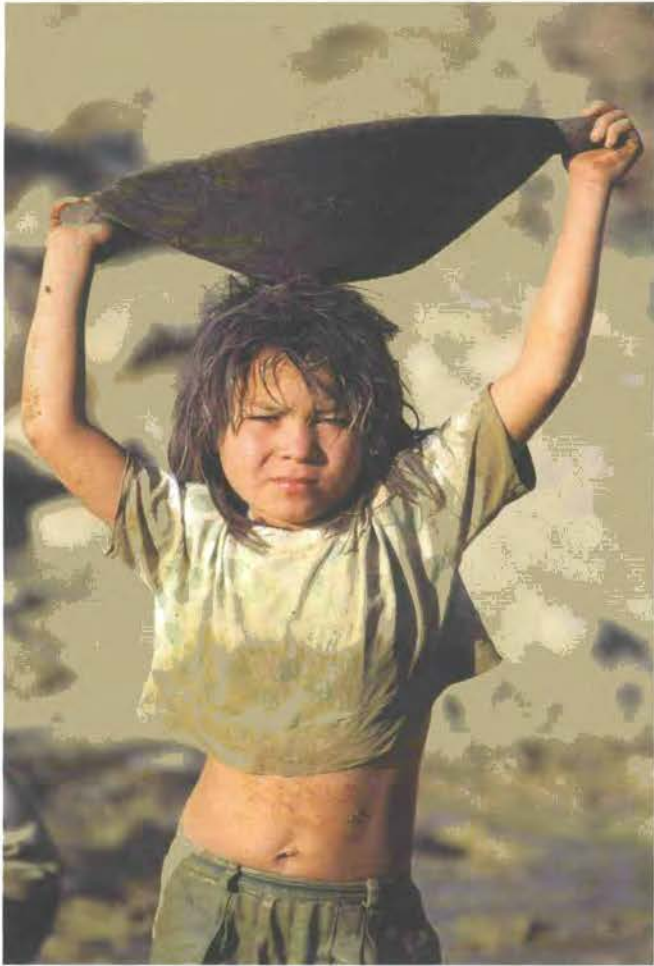
026-1 D. Pham/UNEP



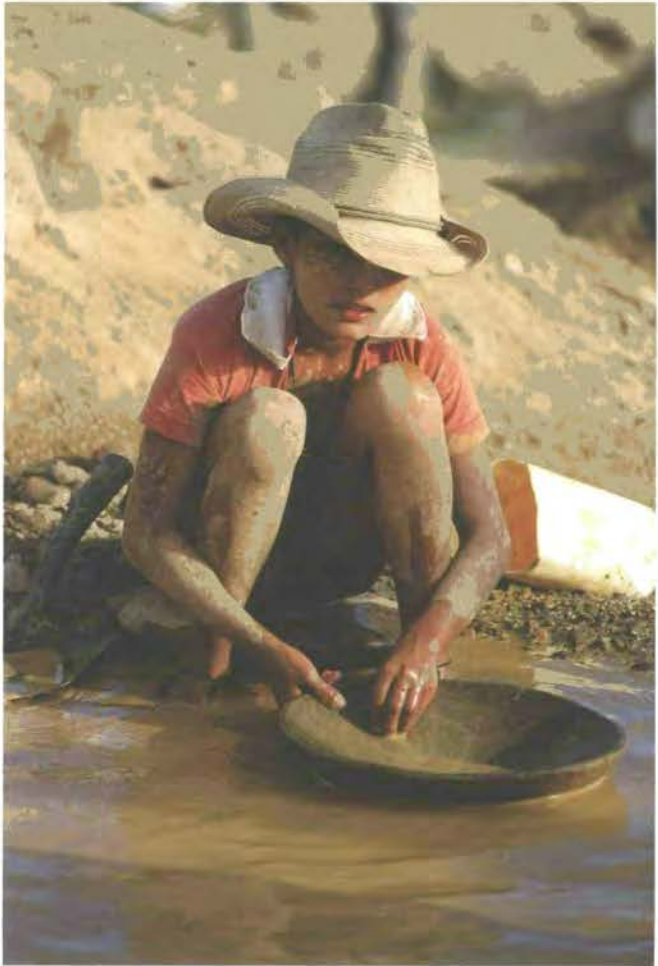
026-2 H. Schwarzbach/UNEP



027-1 T. Nebbia/UNEP



027-3 Rengifo/UNEP



027-2 Rengifo/UNEP



028-1 P. Senanunsakul/UNEP



028-2 F. Ertung/UNEP



028-3 N. Dickinson/UNEP





029-1 L. Stone/UNEP



030-1 Z. Xue/UNEP



030-2 K. Oksnes/UNEP



031-1 M. Sodre/UNEP



032-1 J. Araiyo/UNEP



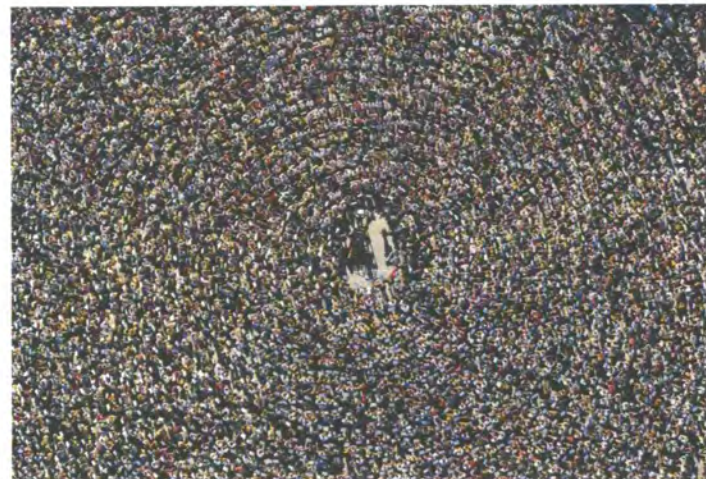
032-2 J. Dago/UNEP



033-1 L. Yong/UNEP



033-2 Kin/UNEP



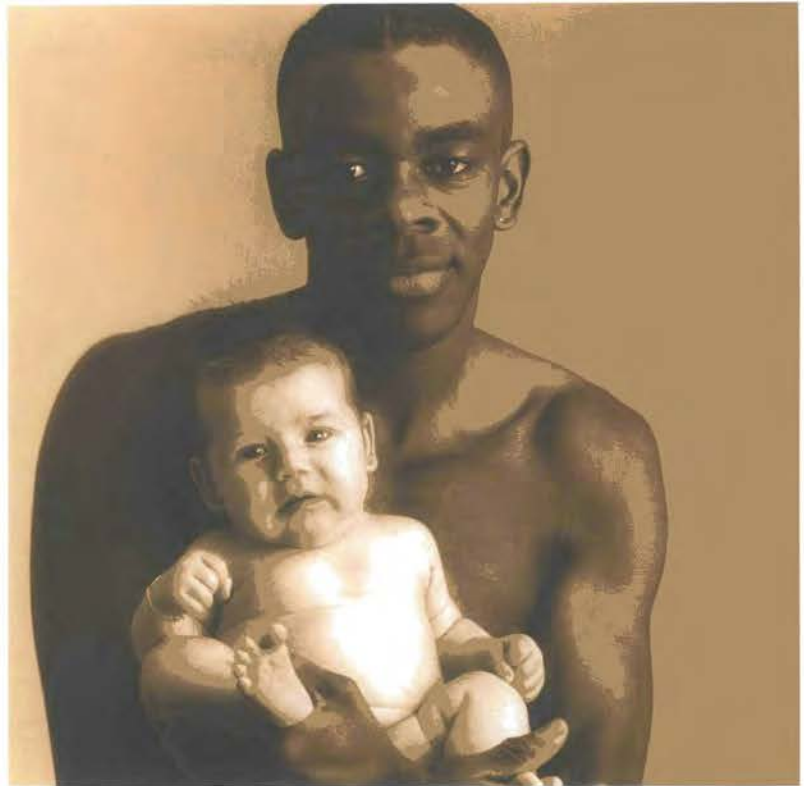
033-3 Duckek/UNEP



034-1 B. Kreis/UNEP



034-2 Florence/UNEP



035-1 M. Put/UNEP



035-2 T. Ketkaew/UNEP

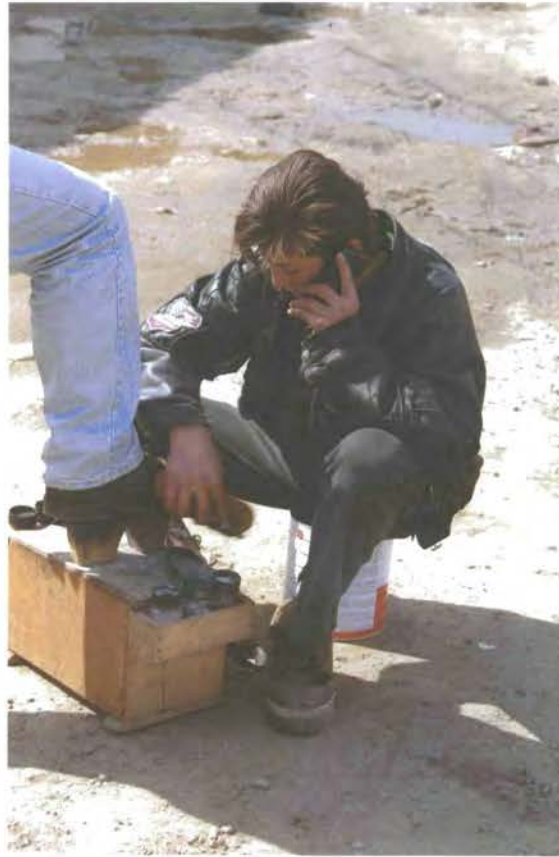


036-1 Jareunsri/UNEP



036-2 Pramkaew/UNEP

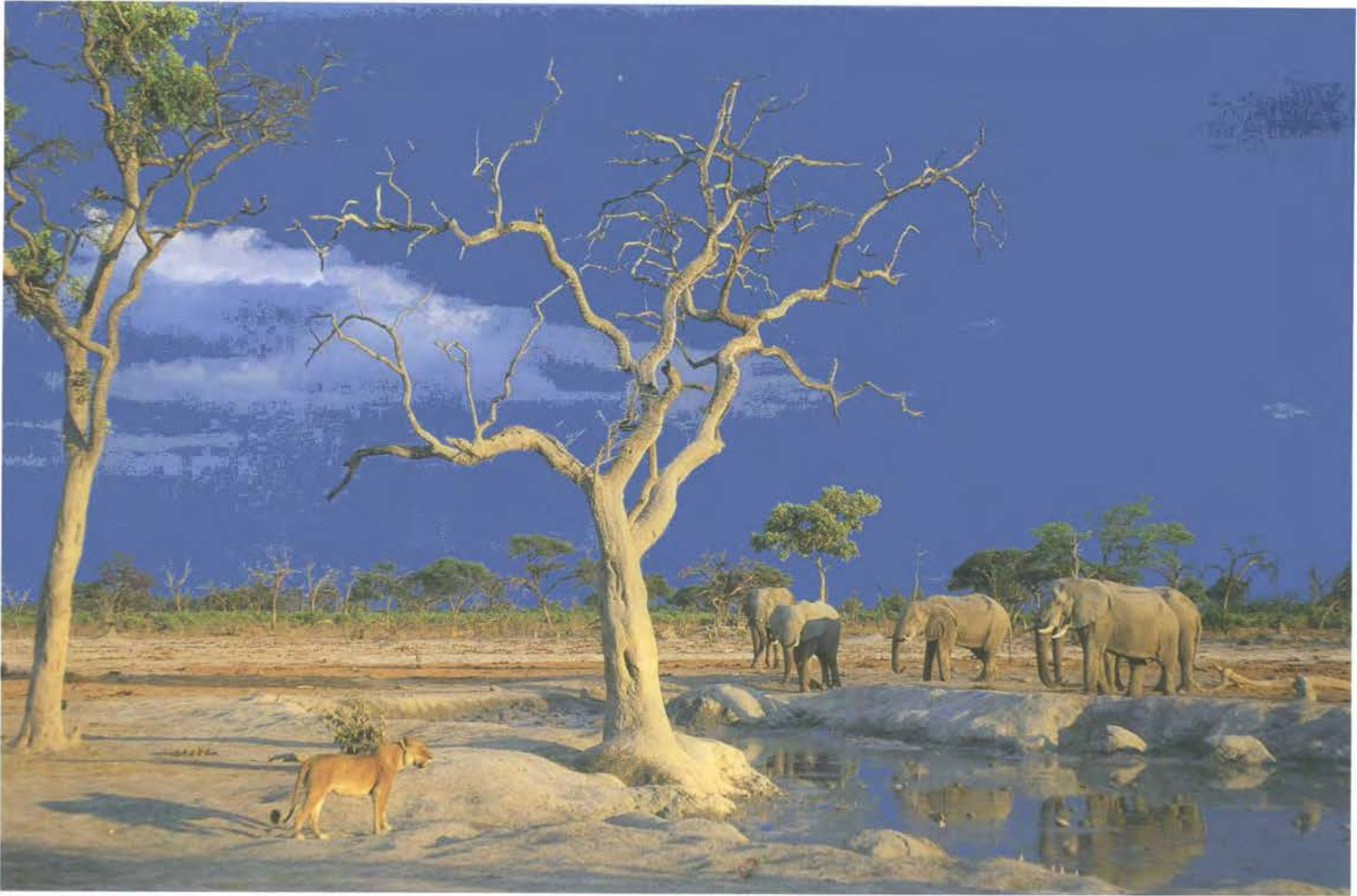




037-1 M. Elhasan/UNEP



037-2 D. X. Yuan/UNEP



038-1 G. Hind/UNEP



038-2 B. Dilley/UNEP



039-1 Brunner/UNEP



039-2 A. Matos Dos Santos/UNEP



040-1 W. Szwey/UNEP



040-2 Sip Li/UNEP



041-1 S. Rath/UNEP



041-2 X. Zhen/UNEP



042-1 A. Djakov/UNEP



042-2 B. Jordan/UNEP



042-3 S. Fongmoon/UNEP



043-1 A. Lyskin/UNEP



043-2 Y. Kozyrev/UNEP



043-3 L. Nakaswa/UNEP



044-1 O. Ismail/UNEP



044-2 M. Nimsiri/UNEP





045-1 B. Thanomsooksan/UNEP



045-2 B. Paton/UNEP



046-1 S. Graham/UNEP



047-1 J. Guang/UNEP



047-2 Stepanow/UNEP



048-1 P. Soni/UNEP



048-2 Y. Hachiro/UNEP



048-3 R. Dwidle/UNEP



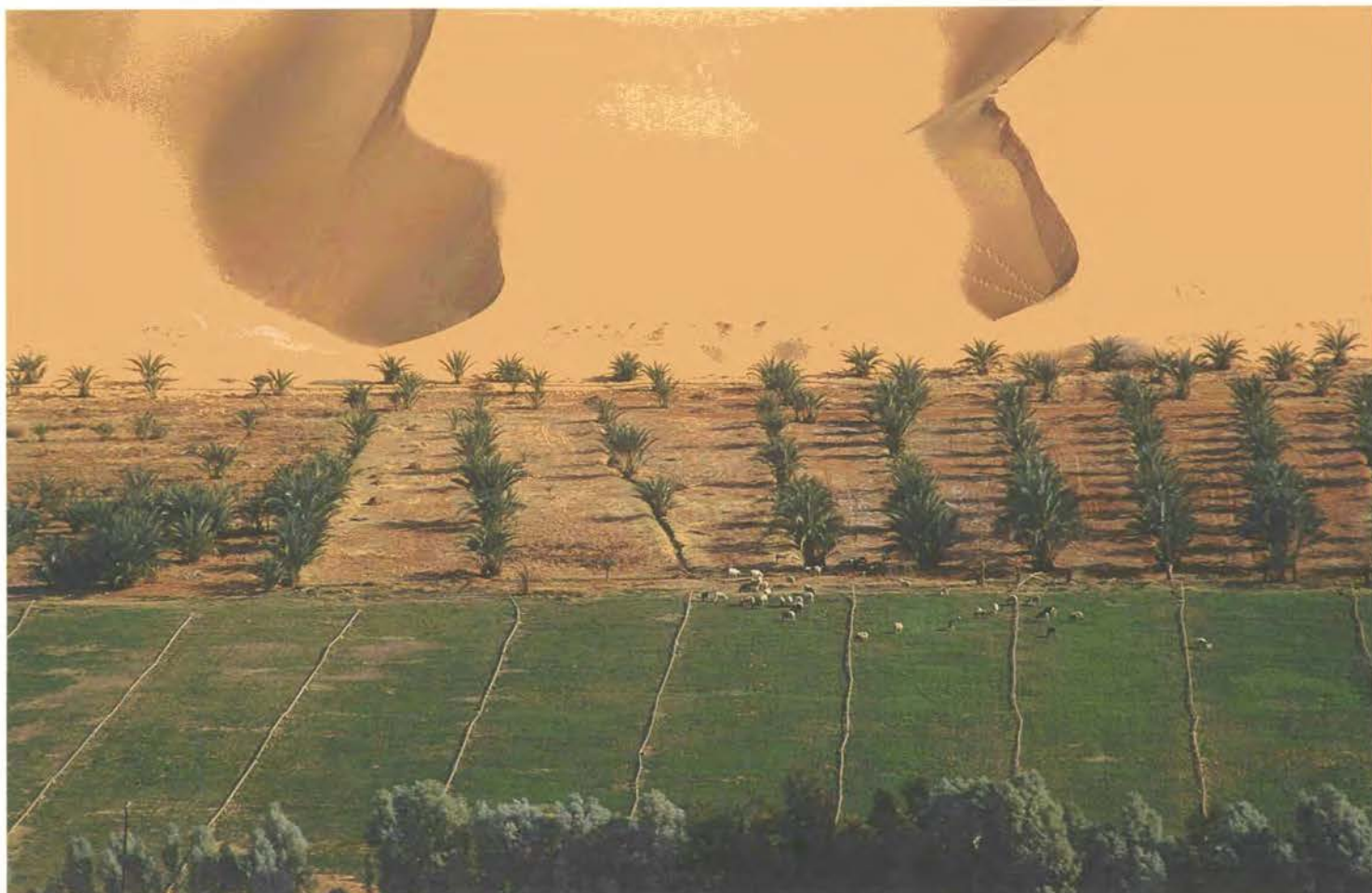
049-1 S. Shiang/UNEP



050-1 Dahlquist/UNEP



050-2 T. Oshima/UNEP



051-1 Voltchev/UNEP



051-2 Z. Yi/UNEP



052-1 C. Petrat/UNEP

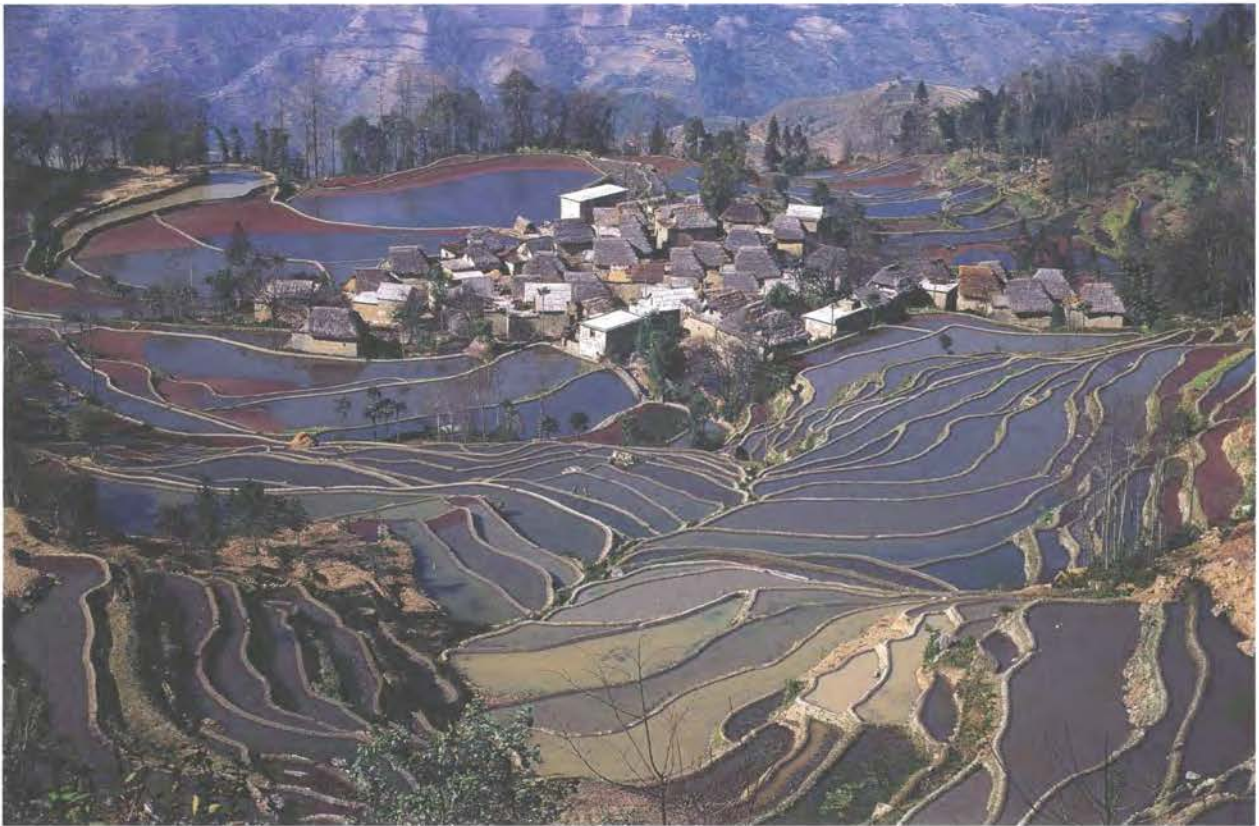


052-2 S. Nazan/UNEP

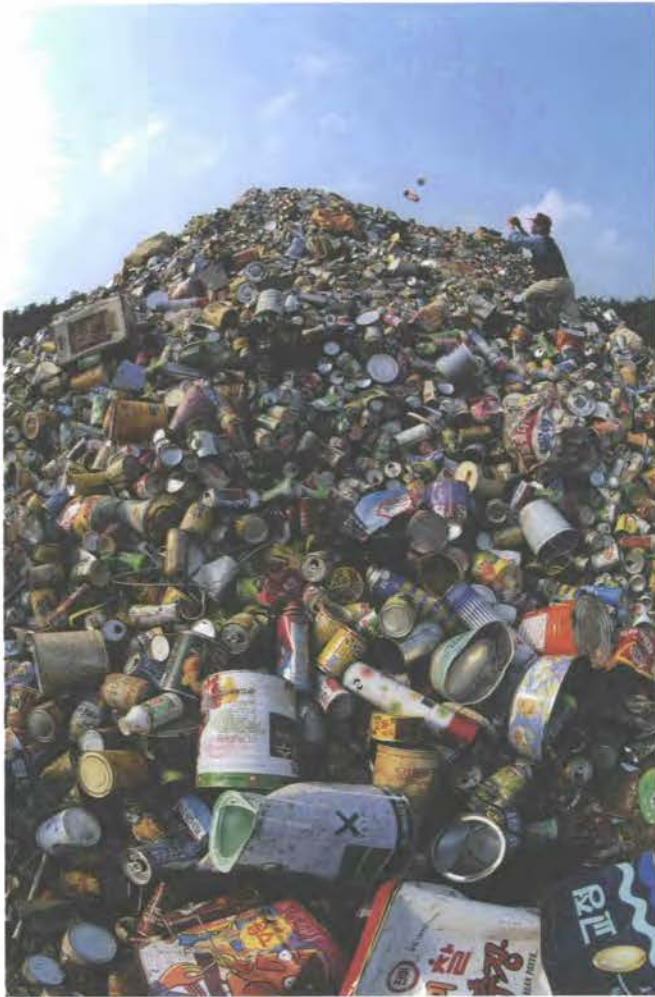




053-1 C. K. Au/UNEP



053-2 L. Hong/UNEP



054-1 A. Vohra/UNEP



054-2 J. Tanodra/UNEP



055-1 P. Van Peenen/UNEP



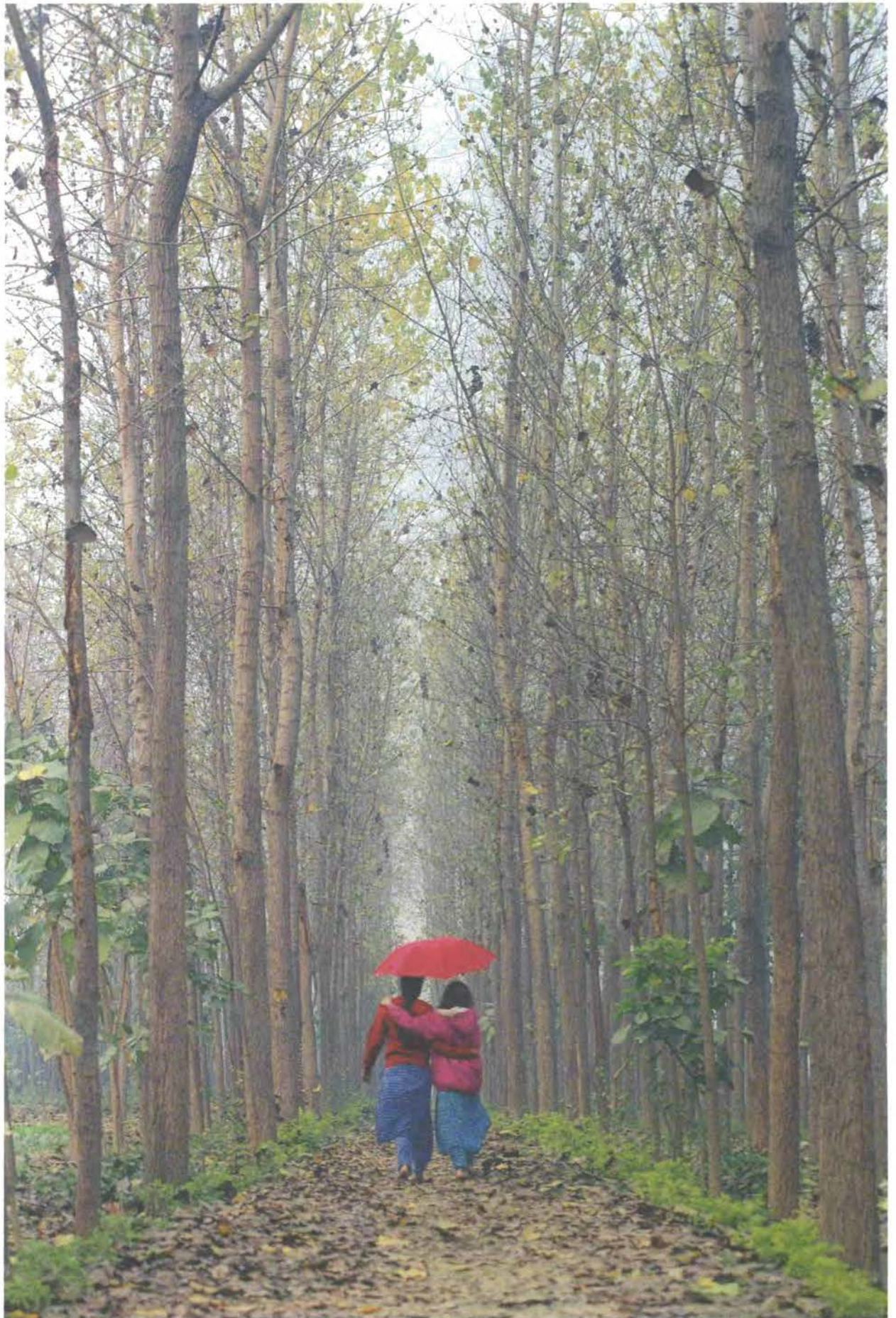
055-2 V. Lenguzin/UNEP



056-1 Kittprempool/UNEP



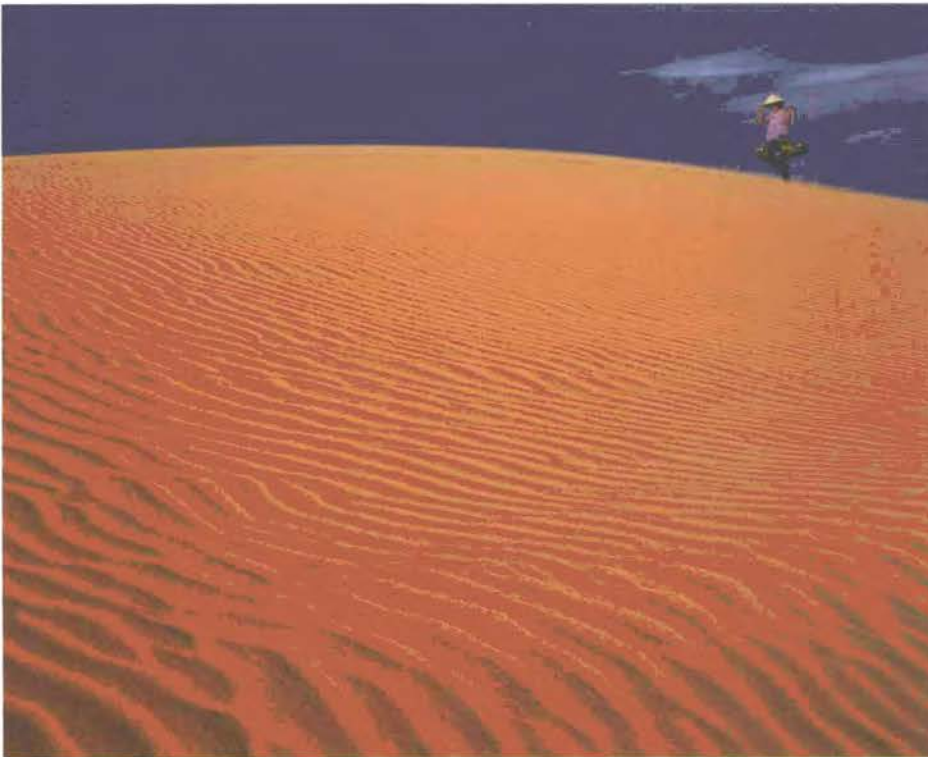
056-2 Boonsiri/UNEP



057-1 A. Dua/UNEP



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058-2 W. Wu/UNEP



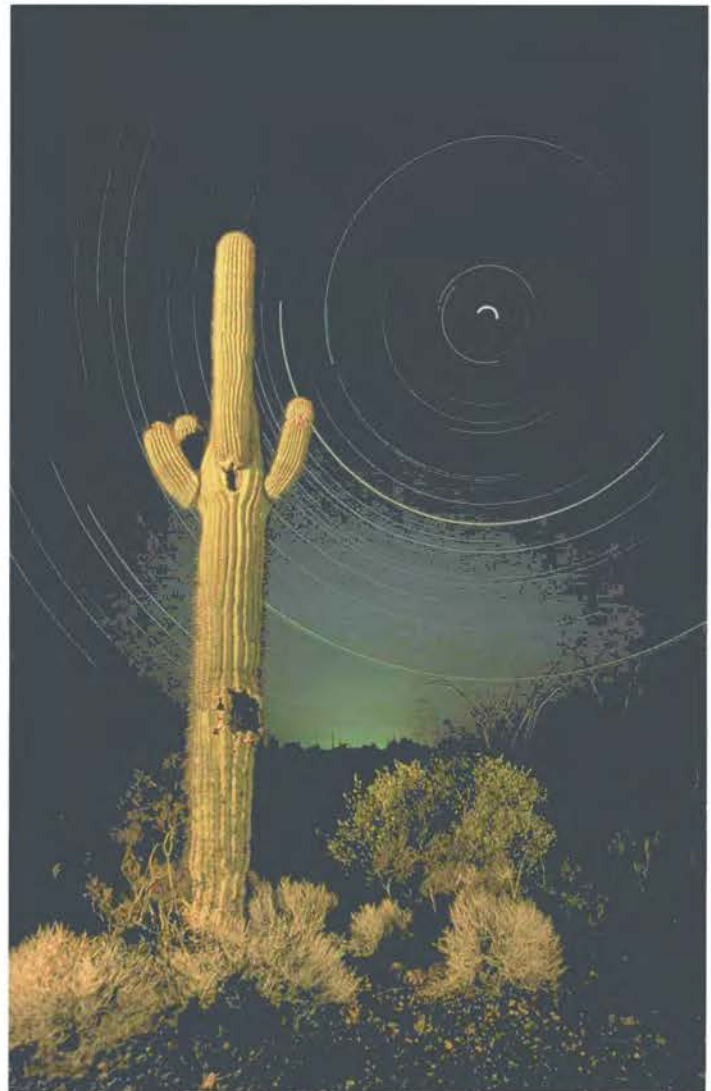
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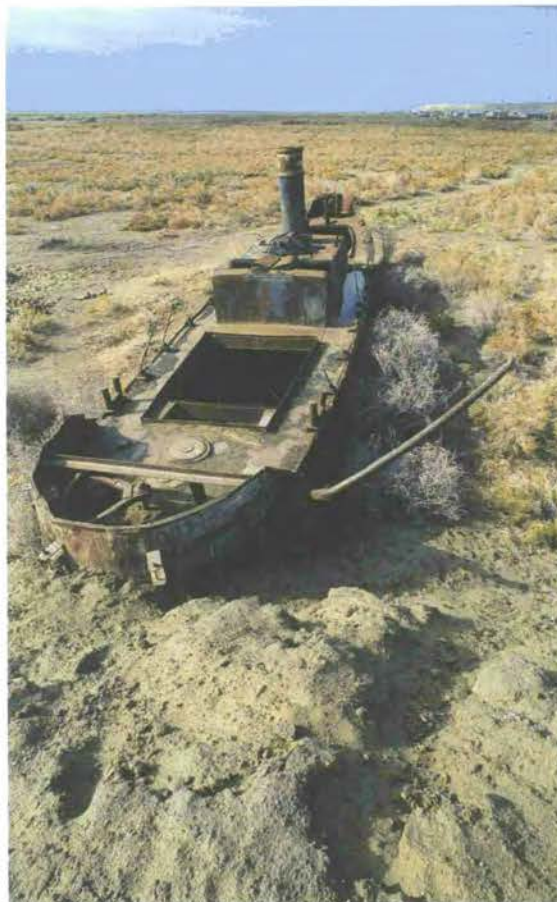
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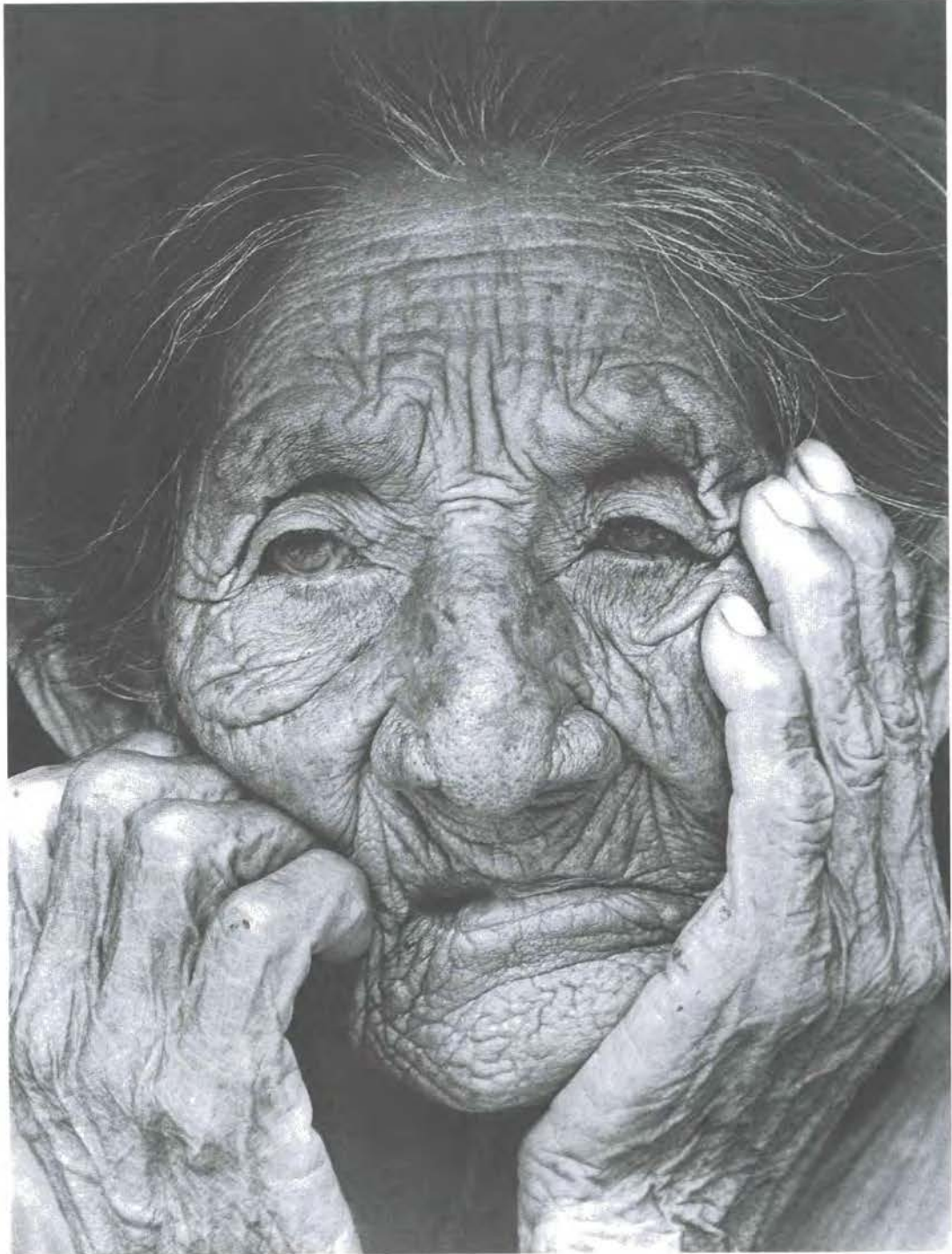
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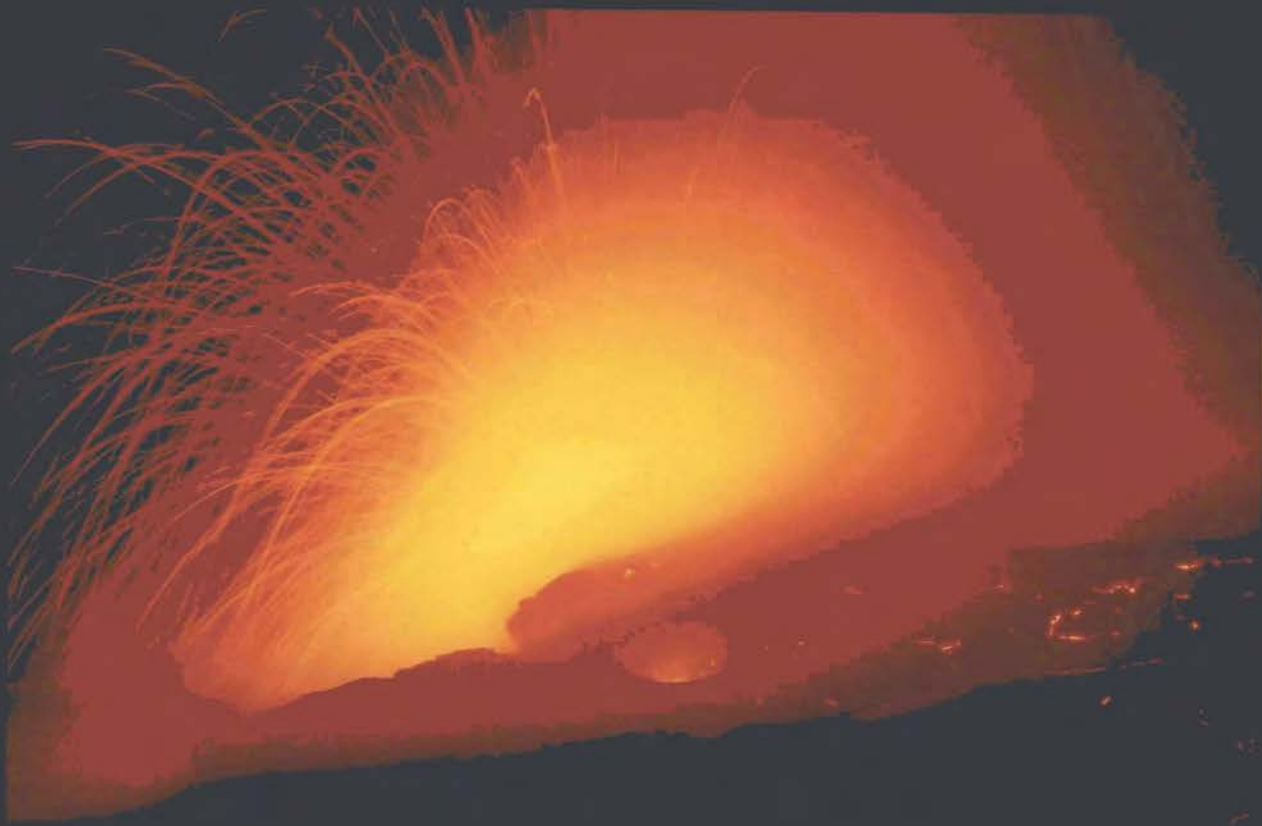


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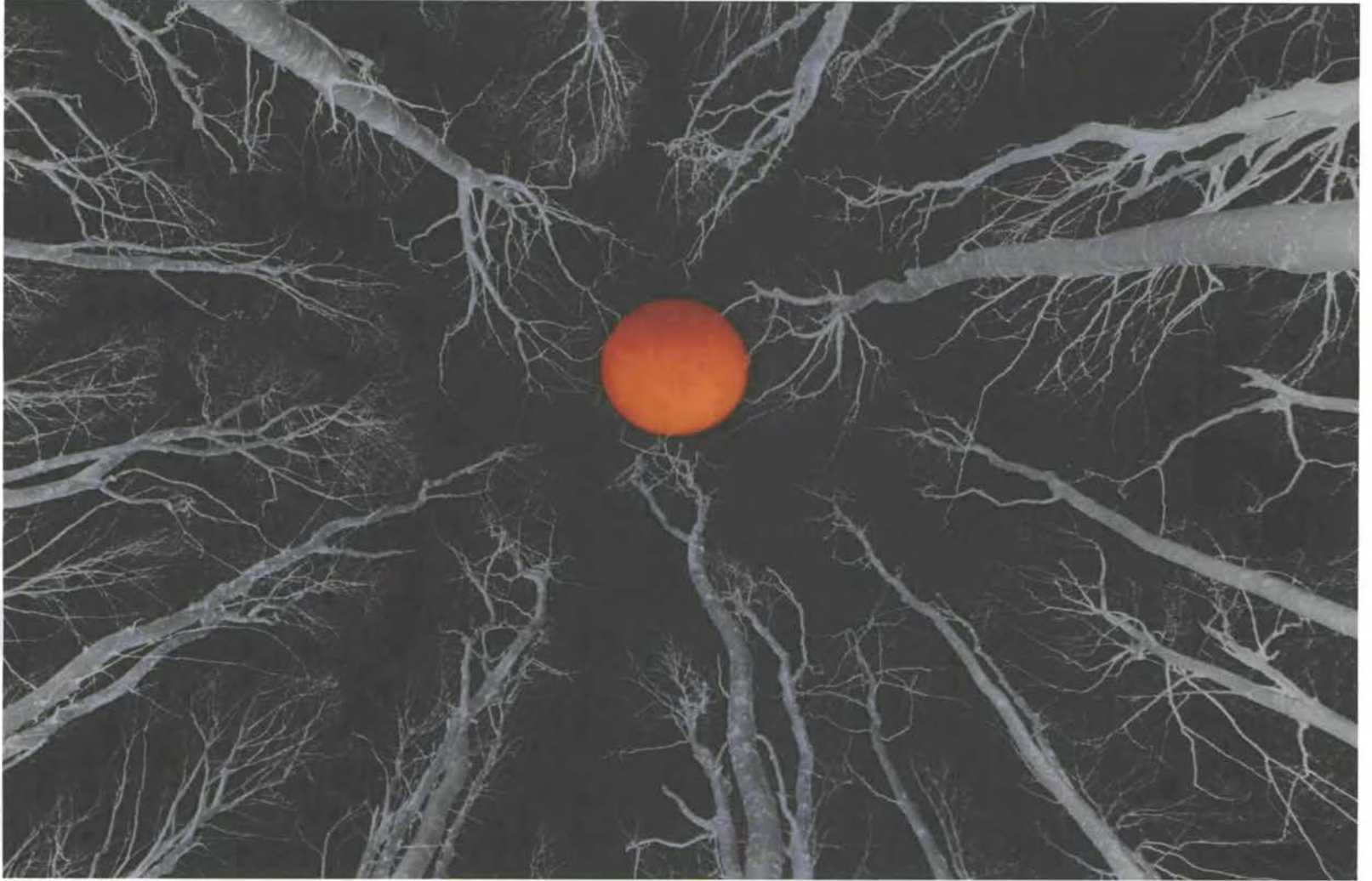


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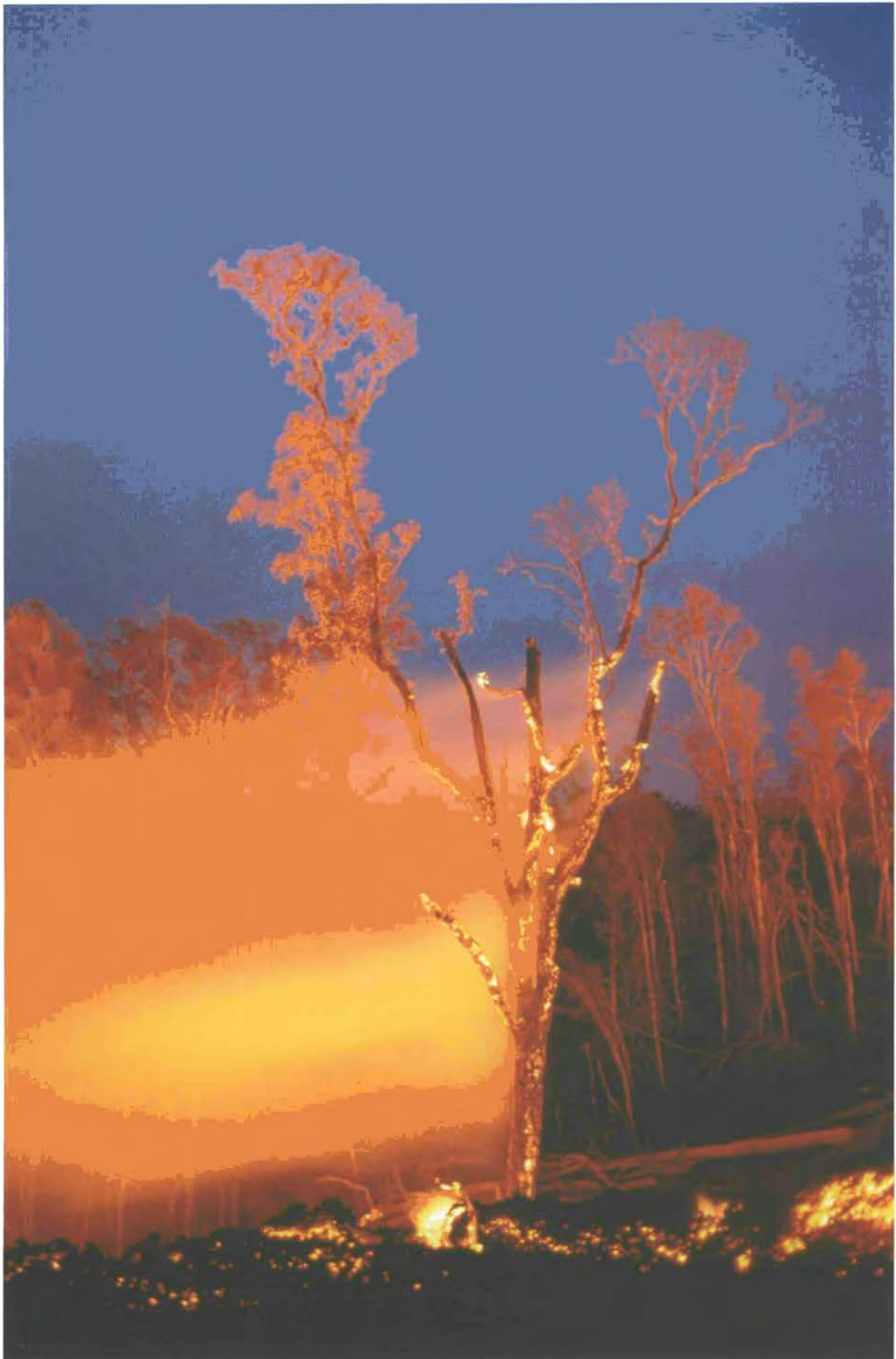


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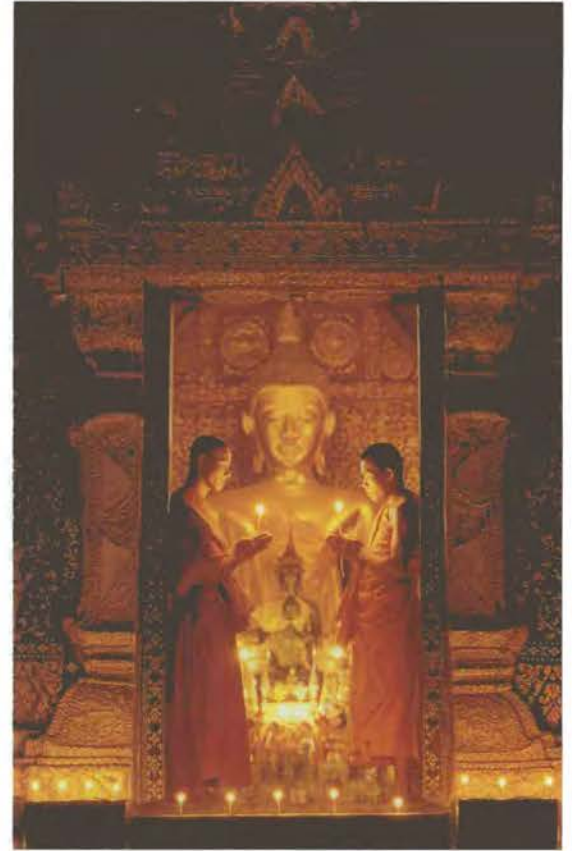




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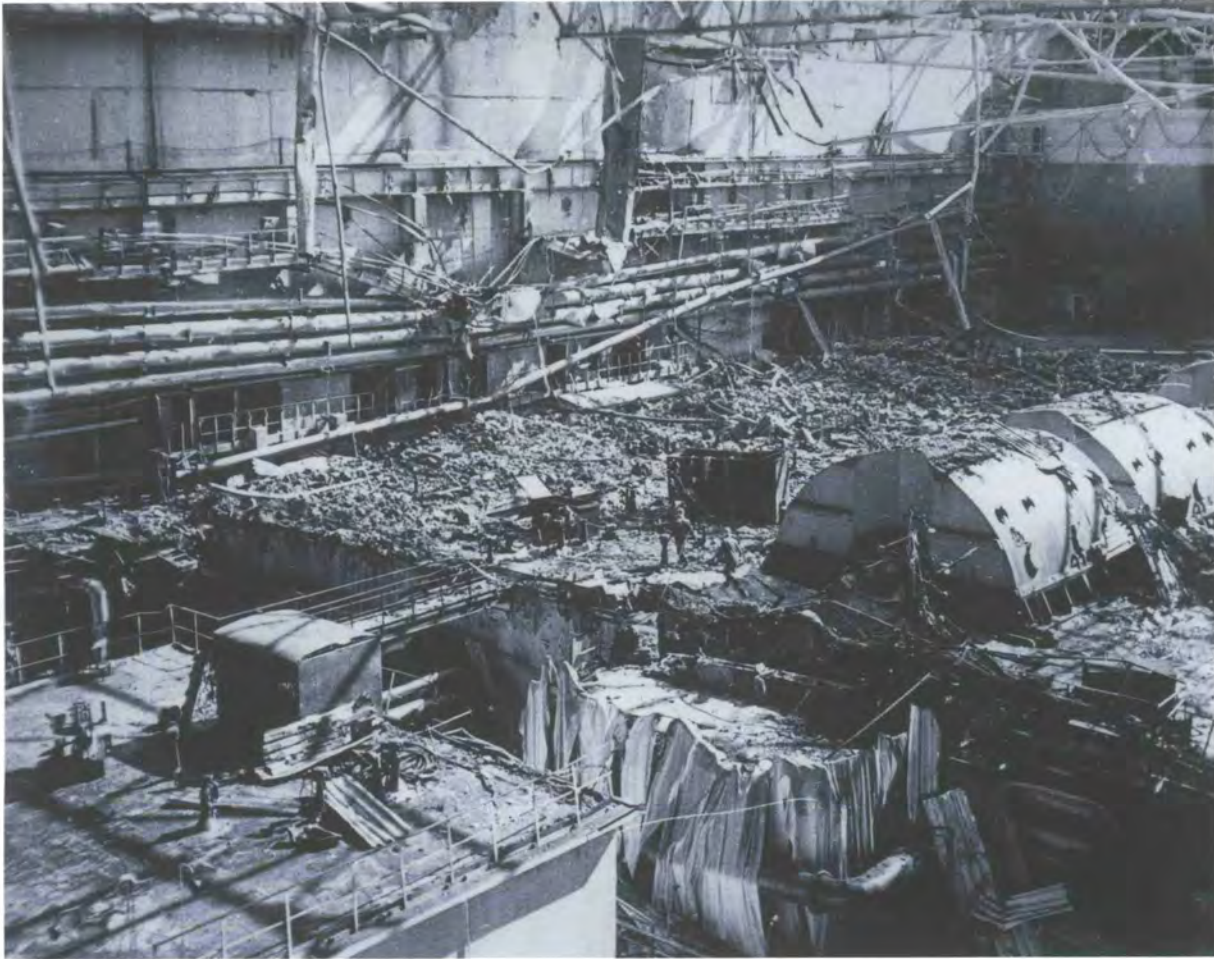
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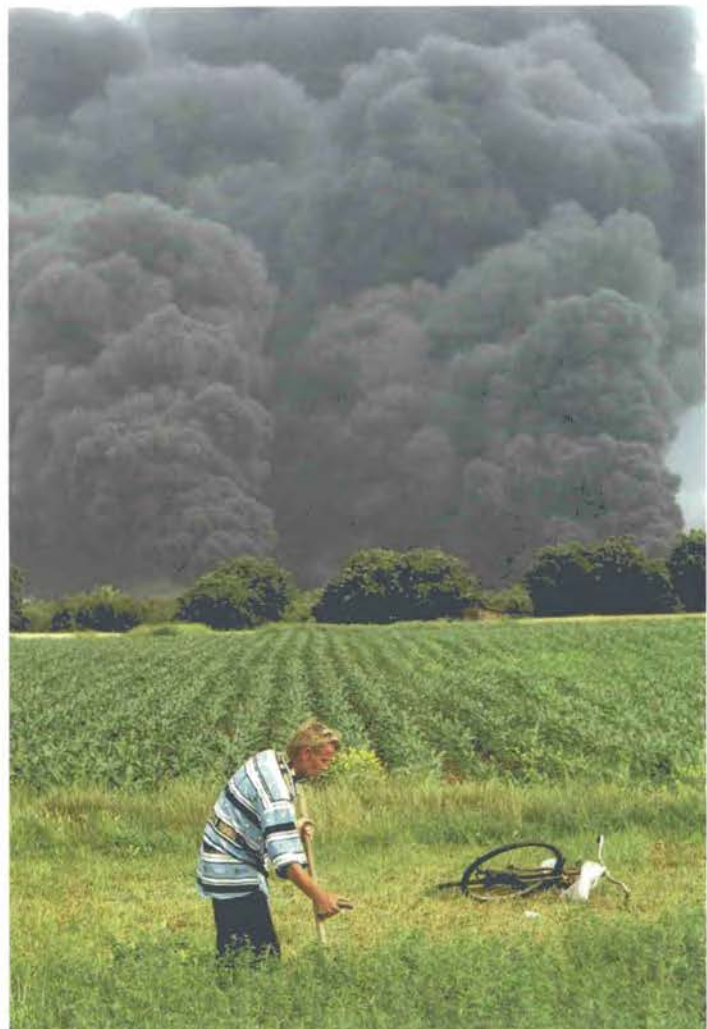
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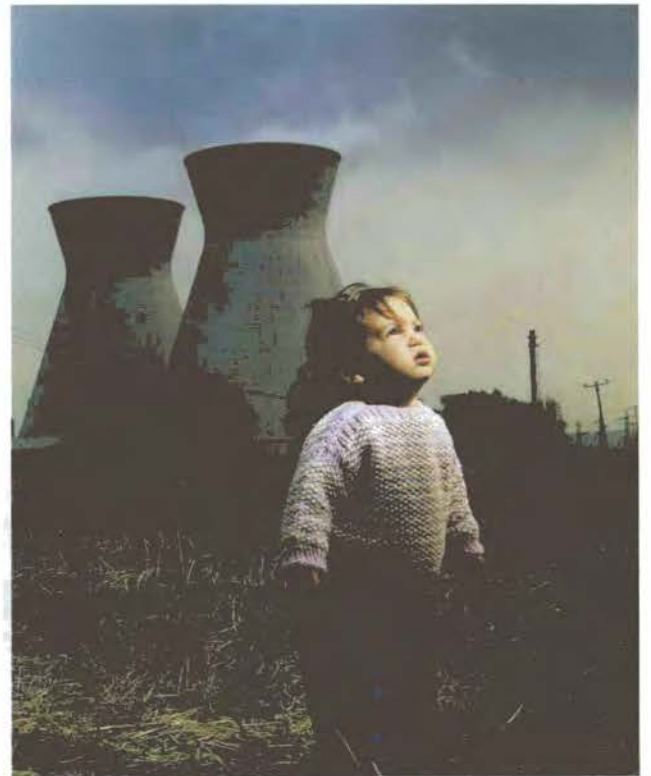
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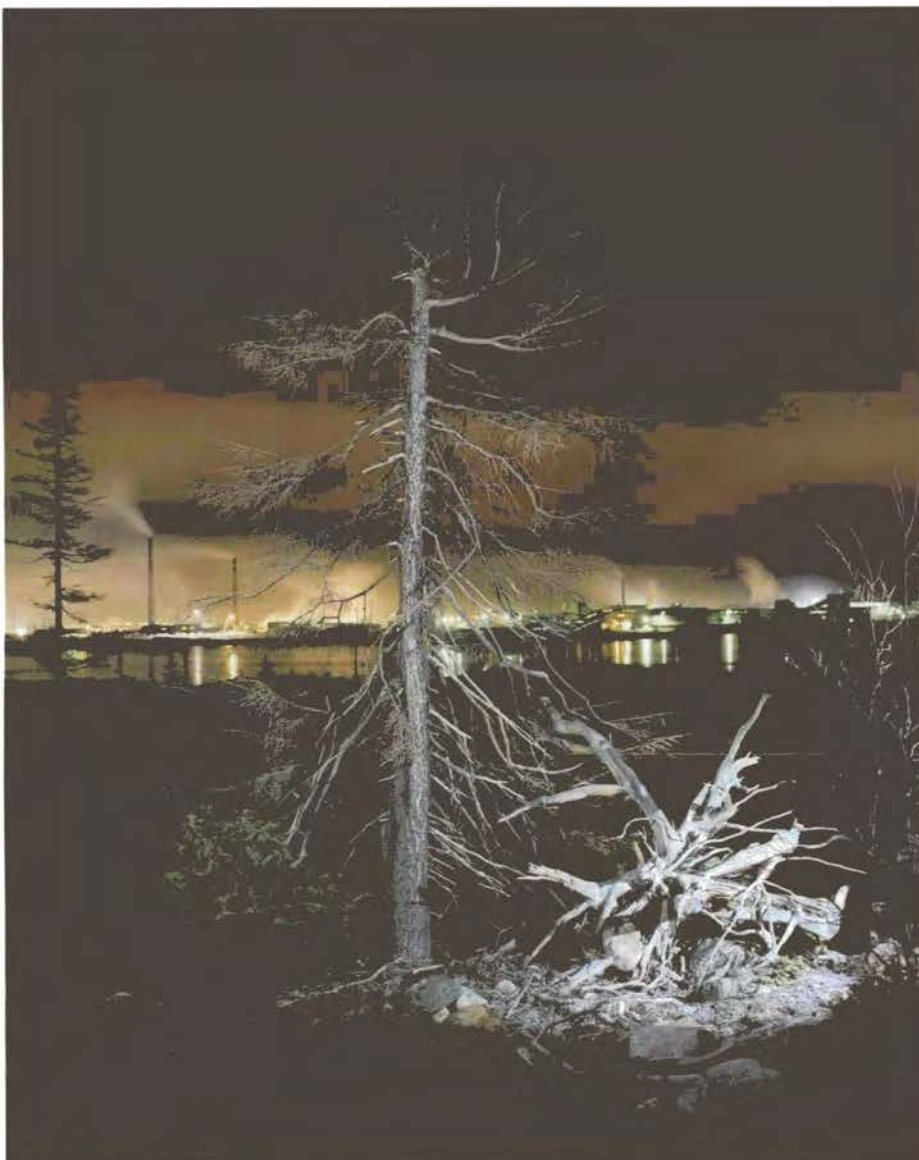
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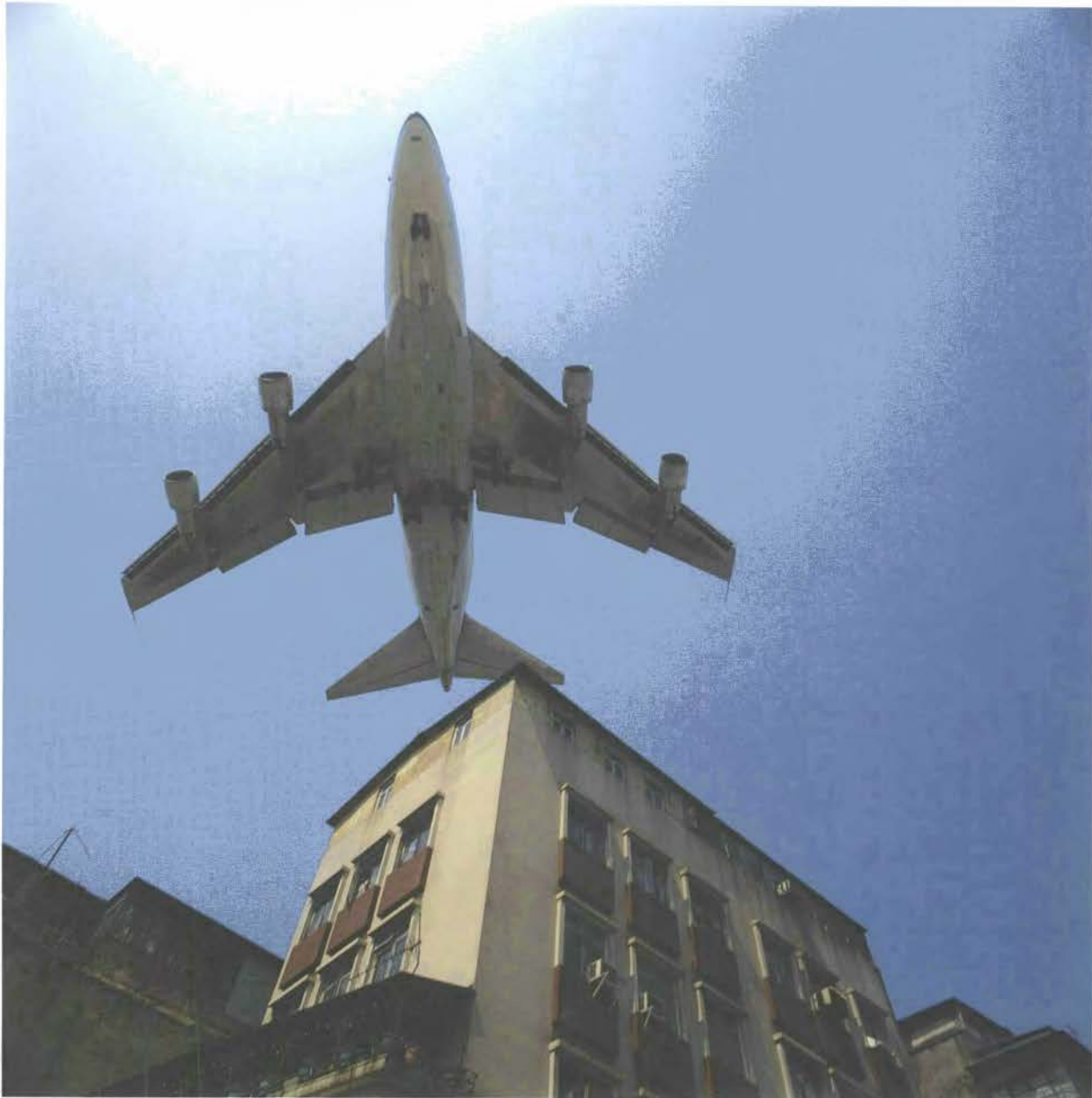
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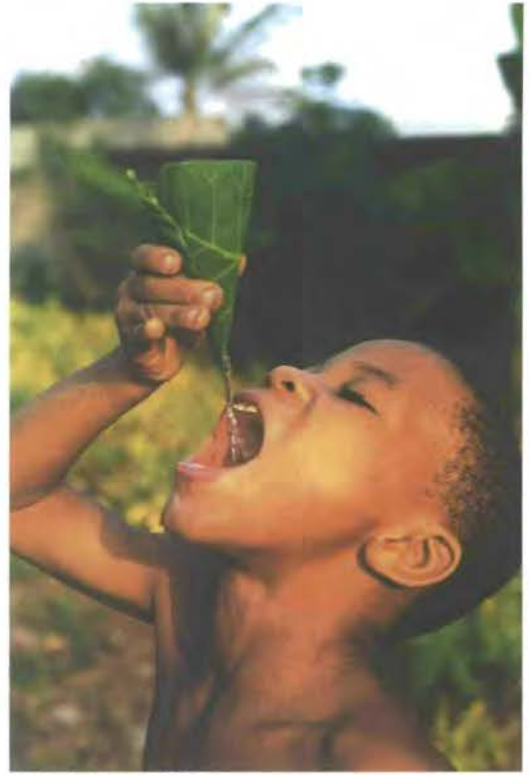
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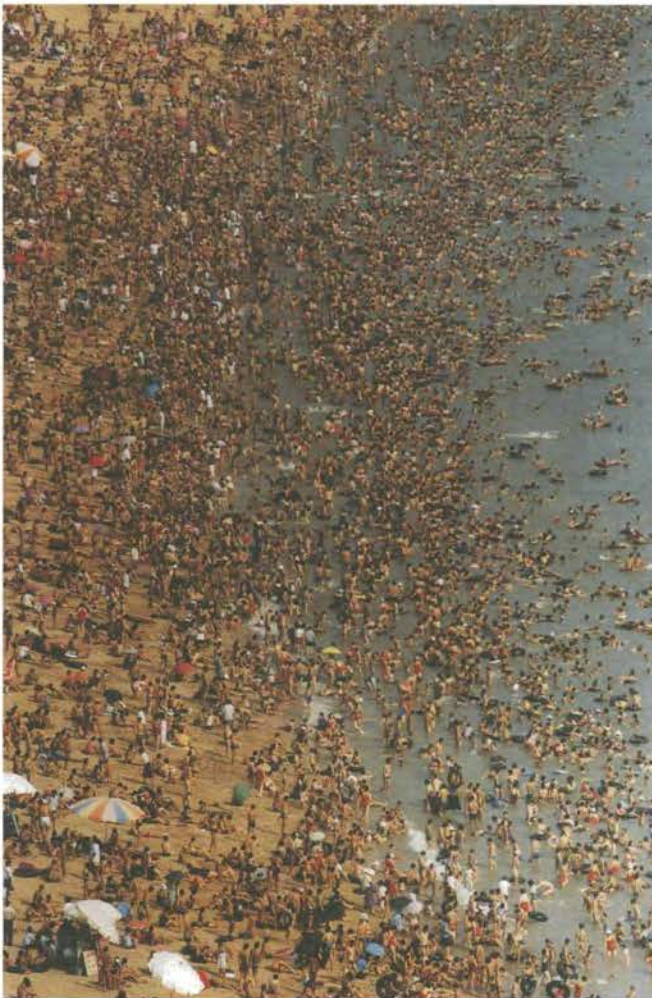
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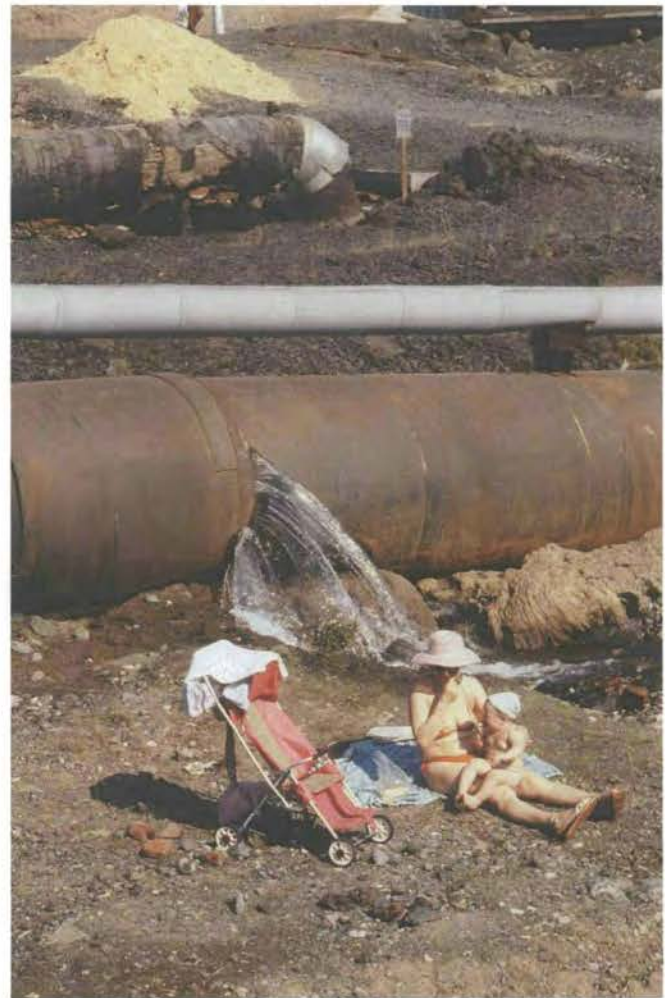
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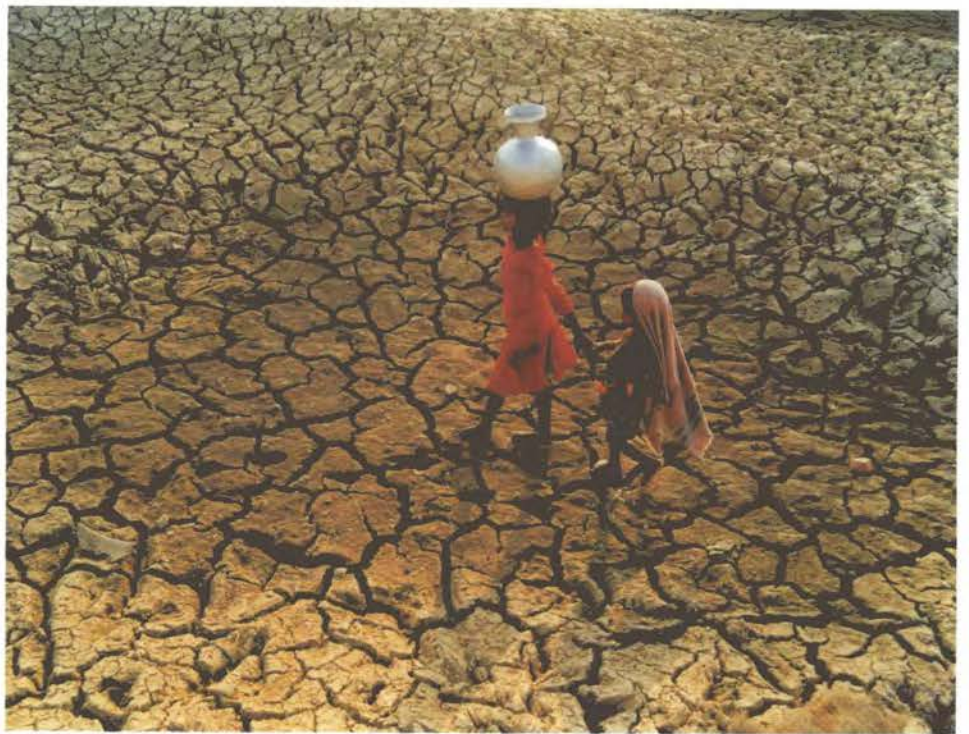
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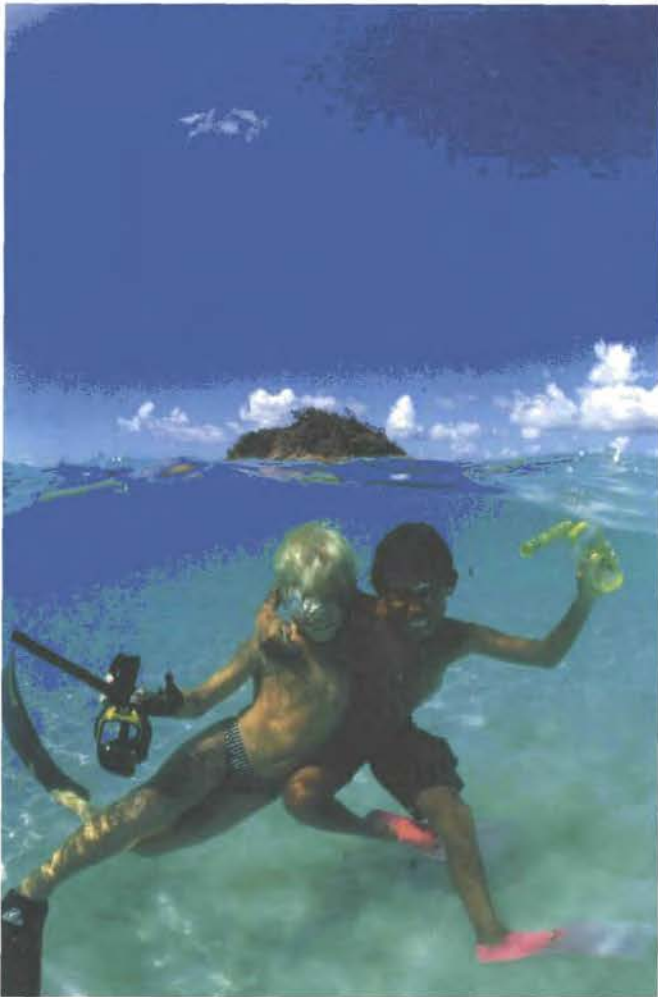
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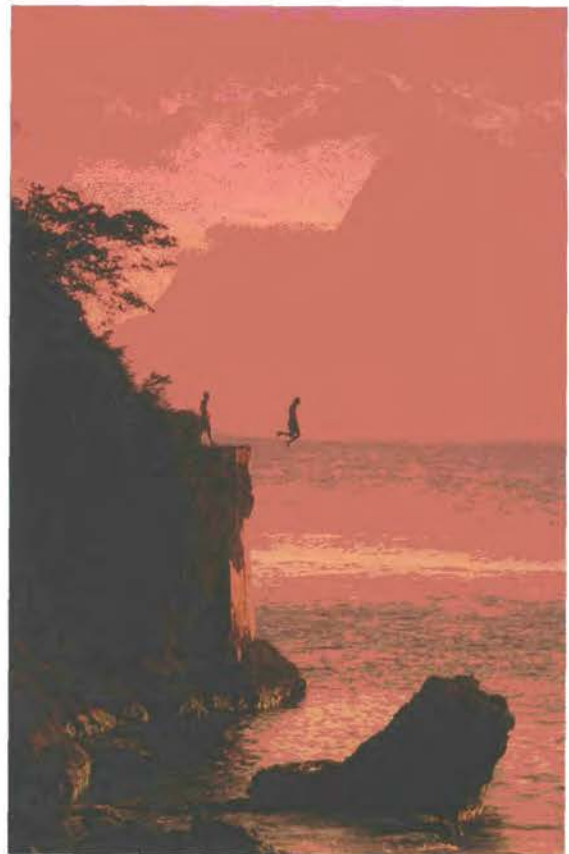
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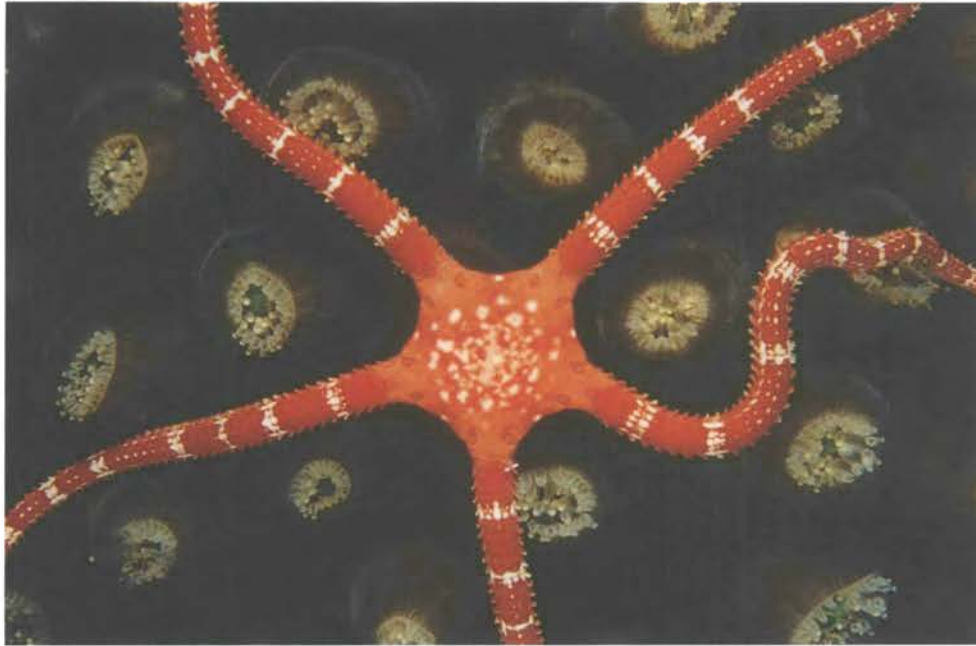
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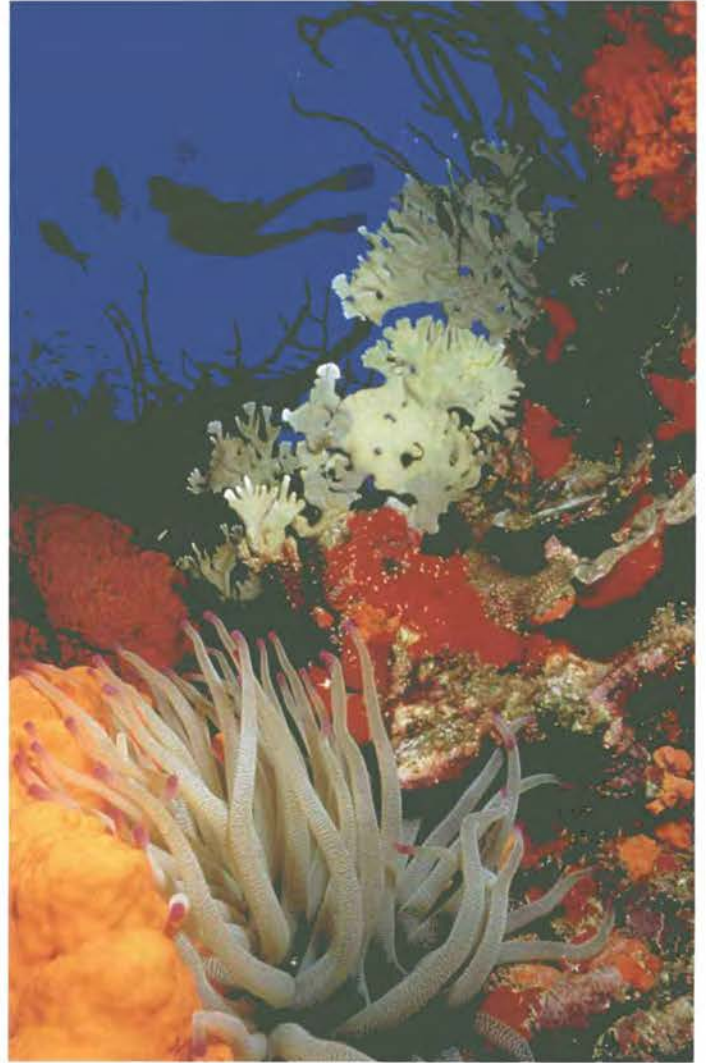
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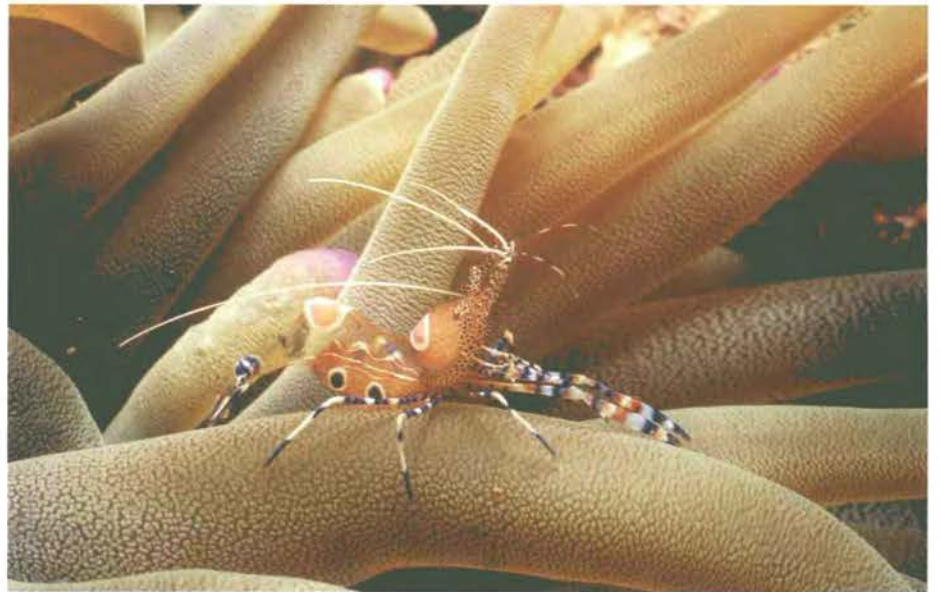
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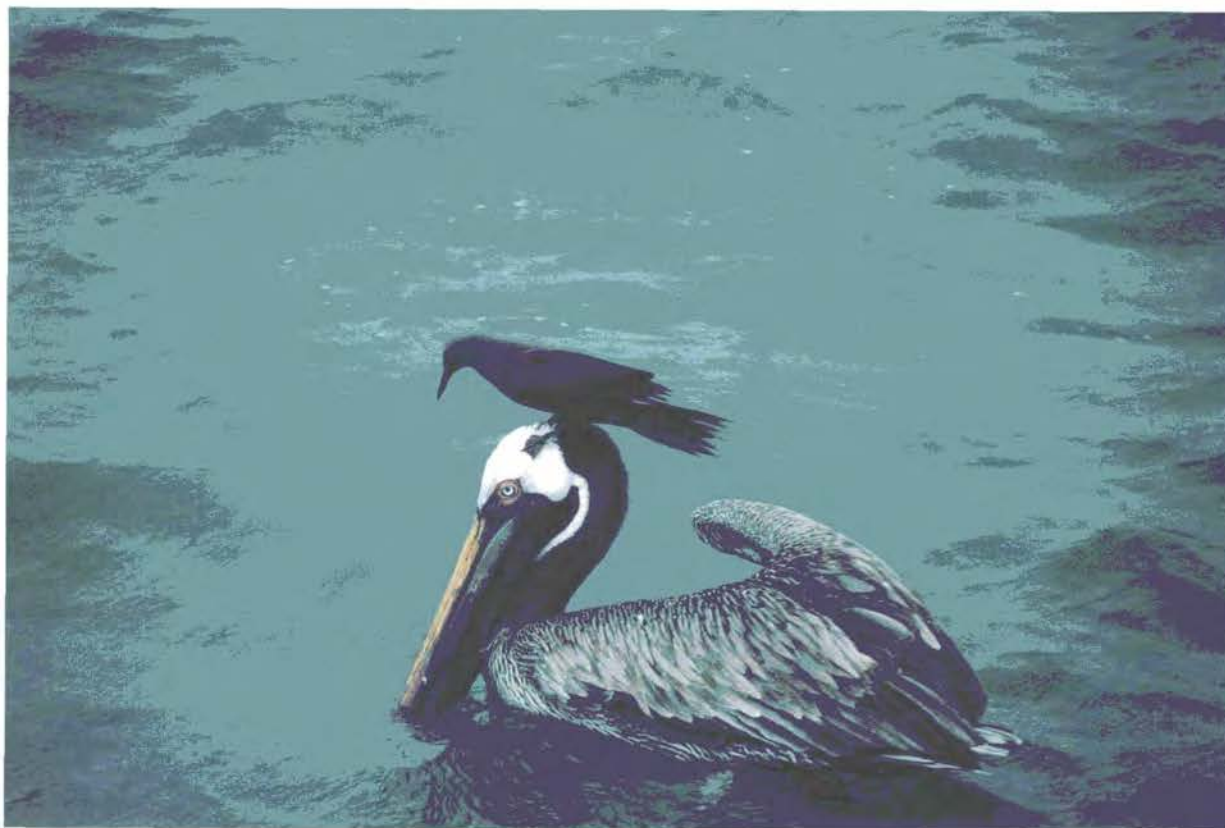
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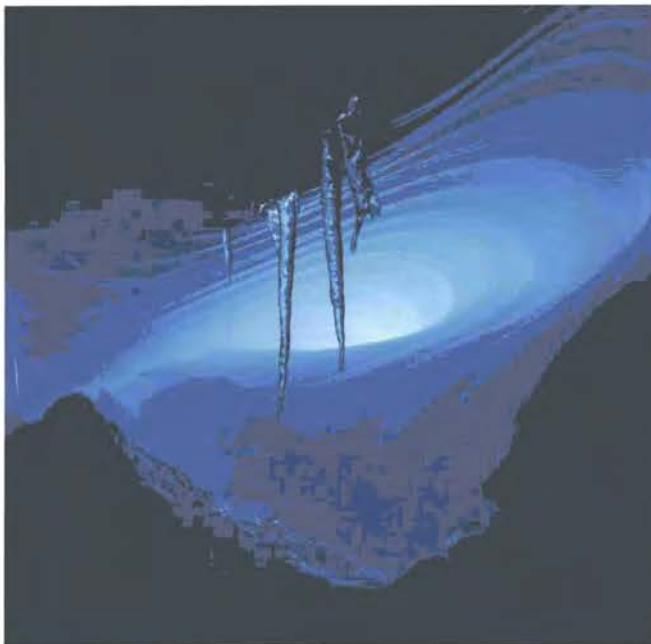
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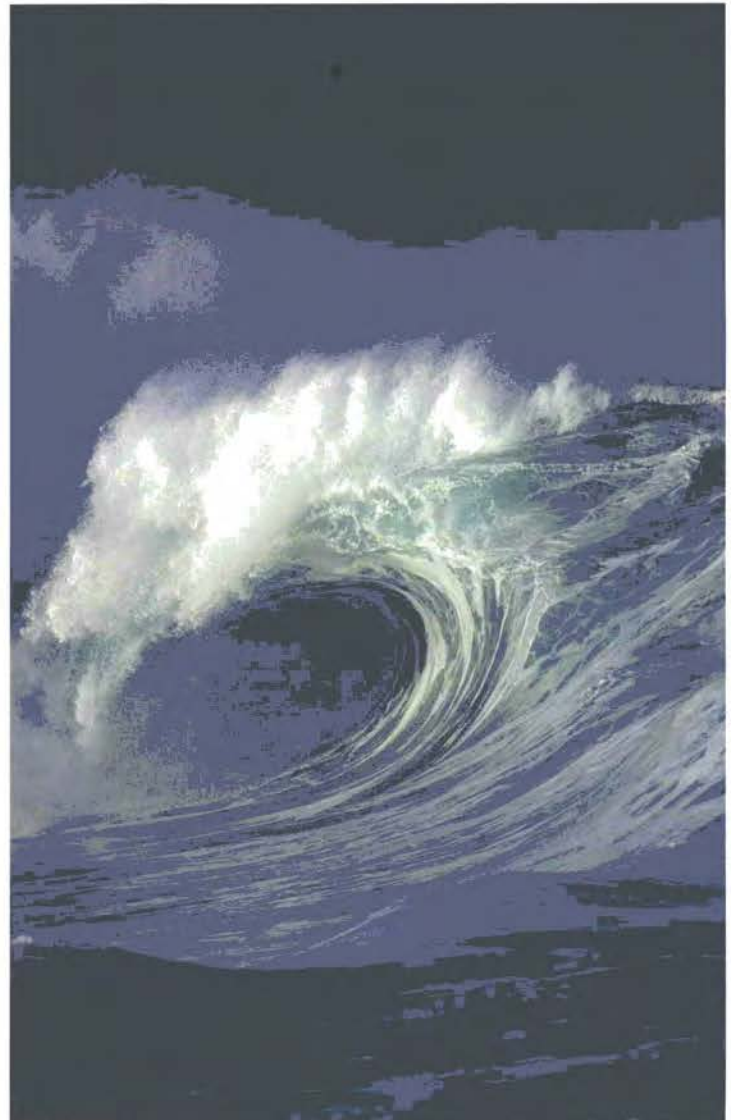
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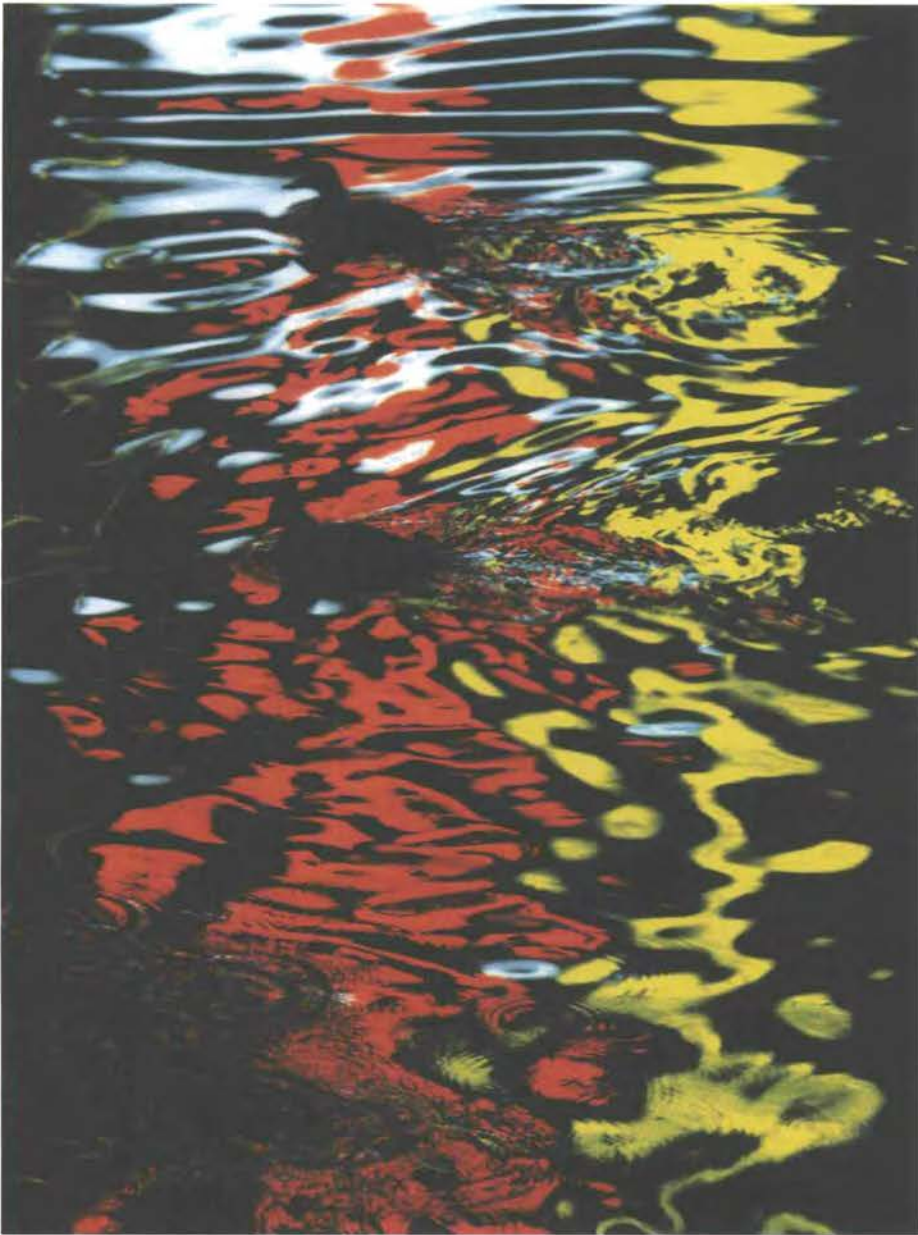
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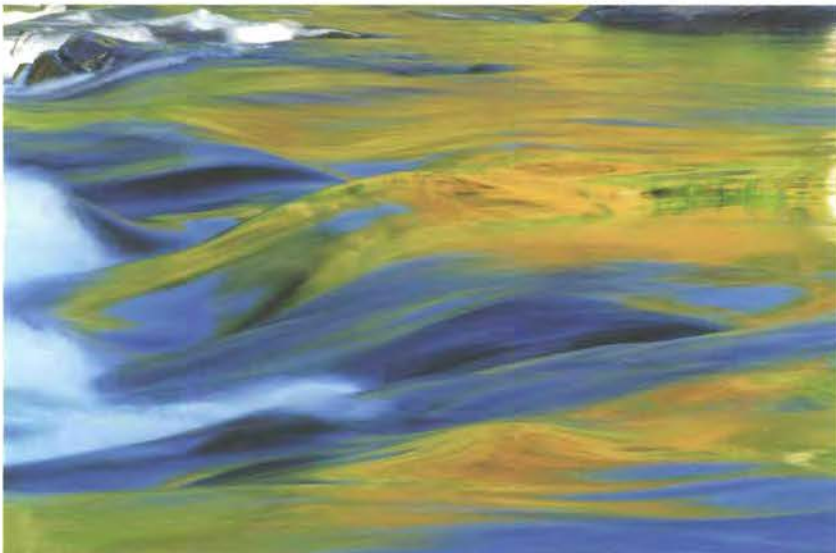
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## Global Environment Outlook (GEO-3)

*A summary of UNEP's latest GEO 3 report; a comprehensive review of the state of the world's environment, providing guidance for the formulation of environmental policies, action planning and resource allocation.*

The year 1972 stands as a watershed in modern environmentalism. The first international conference on the environment – the United Nations Conference on the Human Environment – was convened in Stockholm in that year, bringing together 113 nations and other stakeholders to discuss issues of common concern. In the 30 years since then, the world has made great strides in placing the environment on the agenda at various levels – from international to local. Phrases such as “think global and act local” have galvanized action at many different levels. The result has been a proliferation of environmental policies, new legislative regimes and institutions, perhaps an unspoken acknowledgement that the environment is too complex for humanity to address adequately in every sense.

Decisions made since Stockholm now influence governance, business and economic activity at different levels, define international environmental law and its application in different countries, determine international and bilateral relations among different countries and regions, and influence individual and society lifestyle choices.

But there are problems: some things have not progressed, for example, the environment is still at the periphery of socio-economic development. Poverty and excessive consumption – the twin evils of humankind that were highlighted in the previous two GEO reports – continue to put enormous pressure on the environment. The unfortunate result is that sustainable development remains largely theoretical for the majority of the world's population of more than 6,000 million people. The level of awareness and action has not been commensurate with the state of the global environment today; it continues to deteriorate.

*GEO-3* provides an overview of the main environmental developments over the past three decades, and how social, economic and other factors have contributed to the changes that have occurred.

### State of the environment and policy responses

#### LAND

Since 1972, the main driving force leading to pressure on land resources has been increasing food production. In 2002, food is needed for some 2,220 million more people than in 1972. The trend during the decade 1985–95 showed population growth racing ahead of food production in many parts of the world. While irrigation has made an important contribution to agricultural production, inefficient irrigation schemes can cause waterlogging, salinization and alkalization of soils. In the 1980s, it was estimated that about 10 million ha of irrigated land were being abandoned annually. Human activities contributing to land degradation include unsuitable agricultural land use, poor soil and water management practices, deforestation, removal of natural vegetation, frequent use of heavy machinery, overgrazing, improper crop rotation and poor irrigation practices. The 1992 Earth Summit took a step forward in focusing attention on problems associated with land resources. National needs at times linked with *Agenda 21* have provided a basis for land

#### REGIONAL HIGHLIGHTS: Africa

The increasing numbers of African countries facing water stress and scarcity, and land degradation, are major environmental issues in the region. The rising costs of water treatment, food imports, medical treatment and soil conservation measures are not only increasing human vulnerability and health insecurity but are also draining African countries of their economic resources. The expansion of agriculture into marginal areas and clearance of natural habitats such as forests and wetlands has been a major driving force behind land degradation. The loss of biological resources translates into loss of economic potential and options for commercial development in the future. These negative changes, however, have been tempered by Africa's impressive wildlife conservation record, including a well-established network of protected areas and the region's commitment to multilateral environmental agreements. African countries also participate in many regional and sub-regional initiatives and programmes. Notable achievements include the 1968 African Convention on the Conservation of Nature and Natural Resources (currently being updated) and the 1991 Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Waste within Africa.



**REGIONAL HIGHLIGHTS: Asia and the Pacific**

Overpopulation, poverty and lack of enforcement of policy measures have compounded environmental problems in many parts of the region. Biological resources have long been of subsistence importance, and have been increasingly exploited for trade. About three-quarters of known or suspected species extinctions have occurred on isolated islands in the region. Protected areas constitute only 5 per cent of the total area, compared to the IUCN benchmark of 10 per cent. Discharge of sewage and other wastes has heavily polluted freshwater. Sedimentation in rivers and reservoirs caused by large-scale deforestation have also resulted in big economic losses. Urbanization, industrialization and tourism, coupled with a growing coastal population, have degraded many coastal areas. More than 60 per cent of Asia's mangroves have been converted to aquaculture farms. Air pollution levels in some cities are among the highest in the world. While most environmental trends have been negative, positive changes have included improvement in governance by public authorities, growing environmental awareness and public participation, and increasing environmental awareness in industry.

resources policy, and the importance of land issues was reiterated in the review prepared for the UN Millennium Summit. This review identifies the threats to future global food security arising from problems of land resources.

**FORESTS**

Deforestation over the past 30 years has been the continuation of a process with a long history. By the time of the Stockholm Conference, much forest cover had already been removed. Major direct causes of forest clearance and degradation include expansion of agricultural land, over harvesting of industrial wood, fuelwood and other forest products, and overgrazing. Underlying drivers include poverty, population growth, markets and trade in forest products, as well as macroeconomic policies. Forests are also damaged by natural factors such as insect pests, diseases, fire and extreme climatic events.

The net loss in global forest area during the 1990s was about 94 million ha (equivalent to 2.4 per cent of total forests). This was the combined effect of a deforestation rate of 14.6 million ha annually and a rate of reforestation of 5.2 million ha annually. Deforestation of tropical forests is almost 1 per cent annually. In the 1990s, almost 70 per cent of deforested areas

**REGIONAL HIGHLIGHTS: Europe**

The environmental situation is mixed: there have been some noticeable improvements over the past 30 years (for example, emissions to air); the state of biodiversity and forests has not changed greatly; and other situations have undergone marked degradation (freshwater, and some coastal and marine areas). By the 1990s, the European atmosphere had generally improved significantly. Increasing efforts to safeguard natural areas and biodiversity may signal a turnaround in species protection. Freshwater stocks are unevenly distributed, with parts of southern, western and southeastern Europe being noticeably water stressed. The health of coastal and marine areas has noticeably worsened, particularly in southern and western Europe and the Mediterranean coastline. Geographically, there has been an amelioration of some environmental problems in Western Europe, and a common (but far from universal) deterioration in Central and Eastern Europe, with recent signs of a broad recovery in many countries. The development of strong environmental policies in the European Union promises continuing progress in the area.

were changed to agricultural land, predominantly under permanent rather than shifting systems. A recent study using globally comprehensive and consistent satellite data estimated that the extent of the world's remaining closed natural forests (where crown cover is more than 40 per cent) in 1995 was 2 870 million ha, about 21.4 per cent of the land area of the world.

The Stockholm Conference recognized forests as the largest, most complex and self-perpetuating of all ecosystems, and emphasized the need for sound land and forest use policies, ongoing monitoring of the state of the world's forests and the introduction of forest management planning. Today, the Stockholm Conference recommendations relating to forests remain valid and unfulfilled, in many ways, because of conflicting interests in managing forests for environmental conservation and economic development.

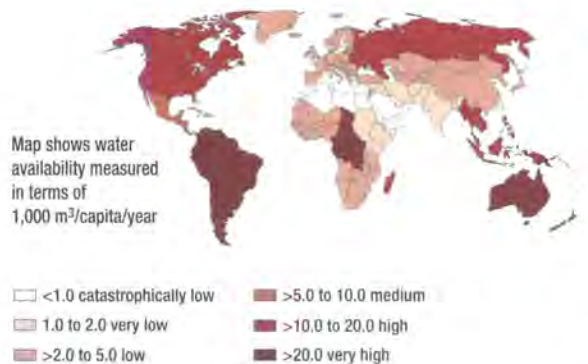
**BIODIVERSITY**

Global biodiversity is being lost at a rate many times higher than that of natural extinction due to land conversion, climate change, pollution, unsustainable harvesting of natural resources and the introduction of exotic species. Land conversion is most intensive in tropical forests and less intensive in temperate, boreal and arctic regions; atmospheric nitrogen deposition is largest in northern temperate areas close to cities; introduction of exotic species is related to patterns of human activity. Human population growth together with unsustainable patterns of consumption, increasing production of waste and pollutants, urban development and international conflict are further contributory factors to biodiversity loss. Over the past three decades, decline and extinction of species have emerged as major environmental issues. Although insufficient information is available to determine precisely how many species have become extinct in the past three decades, about 24 per cent (1 130) of mammals and 12 per cent (1 183) of bird species are currently regarded as globally threatened.

The past three decades have been marked by the emergence of a concerted response to the biodiversity crisis. Civil society, including a hugely diverse and increasingly sophisticated NGO network, has been a major driving force behind this. Increased stakeholder participation relating to conservation action has seen the emergence of partnerships between NGOs, governments and the private sector. A number of international conventions have been developed that deal specifically with conservation of threatened species. These include the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the 1979 Convention on the Conservation of Migratory Species of Wild Animals (CMS). A major policy response of the 1990s is the adoption, ratification and implementation of the convention on Biological Diversity (CBD).

**FRESHWATER**

About one-third of the world's population lives in countries suffering from moderate-to-high water stress – where water consumption is more than 10 per cent of renewable freshwater



resources. Some 80 countries, constituting 40 per cent of the world's population, were suffering from serious water shortages by the mid-1990s. Increasing water demand has been caused by population growth, industrial development and the expansion of irrigated agriculture. For many of the world's poorer populations, one of the greatest environmental threats to health remains the continued use of untreated water. While the percentage of people served with improved water supplies increased from 79 per cent (4.1 billion) in 1990 to 80 per cent (4.9 billion) in 2000, 1.1 billion people still lack access to safe drinking water and 2.4 billion lack access to adequate sanitation. Most of these people are in Africa and Asia. Lack of access to safe water supply and sanitation results in hundreds of millions of cases of water-related diseases, and more than 5 million deaths, every year. Large, but poorly quantified adverse impacts on economic productivity have been noted in many developing countries. Emphasis on water supply, coupled with weak enforcement of regulations, has limited the effectiveness of water resource management, particularly in developing regions. Policy makers have now shifted from supply to demand management, highlighting the importance of using a combination of measures to ensure adequate supplies of water for different sectors. Measures include improving water use efficiency, pricing policies and privatization. There is also a new emphasis on integrated water resources management (IWRM), which takes into account all the different stakeholders in water resource planning, development and management.

#### COASTAL AND MARINE AREAS

Marine and coastal degradation is caused by increasing pressure on both terrestrial and marine natural resources, and on the use of the oceans to deposit wastes. Population growth and increasing urbanization, industrialization and tourism in coastal areas are root causes of this increased pressure. In 1994, an estimated 37 per cent of the global population lived within 60 km of the coast – more people than inhabited the planet in 1950. The effects of population are multiplied by both poverty and human consumption patterns. Globally, sewage remains the largest source of contamination, by volume, of the marine and coastal environment, and coastal sewage discharges have increased dramatically in the past three decades.

Marine and coastal eutrophication from elevated nitrogen inputs has emerged as a worrying trend not foreseen three

decades ago. There is increasing evidence that blooms of toxic or otherwise undesirable phytoplankton are increasing in frequency, intensity and geographic distribution. Severe eutrophication has occurred in several enclosed or semi-enclosed seas, including the Black Sea. Human-induced changes in the natural flow of sediment have emerged since the Stockholm Conference as a major threat to coastal habitats. Urban and industrial development drives the construction of residential and industrial infrastructure which, depending on its nature, can alter sediment flow.

There is particular concern about the possible effects of global warming on coral reefs. During the intense El Niño of 1997-98, extensive coral bleaching occurred on coral reefs worldwide. While some reefs quickly recovered others, particularly in the Indian Ocean, Southeast Asia, the far western Pacific and the Caribbean suffered significant mortality, in some cases more than 90 per cent.

Progress in protecting the marine and coastal environment over the past 30 years has generally been confined to relatively few, mostly developed countries, and to a relatively few environmental issues. Overall, coastal and marine environmental degradation not only continues but has intensified.

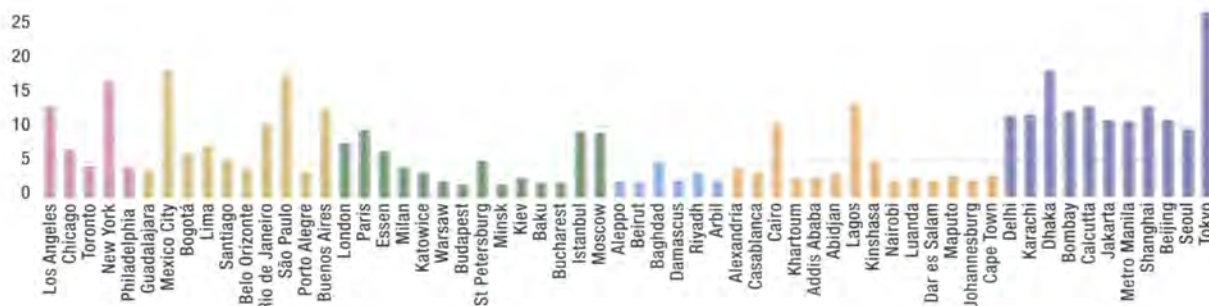
#### ATMOSPHERE

Acid precipitation has been one of the most prominent environmental concerns over the past decades, especially in Europe and North America, and more recently also in China. Thousands of lakes in Scandinavia lost fish populations due to acidification from the 1950s to the 1980s. Significant damage to forests in Europe became a high priority environmental issue around 1980. Air pollutant emissions have declined or stabilized in most industrialized countries, largely as a result of abatement policies developed and implemented since the 1970s. Initially, governments tried to apply direct control instruments but these were not always cost-effective. In the 1980s, policies were directed more towards pollution abatement mechanisms that relied on a compromise between the cost of environmental protection measures and economic growth. Stricter environmental regulation in industrialized countries has triggered the introduction of cleaner technology and technological improvements,

#### REGIONAL HIGHLIGHTS: Latin America and the Caribbean

Environmental degradation in Latin America and the Caribbean has increased over the past 30 years. The main pressures on the environment and natural resources are the rising population, increasing inequality of incomes, limited planning, especially in urban areas, and the high dependence of many economies on natural resources exploitation. More than 300 million ha of land have been degraded and almost 30 per cent of the reefs in the Caribbean are considered to be at risk. Of the more than 400 million ha of natural forest lost worldwide over the past 30 years, more than 40 per cent was in the region. Urban environmental problems, especially air pollution, water contamination and inadequate waste disposal, are having severe health impacts on people living in cities, currently 75 per cent of the population. The increasing frequency and intensity of natural disasters, possibly linked to climate change, is having a high human and financial cost. The poorest populations, especially urban ones, are the most vulnerable to such disasters.

Population (in millions) of some of the largest cities in the world, by region



especially in the power generation and transport sectors.

Since the industrial revolution, the concentration of CO<sub>2</sub>, one of the major greenhouse gases, in the atmosphere has increased significantly, contributing to the greenhouse effect known as 'global warming'. The increase is largely due to anthropogenic emissions of CO<sub>2</sub> from fossil fuel combustion and to a lesser extent land-use change, cement production and biomass combustion. Greenhouse gas emissions are unevenly distributed between countries and regions. Organization for Economic Cooperation and Development (OECD) countries contributed more than half of CO<sub>2</sub> emissions in 1998, with a per capita emission of about three times the world average. However, the OECD's share of global CO<sub>2</sub> emissions has decreased by 11 per cent since 1973. Climate change represents an important additional stress on those ecosystems already affected by increasing resource demands, unsustainable management practices and pollution. The United Nations Framework Convention on Climate Change and the Kyoto Protocol are the key policy instruments adopted by the international community to try and address the problem of greenhouse gases emissions.

The protection of the ozone layer has presented one of the major challenges over the past 30 years, spanning the fields of environment, trade, industry, international cooperation and sustainable development. The depletion of the ozone layer has now reached record levels, especially in the Antarctic and recently also in the Arctic. In September 2000, the Antarctic ozone hole covered more than 28 million km<sup>3</sup>. Continuous efforts by the international community has resulted in a marked decrease in the consumption of ozone-depleting substances. The ozone layer is predicted to start recovering in the next one or two decades and to return to pre-1980 levels by the middle of the 21st century – if the control measures of the protocols to the Vienna Convention are adhered to by all countries.

#### REGIONAL HIGHLIGHTS: West Asia

Conservation and protection of freshwater resources is a top priority, particularly on the Arabian Peninsula where water deficits are being met mainly through exploitation of ground water resources. Countries are developing water policies to manage water scarcity by increasing both water supply and conservation, and introducing more efficient irrigation. Land degradation and food security continue to be key environmental issues. The region's seas include some of the busiest shipping areas of the world, making the marine environment susceptible to pollution events such as oil spills. Per capita hazardous waste production is among the highest in the world due to the types of industry in the region. Air emissions from power stations, desalination plants and industrial installations are also of concern.

#### URBAN AREAS

About half of the world's population (47 per cent) now lives in urban areas, compared to little more than one-third in 1972. The accumulation of people, their consumption patterns, travel behaviour and their urban economic activities impact the environment in terms of resource consumption and waste discharges. Some 70 per cent of the world's urban population live in Africa, Asia or Latin America. The urban population is expected to grow by 2 per cent per year during 2000–15, and to reach an overall 65 per cent by 2050.

The implications of rapid urban growth include increasing unemployment and poverty, inadequate urban services, overburdening of existing infrastructure, lack of access to land, finance and adequate shelter, and environmental degradation. Managing the urban environment sustainably will therefore become one of the major challenges for the future.

Poverty is among the major drivers of urban environmental degradation. The urban poor, who are unable to compete for scarce resources or protect themselves from harmful environmental conditions, are most affected by the negative impacts of urbanization. It is estimated that one-quarter of the urban population lives below the poverty line and that female-headed households are disproportionately affected.

Inadequate waste collection and waste management systems are the cause of serious urban pollution and health hazards, especially in cities in developing countries. Cities in industrialized countries also face the consequences of past environmentally-damaging production techniques and inadequate waste disposal. Well-planned, densely populated settlements can reduce the need for land conversion, provide opportunities for energy savings and make recycling more cost-effective.

#### DISASTERS

People and the environment are suffering increasingly from the effects of natural disasters due to high population growth and density, migration and unplanned urbanization, environmental degradation and possibly global climate change. The number of people affected by disasters rose from an average of 147 million a year in the 1980s to 211 million a year in the 1990s. While the number of geophysical disasters has remained fairly steady, the number of hydrometeorological disasters (such as droughts, wind storms and floods) has increased. In the 1990s, more than 90 per cent of those killed in natural disasters lost

their lives in hydrometeorological events. While floods accounted for more than two-thirds of people affected by natural disasters, they are less deadly than many other types of disaster, accounting for only 15 per cent of deaths. The most expensive disasters in purely economic terms are floods, earthquakes and windstorms but events such as drought and famine can be more devastating in human terms. While earthquakes accounted for 30 per cent of estimated damage, they caused just 9 per cent of all fatalities due to natural disasters. In contrast, famine killed 42 per cent but accounted for just 4 per cent of damage over the past decade. Among the least developed countries, 24 of the 49 face high levels of disaster risk; at least six of them have been affected by between two and eight major disasters per year in the past 15 years, with long-term consequences for human development. Since 1991, more than half of all the disasters reported occurred in countries with medium levels of human development. However, two-thirds of those killed came from countries with low levels of human development, while just 2 per cent came from highly developed countries.

Some experts link the recent trend in extreme weather events to an increase of the global mean temperature. Many parts of the world have suffered major heat waves, floods, droughts and other extreme weather events. A number of major accidents involving chemicals and radioactive materials have drawn attention worldwide to the dangers of mismanagement, particularly in the transport, chemical and nuclear power sectors. These events often have impacts that transcend national boundaries; they also emphasize the fact that issues of technological safety concern more than just the developed countries.

## Human vulnerability to environmental change

### VULNERABLE GROUPS

Everyone is vulnerable to environmental impacts of some kind but the ability of people and societies to adapt to and cope with change is very varied. People in developing countries, particularly the least developed, have less capacity to adapt to change and are more vulnerable to environmental threats and global change, just as they are more vulnerable to other stresses. Poverty is generally recognized as one of the most important causes of vulnerability to environmental threats, on the basis that the poor tend to have much lower coping capacities, and therefore they bear a disproportionate burden of the impact of disasters, conflict, drought, desertification and pollution. But poverty is not the only reason.

### VULNERABLE PLACES

Human exposure to environmental threats is unevenly distributed. Some locations, such as high latitudes, floodplains, river banks, small islands and coastal areas, pose more risk than others. Of the projected one billion new urban dwellers by 2010,

### REGIONAL HIGHLIGHTS: North America

North America is a major consumer of the world's natural resources and producer of its wastes, and its per capita impact on the global environment is larger than that of any other region. Resource conservation in North America has been less successful than pollution abatement, and per capita consumption has increased steadily since 1972. There has been significant progress in controlling some forms of air and water pollution and in continuing a trend to set aside protected areas. During the 1990s, North American free trade strengthened the economic ties between Canada and the United States. At the same time, regional environmental degradation led to an increased recognition of the interdependent nature of cross-border ecosystems. The two countries strengthened cooperative measures to address transboundary pollution, agreeing to more aggressive NO<sub>x</sub> emission controls, for example. They also undertook to conserve the continent's wetland habitats to protect waterfowl and other migratory species. The impact of introduced exotic species on biological diversity became of increasing environmental concern with the liberalization of trade.

most will probably be absorbed by cities in developing countries that already face multiple problems such as shortages of adequate housing, infrastructure, potable water supplies, adequate sanitation and transportation systems as well as environmental pollution.

### ENVIRONMENTAL CHANGE

Degradation of natural resources such as land, fresh and marine waters, forests and biodiversity threatens the livelihood of many people but especially the poor. The 'sink' function of the environment operates through such processes as nutrient recycling, decomposition, and the natural purification and filtering of air and water. When these functions are impaired or overburdened, health can be jeopardized by contaminated water supplies including groundwater, urban air pollution and agrochemical pollution. Human health is increasingly determined by environmental conditions. For example:

- Deteriorating environmental conditions are a major contributory factor to poor health and a reduced quality of life.
- Poor environmental quality is directly responsible for some 25 per cent of all preventable ill-health, with diarrhoeal dis-

### REGIONAL HIGHLIGHTS: Polar Regions

The major environmental issues in the polar regions include the depletion of the stratospheric ozone layer, the long-range transport of air pollutants, warming associated with global climate change, the decline of several bird, mammal and fish species, and pollution of major rivers. In the Arctic, average yearly ozone levels in the 1990s had declined by 10 per cent from the late 1970s, increasing the risk of snow blindness and sunburn. Climate change is expected to be more extreme in the polar regions than anywhere else. Human activities are major threats to biodiversity in the Arctic. The warming trend is reducing the ice habitat for species such as the polar bear and walrus. In the Antarctic, sealing and whaling have reduced populations in the Southern Ocean. Eutrophication is a recent problem in several lakes in Scandinavia. One of the major developments in the Arctic is public opposition to dam construction, particularly in the Nordic countries. For example, in 2001 Iceland's National Planning Agency rejected plans for a hydroelectric power project that would have dammed two of the three main rivers flowing from Europe's largest glacier and destroyed an extensive wilderness.

eases and acute respiratory infections heading the list.

- Air pollution is a major contributor to a number of diseases
- Globally, 7 per cent of all deaths and diseases are due to inadequate or unsafe water, sanitation and hygiene. Approximately 5 per cent are attributable to air pollution.

#### RESPONDING TO HUMAN VULNERABILITY

The cumulative evidence for increasing human vulnerability to environmental change calls for a significant policy response and action on several fronts. Governments need to assess and map national threats due to environmental change, particularly those that may be growing, and to institute early warning, mitigation and response measures to reduce the human and economic costs of disasters that are in part avoidable.

##### *Reducing vulnerability*

There is a large and widening vulnerability gap between well-off people, with better all-round coping capacity, who are becoming gradually less vulnerable, and the poor who grow increasingly so. It is vital to the sustainable development effort that this gap is addressed, as well as vulnerability itself. For the most significant improvements, priority should go to policies that reduce the vulnerability of the poor as part of general strategies for poverty reduction.

##### *Adapting to threat*

Where a threat cannot be reduced or eliminated, adapting to it can be an effective response. Adaptation refers both to physical adjustments or technical measures (such as constructing a higher sea wall) and changing behaviour, economic activities and social organization to be more compatible with existing or emerging conditions or threats. The latter requires adaptive capacity, including the ability to develop new options and to deliver them to vulnerable populations.

##### *Early warning*

One of the most effective responses to human vulnerability to environmental change is to strengthen mechanisms for early warning. Many actions can be taken to protect life and property if warning is received in time. While some threats are inherently unpredictable, many of those arising from environmental degradation and mismanagement, and from human activities, can now be anticipated with some precision.

#### ASSESSING AND MEASURING VULNERABILITY

Vulnerability assessment measures the seriousness of potential threats on the basis of known hazards and the level of vulnerability of societies and individuals. It can be used to translate early warning information into preventive action and is a necessary element in early warning and emergency preparedness. Assessments of vulnerability can be made for both people and the environmental systems that provide goods and services. They should identify the location of vulnerable populations, the threats to their well-being and the extent of their vulnerability,

the risks to the environmental capacity to provide goods and services, and the preventive steps that can be taken to improve environmental conditions and reduce the negative impacts of human action on the environment.

#### Outlook 2002–32

*GEO-3* emphasizes that the next 30 years will be as crucial as the past 30 for shaping the future of the environment. Old troubles will persist and fresh challenges will emerge as increasingly heavy demands are placed upon resources that, in many cases, are already in a fragile state. The increasing pace of change and degree of interaction between regions and issues has made it more difficult than ever to look into the future with confidence. *GEO-3* uses four scenarios to explore what the future could be, depending on different policy approaches. The scenarios, which span developments in many overlapping areas, including population, economics, technology and governance, are described in the boxes that follow. They are:

- Markets First
- Policy First
- Security First
- Sustainability First.

Some of the global and regional environmental implications arising out of the four scenarios are highlighted below.

The absence of effective policies to reduce emissions of carbon dioxide and other greenhouse gases in the *Markets First* and *Security First* scenarios leads to significant increases over the next 30 years. However, the policy actions taken under a *Policy First* scenario, notably carbon taxes and investments in non-fossil-fuel energy sources, effectively curb growth in global emissions and lead to actual reductions starting around 2030. The behavioural shifts under *Sustainability First*, together with improved production and conversion efficiencies, result in a rapid levelling off of emissions and a decline by the middle of the 2020s.

Biodiversity will continue under threat if there is no strenuous policy action to curb human activity. Continued urban and infrastructure expansion, plus the increased impacts of climate change, severely deplete biodiversity in most regions in all scenarios. Pressures will also increase on coastal ecosystems in most regions and scenarios.

The scenarios carry important implications for the provision of basic human needs. Growing populations and increased economic activity, particularly in agriculture, will lead to increased demand for freshwater in most scenarios. Similarly, the demands for food and the ability to meet them in the different scenarios reflects a combination of shifts in supply and demand, influenced by social, economic and environmental policies. In *Markets First*, even with a decrease in the percentage of the population facing hunger, the total number affected changes relatively little and even increases in some regions as populations grow. Under *Policy First* and *Sustainability First* the targeting of hunger reduction as a key goal, and the emphasis on more balanced development between regions, help to achieve dramatic reductions in the percentages and total num-

bers of people affected. The sharp increases in most regions in *Security First* points to the unsustainability of such a scenario in terms of social acceptability.

In Africa, there is increasing risk of land degradation. In *Policy First* and *Sustainability First*, easier access to support services helps farmers to manage soils better and policies based on integrated land management become commonplace in the region. At the other end of the spectrum, in a *Security First* scenario, while reasonable conditions are maintained in the protected areas serving the land-owning elite, the high concentrations of people elsewhere contributes to severe land degradation and soil erosion. Similar problems arise in *Markets First* as better quality agricultural land is taken over for commodity and cash crop production.

Under the *Markets First* scenario in Asia and the Pacific, water withdrawals are expected to increase in all sectors, leading to an expansion of areas with severe water stress in South and Southeast Asia. Slower economic growth under *Security First* tempers growth in demand. With effective policies and lifestyle changes under the *Policy First* and *Sustainability First* scenarios, water withdrawals remain at current levels or even decrease in most of the region.

The ability of Europe to address the issues of large-scale air pollution and greenhouse gas emissions will depend heavily upon developments in the areas of energy use and transportation. Extremely active policies to improve public transportation and energy efficiency can be expected in *Policy First* and *Sustainability First* worlds, but not in *Security First* or even *Markets First* circumstances.

Land and forest degradation as well as forest fragmentation remain among the most relevant environmental issues in Latin America and the Caribbean in all scenarios. Significant loss of forest area occurs in a *Markets First* scenario. In a *Security First* world, the control over forest resources by transnational companies that create cartels in association with the national groups in power, promote the growth of some forest areas, but this is not enough to stop net deforestation. More effective management ameliorates some of these problems in *Policy First*. Unsound deforestation stops almost completely in a world of *Sustainability First*. As the world's biggest emitter of greenhouse gases, North America plays a major role in determining the future climate of the planet. In *Markets First*, the region's refusal to participate significantly hampers international efforts to control the emissions of these gases, and per capita and absolute emissions remain high. The collapse of parts of the transport infrastructure and restrictions on fossil-fuel vehicle ownership in *Security First* result in even greater increases in emissions in this scenario. Under *Policy First*, emissions are reduced through increased fuel efficiency and greater use of public transport but most spectacular results are achieved in *Sustainability First*.

West Asia is one of the most water-stressed regions of the world, with more than 70 million people living in areas under severe water stress. Under the *Markets First* and *Security First* scenarios, population and economic growth lead to strong increases in withdrawals for households and industry, resulting in an increase in areas with severe water stress and affecting over 200 million people by 2032. A range of policy initiatives help to counteract additional demands related to economic

#### Markets First

Most of the world adopts the values and expectations prevailing in today's industrialized countries. The wealth of nations and the optimal play of market forces dominate social and political agendas. Trust is placed in further globalization and liberalization to enhance corporate wealth, create new enterprises and livelihoods, and so help people and communities afford to insure against – or pay to fix — social and environmental problems. Ethical investors, together with citizen and consumer groups, try to exercise growing corrective influence but are undermined by economic imperatives. The powers of state officials, planners and lawmakers to regulate society, economy and the environment continue to be overwhelmed by expanding demands.

#### Policy First

Decisive initiatives are taken by governments in an attempt to reach specific social and environmental goals. A coordinated pro-environment and anti-poverty drive balances the momentum for economic development at any cost. Environmental and social costs and gains are factored into policy measures, regulatory frameworks and planning processes. All these are reinforced by fiscal levers or incentives such as carbon taxes and tax breaks. International 'soft law' treaties and binding instruments affecting environment and development are integrated into unified blueprints and their status in law is upgraded, though fresh provision is made for open consultation processes to allow for regional and local variants.

#### Security First

This scenario assumes a world of striking disparities where inequality and conflict prevail. Socio-economic and environmental stresses give rise to waves of protest and counteraction. As such troubles become increasingly prevalent, the more powerful and wealthy groups focus on self-protection, creating enclaves akin to the present day 'gated communities'. Such islands of advantage provide a degree of enhanced security and economic benefits for dependent communities in their immediate surroundings but they exclude the disadvantaged mass of outsiders. Welfare and regulatory services fall into disuse but market forces continue to operate outside the walls.

#### Sustainability First

A new environment and development paradigm emerges in response to the challenge of sustainability, supported by new, more equitable values and institutions. A more visionary state of affairs prevails, where radical shifts in the way people interact with one another and with the world around them stimulates and supports sustainable policy measures and accountable corporate behaviour. There is much fuller collaboration between governments, citizens and other stakeholder groups in decision making on issues of close common concern. A consensus is reached on what needs to be done to satisfy basic needs and realize personal goals without beggaring others or spoiling the outlook for posterity.

growth in both *Policy First* and *Sustainability First*. Although total withdrawals drop in both scenarios, water scarcity persists and demand continues to exceed available water resources.

Fish and other marine stocks are a key area of concern in the polar regions. Under *Markets First*, massive increase in commercial harvesting and abandonment of targeted fisheries leads to some fish populations crashing. Illegal, unregulated and unreported fishing activities cease in *Security First* under direct pressure from powerful regulatory interests, but controlled exploitation rises to very high levels. Total collapse of any single fishery is averted under *Policy First* by enforcement of

stringent harvesting quotas and other regulatory systems. In *Sustainability First*, fish and marine mammals are rigorously defended against over exploitation.

The environmental implications of the various scenarios illustrate the legacy of past decades and the level of effort that will be needed to reverse powerful trends. One of the major policy lessons from the scenarios is that there can be significant delays between changes in human behaviour, including policy choices, and their environmental impacts, specifically:

- Much of the environmental change that will occur over the next 30 years has already been set in motion by past and current actions.
- Many of the effects of environmentally-relevant policies put into place over the next 30 years will not be apparent until long afterwards.

### Options for action

The world is currently plagued by increasing poverty and continually widening divisions between the haves and the have-nots. These divisions – the environmental divide, the policy divide, the vulnerability gap and the lifestyle divide – all threaten sustainable development. They must be addressed urgently, and with greater success than has often been the case in the past. Certain key areas of attention have been identified for global action at all levels to ensure the success of sustainable development. Prime among them are alleviating poverty for the world's have-nots, reducing excessive consumption among the more affluent, reducing the debt burden of developing countries, and ensuring adequate governance structures and funding for the environment.

Underlying this action, however, must be the greater provision of and access to information in all its forms as the fundamental basis of successful planning and decision making. The information revolution holds the possibility of providing cheap and reliable information in appropriate forms to all stakeholders in the environment – decision makers, local communities, the general public – thus enabling them to par-

ticipate more meaningfully in decisions and actions that determine the courses of their daily lives and of those of succeeding generations.

The final section of *GEO-3* presents possible policy options for the future based on UNEP experience, the *GEO-3* assessment and wide consultations at different levels. The suggestions are intended as a check-list from which to make appropriate selections for action. The over-riding need in policy development is for a balanced approach towards sustainable development. From the environment perspective, this means bringing the environment in from the margins to the heart of development. The fields where action is suggested cover the need to:

- Rethink environmental institutions because they need to adapt to new roles and partnerships to fulfill present obligations and confront emerging environmental challenges.
- Strengthen the policy cycle so that it becomes more rigorous, systematic, integrated and able to develop policies that are better attuned to specific localities and situations
- Provide an enhanced international policy framework to overcome the fragmentation and duplication inherent in the present system.
- Use trade more effectively for the benefit of sustainable development to capitalize on the new opportunities provided by trade liberalization
- Harness technology for the environment and manage the associated risks to maximize the potential of new technologies to deliver substantial environmental and social gains.
- Adjust and coordinate policy instruments, including various legal frameworks, and measures such as valuing environmental goods and services, ensuring that markets work for sustainable development and promoting voluntary initiatives, to develop appropriate packages that work more effectively for the environment.
- Monitor policy performance with the aim of improving levels of implementation, enforcement and compliance.
- Re-define and share roles and responsibilities between local, regional and global levels to provide efficient solutions to managing complex and varied situations at a variety of scales.



These pictures illustrate the issues that will define the 21st century. The effect of this book is unlike any statement yet made about the environment by governments, NGOs, UN organisations or journalists. Anger, sorrow, joy, despair, and more surprisingly, humour triggered these photographs, and as you look through the pages you may well share the photographers' feelings.



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