Environmental Emergencies

Learning from multilateral response to disasters

UNEP

Office for the Coordination of Humanitarian Affairs (OCHA)

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Geneva 2009

Published in Switzerland, 2009 by the Joint UNEP/OCHA Environment Unit

Document Number: XXX

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Writing, editing, design and layout, and proofreading: Green Ink, UK (www.greenink.co.uk)

Printing: United Nations, Geneva, Switzerland

Cover photo: Rescue teams dig out the town of Xiaolin in August 2009.
The town was buried by mudslides following Typhoon Morakot © Sawyer Mars

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Foreword by Mikhail Gorbachev

Having grown up in a rural area, from a very early age I came to appreciate the inherent interdependence of people and nature. I discovered that humans are not independent or above their environment, but rather an intrinsic and inalienable part of it. Later, serving in various capacities for the Soviet leadership, I saw the terrible environmental price we paid for many of our industrial and technological decisions. None of this, however, prepared me for what would occur early on the morning of 26 April 1986. The Chernobyl Nuclear Power Plant disaster in Ukraine, then part of the Soviet Union, resulted in a severe release of radioactivity. People will have to live with the dire consequences regionally and locally for years – and even centuries – to come.

It was clear to me after Chernobyl that environmental threats were becoming more prominent. In January 1990 at the *Global Forum on Environment and Development for Survival in Moscow*, I brought up the idea for an organization that would apply the Red Cross emergency response model to ecological conflicts and disasters and expedite solutions to environmental problems that transcend national boundaries.

As a result of this, Green Cross International was created in 1993. The mission of Green Cross is to help ensure a just, sustainable and secure future for all by fostering a value shift and cultivating a new sense of global interdependence and shared responsibility in humanity's relationship with nature. One of the areas that Green Cross focuses on is addressing the environmental consequences of wars, conflicts and disasters, including ensuring that environmental rehabilitation is now included within the umbrella of humanitarian assistance.

The web between humanitarian and environmental damage is intrinsically interconnected. Therefore, I was heartened when the Joint UNEP/OCHA Environment Unit was created to deal with environmental emergencies. The United Nations effort is particularly important as politics lag behind in realizing the true challenges that lie ahead. Due to the dark cloud of climate change, the necessity for properly responding to and handling environmental emergencies is ever growing. The work of OCHA and UNEP is therefore an important and vivid example of the advantages of multilateralism.

I congratulate the Joint UNEP/OCHA Environment Unit on its first 15 years as the primary United Nations mechanism to mobilize response to environmental emergencies worldwide. Green Cross International looks forward to continued close collaboration with the Unit and realizing the full spectrum of response to environmental emergencies.

Mikhail Gorbachev, the last President of the USSR and 1990 Nobel Peace Prize Laureate, is the Founding President of Green Cross International

Achim Steiner

Foreword by Achim Steiner and John Holmes

John Holmes

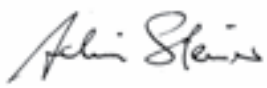
Natural disasters, industrial accidents, conflicts and wars draw the world's attention through dramatic images of destruction and human misery. Their impact on the environment, however, often fails to make the headlines. We hope that this publication will help illustrate the important work done in preventing, preparing for and responding to environmental emergencies, in order to prevent future suffering and loss.

Since its inception in 1994, the Joint UNEP/OCHA Environment Unit has responded successfully to a wide range of environmental emergencies around the globe, including industrial and technological accidents, chemical and oil spills, forest fires and secondary impacts of natural disasters. As a result, countries facing environmental emergencies and natural disasters have benefited greatly from the joint assistance of UNEP and OCHA at the times when they needed it most. With the help of other important partners featured in this anniversary publication, the Joint Environment Unit has also provided capacity building and training to a large number of countries.

In the face of global challenges such as climate change, it becomes all the more important to address environmental issues as an essential part of humanitarian response. In response to increasing global awareness of the environmental dimensions of crises, and to growing demand for the services that address them, UNEP has identified Disasters and Conflicts as one of six priority areas of work. Along with a greater understanding of the role of the environment in humanitarian action, this inevitably leads to higher expectations for the Joint Unit, including expectations for an even more effective cooperation between the two organizations.

We must therefore work to improve the global environmental emergency response regime; for example, through greater awareness, greater capacity, more partnerships and learning the lessons from past emergencies.

With this in mind, we hope that this publication celebrating 15 years of successful multilateral environmental emergency response undertaken by the Joint Environment Unit and its partners will serve to highlight the work done thus far and inspire increased action. Although we can do little to prevent many disasters, we are capable of taking action to prevent environmental emergencies from causing major loss of life and livelihoods, both in the short and long term. Disaster risk reduction must be an increasingly important part of all we do.



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

John Holmes, United Nations Under-Secretary-General for Humanitarian Affairs and Emergency Relief Coordinator

Acknowledgements and Dedication

This publication celebrates the collaborative nature of past, current and future efforts to deal with environmental emergencies all around the world. The staff of the Joint UNEP/OCHA Environment Unit wish to thank the countries who have received assistance in an environmental emergency for allowing others to learn from their experience. Likewise, we acknowledge the generous efforts made by the providing countries, who may one day be on the receiving side themselves.

Many people and organizations have contributed considerable time, effort and ideas to help make this publication representative of past multilateral response to environmental emergencies. We would like to extend our sincere thanks to everyone who has given an interview or provided other information, editing or specific advice. Our cooperation and partnership with all of you help us to make continuous improvements.

Special thanks go to Vladimir Sakharov, Chief of the Joint Environment Unit, who has been at the forefront of refining the disaster response mechanism from the days of the United Nations Centre for Urgent Environmental Assistance, the predecessor to the Joint Environment Unit. Without his institutional memory and longstanding commitment to environmental emergency response work, this publication would not be what it is. We also wish to extend a special appreciation to our colleagues at UNEP and OCHA for successful collaborative efforts to date.

This publication is dedicated to the memory of Gerard Le Claire, a United Nations disaster response professional who played a pivotal role in shaping the United Nations response to environmental emergencies and establishing the Joint Environment Unit.

Gerard was tragically killed in a helicopter crash in Mongolia in 2000 during a United Nations Disaster Assessment and Coordination mission. The accident also claimed the lives of several other United Nations personnel.

In homage to a respected environmentalist and humanitarian, the Gerard Le Claire Environmental Trust Fund (http://www.gerardleclairetrust.org) was established to further his ideals. As Gerard once wrote: "The environment is not just green fields; it is everything we live in, use and produce. What we see, feel, smell and breathe is the environment".

Introduction

"Disasters and conflicts can impact the environment in ways that threaten human life, health, livelihoods and security. Disaster managers and humanitarian workers must therefore identify and address acute environmental risks quickly and consistently as an integral part of effective emergency response."

John Holmes, Under-Secretary-General for Humanitarian Affairs and Emergency Relief Coordinator

Environmental emergencies – oil spills, pollution of rivers with toxic chemicals, explosions at factories – are associated with sensational media headlines and mass public protests. And for good reason. Their effects can be devastating and long-lasting, and it is the world's responsibility to prevent them where possible and deal with them quickly when they occur.

Until the 1990s, international response to industrial accidents dealt with them largely on an *ad hoc* and bilateral basis. But as the scale of industry has increased and public awareness of the damaging effects of industrial accidents has grown, so the volume of calls for a more coordinated response system has risen. Several large-scale accidents occurring during the 1980s and early 1990s confirmed feelings among the public and governments that there was an urgent need for change (see boxes on following pages).

Calls for an international mechanism to respond to environmental emergencies were finally answered in 1993, when United Nations Member States formally requested a new mechanism to deal specifically with the environmental aspects of disasters. With the establishment of the Joint UNEP/OCHA Environment Unit – a partnership between the United Nations Environment Programme (UNEP) and the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) – many needs from both requesting and providing countries were met.

Large-scale forest fires endanger lives, have a huge impact on the environment, and contribute to global warming

3 December 1984: Bhopal, India

In the early hours of the morning, people woke up to the sounds of screams and the sensation of intense burning in their eyes, noses and mouths. Running outside, they found themselves surrounded by a thick, choking cloud of gas. Whole neighbourhoods fled in panic; children were trampled and their parents convulsed and fell dead in the streets.

The accident happened at the Union Carbide Plant, near the city of Bhopal in Madhya Pradesh. More than 20,000 people required hospital treatment for terrible side effects, including blindness and kidney and liver failure. Government figures put the final death toll at almost 4,000 but other sources estimate that between 8,000 and 10,000 died within the first 72 hours and a further 10,000 later on from gas-related diseases.

Frequently cited as the world's worst industrial disaster, the tragedy was caused by the release of a highly toxic cloud of methyl isocyanate, used to make the pesticide carbaryl. A valve in the plant's underground storage tank had broken under pressure, exposing around half a million people to the gas. The factory was closed immediately after the accident and three senior members of staff arrested.

Cost-cutting measures at the plant are said to have compromised safety standards. The effects of the accident were compounded by a lack of local awareness and preparation planning. In 1989 Union Carbide paid the Indian Government US$470 million in a compensation settlement.

International collaboration was a key factor in minimizing the environmental impact of a large oil spill on the coast of South Korea in 2007

26 April 1986: Chernobyl, Soviet Union

When the number four reactor at the Chernobyl Nuclear Power Plant in Ukraine exploded, it released 100 times more radiation than the atom bombs dropped on Nagasaki and Hiroshima and caused a fire that burned for nine days.

Engineers on the night shift had been conducting an experiment to find out if the cooling pump system could function efficiently under low power. However, by removing too many control rods they allowed the reactor core to overheat and at 1.24 a.m., two explosions blew away the reactor's dome-shaped roof.

Because the reactor was not housed in a reinforced concrete shell, as is standard practice in most countries, the building sustained severe damage and large quantities of radioactive debris were released into the atmosphere. Much of the fallout was deposited close to Chernobyl in parts of Belarus, Ukraine and Russia, but traces of radioactive deposits were found in nearly every country in the northern hemisphere. More than 100,000 people were evacuated from the nearby town of Pripyat and the surrounding area.

Over 200 people were affected by acute radiation sickness and almost 30 of them died within three months of the explosion. Since the accident, there has been a sharp increase in thyroid cancer among local people, particularly among those who were children or adolescents at the time. Environmental contamination with caesium and strontium means it could be as many as 200 years before the area surrounding the power plant can be used again for agriculture or industry. The reactor itself will remain highly radioactive for around 20,000 years.

Reviews of the disaster have concluded that a potentially unstable reactor design, poor and inadequate safety features, poorly trained operators, and the lack of a containment building all played their part. It was felt that the underlying vulnerabilities and flaws in the Soviet nuclear industry that set the stage for the tragedy had been developing for as long as 35 years. Furthermore, international response to the disaster was hampered by a lack of information.

The Joint UNEP/OCHA Environment Unit represents a single entry point, including a 24/7 duty system with dedicated telephone and fax lines for requesting assistance to environmental emergencies. Through the Joint Environment Unit, countries can find out which services are being provided by others, thereby avoiding duplication and optimizing effectiveness of aid. Cooperation between the two United Nations agencies complements their specific specialities and was a unique situation at the time.

In 2009, the Joint Environment Unit celebrated its fifteenth anniversary, offering an opportunity to draw attention to the importance of multilateral cooperation in preparing for and responding to environmental emergencies.

This publication, which highlights success stories and lessons learned, is aimed at a wide audience. The intent is to further raise awareness of the devastation that an environmental emergency can cause, and to promote advocacy and action in response. It also aims to highlight the strong need to integrate humanitarian and environmental action.

Chapter 1 introduces the key players in the field of environmental emergencies and describes the development of the United Nations international response mechanism. The following three chapters highlight international responses to some of the many emergencies that have occurred as a result of industrial accidents, natural disasters and conflict situations over the past 15 years. Chapter 5 looks at some of the lessons that have been learned from environmental emergency response work, and how these have influenced changes in disaster response efforts and management. And the final chapter looks briefly at what is perhaps the greatest challenge affecting response and preparedness activities in the future: climate change.

1 November 1986: Schweizerhalle, Switzerland

People living along the Rhine had a terrible shock when a fire broke out at the Sandoz chemical plant at Schweizerhalle, near Basel. Because there were no retention reservoirs, water used by fire fighters to put out the blaze flushed huge quantities of agricultural chemicals, pesticides and dyestuffs into the river, sparking an ecological catastrophe. The river ran red, thousands of dead fish floated on the surface, and eels were totally wiped out. The effects were felt along the Rhine as far away as the Netherlands.

Although local residents were largely untouched, other than by the foul-smelling cloud of chemicals emanating from the fire, there was a delay in raising the alarm downstream, and pictures of the disaster were broadcast around the world. Occurring just a few months after the Chernobyl accident, the disaster severely damaged the image of the Swiss chemical industry as immune to such catastrophes.

As a direct consequence of the disaster, significant progress has been made in efforts to prevent a similar event. These include legal regulations and controls on the chemical industry as well as chemical and biological monitoring of water quality. Moreover, willingness for international cooperation in river water management and protection has grown considerably.

Cyclone Indlala, which hit Madagascar in April 2007, caused extensive flooding and travel was possible only by boat

21 January 1991: Persian Gulf

In August 1990, Iraqi forces invaded Kuwait, sparking the first Gulf War. By the following February, coalition forces, drawn from 34 nations (with United Nations authorization), had been successful in restoring Kuwaiti sovereignty, but the conflict caused widespread devastation with explosions, fires and spillage of millions of tons of crude oil.

The worst incident happened on 21 January 1991, when Iraqi forces opened valves at the Sea Island oil terminal and dumped oil from several tankers into the Persian Gulf. The apparent strategic goal was to foil a potential landing by US Marines. Estimates of the volume spilled range from 160 to 1750 million litres; the slick reached a maximum size of 160 by 68 kilometres and was 13 centimetres thick. Despite the uncertainty surrounding the size of the spill, figures place it 5 to 27 times the size (in volume spilled) of the Exxon Valdez oil spill in Alaska.

The Persian Gulf oil spill decimated marine invertebrate, fish, seabird and other wildlife populations, especially in the areas surrounding Iraq and Kuwait. The oil moved southward, ending up on the north coast of Saudi Arabia, where it smothered the fragile mangrove forests, destroying miles of valuable wildlife habitats. Effects of the accident were exacerbated by delays in response and a lack of local experience.

1

A father holds his injured child and surveys the damaged city of Balakot, Pakistan, following a major earthquake in 2005

Dealing with disasters: Developing an international response system

Every day, disasters threaten human life and welfare somewhere in the world. They may be natural disasters – floods, droughts, hurricanes, earthquakes, landslides and forest fires – or they may be man-made accidents, involving chemical releases and oil spills. Conflict and war also create disasters. Not only do disasters kill people, they also wreck people's health, property and livelihoods, and can have severe and long-lasting impacts on the environment.

In many developing countries, the rate of industrial growth has outpaced the government's ability to cope with disaster. People living in these countries are highly vulnerable to the effects of an environmental emergency; when one occurs, international help is often needed. This trend, along with continuing land degradation, climate change and increasing use of chemicals, is putting more and more people at risk and highlights the need for a strong international response system, both now and in the foreseeable future.

So what is an environmental emergency? What happens when disaster strikes? And how does the international response system work?

What is an environmental emergency?

A major spill of lethal cyanide into Romanian rivers in 2000; a devastating earthquake in South Asia in 2005; an oil spill caused by the bombing of the Jiyeh power plant in Lebanon in 2006: these diverse events have in common their potential to cause an environmental emergency. They typify the three main types of environmental emergency – technological or man-made disasters usually resulting from an industrial accident; natural disasters caused by elements such as earthquakes, floods and fires; and complex emergencies resulting from conflict and war.

Natural disasters can have negative impacts on the environment, potentially causing environmental emergencies. In July 2009, floods affecting Cotonou, Benin caused an oil leak at the central electricity power station. Given the porous soil in the area, the drinking water drawn from an aquifer just below the surface was likely to have been affected.

An environmental emergency is the sudden onset of a disaster or an accident as a result of natural, technological or human-induced factors that cause – or threaten to cause – severe environmental damage. People's health, livelihoods and property are often endangered at the same time. Environmental emergencies can also represent 'secondary risks': natural and complex emergencies can damage infrastructure and industrial installations, and this in turn may affect the environment, as well as the health and safety of the population and emergency workers.

The humanitarian and environmental aspects of emergency response are inextricably linked

Environmental emergencies lie on the border between an environmental crisis and a humanitarian disaster. A natural disaster such as an earthquake can have a huge humanitarian impact – deaths and injuries, houses ruined, crops and livestock destroyed. At the same time, there may be severe environmental consequences: landslides and floods endanger survivors and rescuers alike, while debris and waste create environmental and health hazards. Access routes may be blocked, delaying the arrival of food and supplies, and slowing the economic recovery of affected areas in the longer term. An environmental emergency endangers not only the environment, but threatens to feed back into a worse humanitarian disaster. The humanitarian and environmental aspects of emergency response are inextricably linked.

Nonetheless, for many years environmental issues took a back seat to the humanitarian response to emergencies. Responders tended to think of environmental problems as longer-term green issues – something to be dealt with later – without considering the way the environment can have an immediate effect on people's lives.

Keeping the environment on the agenda in the midst of an emergency is a tough job that the world is gradually coming to recognize.

A global response system

The Chernobyl nuclear disaster and other environmental emergencies focused global attention on the seriousness of this threat. Mikhail Gorbachev, then President of the Soviet Union, formally requested the United Nations General Assembly to establish an appropriate United Nations centre to deal specifically with environmental emergencies. Several organizations and countries including the European Union, Germany, Russia, Switzerland and Scandinavian countries lent their support to his request.

Vladimir Sakharov is Deputy Chief of the Emergency Services Branch of OCHA and Chief of the Joint UNEP/OCHA Environment Unit. He has been involved in environmental response work for over 20 years. "The Member States recognized that something was missing from the United Nations because no-one was taking care of this huge area," he explains. "At the time, the focus of emergency response was on humanitarian aspects, and there were no mechanisms or resources available for the environmental impacts of disasters."

As a result, in 1992 the United Nations Centre for Urgent Environmental Assistance was set up in Geneva on an experimental basis, with

support from the European Commission and Switzerland in addition to various other countries. As a first step, the Centre reviewed the international response to major environmental emergencies over the previous 10 years. The exercise revealed significant gaps in response mechanisms and identified ways to improve international arrangements.

Sakharov describes the early learning process. "We studied several large technological, industrial and man-made emergencies – Chernobyl, Bhopal, Schweizerhalle and the environmental impacts of the Gulf conflict – to review international responses and learn from what happened. We also considered whether and how to build a roster of international expertise that we could call on in case of an emergency. However, governments advised us that while this was easy to build, it would be almost impossible to keep up-to-date and use, and anyway, each disaster is so different, the type of expertise you need is very specific indeed. We have thus established a system where in case of disaster, we ask our partner countries to make specialized experts available."

Vladimir Sakharov, Chief of the Joint UNEP/OCHA Environment Unit and Deputy Chief of OCHA's Emergency Services Branch working in Guinea in 2001

About OCHA and UNEP

In 1998, the United Nations Department for Humanitarian Affairs was transformed into the United Nations Office for the Coordination for Humanitarian Affairs (OCHA). This organization plays the leading role in the coordination and management of activities relating to disaster response in the United Nations system, in particular through its Emergency Services Branch based in Geneva.

Within the United Nations system, the United Nations Environment Programme (UNEP) is the voice of the environment. UNEP's work in the area of emergency response is coordinated by OCHA through the Joint Environment Unit. UNEP also deals with longer-term environmental programmes that may follow on from environmental emergency response work.

The work of the Joint UNEP/OCHA Environment Unit is complemented by that of UNEP's Post-Conflict and Disaster Management Branch. This branch investigates the environmental consequences of conflicts, determines the environmental impacts of refugee movement, and proposes solutions for clean-up and environmental activities in the post-conflict period.

The experimental stage highlighted the need for a special international mechanism to respond to environmental emergencies. To prevent a proliferation of disaster reponse mechanisms, the Governments wanted to integrate UNEP's environmental expertise into the Department of Humanitarian Affairs (DHA). The already established United Nations Centre for Urgent Environmental Assistance (UNCUEA) was transformed into the Joint UNEP/DHA Environment Unit, hosted by DHA's Disaster Response Branch in Geneva. After endorsement by the Committee of Permanent Representatives to UNEP, the Joint Environment Unit became operational on 1 July 1994.

A logical partnership

Reflecting the crossovers between humanitarian and environmental aspects of emergencies, the Joint UNEP/OCHA Environment Unit takes advantage of the emergency response coordination infrastructure that exists in OCHA and pairs it with the technical and scientific environmental expertise available within UNEP. It therefore provides a comprehensive response to environmental emergencies that maximizes the use of resources and minimizes duplication of effort.

Franklin Thévenaz, Deputy Permanent Representative of Switzerland to the United Nations Food and Agriculture Organization (FAO), International Fund for Agricultural Development (IFAD) and World Food Programme (WFP) in Rome, believes this is "a logical partnership: UNEP has the environmental knowledge, while OCHA brings its operational expertise". Rudolph Müller, Deputy Director of OCHA's Coordination and Response Division in New York agrees: "The Joint Environment Unit was a logical step in broadening our capacity to address environmental emergencies. The United Nations Disaster Relief Office (UNDRO) had established links already, but these had been largely forgotten; the United Nations had prepared strategies for responding to humanitarian results of industrial accidents but not the environmental aspects."

In the early years, the Joint Environment Unit focused exclusively on responding to technological emergencies. During this period there were many instances when offers of assistance were not accepted (although they may have been useful), perhaps because the authorities did not want to release information or appear to admit culpability for an industrial accident. Over the years the Unit's focus has gradually widened to include other forms of environmental emergency, especially after a major earthquake hit the Izmit Province of Turkey in August 1999 (see page 38).

Unique international forum for environmental emergency response

The international response to environmental emergencies is provided by a wide range of governmental, non-governmental and international organizations. The Advisory Group on Environmental Emergencies (AGEE), established in 1995, brings together disaster managers and environmental experts from governments, United Nations agencies, non-governmental organizations and civil society to share ideas and exchange experiences on global environmental emergency response issues. AGEE also reviews the Joint Environment Unit's work, advises on its future activities, and acts as its main source of accountability. In return, the Joint Environment Unit acts as the Secretariat for AGEE.

"After the Turkey earthquake we realized that governments were much more willing to request assistance for environmental emergencies when the cause was a natural disaster," says Vladimir Sakharov. "In these cases there is a perception that nobody is to blame. Although of course, it is never the earthquake that kills people and damages the environment; nine times out of ten the fault lies with badly designed infrastructure and poor planning of building development."

The earthquake in Izmit also prompted better integration of the Joint Environment Unit's activities into the wider disaster management structure of OCHA. "In the early years, the JEU was really working in parallel with OCHA, but now response activities are much more integrated," says Patricia Charlebois, Environmental Affairs Officer at the Joint Environment Unit (2000–2004) and now Head of the Pollution Response Section, Marine Environment Division at the International Maritime Organization. "The Joint Environment Unit staff worked actively to effect this change and became more integrated into emergency systems through active engagement in large disaster missions such as that following the Turkey earthquake."

What happens when an environmental emergency strikes?

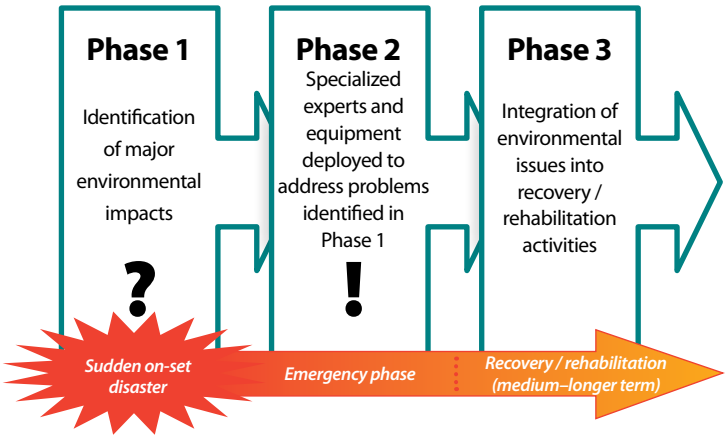
When disaster strikes, the situation on the ground is often chaotic and overwhelming. There is very little information available about the disaster itself, the location, how many people have been affected and where they are. It is often unclear who is in charge of the response and what capacity they have to deal with the emergency. Humanitarian relief workers are often dispatched within hours of a disaster, but they do not know what situation they will encounter on the ground. In an environmental emergency, there are significant dangers to relief workers as well as to the local people, particularly where there is a risk that toxic substances have been released. Information is key – and usually lacking.

In support of these first emergency responders, the main priority is the identification of major environmental impacts and risks: the 'big and obvious' sites that could create a life-threatening situation. Oil refineries and chemical manufacturing sites both pose risks of severe environmental contamination if damaged. The immediate priority is to identify where these sites are and get personnel on the ground to assess whether they have been damaged and what risk they pose. This phase calls for 'environmental generalists' – people who can look at a wide range of environmental issues, from chemical pollution of a river to the threat of a

Rescue teams dig out a town buried by mudslides following Typhoon Morakot in August 2009

landslide engulfing a village, and who can decide which ones need most attention.

And so, information gradually starts to flow. The situation becomes clearer and the next level of priorities can be decided. Specialists, such as chemists, waste management experts, geologists or engineers, can be sent to the area to make specific site assessments. This is the second phase of the emergency response (as shown in the following diagram).



Together with national agencies and often the military, they can begin to identify the short-term needs for immediate action, and to consider the longer-term plans that will help restore infrastructure, avoid future risks, and allow people to resume their lives.

The recovery and rehabilitation phase is, of course, the longest. Once the disaster response is over, the emergency specialists hand over their assessments, plans and proposals to the national authorities and international development agencies. As the response to the emergency

Making connections

When a disaster occurs, the first response usually comes from local and national sources. The affected communities themselves often start the relief effort, simply because there is nobody else to help during the first hours or even days. National civil protection agencies and national emergency responders frequently take on the bulk of the immediate relief work.

But dealing with the environmental impacts of a major disaster sometimes requires a level of technical expertise that is beyond the capacity of individual countries. Governments must often resort to requesting expertise and resources internationally to supplement their own capabilities. In many cases, this is done bilaterally: individual countries provide assistance directly to the affected country. For many countries this is a preferred channel, building on their historical links and on-going relations. In some cases, the Joint Environment Unit is involved in brokering this bilateral assistance, putting affected countries directly in touch with donors who have the right expertise.

In the case of multilateral assistance, the Joint Environment Unit plays a key role in facilitating the international response to environmental emergencies. As an integral part of both UNEP and OCHA, the Joint Environment Unit is able to tap into these bodies' regional offices, which act as the eyes and ears on the ground, rapidly identifying emergency situations as they occur and providing on-going situation reports. Other information sources and the media are also monitored to spot potential emergencies.

Operating around the clock, the Joint Environment Unit can be reached 24 hours a day, seven days a week, all year round. At the same time, the Unit can put affected countries in contact with donors willing to provide response resources, and the release of OCHA Emergency Cash Grants can be arranged in certain circumstances to meet immediate emergency response needs.

Once the need for specialist skills has been identified, the Joint Environment Unit calls on its network of donors and contacts to find and deploy suitable experts as soon as possible. Throughout the emergency phase, the Unit also works closely with UNEP's Post-Conflict and Disaster Management Branch (PCDMB) and the United Nations Development Programme (UNDP), helping smooth the way for the transition from an emergency phase to a recovery phase.

In recent years, a growing number of developing countries have focused on building their own environmental emergency response capacity. Better emergency preparedness ensures that governments are ready to deal with an environmental emergency, with appropriate procedures in place and equipment accessible. With the help of an environmental emergency preparedness mission from the Joint Environment Unit, a country can assess its needs and priorities at strategic, managerial and operational levels. Since 2005, the Unit has conducted preparedness missions in, Iran, Kuwait, Turkey and the Republic of Yemen, and has also supported OCHA's preparedness activities in Cambodia, Côte d'Ivoire, Lao People's Democratic Republic, Papua New Guinea and others. With the Joint Environment Unit's integration into OCHA's Emergency Preparedness Section in 2008, the Unit has further increased its emergency preparedness activities.

itself becomes part of national development programmes, there is a real opportunity to 'build back better' – such as homes that won't collapse in an earthquake, oil storage installations that withstand flooding, and roads that are less susceptible to landslides.

A quick guide to environmental emergency response tools

It is a complex and highly pressured task that presents emergency responders, described by Arjun Katoch, Chief of OCHA's Field Coordination Support Section, as "a high-pressure cauldron". By this, he means they face the challenges of sudden, overwhelming needs, damaged infrastructure and communications, and degradation of local capacity due to casualties and stress.

Emergency relief workers need to make a quick assessment of a potentially dangerous situation on the basis of very little information. They cannot rely on support or services to be available: water and food may be limited, transport and communications disrupted, and monitoring and sampling equipment unavailable. Over the years the Joint Environment Unit has worked with many United Nations and national organizations to contribute to existing systems, and to develop new tools that support emergency responders in their work.

The UNDAC system

In the immediate aftermath of a disaster, national and local governments are often overwhelmed. In this initial stage, the government of the affected country can ask for assistance from a United Nations Disaster Assessment and Coordination (UNDAC) team. These teams are assembled and administered by OCHA's Field Coordination Support Section, and are made up of disaster management professionals from a range of sectors,

who are seconded by donor governments, as well as by OCHA, UNDP, the World Food Programme, the United Nations Children's Fund and the World Health Organization. In many emergency situations, UNDAC teams have been identified and deployed within hours of a disaster. Their task is to make a rapid assessment of the situation and prioritize needs, and to support the national authorities and the United Nations country teams in the coordination of international relief.

UNDAC teams were first deployed during the Indonesian forest fires in 1995, and have since become an important tool for inter-agency response to environmental emergencies. While UNDAC teams deal with issues ranging from healthcare to landslides, environmental issues have gradually been given more prominence. Alongside the medical, food aid and other specialists, the UNDAC teams can often include an 'environmental generalist', whose job it is to identify and assess environmental threats and to call for specialist help where needed.

Since its inception, UNEP has been a member of UNDAC and a number of UNEP staff members have been trained, ready to be deployed with the UNDAC teams. In 2008, Sweden supported the training of a further 15 associate environmental experts, effectively doubling the standby environmental capacity of the UNDAC system.

Hazard Identification Tool

In the early stages of an emergency response, relief workers may be dispatched 'blind' to the affected area. Often very little information is available about the hazards they are likely to face and the first job for an environmental expert is to identify what installations and infrastructure exist, where they are, and what hazards they may pose both to emergency relief workers and to the resident community.

This job can be made easier and quicker if the locations of such installations are known before the UNDAC team arrives. Together with the Flash Environmental Assessment Tool (FEAT), the Joint Environment Unit developed the Hazard Identification Tool (HIT). This is usually applied to a region at the first sign that a disaster is occurring, triggered by the UNDAC stand-by alert message. By the time the UNDAC team arrives in the field, the initial hazard identification can be complete. "HIT is based on the methodology of the Flash Environmental Assessment Tool and provides a first screening of an actual situation from a distance," says Sander van Dijk, Environmental Expert and Dutch UNDAC member.

After an industrial accident, relief workers may be faced with the release of hundreds, or even thousands, of different chemicals and it is easy to overlook or misjudge important risks

Using remotely available information sources, the HIT helps the operator to draw up a list of known secondary environmental risks in the area, including large infrastructure, nuclear facilities, hazardous waste storage sites and other industrial facilities. The tool also lists the hazardous chemicals known or likely to be present, such as ammonia, chlorine, cleaning agents, cyanide, crude oil or fuel, solvents and pesticides. The result is a technical list of the known and probable hazards in the affected area that

might pose a threat to people or the environment, and that need to be checked on the ground to verify their status. To make the information useful to non-specialists within the humanitarian response, estimated impacts on people and the environment are given in non-technical language. Although the UNDAC teams are the primary audience for the HIT, the assessment is shared with other emergency responders in the affected area.

The HIT has great potential for use in the context of preparedness activities. If hazards were identified before an emergency occurred, the information would be immediately available to help responders focus their attention on the relevant sites even more quickly. Kenya and Sweden thus agreed to undertake a joint pilot project to map industrial installations and large infrastructure installations, such as dams, airports and port facilities in Kenya. A replication of these efforts in other countries could contribute significantly to the prevention or mitigation of environmental emergencies.

Flash Environmental Assessment Tool

Environmental emergencies have the potential to release a myriad of hazardous materials into the environment. After an industrial accident, for example, relief workers may be faced with the release of hundreds, or even thousands, of different chemicals, each with its own toxicity profile, exposure pathway (through the air, water or soil) and receptors (humans, livestock or fish, for example). In such complex situations it is easy to overlook or misjudge important risks. At the same time, the overwhelming demands of disaster situations make a fully fledged environmental assessment impractical. What first responders need is an accurate yet simple tool that can be used in the field.

Introduced in 2008, the Flash Environmental Assessment Tool or FEAT is a user-friendly, 'first aid' manual that helps responders identify and prioritize environmental risks. The manual that is available on the Internet,

"The strong involvement of numerous countries in the development of response tools such as the Flash Environmental Assessment Tool and the Environmental Assessment Module has led to substantial progress in strengthening the international system to respond to environmental emergencies."

Chris Dijkens, Head of Crisis Management of the Ministry of Housing, Spatial Planning and Environment of the Netherlands

The Netherlands' Environmental Assessment Module being tested during a training exercise in Sweden and Norway in 2008

balances simplicity with scientific rigour, and provides quick answers in complex disaster situations, even when specialized technical resources and expertise are not available.

Sander van Dijk, UNDAC Environmental Expert, was in charge of the team at the Netherlands National Public Institute for Environment and Public Health that developed the tool in the wake of the Indian Ocean earthquake and tsunami in 2004. "The Flash Environmental Assessment Tool was developed because there was no uniform methodology for rapid post-disaster assessments," he explains. "Individual experts were dispatched with their own background and speciality, which might range from very chemical to very ecological. With basic training, the tool allows an UNDAC team member to know what questions to ask and whether they need to call for more expert advice."

Environmental Assessment Module

Imagine a fire in an oil refinery. A dense plume of black smoke rises into the air and is carried by the wind. Oil tanks rupture and spill. The wastewater treatment plant fails and oily residues escape, washed into the sea by fire fighters' hoses. Which toxins escaped? Where exactly did they go? How far was the smoke carried before it dropped its polluting load? Did it fall in farmers' fields – or on a drinking water supply?

While other tools can point to the risks, only sampling and analysis can provide concrete answers to these questions. And in the aftermath of a disaster, local laboratories are likely to be damaged or overwhelmed. In environmental emergencies, specialist equipment and skilled operators are needed, on the spot, and equipped to work independently of local services.

To fill this hole in the environmental emergency response capability, the Netherlands Ministry of Housing, Spatial Planning and the Environment, and the Ministry of Foreign Affairs, developed the Environmental Assessment Module. This mobile laboratory consists of two fully equipped, off-road vehicles that can be used in emergencies involving hazardous substances. It is designed to allow rapid assessment of environmental contamination and related health effects. The module provides sampling, detection and on-site analysis of toxic compounds; and allows rapid scientific interpretation of data, and conversion of those data into an exposure or risk assessment that can be used by national authorities and response organizations.

Different parts – or all – of the module can be transported, depending on the demand for the various sampling, measurement and analysis options. Three or four staff can accompany the module, backed up by personal safety equipment, communication and power-generating tools, and facilities for data processing and transfer. All equipment can be stored in dedicated aluminium boxes for safe transportation to the affected site. The boxes can be transported by air using commercial flights or an aircraft from the Netherlands Ministry of Defence, or by land in the two four-wheel drive vehicles if the emergency occurs within Europe.

Awareness and Preparedness for Emergencies at Local Level (APELL) programme

The international community and national governments have learned to respond more effectively to environmental emergencies over the past decades. Increasingly, the focus is now shifting to preparing for disasters before they occur. With support and funding from UNEP and industry, the APELL programme aims to do just that: on the one hand, providing information to communities to help them understand local risks, and on the other, helping local and national authorities to put together a coordinated plan to protect people, their property and the environment in the event of a disaster.

While the main focus of the programme is on environmental emergencies related to industrial activities with potential for fire, explosion or toxic release, it is also relevant to natural disaster preparedness. So far, it has been used to improve the coordination of emergency response services in both local and cross-border situations. See Chapter 4 for more.

National Focal Points

In close consultation with the Advisory Group on Environmental Emergencies (AGEE), the Joint Environment Unit established the global network of officially designated *National Focal Points*, which allow the Unit to maintain efficient links between potential donor and recipient countries. This global network of significantly placed individuals is poised to provide the Unit with critical information on the nature of the emergency, together with supporting incoming assistance.

Building capacity for environmental emergency response

National governments hold the primary responsibility for preparing for, and responding to environmental emergencies. When a disaster happens, the speed and effectiveness of the response is largely dictated by the national government's ability to manage resources and organize the response. There is much that governments – and local authorities – can do to plan for such an event, ensuring for example that everyone knows their role and responsibility, the chain of command, and what to do if communications break down.

Donors also need guidance on the most effective way to support another country that has been affected by a disaster. How can they ensure they are ready to provide support, and how do they mobilize the right response professionals quickly enough? To help develop this capacity among both potential recipients and donors of environmental emergency assistance, the Joint Environment Unit and its partners have developed a number of guidelines (these are available on the Unit's website: http://ochaonline.un.org/ochaunep).

- *Guidelines for Environmental Emergencies*: provides guidance for donor and recipient countries on their roles and responsibilities in response to environmental emergencies. The Guidelines cover the phases of preparedness, alerts, offer and request of assistance, receipt and provision, as well as post-mission.

- *Guidelines for the Development of a National Environmental Contingency Plan and Establishing a National Environmental Emergency Response Mechanism*: describe options for establishing national structures to coordinate resources and expertise in response to environmental emergencies. A sample National Environmental Contingency Plan shows how these might be used in practice.
- *Guidelines for Environmental Assessment Following Chemical Accidents*: can be used as an emergency assessment tool to help competent national authorities or international experts gather data on the ground. This allows the Joint Environment Unit and possible donor countries to decide on the exact type of assistance needed.
- *Guiding Principles for Chemical Accident Prevention, Preparedness and Response*: prepared under the umbrella of the Organization for Economic Cooperation and Development (OECD), this sets out guidance for the planning, construction, operation and safety review of hazardous installations, with the aim of preventing accidents.

Training courses

Experts deployed in the aftermath of an environmental emergency need to hit the ground running. An effective international response relies on the availability of well-trained experts, who understand the emergency response process and are familiar with the tools and resources available to back them up. Arriving in a new country in the midst of an emergency is not the moment to learn.

To support the streamlining and increasing professionalism of the international response system led by the Joint Environment Unit, environmental experts from donor countries are encouraged to participate in a training course on environmental emergency response. The course was developed by the Government of the Netherlands, in close collaboration with the Government of Sweden, and piloted in August 2008 in the Netherlands. The curriculum covered a wide range of issues including the United Nations response system, safety and security, information and stress management, and cultural awareness, as well as tools such as the Flash Environmental Assessment Tool, the Hazard Identification Tool and the Environmental Assessment Module.

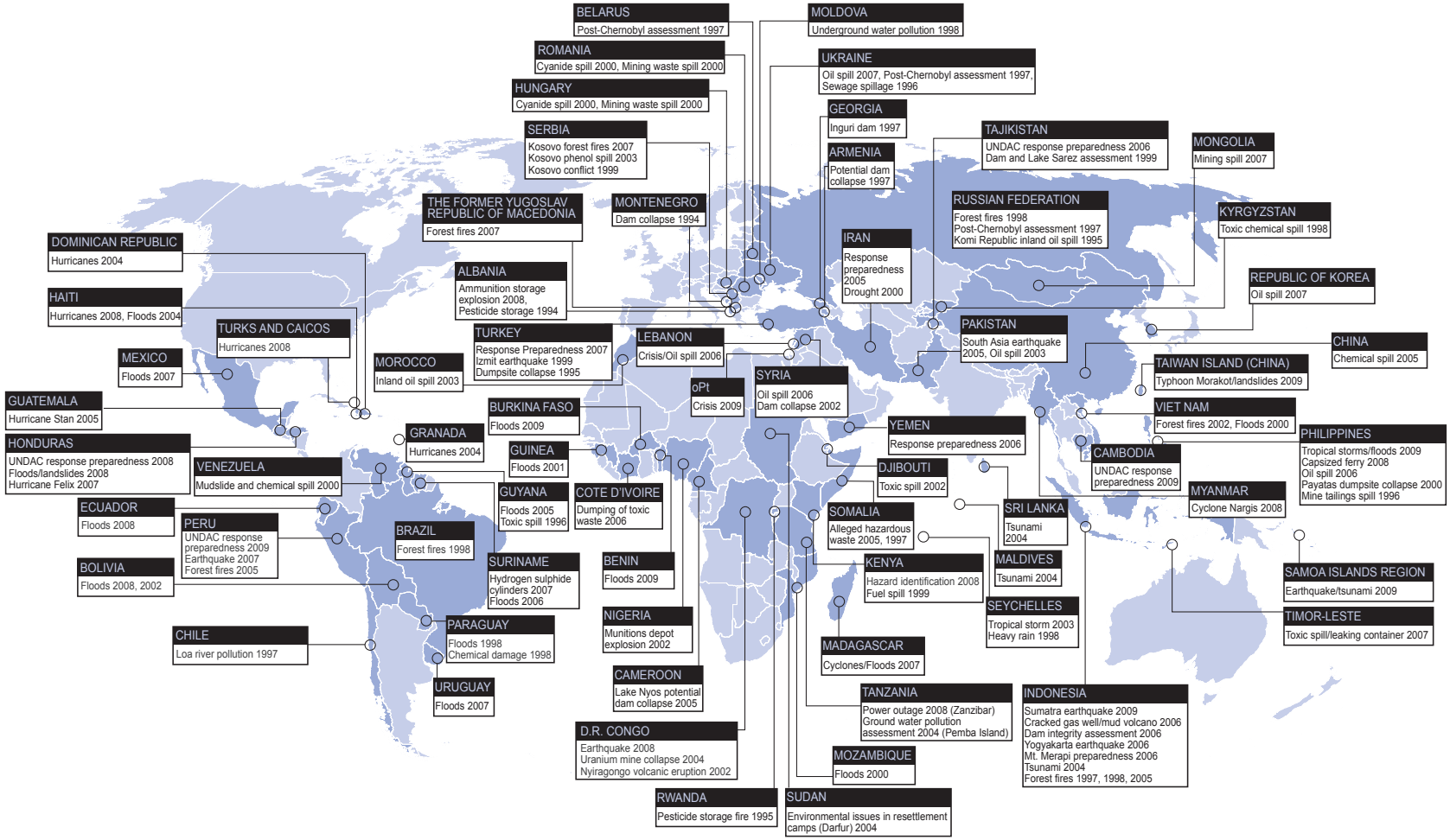
As Leif Jönsson, Head of the Regional Desk for Western, Eastern and Southern Africa at the Swedish Civil Contingencies Agency, notes: "Most environmental experts deployed with the UNDAC teams need training in deployment and how to work in a disaster zone, not in the environmental aspects."

From response to preparedness

As the following three chapters show, disasters occur with tragic regularity around the world. The response to environmental emergencies often comes from a huge range of groups: local communities, local and national authorities, foreign governments, the United Nations, non-governmental organizations, and increasingly, corporate entities. In this confusing melée, the Joint Environment Unit is the primary multilateral focal point with a remit to mobilize and coordinate international responses to environmental emergencies.

Over the past 15 years, the Joint Environment Unit has worked with many international partners to develop tools, systems, training and coordination mechanisms that make environmental emergency responses more effective. The world will never be free from environmental emergencies: natural forces are too strong to be contained, accidents will happen, and conflict recurs. If anything, climate change and population pressure will increase the danger. But with planning, preparation and coordination, vulnerable countries can be ready to deal with disaster and the international community can respond quickly and effectively.

Joint UNEP/OCHA Environment Unit: Activities as of October 2009



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.
Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties.

Created by UN OCHA VMU, 15 October 2009

2

United Nations environmental experts on mission following the collapse of a former uranium mine in the Democratic Republic of Congo, 2004

Putting things right: Responding to technological emergencies

The 1989 Exxon Valdez oil spill in Prince William Sound, Alaska was an environmental emergency on the largest scale. Within a few days of the tanker running aground, the oil had killed thousands of animals, including 250,000 seabirds, 1,000 sea otters and 22 killer whales. Over 1,000 km of coastal habitat were affected, both by the oil and by the pressure-washing techniques used to disperse it. Although the volume of oil spilled (about 40 million litres) places this disaster some way down the list of the world's most serious oil pollution events, the effects of the disaster were exacerbated by the remoteness of the location. Clean-up teams had to travel by helicopter and boat, complicating the response effort and severely stretching existing disaster management plans.

'Classic', man-made or technological environmental emergencies like this one are generally caused by some kind of industrial accident. They involve hazardous materials and can occur at any location where such materials are produced, used or transported. In addition to oil spills and other forms of water pollution, examples include explosions or other accidental release of toxic substances from mines, chemical plants or power plants. Deliberate dumping of toxic waste in remote locations also occurs. Common locations for technological emergencies include oil and chemical manufacturing and storage sites, mining waste and spoil heaps, and any coastline vulnerable to an accident to shipping.

In addition to causing immediate environmental damage, technological disasters may also pose a danger to human health. They usually require specific specialist knowledge as well as a coordinated response among many different national and international agencies. Rapid industrialization and introduction of new technologies in developing countries (which may lack the capacity to deal with disasters) is creating new hazards and there is potential for the severity and frequency of this type of disaster to increase as a result.

So what happens when a factory explodes or an oil tanker spills its cargo? What are the particular challenges associated with this type of emergency? This chapter describes international response missions to some of the major technological emergencies addressed during the past 15 years, highlighting the roles of the different response agencies and personnel.

Who knows what to do?

An often-underestimated challenge is the specificity of each disaster involving hazardous materials. Innumerable toxic and harmful chemicals are used globally in industrial processes, often requiring very specific technical expertise to deal with them. In addition, in many developing countries, the national operational response capacity – in particular when it comes to on-site sampling and analysis – is often insufficient to cope with the needs of an emergency. One of the benefits of the international response system is that a wide network of professionals can be contacted quickly and an expert with the appropriate skills deployed to the scene.

Technological emergencies: the role of the international community

A technological emergency requires a rapid and multi-faceted response. National response capacity is often completely overwhelmed and this is where the Joint Environment Unit steps in, playing a key role in the mobilization and coordination of urgent international assistance. The exact nature of this support varies according to the type and scale of the emergency, the potential environmental impacts and the national capacity to respond to the situation.

In some cases, the international community simply provides monitoring and hazard identification rather than full-scale practical assistance. In others, the Joint Environment Unit needs to contact its network of partner countries to very quickly find an expert with the specific knowledge needed to deal with a particular hazardous substance. The value of multilateral and multi-agency assistance is a common theme demonstrated throughout this publication.

Over the years, the Joint Environment Unit has become involved increasingly in post-disaster issues and future hazard prevention measures, which include educating stakeholders – particularly in developing countries – about potential hazards. Once again, this calls for coordination, collaboration and attention to finding exactly the right person or agency for the task in hand.

"One of the main issues is that in developing countries, hazardous waste is often not seen as a hazard – people are not aware and will collect and sell waste material in an unsafe way," says Laurent Nicole, a consultant chemical engineer and specialist in occupational health and safety. "In post-disaster management and prevention work, it is therefore important to educate stakeholders – the government, relevant authorities, private sector and others – on the potential dangers."

July 2004: Shinkolobwe, Democratic Republic of Congo

Eight people were killed and 13 seriously injured when part of the Shinkolobwe uranium mine collapsed. The accident sparked fears about the harmful consequences of the mine's exploitation on the environment and the local population, while rumours of an illicit uranium trade and child labour began to spread.

Located 35 km west of Likasi in the southern province of Katanga, the Shinkolobwe mine was officially closed in 1961 following the country's independence from Belgium. It had been exploited for its uranium and radium deposits between 1921 and 1959, and its uranium was used in the Hiroshima and Nagasaki atomic bombs. At the end of the 1990s, however, artisanal or informal exploitation of copper and heterogenite (an ore containing cobalt) began to grow as the world's demand for cobalt increased. As a result, a mining village developed at Shinkolobwe, despite a Presidential Decree prohibiting any artisanal mining there. After the disaster, the Government evacuated the area, forcibly closed the mine, and requested a full environmental assessment.

Responding to the request for international assistance from the Minister for Solidarity and Humanitarian Affairs, the Joint Environment Unit set up an inter-agency mission that included experts on mining (from France) and the environment (provided by Switzerland), an expert on radiological contamination (from the International Atomic Energy Agency) and an environmental health professional (from the World Health Organization), together with staff

of UNEP, OCHA and the United Nations country mission team. The mission team assessed the current state of the mine and evaluated the causes of its partial collapse. Samples of water, soil and dust were analyzed in Switzerland. Although the site had been evacuated and was devoid of any activity, the expert team also evaluated environmental impacts, including contamination by heavy metals, as well as humanitarian and health concerns linked to mining activities and ionising radiation exposure.

Environmental experts take water samples near the village of Shinkolobwe, following the collapse of a former uranium mine

The mission team found that the cause of the accident was haphazard mining with no respect for safety regulations. The ground was unstable due to unskilled excavation and poorly managed waste heaps. The risk of further collapse, therefore, was very high. They found no evidence to suggest that uranium had been exploited. The collapse was not a result of a nuclear or radiological accident and, within the enclosed perimeter of the mine, did not lead to increased exposure to ionising radiation. However, they warned that future collapse could lead to such a risk.

René Nijenhuis, Officer in Charge/Humanitarian Affairs Officer of the Joint Environment Unit (who led the mission), says: "Because we had experts from several different disciplines within our team, we could look at all aspects of the mine collapse, then provide the authorities with recommendations on how to minimize environmental risks and enforce safety standards better, protecting local people, especially the children."

21 June 2008: Sibuyan Island, the Philippines

Rescue teams battled furious seas and high winds as they searched for survivors after a ferry sank with 862 people aboard. The MV *Princess of the Stars* had been allowed to sail despite the imminent approach of Typhoon Fengshen because the vessel was deemed large enough to stay afloat in the periphery of the storm. But Fengshen tragically made a sudden change of direction and headed directly for the ferry, pushing it onto a coral reef and causing it to capsize about 3 km from Sibuyan Island. Fewer than 60 passengers survived.

The Philippines Coast Guard and Navy, assisted by the US Navy, tried to retrieve the bodies from the ship but operations were suspended on 28 June after it was discovered that the vessel was carrying a shipment of

When the ***Princess of the Stars*** capsized in the Philippines in June 2008, it was carrying endosulfan, a toxic pesticide, amongst its cargo. This and other chemicals on board posed a threat to the rescue workers as well as to livelihoods in the coastal area

Typhoon Fengshen scattered debris along the shore of Sibuyan island, while many houses were damaged after being battered by huge waves

endosulfan (a toxic pesticide) and other chemicals in its cargo. Endosulfan is an organochlorine insecticide and its use is banned in the European Union (EU) and restricted in many other countries (including the Philippines) due to its acute toxicity and high potential for bioaccumulation and environmental contamination.

The Joint Environment Unit and the European Commission (EC) Monitoring and Information Centre began monitoring the accident through media reports at the onset of the disaster. Jointly, they offered assistance to assess and address issues related to the pesticides aboard the ship, which was welcomed by the Philippine authorities.

On arrival in the Philippines, the first task of the team, which included an ecotoxicologist and a marine chemist, was to gather, consolidate and analyze available data regarding the secondary impacts of the chemicals contained in the capsized ferry. On the basis of this information, the team was able to evaluate on-going and planned response activities (national and international). The assessment also focused on identifying gaps in response activities and making recommendations on further possible international assistance.

"Our team was able to support the national authorities in finding out which chemicals and in what quantities were on board the capsized ferry and whether they were leaking," says Rune Berglind, a Swedish ecotoxicologist and member of the joint expert team. "This contributed to ensuring that impacts on the fishing grounds could be mitigated."

The team undertook on-site assessments on land and at sea, which included surveying the wreck by plane. They had numerous meetings and discussions with the relevant national agencies. While they noted the successful efforts made to monitor the situation with regard to possible contamination of seawater by chemicals and oil, they also made recommendations in a number of areas where improvements could

"Cooperation in response to the Philippines ferry disaster demonstrates that it is possible to put resources together and increase output…Such partnerships and synergy help make international response faster and more effective, with the ultimate objective of supporting the populations in need of our help."

Advisory Group on Environmental Emergencies, Eighth Meeting Report

be made. These concerned crisis organization (such as contingency planning and the establishment of a command post), sampling and monitoring (such as sampling procedures, analytical protocols and bio-monitoring), and the next steps for the salvage operations (especially contingency planning in the event of further damage to the vessel).

Transboundary emergencies need an international response

A spill of toxic chemicals will spread wherever the surrounding air or water takes it. A technological disaster can therefore affect several countries at once. In these cases, the response effort needs not only efficient coordination, but also impartial and neutral assistance – best provided by a multilateral response.

30 January 2000: Baia Mare, Romania

A major cyanide spill in the heart of Romania's mining region decimated local fish populations and polluted drinking water in Romania, Hungary, Serbia and Bulgaria, before dissipating into the Black Sea.

The trigger was heavy rain and rapid melting of accumulated snow, which overflowed and washed away part of the dam containing toxic waste material from the Baia Mare Aurul gold mine. This released 100,000 cubic metres of wastewater heavily contaminated with cyanide into the Lapus and Somes tributaries of the River Tisza that flows into the Danube. Cyanide is lethal to humans and other species even in very small doses. At the beginning of February, the concentration of cyanide in the Tisza was 100 times higher than that permitted in drinking water. In addition to killing fish and other river life along its path, the deadly pollution threatened the entire ecosystem of the Danube delta, one of Europe's richest wetland conservation areas.

Following requests from the Governments of Hungary, Romania and the Federal Republic of Yugoslavia (Serbia and Montenegro), and consultations with European Environment Commissioner Margot Wallström and OCHA, UNEP announced that a team of international experts would be sent to the affected area to carry out a scientific analysis of the environmental damage caused by the spill.

> ***"The range of expertise included in the team covered chemistry, ecotoxicology, biology, hydrology, process engineering and dam engineering – this was quite an achievement."***
>
> *Vladimir Sakharov, Joint Environment Unit*

The mission was organized by the Joint Environment Unit and headed by the Director of UNEP's Regional Office for Europe. Its terms of reference included an independent, scientific description of the spill, the situation and events causing it, the collection and review of data related to the spill and its environmental implications, and the preparation of recommendations for future action and prevention.

Sixteen experts from seven countries (Austria, Czech Republic, Finland, Germany, Norway, Sweden and Switzerland) were selected at very short notice to travel to the affected areas. In addition to the expert group, a four-person United Nations Disaster Assessment and Coordination (UNDAC) team from the Disaster Response Branch of OCHA was dispatched to provide essential logistic and coordination support for the mission. UNEP's Regional Office for Europe provided a press officer and a scientific coordinator. The mission also included representatives from the World Health Organization, the United Nations Economic Commission for Europe and the European Commission delegations in Romania and Hungary.

The process of gold mining can pose major risks to human health and the environment. If an incident occurs, immediate action needs to be taken to mitigate the impacts

The Governments of Germany, Switzerland and the Czech Republic provided three mobile laboratories, with backstopping available from the Joint Environment Unit, as well as the Field Coordination Support Section and the Military and Civil Defence Unit of OCHA's Disaster Response Branch in Geneva. Mining specialists in the UNEP Division of Technology, Industry and Economics in Paris also provided specialist advice. Considerable logistical and other support was received from the UNDP Office in Bucharest, the United Nations Liaison Office in Croatia and the OCHA Office in Belgrade.

The team assembled in Bucharest in Romania, then travelled to the breach site in Baia Mare before crossing the border into Hungary and following the river system down to the Serbian border. Finally, sampling was undertaken along the Danube in Serbia.

Since so many different institutions were involved, the mission represented a useful model for inter-agency cooperation and multi-disciplinary rapid assessment work. It combined sampling and analysis with discussions among relevant national and local experts, national authorities, affected populations and local non-governmental organizations. The mission was not intended to provide a full overview of the emergency and its implications; instead, it provided an environmental input to the ongoing process of international investigation and review.

"This was an obvious environmental emergency with little humanitarian need; however, dealing with

Creating conventions

The scale of the Chernobyl nuclear accident prompted the international community to adopt two International Atomic Energy Agency (IAEA) Conventions (*Early Notification of a Nuclear Accident* and *Mutual Assistance in the Case of a Nuclear Accident or Radiological Emergency*) in 1986. These set out an international framework for cooperation among signatory countries. In addition to defining precisely what a nuclear accident is, the Conventions require countries to notify the occurrence of an accident and to provide IAEA with experts and equipment in the event of a disaster. The IAEA serves as the focal point for cooperation by channelling information and available resources.

Similarly, the United Nations Economic Commission for Europe (UNECE) *Convention on the Transboundary Effects of Industrial Accidents* was signed by 26 member countries and the European Community and entered into force on 19 April 2000. The Convention promotes active international cooperation among contracting parties and its scope goes well beyond disaster response. It aims to protect people and the environment by preventing industrial accidents where possible, reducing their frequency and severity and mitigating their effects. Meanwhile, the International Maritime Organization (IMO) is responsible for keeping a wide range of shipping conventions (including those governing oil spills) up to date, and introducing new ones as and when the need arises.

These international governance frameworks promote cooperation and clarify roles and responsibilities in specific cases. However there is no overarching framework for environmental emergencies within which the different agreements and institutions operate. This results in fragmentation, gaps in the international systems and limited coordination. The Advisory Group on Environmental Emergencies (AGEE) is seeking to address this through the *Rosersberg Initiative* (see Chapter 5).

it was complicated by land-ownership issues," says Rudolph Müller, Deputy Director of OCHA's Coordination and Response Division in New York. "The case gave the Joint Environment Unit high visibility and credibility: it was important that a neutral body intervened and this was the key to coordination among the different stakeholders."

13 November 2005: Jilin, China

An explosion at a petrochemical plant resulted in the release of an estimated 100 tonnes of toxic liquids, including benzene, aniline and nitrobenzene, into the Songhua River, which flows into the Heilongjiang and forms a natural border with the Russian Federation. The Songhua River spill is probably one of the largest transboundary chemical incidents in a river system in recent years. In response, the Joint Environment Unit offered assistance to the Governments of China and Russia, putting experts and mobile analysis equipment from Canada, Switzerland, Sweden and the Netherlands on stand-by.

Although the authorities of both countries did not request international assistance, the Chinese State Environmental Protection Administration invited an expert team from UNEP (that included Joint Environment Unit staff) to the affected area. The team visited the major affected cities, where they talked with local officials about the recent incident and the measures taken for protecting public health and the environment. They also presented recommendations for the prevention of a similar occurrence. These included establishing a joint river basin commission and undertaking a lessons-learned exercise.

Being able to advise on preventive measures is becoming an important task of the international community. At the eighth meeting of the Advisory Group on Environmental Emergencies, Vladimir Sakharov had this to say: "While we are constantly working on strengthening the international system in order to be better prepared to respond to environmental emergencies, efforts are also being made to assist countries in preventing accidents from happening. In the long run preparedness measures such as training staff on safety regulations in the work place not only save resources, but by making it less likely that accidents happen, also lower the risks to human health and livelihoods."

"An environmental emergency that causes a major impact on public health can have a dangerously destablising effect in a country"

Joanna Tempowski, World Health Organization

Playing down the politics

Government reluctance to seek international assistance when dealing with technological emergencies is often bound up with the fear of media speculation and scaremongering, which can stir up political trouble and inhibit donor funding for wider economic development. Alleged or actual dumping of toxic waste is a recurring issue that courts controversy, and the international community needs to work closely together to unravel untruths if it is to respond in a useful way.

19 August 2006: Abidjan, Côte d'Ivoire

Over 80,000 people sought medical treatment for symptoms including vomiting, nosebleeds and breathing difficulties in Abidjan, the largest city and former capital of Côte d'Ivoire. Although no autopsies took place, it is believed that 10 of them died. The deaths and medical problems were caused by the dumping of toxic waste at numerous different sites around the city.

A waste-removal expert on mission in Côte d'Ivoire in 2006

The toxic waste had been brought from Europe by a Greek-owned ship registered in Panama and on hire to the Dutch oil trading company Trafigura Beheer BV. The substance was claimed by the company to have been wastewater from the washing of the ships tanks, but a Dutch inquiry, news reports, and the Government of Côte d'Ivoire claimed the substance was more than 500 metric tonnes of fuel, caustic soda, and hydrogen sulphide.

Mass protests over the deaths and illness caused by the toxic waste and suggestions of government corruption resulted in the resignation of the cabinet of Prime Minister Charles Konan Banny and replacement of the Environment and Transport Ministers. At one point the protesters dragged the Transport Minister from his car and beat him. Protesters also set fire to the house of the Port Director.

"An environmental emergency that causes a major impact on public health can have a dangerously destabilising effect in a country," says Joanna Tempowski, Scientist from the Department of Public Health and Environment at the World Health Organization. "Especially where a government is already operating in a climate of social unrest and political instability, as was the case in Côte d'Ivoire at the time. A prompt, well-coordinated and politically neutral response is therefore essential and good communication among the different agencies is vital."

In September 2006, a United Nations Disaster Assessment Coordination (UNDAC) team was asked to assist with this environmental emergency. Coordinated by the Joint Environment Unit, environmental experts from Switzerland and the Netherlands joined forces with a coordination expert from the European Commission's Monitoring and Information Centre and World Health Organization staff. The team found as many as 18 dumping sites, identified the main chemical contaminants, and specified further actions to be taken by the United Nations country team and the national authorities.

The full effect of the dumping remains unclear. Reports suggest that the waste sites have still not been fully decontaminated and that Abidjan residents continue to suffer health problems as a result.

March 2005: Coast of northern Somalia

The huge waves that battered northern Somalia after the Indian Ocean tsunami in December 2004 prompted renewed speculation on the presence of toxic waste. Unconfirmed media reports and anecdotal information suggested that the waves had stirred up hundreds of barrels of toxic waste dumped illegally in the war-racked country during the early 1990s.

Similar rumours had been circulated as far back as the late 1980s and the United Nations had deployed fact-finding missions in 1992 and 1997, neither of which found any evidence of toxic waste dumping. As the security situation did not allow a third field investigation, the Joint Environment Unit made best use of existing government and humanitarian networks in the country. A questionnaire sent to the Transitional Federal Government of Somalia and other Somali partners gave no indication of any sites where waste had been dumped or washed up on the coast. It was therefore impossible to launch a field assessment. However, the rumours impeded export of cattle and fish, exacerbating an already very precarious situation for the Somali people.

René Nijenhuis, Officer in Charge/Humanitarian Affairs Officer of the Joint Environment Unit said: "Ideally, government or national scientific institutions should be able to provide a factual and scientific answer to these allegations and should also be able to communicate that effectively to the communities living in fear of the unknown. When they cannot do this, we can help". He believes that, unfortunately, due to the lack of concrete evidence, the rumours are likely to persist and to resurface from time to time.

23 April 2007: Khongor Soum, northern Mongolia

Several cows and sheep died after drinking water that had overflowed from a waste treatment plant. Groundwater and drinking water supplies were also affected, threatening the health of an estimated 6,000 people and 60,000 animals. The water had been contaminated as a result

Informal gold ore processing plant, Khongor Soum, Mongolia

of informal processing of gold ore using mercury and sodium cyanide. While Mongolian Law restricts the use of such poisonous substances, they are used widely in illegal and private mining. Such activities have expanded rapidly since 1997, as the country has developed a market economy and unemployment rates have risen.

The Mongolian Government did not request immediate international assistance, however, following a June meeting between OCHA and relevant government ministers it was agreed to deploy an environmental expert through the Joint Environment Unit. The objective was to undertake a fact-finding mission on the accident and the national response to it, and to examine related environmental emergency risks stemming from the mining sector.

Although there were no human casualties as a result of the accident, over 1,000 people underwent medical examinations. Of those, five were hospitalized, 600 received medical treatment and 200 showed signs of poisoning. Considering the quantity of hazardous chemicals released at the site, the local community had a lucky escape. However, due to the rapid expansion of Mongolia's industrial sector, especially mining, the transport and use of large quantities of chemicals is likely to grow. This will inevitably increase the probability of chemical accidents, and could have serious consequences for the population and the environment if not accompanied by proper chemical management measures. The expert therefore made several recommendations, particularly regarding the preparedness of the National Emergency Management Agency (NEMA). It was suggested that this agency should appoint a *National Focal Point on Environmental Emergencies* (see Chapter 1) to act as a link between the Mongolian authorities and the international community of environmental emergency responders. The Joint Environment Unit also liaized with UNEP's Post-Conflict and Disaster Management Branch and the World Heath Organization to provide follow-up technical and capacity-building support.

The event also had a specific political dimension because it happened not long before national elections were held and members of opposition parties used it as an excuse to criticize the Government. Better preparedness on the part of the relevant authorities could have avoided the potential for political problems.

Collaboration is the key

Over the years, the United Nations environmental emergency response system has built up strong links with other national and international systems, such as the Environmental Protection Agency (EPA) in the United States and the Monitoring and Information Centre (MIC) of the European Commission (see box). Such collaboration takes many forms, but the most successful results usually follow when coordination starts at the onset of the emergency, thus maximizing complementarities and minimizing duplications.

7 December 2007: West coast of the Republic of Korea
A heavy swell created tough conditions for the tug towing a large crane along the South Korean coast. As it passed the oil tanker *Hebei Spirit*, about 100 km south of Seoul, the line snapped and the jib of the crane punctured three compartments on the port side of the tanker, releasing an estimated 12,500 tonnes of light crude oil into the Yellow Sea. Oil began coming on-shore late that night and, after 10 days, more than 150 km of coastline had been affected, including part of the Taean-gun National Park. In addition to supporting a wild fishing industry and several fish farms, the region is a popular tourist destination and provides valuable habitats for several migratory bird species.

Despite difficult weather conditions and heavy seas, the Korean authorities, led by the Ministry of Maritime Affairs and Fisheries

(MOMAF) and the Coastguard Agency, acted swiftly in responding to the emergency. The Government also accepted a joint offer of assistance from the Joint Environment Unit and the European Commission's Monitoring and Information Centre.

The joint assessment team's main objective was to assess the need for international assistance and equipment for clean-up operations.

Many national agencies and volunteer groups worked together to clean beaches after the *Hebei Spirit* oil spill

They also advised the Korean authorities on the measures that had been employed successfully in the past by other national response agencies. And they were asked to provide guidance on medium- and long-term environmental impacts related to the spill. Team members visited many locations by land, sea and helicopter as well as receiving extensive briefings from relevant national agencies.

Good coordination and considerable effort on the part of the Korean Coastguard Agency, MOMAF, the maritime police, navy, army, and volunteers from the private sector and the general public, meant that the majority of beaches had already been cleaned. Oil booms had also been deployed very quickly after the spill, protecting many sensitive areas. The team therefore determined that no further international assistance was required to aid clean-up operations. Practical recommendations made by the team included the need to monitor for medium- and long-term environmental impacts and to ensure efforts are coordinated between different government departments and authorities.

This case presents a model of coordination between the United Nations and the European Commission in environmental emergencies. Coordination started at the onset of the emergency and culminated in a joint offer of assistance and deployment of a joint team. On the ground, experts used the same on-site coordination mechanism, worked as a team, and made the best possible use of assets and donor resources. This experience has set the standards high for other types of cooperation between the United Nations and other regional bodies.

"Collaboration with our partners is an essential feature of the Joint UNEP/OCHA Environment Unit's work; it leads to better results, creates synergies, and saves resources," says Roy Brooke, former Humanitarian Affairs Officer with the Joint Environment Unit. "With each collaborative mission there are lessons learned which increase the effectiveness of future responses."

What is the Monitoring and Information Centre?

The Monitoring and Information Centre (MIC) is part of the Civil Protection Mechanism of the European Commission Directorate General for the Environment, which brings together the civil protection of 31 Participating States. Its main task is to facilitate the coordinated delivery of European civil protection assistance to disaster-stricken areas. As the central information hub of European civil protection assistance, it tracks European Union assistance, maintains contacts among Member States and identifies suitable disaster management experts to be sent to a disaster zone.

Cooperation between the Monitoring and Information Centre and the Joint Environment Unit began in 2005 on an ***ad hoc*** basis, and has since grown into a close and regular collaboration. For example, in 2006 the two units cooperated in dealing with the earthquake in Indonesia and its subsequent impact on the Merapi volcano and on several dams; the oil spill off the Lebanese coast; the chemical spill in Côte d'Ivoire; and the oil spill in the Philippines. The Joint Environment Unit regularly shares requests for assistance with the Monitoring and Information Centre, and several important joint missions have taken place in recent years, followed by joint reporting and lessons-learned exercises.

"The joint mission between the Joint UNEP/OCHA Environment Unit and the Monitoring and Information Centre of the European Commission in response to the oil spill off the shore of the Republic of Korea in December 2007 is a model of good cooperation among agencies and an example of how taking maximum advantage of existing structures can be used to avoid duplication and find pragmatic solutions in response to environmental emergencies," says Hervé Martin, former Head of the European Commission Civil Protection Unit.

The two organizations strengthened their links by signing an informal cooperation paper in December of 2005. This forms a framework for closer cooperation on response to environmental emergencies and allows the Joint Environment Unit to access a wide range of European environmental experts through the Monitoring and Information Centre.

3

Entire villages disappeared under landslides when an earthquake struck northern Pakistan in 2005

The power of nature: Environmental impact of natural disasters

While the origins of the Joint Environment Unit lie in dealing with the environmental impacts of classic industrial disasters such as Bhopal in India or Baia Mare in Romania, an increasing proportion of the Unit's work deals with responding to natural disasters. Earthquakes, floods, fires, tsunamis, landslides and hurricanes can all create environmental emergencies of enormous scale.

Natural disasters may cause severe secondary impacts that have immediate implications for people's health, and for the safety of those involved in the rescue efforts. Earthquakes create landslides that hamper rescue operations, endanger rescue teams, threaten communities in their path, and create dams that may subsequently rupture, causing flooding downstream. Floods, tsunamis and mudslides may lay waste to entire villages and even cities, distributing debris and waste over large areas of land and creating widespread health risks. And the humanitarian response to natural disasters can itself create an environmental hazard, through poorly located and managed refugee camps, and inadequate control over clean-up operations.

Natural disasters exacerbate existing problems, for example where poor waste disposal facilities become flooded and the waste is spread across the landscape. Conflict also exacerbates environmental problems, as happens where large numbers of displaced people gather fuelwood from diminishing forest resources, causing deforestation and subsequent soil degradation. And 'natural disasters' may really have anthropogenic roots; witness the many wildfires that have been started by people clearing forests for agriculture, or simply being careless with fire.

There are marked differences between the response to natural disasters and complex disasters caused by conflict (described in Chapter 4). For many relief workers, whose primary experience is in the humanitarian response in conflict zones, this can come as a shock. In natural disasters, the initial response needs to be especially swift, as the early phases are critical to saving lives. While national governments are primarily responsible for coordinating relief efforts, many do not have the capacity to do so, sometimes delaying the response. By contrast, in complex emergencies there may not even be a national government that responders can support.

The 2003 earthquake in Bam, Iran, killed 27,000 people in just 20 seconds

A major natural disaster creates an overwhelming need for help in a matter of seconds. Damage to physical and communications infrastructure limits the ability of relief workers to reach affected communities. And often, local government officials and community leaders are themselves victims of the disaster, leaving a void in the local ability to respond. Those who survive may have lost family members and are traumatized by events. As Arjun Katoch, Chief of OCHA's Field Coordination Support Section says: "To then expect the local authorities to function normally, as the media and the outside world sometimes appear to, is irrational."

Natural disasters create a highly difficult environment for responders – the 'responders' cauldron'. The following examples provide a small taste of the dozens of natural disasters to which the world has responded over the past 15 years.

Highlighting needs, coordinating the response

When a natural disaster happens, the first response is from the local community. Friends, family and neighbours as well as the local authorities inevitably start the rescue effort, with whatever tools are available, in whatever way they can. As news emerges from the stricken area, national and international assistance begins to arrive, often in an uncoordinated way, and sometimes unrelated to needs. In fact, when aid arrives before actual needs are assessed, it can be detrimental to the relief effort, blocking roads and distracting from priority tasks. Local and national authorities are often overwhelmed; help from the international emergency relief mechanism becomes essential.

September 1997: Indonesia

An incendiary combination of illegal burning to clear forest lands, together with a rainy season delayed by El Niño: the result was widespread, devastating forest fires that threatened not only the unique biodiversity of Indonesia, but also the air quality of Indonesia and surrounding countries, including Malaysia, Singapore, Brunei, the Philippines and Thailand.

Between September and November 1997, an estimated two million hectares of forest burned. Fires in deep peat deposits released noxious carbon fumes and thick, choking smoke wreathed cities in the region. This was a natural disaster of immense scale, stoked by people's careless, illegal or desperate actions in clearing forests. The fires had severe impacts on health, the tourist industry and, most enduringly, on Indonesia's irreplaceable biodiversity heritage. Some 19 protected areas were threatened by the fires in Indonesia, including a World Heritage site, a Ramsar wetland and a biosphere reserve, all protected because of the internationally important biodiversity riches they hold. By April 1998 fires had affected over one third of Kutai National Park – and its resident population of endangered orang-utans.

This was a natural disaster of immense scale, stoked by people's careless, illegal or desperate actions in clearing forests

Children fleeing smoke from forest fires in Sumatra, Indonesia

Professor Johann Goldammer, Director of the Global Fire Monitoring Center (GFMC), a partner of the Joint Environment Unit, says: "The situation was initially misunderstood by the government, who requested aid for a natural disaster, when in fact it was human-made, by people burning forest to convert land to agriculture. Unfortunately the smoke hazard became too great … Through fact-finding and advice, missions can raise issues when a country doesn't realize there is a problem."

Offers of support, equipment and expertise flooded in from around the world. On 27 September, at the request of the United Nations Resident Coordinator, a United Nations Disaster Assessment and Coordination (UNDAC) mission was dispatched to Indonesia. The mission, composed of UNDAC and Joint Environment Unit staff and seconded experts, remained in Indonesia from September to November 1997.

Divided into four teams, the mission carried out independent field assessments in the areas most affected by the fires. Meeting the people at the forefront of the fight – local authorities, fire fighters, medical personnel, non-governmental organizations (NGOs) and logging companies – allowed the teams to build up a vivid picture of the disaster situation at the local level, and the on-going response by local and national authorities.

Based on these assessments, the UNDAC team was able to assist the Indonesian Government to prioritize emergency relief needs and organize international help. As a result, assistance was mobilized and coordinated from 19 countries, international organizations such as the European Union and Organization of Petroleum Exporting Countries (OPEC), United Nations bodies including UNDP, United Nations Children's Fund (UNICEF), United Nations Educational, Scientific and Cultural Organization (UNESCO), World Health Organization (WHO), and the Global Fire Monitoring Center, as well as private companies and numerous NGOs.

Twelve countries and regions dispatched fire fighters, fire-fighting equipment and water-bombing planes. While fire-fighting equipment and

expertise had been identified as the most pressing priority, the need for co-ordination was clear. As a central forum for information exchange in Jakarta, UNDAC organized a Joint Technical Coordination Group on Fire Fighting. This brought together Indonesian government bodies, UNDP, the European Union and representatives of the donor community from Australia, Canada, Finland, Germany, Japan, Russia and the USA. In the international scramble to provide assistance, such coordination played an essential role, facilitating information exchange and helping prevent duplication of precious efforts.

17 August 1999: Izmit, Turkey

The Izmit Province is one of the most densely populated and industrialized areas of Turkey. Industrial facilities lie interspersed with residential areas, while nearby agricultural lands and lakes provide green vegetables and drinking water to the inhabitants. The Izmit Bay – heavily polluted in the past but subject of intense rehabilitation efforts in the 1990s – forms part of the Sea of Marmara, itself an important area for local fishermen.

When an earthquake struck northwest Turkey at 3 a.m. on 17 August 1999, the epicentre fell in the Sea of Marmara, just off Izmit. Over 17,000 people died in the earthquake and nearly 50,000 were injured. The potential for secondary environmental damage was clear, given the proximity of industrial facilities to residential areas, agricultural land, drinking water supplies and fishing grounds.

The Joint Environment Unit responded immediately in several ways. As news of the earthquake began to emerge on 17 August, staff contacted their network of official National Focal Points for Environmental Emergencies in potential donor countries. A large fire was known to be burning at the Tupras Oil Refinery in Izmit. The Joint Environment Unit approached a number of countries to request specialist fire-fighting chemical additives and foam as a priority. The Unit also highlighted the risk of damage to a number of other industrial sites in the region and requested the Turkish authorities to make information available to permit better assessment of the situation.

On 19 August, Vladimir Sakharov (Chief of the Joint Environment Unit) flew to Turkey to join the UNDAC team deployed two days earlier. While providing general support to the team, he also made a rapid assessment of the environmental impacts of the emergency, together with the Turkish authorities. On the ground in Izmit, large industrial sites were a cause for particular concern. The earthquake had caused significant damage to Izmit and its surroundings, and secondary impacts threatened to turn an environmental emergency into a disaster.

Vladimir Sakharov recalls this as a unique, multidimensional disaster situation. "Many countries provided fire-fighting assistance bilaterally, without any kind of overall coordination," he says. "The result was confusion, delays in operations, and loss of precious time and valuable resources. The upshot of this experience was that it made very clear that measures needed to be taken to improve the coordination of international response to disasters."

In the Tupras Oil Refinery the earthquake had caused three simultaneous fires. A warehouse caught fire, a tall chimney collapsed hitting a furnace and pipelines, and several tanks of naphtha ignited. Meanwhile, the earthquake also disrupted the electricity supply, phone connections were lost and roads to the refinery were damaged. A pipeline carrying fresh water from a nearby lake was ruptured. The wastewater treatment plant ceased functioning because the electricity supply failed, and was subsequently flooded with water from fire-fighting operations, allowing an unknown amount and mixture of oil products to escape into the sea.

Following the oil spill into the Sea of Marmara, a British team from the Southampton Spill Response Centre arrived to support clean-up operations, through which 600 tonnes of oil were recovered. A specialist Dutch team assisted the refinery staff to relocate oil products from damaged tanks inside the refinery to prevent further spills occurring.

"We were faced with one of the most industrialized areas in the world, located directly on a major fault line, but without any hazard identification or assessment tools; so we had no idea what facilities were there or where they were, what potentially dangerous substances were produced and what were the risks."

Vladimir Sakharov, Joint Environment Unit

A number of potential environmental impacts of the refinery fire were outlined in the Joint Environment Unit's assessment. The burning of 30,000 tonnes of oil products potentially led to severe air pollution, with atmospheric dispersal of pollutants likely over several kilometres. Given the proximity of the refinery to residential areas, this was a serious concern. Similarly the contamination of fields and water sources posed a danger to people's health. Marine pollution was extensive, with oil, oil products and fuel polluting Izmit Bay just weeks before the start of the fishing season. The clean-up operation itself was feared to cause more degradation, as debris was dumped into the sea, in some places trapping sunken oil, which would be slowly released in the future.

A major recommendation of the Joint Environment Unit report was the need for continued and further sampling in the Izmit Bay area. More information was needed on contamination levels of soil and water 3–15 km outside the refinery. An urgent need for satellite images of Izmit Bay was highlighted to facilitate assessment and clean-up operations. The Turkish authorities were recommended to collect and make available information on other potentially hazardous industrial facilities producing, storing and using chemicals and hazardous substances.

At the time, no standard procedures or methodology existed for environmental assessments. The development of tools such as the Hazard Identification Tool and the Flash Environmental Assessment Tool – which did not exist at the time of the Izmit earthquake – grew from the experiences and lessons learned from this and other such emergencies. "With Izmit, we were faced with one of the most industrialized areas in the world, located directly on a major fault line, but without a special hazard identification tool, we had no idea what facilities were present in the region," says Vladimir Sakharov. "And without any kind of standard methodology, it was not until two days later that we discovered a

Better tools and more back up

Since 1999, the Joint Environment Unit has made significant strides in its ability to respond rapidly to the type of emergency posed by the Turkey earthquake. Response procedures have moved from an *ad hoc* basis to a guaranteed stand-by capacity, while tools and methodologies have been developed to ensure quick and effective action. The Hazard Identification Tool and Flash Environmental Assessment Tool now focus attention rapidly on the sites of potential environmental impact, reducing the need to request the authorities to identify sites after a disaster occurs, while the Environmental Assessment Module allows samples of soil, water and air to be collected and analyzed immediately, rather than waiting for samples to be processed by overstretched local or international facilities.

"In the past, the UNDAC environmental expert used to be an individual, with their own area of expertise and knowledge, doing what they thought was the right thing," says Sander van Dijk, UNDAC Environmental Expert. "Now, the environmental expert is evolving to become the eyes and ears of a bigger system, backed up with tools and follow up." The Flash Environmental Assessment Tool and the way the Joint Environment Unit is evolving contribute to this development.

chemical accident that could have killed more people than were killed by the earthquake itself. Only when we visited the site with the national authorities did the extent of the threat become clear."

Following the earthquake and a number of other environmental disasters in Turkey, the need for more streamlined coordination of the response to environmental emergencies was recognized. In 2006 the Turkish Ministry of Environment and Forestry, assisted by the Joint Environment Unit, drew up a baseline draft Country Report, detailing the current situation for dealing with environmental emergencies. This was discussed at a workshop in January 2007, leading to concrete recommendations for improving Turkey's ability to respond to future environmental emergencies.

A multilateral response

Just as in the 'classic' emergencies, environmental disasters precipitated by a natural event take many forms and demand diverse skills. Usually deployed through the Joint Environment Unit, environmental experts are drawn from a range of countries, particularly from the 'traditional' supporters of environmental emergency response work: principally Sweden, Switzerland and the Netherlands. The environmental emergency training courses run in 2008 and 2009 (see Chapter 1) aim to prepare more experts from a range of countries in emergency response. As training is offered more widely in the future, the number of experts who can contribute to an environmental emergency response, through bilateral or multilateral mechanisms, will continue to increase.

26 December 2004: Indian Ocean

Registering 9.0 on the Richter scale, the earthquake that struck just off the coast of northern Sumatra on Sunday 26 December was one of the

"The highest elevation in the Maldives being 1.5 metres, and the islands so small, there was nowhere to run when the tsunami struck. The entire population of the Maldives was affected by the disaster."

René Nijenhuis, Joint Environment Unit

strongest ever recorded. The earthquake and its aftershocks, which ranged between 6.3 and 7.0 in severity, caused a displacement of some 15 metres on the seabed, which in turn created gigantic ripples on the water's surface: a tsunami of devastating proportions that fanned out across the Indian Ocean in a wave of destruction.

The tsunami hit Banda Aceh on the north Sumatra coast of Indonesia within 30 minutes, killing 90,000 people; the coast of Thailand after 1.5 hours;

A wrecked train in Pereliya village in southern Sri Lanka, the day after the tsunami hit the island in December 2004

India half an hour later and Sri Lanka 2.5 hours later, where 31,000 people died. The Maldive Islands felt the devastating impact 1.5 hours later, with all 199 inhabited islands inundated and 82 deaths.

Overall, more than 290,000 people were killed or listed as missing and presumed dead in the Indian Ocean tsunami disaster. Given the number and geographic spread of countries affected, the response needed to be huge, drawing in resources from a multitude of countries worldwide.

Within 24 hours, teams were dispatched to countries surrounding the Indian Ocean. The Joint Environment Unit provided environmental experts who were deployed as part of the UNDAC teams in Indonesia, the Maldives and Sri Lanka (see box). In these three countries, the environmental experts carried out a rapid assessment of acute environmental problems that could have immediate and direct effects on people's lives and welfare.

Debris and devastation covered huge areas in Sri Lanka following the 2004 tsunami

Drawing on connections

Following the Indian Ocean tsunami, the Joint Environment Unit deployed environmental experts from a number of countries as part of the UNDAC teams sent to Indonesia, Sri Lanka and the Maldives. The Unit also offered to send environmental experts to India, Thailand and the Republic of Yemen. This ensured that environmental issues, which might have been overlooked in the immediate aftermath of the disaster, were given sufficient attention and prominence in the emergency response and assessments of further needs.

The UNDAC team dispatched to Indonesia included a Dutch environmental expert (supported by the Netherlands National Institute for Public Health and Environment, and Ministries of Housing, Spatial Planning and Environment and of Foreign Affairs). An environmental expert from the Joint Environment Unit was included in the UNDAC team in the Maldives. Three environmental experts were deployed with the UNDAC team in Sri Lanka. These included one funded by the Swiss Agency for Development and Cooperation, one from the Federal University of Parana in Brazil and a third from CARE International. They all worked in collaboration with the UNDAC team.

Roy Brooke, Humanitarian Affairs Officer with the Joint Environment Unit (July 2005), said: "The vast damage caused by the Indian Ocean tsunami clearly showed the benefit of having a large pool of environmental experts from which to draw upon in order to identify and address environmental impacts early on in the emergency response."

In all three countries, disaster waste management emerged as a major concern. The tsunami itself created a wave of debris, mixing together waste from destroyed buildings, domestic waste dumping sites, and sometimes more-hazardous materials. In Sri Lanka, UNEP made the simple calculation that almost 100,000 homes, with an average weight of 3,000 kg each, were destroyed. Combined with other debris from vehicles, boats, damaged houses and shops, they estimated a total exceeding 500 million kilograms of rubble and waste material that needed to be cleared.

> ***"In almost every natural disaster, waste and debris are a huge problem as they hinder rescue activities and can pose additional risks to the surrounding population"***
>
> *Alain Pasche, UNDAC Environmental Expert, Switzerland*

In Banda Aceh, Indonesia, domestic waste and debris (including refrigerators, cars, furniture and plastics) was mixed with oil, chemicals, contaminated water and sewage. In the Maldives, the tsunami exacerbated already poor waste management practices. As no facilities existed for disinfecting medical waste, it was mixed with household waste and dumped. The tsunami effectively distributed this mixed waste over the islands, combining it with demolition debris that included asbestos cement roofing sheets. Clearing and disposing of such waste clearly posed significant logistical and health risks.

In Sri Lanka, the environmental experts observed that immediate disposal methods frequently involved dumping debris on wetlands, beaches and unoccupied land, creating further environmental risks. In the Galle District, the UNDAC team environmental experts introduced a model for waste removal that engaged thousands of displaced people in a pay-for-work scheme to clear land safely and systematically. Debris was recycled or reused where possible. Based on this experience, a similar waste management programme was implemented in Banda Aceh, Indonesia, in cooperation with the United Nations Development Programme.

The Joint Environment Unit's initial reports into the situation in Indonesia and Sri Lanka highlighted the need for donors to provide experts in waste management as well as such heavy specialized equipment as aggregate crushers, wood chippers and compactors, to support the waste management and recycling processes. Guidelines were also needed for the large number of organizations working in the field. Field assessments found that some of the NGOs working in Sri Lanka, for example, were not using the best practices for debris removal, and that they lacked guidance, practical procedures and resources.

As a response to this situation, the Joint Environment Unit drew up simple guidelines for waste disposal for use in future emergency situations. The guidelines were designed as a poster, with easy-to-use pictograms capable of getting the message across in a range of circumstances and cultures, and a template ready for translation into any relevant language. They can be distributed to the local population to

raise awareness and provide instructions on what to do and what not to do in terms of handling, disposal, separation and transport of waste.

Management of sewage and sanitation in sites used to shelter homeless and displaced people was also identified as a key environmental issue through the rapid environmental assessments.

Learning lessons

The Indian Ocean tsunami triggered the development of a number of new tools and guidelines. Several months after the tsunami, OCHA conducted a lesson-learning exercise to examine the treatment of environmental issues during the emergency response. People interviewed for the study consistently raised questions about the methods used for carrying out rapid environmental assessments. In particular, responders felt that the methodology was not applied consistently among countries, or among different parts of the same country. The methodology was not 'rapid' enough for use in the immediate aftermath of a disaster and there was also confusion among different agencies over the scope of the assessments. Some addressed only acute environmental issues while others considered medium- to longer-term environmental problems.

The study concluded (among other things) that the Joint Environment Unit should develop a new methodology to enhance consistency of reporting and compatibility of results. This should identify major secondary risks using a simple format as a standard feature in any emergency assessment. This finding was reinforced by the feedback from the environmental experts deployed to the South Asia earthquake in 2005.

As a result, the Joint Environment Unit asked the Netherlands National Public Institute for Environment and Public Health to develop an improved methodology for the initial assessment following a natural disaster. This led to the development of the Flash Environmental Assessment Tool.

In Sri Lanka, over 500,000 people lost their homes to the tsunami. Many took shelter in schools, religious centres and camps. Inadequate supplies of equipment and methods to clean sewage, and a lack of experience by some organizations managing camps and shelters led to serious risks of environmental contamination and outbreaks of disease. Tools, guidelines and training were all needed, as were equipment and expertise.

The rapid environmental assessment reports from Indonesia, the Maldives and Sri Lanka provided initial recommendations and were widely circulated to the country governments, the donor community and other stakeholders. The findings were used as inputs to subsequent environmental assessment activities and processes. As the battered countries of the Indian Ocean began the long process of reconstruction, these initial assessments helped lay the foundations for 'building back better' using environmentally safe technologies and management practices.

The importance of specialist follow-up

In the aftermath of a natural disaster, the speed of the initial response is of the essence when it comes to saving lives. However, many issues identified as part of the initial environmental assessment cannot be dealt with or completed as part of the immediate relief effort. Longer-term attention is needed, stretching into the later phases of the response.

Often, of course, international support is unnecessary, as national authorities are capable of dealing with the long-term reconstruction effort. However, in some disasters continued support from experts has been critical during this process. Repeated visits allow experts to coordinate with national authorities and international agencies at different stages in the process, and to help resolve problems that emerge during the recovery process.

"The toughest logistical challenge the aid community has faced to date"

Jan Egeland, former United Nations Under-Secretary-General for Humanitarian Affairs, speaking in 2005

Waste management caused a major problem after the earthquake in northern Pakistan

8 October 2005: northern Pakistan

The earthquake struck at 8.50 a.m. on Saturday 8 October 2005. Measuring 7.6 on the Richter scale it flattened villages and destroyed towns and cities over a vast area of northern Pakistan. Roads disappeared under landslides, villages slipped down hills; all roads to the town of Muzaffarabad, 95 km northeast of the Pakistani capital, Islamabad, were cut off and with it an estimated 1,000 settlements.

Seventy-three thousand people died in the disaster, 69,500 were injured and a further 3.3 million were made homeless. With the Himalayan winter rapidly approaching, the need for access to the region was acute. The combination of the enormous number of injured, the high altitude of the affected areas, the mountainous terrain, the almost complete destruction of the infrastructure in an area covering 28,000 square kilometres, and the rapidly deteriorating weather conditions made this situation "the toughest logistical challenge the aid community has faced to date," according to Jan Egeland, then United Nations Under-Secretary-General for Humanitarian Affairs.

Within 24 hours, an UNDAC team had arrived in Islamabad, with more members soon following behind. The team included two environmental experts whose job it was to undertake a rapid environmental assessment and to identify any acute environmental issues arising from the earthquake, to be shared with national and international partners through meetings and OCHA humanitarian situation reports.

Based on this assessment, the Joint Environment Unit identified and deployed four additional environmental experts, including three from Switzerland and one from Sweden, to address the major problems identified. Two experts focused on disaster waste management issues, one was responsible for identifying and advising on slope stability and landslide risks, and the fourth expert examined issues related to natural resource use. These specialists not only carried out assessments of the situation, they also provided practical advice and solutions to the problems on the ground.

One of the environmental experts was Professor Jean Schneider, a geologist specializing in geohazards especially mass movements. Through the Joint Environment Unit, Professor Schneider was seconded from the Swiss Agency for Development and Cooperation (SDC). Working with the Pakistani Military, he provided technical advice and assistance on conducting emergency road clearing, excavations of landslides, and reinforcing unstable slopes. This advice proved essential in helping open the roads to the isolated Muzaffarabad area and the three most affected valleys – Neelum, Kaghan and Jhelu – while reducing the number of accidents affecting road-clearing crews, convoys and relief workers.

The danger of landslides severely hampered the relief effort until the advice of a slope-stability expert was secured

Introducing the 'Cluster' approach

The Cluster approach was a key recommendation of the July 2005 Humanitarian Response Review (HRR). Clusters create a single framework for coordination by bringing together a variety of different actors, including international governmental organizations, national and international non-governmental organizations, government and the military, for regular coordination meetings. The approach was implemented for the first time during the response to the South Asia earthquake in Pakistan.

To date there are 11 clusters: agriculture, camp coordination/management, early recovery, education, emergency shelter, emergency telecommunications, health, logistics, nutrition, protection, water sanitation and hygiene. The clusters of particular relevance to environmental emergency response include health, water and sanitation, and early recovery. Clusters are also established in countries where there are humanitarian concerns.

In July 2006, the Inter-Agency Standing Committee (IASC) recognized the environment as a crosscutting issue with UNEP as a focal point in the humanitarian coordination system. Subsequently, the Committee asked UNEP, with the support of the Joint Environment Unit, to develop guidance and other tools to better integrate environmental issues into humanitarian action and early recovery programmes.

During the earthquake, a large landslide was also triggered in the Jhrlu Valley, blocking the waterways of two small tributaries of the Jhrlu River. As well as burying the small village of Dandbeh, the landslide created a dam, 250–350 metres high. If the dam were to collapse, severe downstream flooding could occur. Professor Schneider worked with national authorities to draw up a list of priority mitigation measures, which aimed to lower the risk of a possible outbreak flood. These needed to be put in place during the spring of 2006, before the snowmelt increased the water level in the lake to a dangerous degree.

In January 2006, Professor Schneider was able to return to Pakistan to reassess the situation, review the work already done and plan the next steps, alongside the Pakistan Army Corps of Engineers and Geological Survey of Pakistan. The Joint Environment Unit supported his return visit to Pakistan in order to provide continued support and handover to the longer-term recovery team. This feature of the Joint Environment Unit provides great flexibility in the response to environmental emergencies.

September 2008: Turks and Caicos Islands

Tropical Storm Hanna hit the Turks and Caicos Islands at the beginning of September 2008, leaving hundreds of people homeless. Close on its heels came Hurricane Ike, striking Grand Turk, South Caicos and Salt Cay most severely on 7 September. This British Overseas Territory in the Caribbean is made up of 40 islands, eight of which are inhabited. The low terrain is largely covered with marshes, mangroves and swamps, making them vulnerable to the hurricanes and flooding. With an economy heavily reliant on tourism, the Turks and Caicos Islands could ill afford an environmental disaster that would discourage visitors in the long term.

An environmental expert, sent to the islands with the UNDAC team on 8 September, identified a number of risks that needed to be urgently

addressed. In particular, medical waste was found mixed with domestic material in the municipal dumpsite, which had reportedly been flooded by the hurricane, spreading waste over the surrounding area and possibly contaminating groundwater and nearby water bodies.

Throughout the islands Tropical Storm Hanna and Hurricane Ike deposited a huge variety of waste: construction material (plastic, metal, wood and rubble); hospital waste (needles, scalpel blades and syringes); and organic domestic waste and natural debris including trees and vegetation. Furthermore, the storms had disrupted power supplies and water supply systems, potentially spreading human faecal waste.

Debris from homes and other buildings in Turks and Caicos following Tropical Storm Hannah and Hurricane Ike

Given the scale and urgency of the waste problem and the risk it posed to people's health, the Turks and Caicos Islands Ministry of Home Affairs requested urgent further assistance from the Joint Environment Unit. On receiving the official request, the Unit deployed a solid waste management expert through the Swedish Rescue Service Agency (SRSA, now the Swedish Civil Contingencies Agency, MSB). Per Berg, a specialist in solid disaster waste management, made two trips to the Turks and Caicos Islands in the aftermath of the hurricane. Over a period of three weeks in September and October 2008, he assessed disaster waste management issues on the three islands most affected by the storms, in order to identify urgent needs for support and develop practical guidance for local authorities. In December, a follow-up visit was made, which identified that there was still a need for support.

During September, Per Berg worked in close cooperation with the Department of Environmental Health in Grand Turk and with other local authorities. Waste disposal at the hospital was identified as a serious problem, as the incinerator had been damaged during the hurricane, and infectious waste was mixed with regular waste. Roofing materials were sampled and sent for analysis in the USA; these were found not to contain asbestos, relieving the authorities of a potentially serious concern. In the short term, the need for assistance with equipment for removing disaster waste from the streets and support for the disposal of electrical transformers were identified as priorities.

During the follow-up mission in December, improvements were seen in the situation on Grand Turk despite the fact that the grapple equipment needed for clearing the streets had not been made available by any donor. During that mission, the Caribbean Development Bank made funds available for a grapple to be bought. The follow-up mission in December also provided guidance and recommendations

for actions to be taken over the following year in order to deal with the threats still remaining from Hurricane Ike, and to ensure better preparedness before the onset of the next year's hurricane season.

Testing new tools

3 February 2008: eastern Democratic Republic of Congo

On 3 February 2008, an earthquake of magnitude 6.1 on the Richter scale struck the eastern Democratic Republic of Congo, with its epicentre some 20 km north of the South Kivu provincial capital, Bukavu. This was followed by a number of aftershocks, including another earthquake of magnitude 6.1 just 11 days later. In the Democratic Republic of Congo and neighbouring Rwanda 47 people died and 1,155 were injured in the two earthquakes.

The UNDAC team sent to the area on 10 February included two environmental experts from Denmark and Switzerland. While working as part of the team, they were able to field test the Flash Environmental Assessment Tool (FEAT), developed by the Netherlands National Institute for Public Health and the Environment (RIVM).

The FEAT primarily aims to identify acute risks related to industrial infrastructure and natural systems. As a secondary consideration, it also helps to identify medium- to longer-term issues that need to be highlighted at the earliest stages following a disaster. On arrival in Bukavu, the UNDAC environmental experts worked with local experts and stakeholders, using the FEAT methodology, to build a list of major infrastructure, industrial installations and landslides that posed an immediate threat to human life and health. These priority sites were visited for further field assessment.

The assessment identified landslides as being the biggest threat following the earthquake. Dense settlements on the steep slopes on both sides of the Institut Technique Fundi Maendeleo (ITFM) landslide were found to be at high risk from future earthquakes and landslides. Some of the houses were very likely to have been damaged by the earthquake and were potentially at risk of collapse.

The team recommended that the national authorities should carry out detailed mapping of the landslides and faults, and develop a prioritized action plan. Relocation options for the people living on the steep slopes on either side of the Institut Technique Fundi Maendeleo landslide should also be considered. The assessment did not identify any immediate or direct impacts on human health from infrastructure and industrial installations. This was also a useful finding, allowing these issues to be dismissed as potential problem areas.

29 August 2005: Hurricane Katrina, Gulf coast of USA

When Hurricane Katrina made landfall on the US Gulf Coast, it wreaked havoc, causing physical destruction and flooding on an unprecedented scale, ultimately leaving over 1,300 people dead and entire neighbourhoods under water

Winds of up to 209 km per hour and an accompanying storm surge as high as 8 metres affected 240,900 square kilometres. Breaches in New Orleans' 560-kilometre levee system allowed water to flood 80% of the city to a depth of 1.8 to 7.3 metres

The United States Environmental Protection Agency (EPA) led the response regarding hazardous materials and oil. Environmental problems included sediment and water contamination with oil, petrol and bacteria such as *E. coli*. Orphan oil and chemical containers and other household debris posed a significant clean-up task

The EPA collected refrigerators and extracted the freon to ensure that the ozone-damaging gas was not released when refrigerators were dumped in landfills in the scramble to clean up

7 August 2009: Typhoon Morakot, Xiaolin

Rescue teams work together to dig out the town of Xiaolin, buried by mudslides following Typhoon Morakot

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Satellite images of Xiaolin before (left) and after (right) the mudslides show the scale of devastation

©NSPO/UNOSAT

The town was buried under up to 20 m of mud and rocks. By 2 September, 614 people were confirmed dead, with 92 still reported as missing. More than 1.6 million people were evacuated

© René Nijenhuis/OCHA

The UNDAC team worked closely with army personnel to verify the stability of the debris because of the probability of further landslides during the remainder of the typhoon season

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Years after the various conflicts in Iraq, tanks hit by depleted uranium ammunition can be found corroding by the side of the road

Conflict and war: Complex environmental emergencies

In 1999, images from Kosovo in the Balkans alarmed the world. Fires in oil refineries and oil storage depots burned for days, creating black clouds of pollution over wide areas; toxic chemicals leaked into the River Danube; sewage escaped as towns and villages were destroyed; and huge bomb craters appeared in protected wilderness areas. Meanwhile, tens of thousands of refugees fled their homes, straining drinking water and sanitation systems to breaking point in neighbouring Albania and Macedonia.

Complex environmental emergencies are those that occur in such situations of civil unrest, conflict and the breakdown of authority, where bombing, looting and attacks on strategic industrial installations become commonplace. Environmental emergencies also occur in the aftermath of conflict, for example, when there is an accident at a munitions storage or decommissioning facility.

In common with natural disasters, such as droughts and tsunamis, conflict can lead to the displacement of thousands of people, who then congregate in displacement camps. Damage to the environment from pollution of soil and water and deforestation will follow, especially when people are confined in an unsuitable location with few natural resources to support them.

Overcoming hostilities, overseeing actions

14–15 July 2006: Jiyeh, Lebanon

Open hostilities between Israel and Hezbollah led to heavy aerial bombardment of Lebanon, particularly in the south of the country and south Beirut. The conflict resulted in loss of life, injuries and considerable damage to Lebanese industrial installations and infrastructure. From the beginning of the crisis, the Joint Environment Unit monitored and identified potential acute risks, such as chemical spills, occurring as a result of damage to industrial infrastructure.

Numerous players were involved in the environmental response efforts at the international level, giving rise to a need for effective coordination. International response to the oil spill involved the Regional Marine Pollution Emergency Response Centre for the Mediterranean (REMPEC), which was responsible for the operational elements of the response, the European Commission's Monitoring and Information Centre (MIC), which mobilized a range of expertise and resources from its member states, and the International Maritime Organization (IMO). The Joint Environment Unit played a key role in coordination and sharing knowledge, issuing environmental updates as the crisis developed and providing input into the OCHA

Humanitarian Situation Reports. The Unit also organized and chaired regular stakeholder conference calls that provided a forum for information sharing, ensured maximum efficiency and minimized overlap. Finally, the Joint Environment Unit ensured a smooth transition when 'handing over' to the UNEP Post-Conflict and Disaster Management Branch (PCDMB) (see box), who followed up by undertaking a post-conflict environmental assessment study.

"The large number of individual countries – such as Italy, Kuwait and Norway – and inter-governmental organizations – such as the European Commission, Organization of Petroleum Exporting Countries and the United Nations – that responded to the Lebanese appeals for assistance posed a serious coordination challenge. To avoid duplication of effort and waste of resources, we helped the Ministry of Environment to set up a coordination centre so that all parties could benefit from the same information base," says René Nijenhuis, Officer in Charge/Humanitarian Affairs Officer of the Joint Environment Unit.

One of the most serious environmental consequences of the conflict happened when the Israeli air force bombed the Jiyeh power plant, damaging storage tanks and releasing an estimated 10,000 tonnes of heavy fuel oil into the eastern Mediterranean Sea. A 10 km-wide oil slick travelled northwards, affecting most of the Lebanese coast and around 20 km of the Syrian coastline. The slick covered beaches, killing fish and seabirds and threatening the habitats of the endangered northern bluefin tuna and the green sea turtle. Burning oil created a toxic cloud that rained oil downwind of the power station, creating a human as well as environmental health hazard. Clean-up operations were hampered by the Israeli naval blockade and continuing military strikes.

The oil spill contained in Byblos Harbour, Lebanon

"We did on occasion find ourselves close to previously unmarked cluster bombs – they can take your limbs off."

Mike Cowing, UNEP

'Handing over' environmental response activities

A key function of the Joint Environment Unit is to assess the acute environmental impacts of industrial accidents, natural disasters and other emergencies, and to mobilize assistance to address them. Assistance focuses on the initial emergency phase of disaster response, rather than on long-term recovery and rehabilitation issues. During the Lebanon crisis, the Joint Environment Unit established a presence in Syria on 8 August 2006, pending United Nations security clearance to enter Lebanon. Once that was agreed, the Unit maintained a presence in Lebanon from 13 August until the start of the post-conflict environmental activities led by UNEP's Post-Conflict and Disaster Management Branch (PCDMB) during the second half of September. So what happens when the Joint Environment Unit 'goes home'?

UNEP's PCDMB is one of the Joint Environment Unit's main partners. The two departments work together closely to ensure a smooth transition from the response phase to the subsequent recovery and rehabilitation phases for which PCDMB has responsibility. They also liaise closely during the disaster response phase.

"When you send experts you create expectations," says Henrik Slotte, Chief of PCDMB. "It is important that the work begun by the Joint Environment Unit is followed up by the involvement of some other part of the United Nations system."

In the Lebanon crisis, René Nijenhuis, on behalf of the Joint Environment Unit focused on the oil spill and immediate industrial pollution issues, while Mike Cowing led the PCDMB mission, which had a much wider mandate. UNEP's team was comprised of 12 experts, whose main task was to deal with contaminated sites all over the country. They collected samples of soil, surface and groundwater, dust, ash, seawater, sediment and molluscs and sent them to specialist laboratories in Europe. The major environmental problems facing post-conflict Lebanon included hazardous waste (unexploded ammunition, chemicals and healthcare waste) mixed in among the demolition rubble, damaged water infrastructure, a polluted coastline, and a legacy of landmines in agricultural land.

In early 2008, the Joint Environment Unit and PCDMB cemented their partnership by finalizing Standard Operating Procedures. These define the roles and responsibilities governing the deployment of environmental experts during emergency response and aim to ensure a smooth transition and handover from the emergency response phase to the stage of early recovery.

Following a request from the Syrian authorities, the Joint Environment Unit together with the IMO and REMPEC undertook an assessment of the Syrian coast. And in Lebanon itself, the Joint Environment Unit set up an Oil Spill Operations and Coordination Centre within the Ministry of Environment. During the aerial blockade of Lebanon, UNEP's Executive Director played a key role in getting Israeli agreement for aerial surveillance flights along an 'environmental corridor'. This allowed the response team to assess the extent of the spill.

Meanwhile in south Beirut, intense aerial bombing had created mountains of demolition rubble and waste, posing a major challenge for long-term reconstruction efforts. The Swiss Agency for Development and Cooperation (SDC) therefore deployed a waste management expert (through the Joint Environment Unit) to work with the Lebanese Ministry of Environment to prepare a rapid waste assessment. A key problem was the possible presence of unexploded bombs in the rubble, since this posed a serious risk to all involved in clearing and demolition activities. The expert recommended that a temporary waste recycling and storage site should be set up to promote the recycling of various waste streams, thereby reducing the pressure on natural resources.

Dangers of ammunitions storage

27 January 2002: Lagos, Nigeria

An ammunition dump located in the main Ikeja military cantonment in Lagos started exploding at about six o'clock in the evening, reportedly caused by a fire that spread from a nearby market. Explosions continued throughout the night and into the next day, devastating an area of over 1.5 square km. Shells and other ammunition landed up to 5 km away, killing people and damaging buildings in the heavily populated areas surrounding the cantonment.

According to official statistics, over 1,000 people died, although local sources suggest there could have been as many as 2,000 fatalities. Most of the deaths were not caused by the ammunition, but by the panic that followed the explosions. Hundreds perished when fleeing crowds spilled over into the Oke-Afa canal, and small children were trampled as crowds rushed down the slopes. Many families became separated in the confusion, and around 200 children were abandoned.

Most of the deaths were not caused by the ammunition, but by the panic that followed the explosions

The international response mission included representation from the Joint Environment Unit, UNEP, OCHA, United Nations Children's Fund (UNICEF), World Health Organization (WHO) and the International Federation of Red Cross and Red Crescent Societies (IFRC). In addition to providing humanitarian response in the form of medical aid and temporary camps, the mission advised the Nigerians on how to clean up the area and make it safe. Unexploded shells and other ammunition are highly unstable and clearing them up is a costly and time-consuming exercise. The team advised that specialist equipment should be brought in to deal with this aspect.

"This disaster is a typical example of a technological, or man-made, incident when hazardous materials are located in densely populated areas

without the necessary prevention and preparedness arrangements for surrounding populations," says Vladimir Sakharov. "The humanitarian impact of this event was made more severe by the lack of clear information, warnings or guidance from the authorities at the outset. Certain aspects of the relief operation reflect weaknesses in coordination among the various agencies involved and there was clear evidence of a lack of disaster management capacity and contingency planning."

Mission staff also recommended an environmental impact assessment in connection with the incident, including assessment of structural damage resulting from the initial blast. The introduction of UNEP's Awareness and Preparedness at Local Level (APELL) process, especially focusing on various potential hazardous sites in the country, was advised (see box). They also suggested that improving the overall disaster management capacity in Nigeria would be important in mitigating against the impacts of any future events.

15 March 2008: Gerdec, Albania

Twenty-six people died and over 4,000 had to be evacuated after an explosion at a munitions decommissioning facility in the village of Gerdec, 15 km west of the Albanian capital, Tirana. The powerful blasts shattered windows and destroyed houses throughout the nearby residential neighbourhoods. Over 4,000 houses and business premises were damaged along with numerous water and power supply networks, roads, public buildings, schools, kindergartens and health centres.

Environmental expert and UNEP Programme Officer Muralee Thummarukudy, was deployed to the scene. "I went as part of an UNDAC team who understood bombs – the team leader was an Austrian general," he says. "We looked at environmental issues, explosives, chemicals, and groundwater and took soil and water samples. Our main concern was the number of high-energy explosives and the fact that live ammunition was lying all over people's backyards. We even saw a father and son walking around the garden picking it up!". The mission team understood that the ammunition was simply being unscrewed so as to sell the metal containers.

The accident scattered unexploded ammunition widely, rendering the area around the factory a safety nightmare. The UNDAC environmental assessment concluded that even after all the ammunition had been removed, the area should be considered an environmental hotspot, due to the presence of heavy metal contaminants. Destruction of buildings and vegetation created large quantities of solid waste that needed to be cleared and managed. The factory was located on a slope and contamination from the site was draining into a watercourse, requiring immediate pollution prevention measures.

Furthermore, there was little understanding among the community or local administration about the nature of the operations being carried out in the factory and their risk to human health and the environment. The assessment report also recommended longer-term measures that included introducing a programme to increase local communities' awareness of the risks associated with nearby industrial activities.

Additional stress on a marginal environment

October 2004: Darfur, Sudan

Long-term ethnic conflict in the Darfur region of Sudan escalated in 2002/03 into open warfare, forcing an estimated 1.6 million people to flee their homes and creating a humanitarian emergency. While many people fled to neighbouring Chad, the majority of the internally displaced people, known as 'IDPs', were housed in temporary camps within Darfur, where they remained vulnerable to attack and put pressure on already scarce environmental resources.

Competition for land and water between sedentary farmers and nomadic tribes has long been a part of Darfur's history. More recently, changes in

'Just in case': promoting local emergency awareness

Goats grazing next to rocket fuel containers, Afghanistan. Local communities often lack awareness of potential dangers to health and the environment

A fully aware, well-informed and properly trained population is the best guarantee of safety and of successful response to any disaster. Unfortunately, most communities and many government services are not prepared for the hazards they face, lacking the education, awareness, knowledge and preparedness they need to take effective action when disaster strikes. If communities were more aware of potential dangers and were informed what to do 'just in case', the impacts of humanitarian and environmental emergencies could be reduced dramatically.

"In the Nigeria and Albania explosions, many more people would have survived if the local community had been more aware of the dangers and had known what to do in the event of an explosion," says Vladimir Sakharov. "Similarly, if local authorities had been better prepared with contingency plans, they could have contained the damage more effectively."

A number of major industrial accidents that had serious impacts on health and the environment prompted UNEP to develop the Awareness and Preparedness at Local Level (APELL) programme (mentioned briefly on page 17). The aim is to minimize the occurrence and harmful effects of technological accidents and environmental emergencies resulting from human activity or as a consequence of natural disasters, particularly in developing countries. APELL was developed in partnership with industry associations, communities and governments and recognizes that the greatest opportunity for reducing the effects of environmental disasters is to involve the local community in prevention and preparedness initiatives.

"APELL is a tool for bringing people together to allow effective communication about risks and emergency responses," says René Nijenhuis. "The process of dialogue should help to reduce risk, improve the effectiveness of response to accidents and allow ordinary people to react appropriately during emergencies."

Within the framework of the programme, UNEP produces technical reports and other materials that serve as important information sources on disaster prevention and response planning in vulnerable areas. APELL has now been successfully introduced in more than 30 countries and in over 80 industrial communities worldwide.

Queues for water in an IDP camp in Darfur

governance, environmental degradation and the impacts of prolonged droughts have exacerbated the situation, causing nomadic groups to move further south and intensifying friction with farmers in Darfur's more fertile agricultural belt. Housing so many people in an already impoverished landscape has created an emergency, with groundwater depletion, soil and water pollution, deforestation and further environmental degradation, including desertification. This severely threatens the rehabilitation of the area and restoration of livelihoods once the conflict is over and people can return home.

"Efforts to sustain even minimal levels of survival for the displaced were clearly using locally available natural resources at unsustainable levels," says Rapid Environmental Impact Assessment Project Lead Researcher Charles Kelly. "The humanitarian agencies were doing their best to meet immediate needs with limited resources, but little thought was given to environmental impacts, nor to how current actions would eventually contribute to future conflicts around the camps."

Because of the close links between the humanitarian and the environmental emergency, and the fact that environmental considerations should play an important role in relief operations, the Joint Environment Unit and the United States Agency for International Development (USAID) supported CARE International in Sudan and the Benfield Hazard Research Centre in conducting a Rapid Environmental Assessment in three refugee camps in Darfur. The objective was to identify environmental issues with immediate relevance to human welfare and response efforts in Darfur and, where possible, offer recommendations for future response and rehabilitation work.

The assessment identified several serious environmental problems in the camps, related particularly to an unsustainable use of wood, water and grass along with poor management of waste. It became apparent that environmental considerations and available solutions were not consistently integrated into the relief efforts, thereby undermining their effectiveness. At the same time, a relief-assistance 'gap' was forcing inhabitants to deplete natural resources in order to survive, with significant humanitarian and environmental consequences for the future.

Charles Kelly concludes: "The Darfur assessment confirmed that displaced persons camps can have major negative environmental impacts due to a survival-driven need to exploit natural resources, inadequate waste management and the life-threatening lack of proper sanitation. Addressing these and other environmental concerns needs to be integral to effective camp planning and management so that negative environmental impacts are reduced and natural resources used in a sustainable manner. Sustainable camp management can also contribute to the integration of the environment as a core element in return and resettlement plans."

5

Environmental expert Alain Pasche taking soil samples following the collapse of a uranium mine in the Democratic Republic of Congo in 2004

The changing face of international response

As the previous chapters show, environmental emergencies occur in a wide range of situations, from extreme and far-reaching weather events to localized industrial accidents. But under this broad umbrella are some common themes; the principal one being that no region, country or community is immune. Environmental emergency can strike anywhere, at any time. It is also clear, however, that developing countries and those with economies in transition are most vulnerable, being weaker in all areas of prevention, preparedness, assessment, mitigation and response. The international community therefore has a responsibility to help build developing country capacity by sharing appropriate prevention and mitigation tools and applying valuable lessons learned from previous multilateral response to environmental emergency management.

So what lessons have been learned during the past 15 years? And how have these influenced changes in emergency response efforts and management? This chapter presents some answers to these questions, as viewed by a range of environmental emergency professionals.

Connecting humanitarian and environmental response

Whether they have a technological cause (as in the Baia Mare accident) or are precipitated by a natural event (like the South Asia earthquake), most disasters and emergencies have both humanitarian and environmental impacts. "Too often, a disaster gets labelled as being one or the other without considering its holistic consequences," says Vladimir Sakharov. "And this compartmentalization has carried over into how the international community has initially developed its response mechanisms to such disasters."

Humanitarian responders are being encouraged to give a higher profile to environmental aspects of disaster response. After the 2005 Pakistan earthquake, relief supplies (such as spare clothing) flooded in, creating supply and waste management challenges

While the humanitarian community has grown more aware of the importance of environmental concerns during the past 15 years, many challenges remain. Environmental concerns are still frequently ignored when planning and carrying out large-scale relief operations. For example, when relief agencies distribute hundreds of thousands of bottles of drinking water to people affected by a disaster, they are dealing with the immediate problem of keeping people alive and healthy. But what happens to those bottles afterwards? Tonnes of plastic bottles remain, strewn across the landscape and ignored by struggling waste disposal systems. Furthermore, many humanitarian responders are unaware that relief and recovery activities themselves may have negative impacts on the environment. Dealing with relief supplies packaging, for example, can pose an enormous problem to a country that has no formal waste collection or disposal service.

Failing to take account of the environmental impact of a humanitarian response can undermine the relief process, leading to additional loss of life, increased vulnerability and long-term dependency on aid. The Joint Environment Unit was established by UNEP and OCHA on the recommendation of concerned Member States in recognition of the fact that human populations and the environment are closely interlinked, and therefore international humanitarian and environmental assistance should be similarly linked. In light of this, recent major developments in the humanitarian response field have seen consolidation of activities into a 'cluster' approach and integration of the environment as a crosscutting issue (see page 47).

Meanwhile, the Joint Environment Unit and UNEP's Post Conflict Disaster Management Branch (PCDMB) have embarked on a comprehensive strategy to raise the visibility of the environmental dimension of crises with disaster managers at various levels. This includes capacity-building support for national authorities in disaster-prone countries; for

Humanitarian action and the environment

Invited by the United Nations Inter-Agency Standing Committee and working with UNEP's Post-Conflict and Disaster Management Branch (PCDMB), the Joint Environment Unit has developed a guidance note entitled *Humanitarian Action and the Environment*. The publication aims to raise awareness among humanitarian agencies of the need to consider environmental issues and to point the way to the available standards, technical guidelines and tools. It explains why environmental concerns should be given attention, describes which institutions, tools and mechanisms can provide assistance in this sector, and identifies specific areas of concern related to the different humanitarian clusters (e.g., health, water, shelter). The target audience is humanitarian relief managers, field practitioners and policymakers.

As part of a comprehensive advocacy and information strategy, this publication aims to raise the visibility of the environmental dimension of crises with disaster managers

Key environmental issues in humanitarian response clusters

Cluster	Environmental impacts on humanitarian activities	Humanitarian activities causing environmental impact
Health	Contamination by chemicals, hazardous waste and weapons Release of asbestos from buildings Presence of debris and carcasses Unsafe chemicals waste management	Improper management of healthcare waste and expired medicines Improper management of chemicals required for health protection (e.g., water treatment) Improper management of waste, debris and carcasses
Water, sanitation, hygiene	Contamination of water sources by chemicals, hazardous waste and weapons Damage of water and sanitation infrastructure, leading to cross-contamination Presence of debris and carcasses	Over-pumping of groundwater aquifers Improper rehabilitation and decommissioning of wells Water contamination from sewage disposal Inappropriate/energy-intensive WASH systems (e.g., septic tanks, desalination plants)
Shelter	Contamination of land by chemicals, hazardous waste and weapons Environmental hazards (e.g., floods, landslides, volcanoes) Loss of forests resulting in reduced access to fuel wood and building materials	Unsustainable supply of shelter construction materials Inappropriate design for a specifi need, site, community or culture, leading to misuse on non-use Unsustainable use of timber and fuel wood in shelter construction Deforestation and soil erosion Inadequate disposal of construction and packaging waste
Camp coordination and management	Contamination of land by chemicals, hazardous waste and weapons Environmental hazards (e.g., floods, landslides and volcanoes)	Land degradation and biodiversity loss Improper management and decommissioning of pit latrines Unsustainable use of natural resources (e.g., timber, fuel wood) Contamination by fuel spills and disposal of chemicals Improper decommissioning of camps Inadequate disposal of construction and packaging waste
Logistics	Environmental hazards (e.g., floods, landslides and volcanoes)	Improper management and disposal of fuel, waste oil and tyres Chemicals and waste from logistics base operations Procurement of goods produced through unsustainable practices
Early recovery	Damage to natural resources that support livelihoods Loss of government capacity for natural resources management	Unsustainable use of natural resources for reconstruction and livelihoods Improper land use and urban planning Failure to conduct strategic environmental assessments Inappropriate building designs or choices of reconstruction materials Unequal access to natural resources and changes in tenure Development of unsustainable livelihoods

Source: *Humanitarian Action and the Environment*, see www.humanitarianreform.org

example, workshops have been held in Iran and the Republic of Yemen and a national assessment exercise in Turkey. Similarly, the Unit is working to educate and inform stakeholders – especially those involved in humanitarian response – on the need to take account of environmental issues as an integral part of the humanitarian response. These include the preparation and dissemination of a guidance note (see box) and the development of technical guidelines for humanitarian agencies. A series of proposed follow-up activities includes providing training within the humanitarian cluster system.

In addition to the environment, gender, age and HIV/AIDS are recognized as cross-cutting issues for which clusters have responsibility for mainstreaming into their own work. Gender is of particular importance to ensure an effective humanitarian response in environmental emergencies (see box on page 65). Several recent evaluations of emergency responses (such as those following the Asia tsunami and Pakistan earthquake) concluded that gender kept 'falling through the cracks'. Women, girls, boys and men each have different vulnerabilities and opportunities that must be analyzed and addressed in every emergency context. In an effort to address this systemic weakness, the Gender Standby Capacity Project (GenCap) was established in 2007.

"In practice, gender mainstreaming in our day-to-day work remains a challenge because of the rapid nature of response work," says Ingvill Tveite, Norwegian Associate Expert at the Joint Environment Unit. "We are committed to learning from our past actions and looking for ways to address the different gender needs in our preparedness, prevention and response activities. This requires a conscious change in how we approach an emergency situation, yet as we strive to see an environmental focus as an integral part of humanitarian response, we should in a similar manner include gender as a natural component of our work."

"Effective humanitarian response addresses the needs and concerns of all groups in an affected population. This means understanding how conflicts and disasters affect women, men, boys and girls differently and basing programming on their differential needs and capacities. This is what gender equality programming is all about"

John Holmes, Under-Secretary-General for Humanitarian Affairs and Emergency Relief Coordinator

Applying a gender perspective to disaster missions

During the Bangladesh floods in 1991, five times more women died than men. Two thirds of those killed during the Asia tsunami of 2004 were women. And the 2005 Pakistan earthquake resulted in the deaths of far more women than men. The reasons for these statistics are many, but women are often more vulnerable because in many cultures they have different areas of responsibility, different levels of personal freedom and movement, and different types of education. Cultural considerations can also affect activities during the rescue mission. For example, most of the Pakistan earthquake immediate rescue teams were men, some of whom were reluctant to pull women from the rubble because the local culture does not allow them to touch women they do not know.

In recognition of the need for a greater focus on gender in disaster response missions, the United Nations Security Council adopted a Resolution in 2000. This states that women should be given the opportunity to express their needs during a disaster or emergency and they should be part of the development of solutions to problems. The Resolution makes provision for women as well as men to be involved in decisions, for example, regarding pedestrian access to new roads and bridges or the location of a new well, something that does not happen as a matter of course in many societies.

Women should also be included in rescue missions and in recovery and future preparedness planning teams. While this can be difficult to achieve, since the demand is often for male-dominated trades such as mechanics and fire-fighters, efforts in this direction will be rewarded by a more effective operation that can help a greater number of people in need.

An elderly woman sits amongst the rubble of her home. When houses are destroyed, women tend to suffer most, since in many cultures they are more likely to spend their time in and around the home

Bringing it all together

Coordination or facilitation?

Dealing with the diversity of environmental emergencies requires a multi-sectoral, multidisciplinary approach and coordinating the response effort can be very difficult, especially in the immediate post-disaster chaos. Many people are also reluctant to be 'coordinated'. Vladimir Sakharov prefers to use the term 'facilitation', and this is the main task of the Joint Environment Unit: facilitating dialogue between different actors, stimulating cooperation, and providing a platform for common action.

> ***"There is never a problem getting people to help when an emergency occurs; the problem is getting them to work together efficiently."***
>
> *Kjell Larsson, Swedish Civil Contingencies Agency (MSB)*

Not only does the Joint Environment Unit play a unique role in bringing different United Nations and other international agencies together, it also achieves a high degree of collaboration with very few resources. "The Unit is different in that we have clear arrangements with donors for 'in kind' resources – expertise, equipment, but not finances in the conventional way – and this is one of our strengths, that we do not rely on purely financial support," says Vladimir Sakharov.

Indeed, the small unit model leverages capability among donors and is beneficial to both donors and recipients, since donors get emergency response experience while responding to emergencies in other countries, believes Kathy Jones, Director of Evaluation and Communications, Office of Emergency Management, United States Environmental Protection Agency (EPA).

Patricia Charlebois, Environmental Affairs Officer at the Joint Environment Unit (2000–2004) and now Head of the Pollution Response Section at the International Maritime Organization (IMO) agrees: "The Joint Environment Unit fills a unique niche…although very small it is 'lean and mean'; by that I mean it is efficient and has developed good collaborative relationships to make up for its small size."

Coordinating the response after the collapse of a uranium mine in the Democratic Republic of Congo in 2004

Patricia Charlebois has watched the nature of international response to environmental emergencies change over the years. "A big change has been the mainstreaming of the environmental emergencies component into the wider disaster management structure of OCHA," she says. "Response activities are now much more integrated with more cross-pollination; for example, including environmental emergency experts in the same mobilization and training approach adopted by the UNDAC system." One of the benefits of this, along with advocacy work, she notes, is the attraction of greater funding as donors become more interested in the environmental aspects of disaster response.

Multilateral collaboration

As the previous chapters show, multilateral collaboration in environmental emergency response has numerous benefits but needs strong coordination. Good collaborative arrangements are in place with numerous response organizations, such as the European Commission (EC)'s Monitoring and Information Centre (see Chapter 2) and the World Health Organization (see below) as well as with individual countries, particularly Sweden, Switzerland and the Netherlands.

When an environmental emergency has implications for human health, the Joint Environment Unit works closely with the World Health Organization Department of Public Health (PHE) International Programme on Chemical Safety, Evidence and Policy on Environmental Health (EPE). For the moment, coordination and collaboration are largely on an informal basis, case by case. However, there is potential for further collaboration, especially in conducting risk assessment and hazard monitoring, and in organizing pre-deployment training.

The Joint Environment Unit's collaborative arrangements tend to be informal and this has advantages in terms of the speed and flexibility of the response. "It makes for a less rigid decision-making process," says Leif Jönsson, Head of the Regional Desk for Western, Eastern and Southern Africa for the Swedish Civil Contingencies Agency (MSB). MSB has a stand-by capacity that can be activated at short notice and has been involved closely with the Joint Environment Unit in developing an environmental emergency training course as well as new guidelines that aim to improve operating procedures (see Chapter 1). This close contact, combined with consistent support from the Swedish Government, contributed to Sweden being awarded a 2009 *Green Star Award* for its national contribution to environmental emergency work (see page 76).

The joint United Nations–European Commission emergency response mission to the *Hebei Spirit* oil spill clean-up operation was a model of success

Madagascar's forests under threat

Hassan Partow, Environmental Affairs Officer for UNEP's PCDMB, was deployed to Madagascar as part of an UNDAC team in April 2007. The mission was in response to Tropical Cyclones Jaya and Indlala, which had flattened towns and villages and wiped out the harvests of many poor farming communities.

"The cyclone created a window of opportunity that was unscrupulously exploited for natural resource looting," he says. "Exceptionally, following the cyclone's aftermath, permission was given by the authorities to collect reportedly 'dead wood' of high-value timber trees, namely rosewood and ebony. However, we had not seen or come across verifiable reports of strong and heavy hardwood trees being toppled by the cyclone, which is unlikely, only the more fragile coconut palms and breadfruit trees were visibly damaged."

The authorities subsequently allowed the raw timber to be exported, thereby creating a market for it, which is otherwise legally prohibited in Madagascar. As a result, illegal logging of high-value rosewood timber got out of control, with dealers, middle men and export agents all moving in. The ensuing political crisis in Madagascar in 2009 made things worse; thousands of people were going into the national parks in organized gangs to pillage the timber. On verifying the evidence received from local communities he had met during the UNDAC mission, Partow alerted the United Nations Educational, Scientific and Cultural Organization (UNESCO), which as recently as 2007 had designated the national parks as World Heritage Sites because of their outstanding biodiversity. "Given the scale of the pillaging, the UNESCO World Heritage Committee requested the Government to submit a detailed report on the sites' status," adds Partow. "This shows the potential gaps that could arise from the secondary impacts of disasters if not addressed in recovery planning and follow up."

Tropical Cyclones Jaya and Indlala flattened thousands of trees, including coconut and breadfruit

"An environmental expert used to be an expert with some knowledge of some areas, doing what he or she thought was the right thing. Now the environmental expert is evolving to become the eyes and ears of a bigger system, backed up by tools and follow up."

Sander van Dijk, UNDAC Environmental Expert

Within UNEP, coordination and collaboration between the Joint Environment Unit and the Post-Conflict and Disaster Management Branch (PCDMB) has grown over the years, particularly since the Unit has developed its resources and begun to focus more on follow-up and preparedness. The relationship is well planned and even includes 'loan' of staff when either department is under particular pressure.

"While there is often a successful 'hand-over' from the emergency response to post-disaster recovery or clean-up operations (see Chapter 4), this is not always automatic and some cases fall into a gap," believes Muralee Thummarukudy Programme Officer at UNEP's PCDMB. This is often due to prioritization: typically 'bigger' emergencies are followed up more systematically. In some cases the countries themselves have the capacity to follow up, but in others this gets left behind. This needs to be resolved so there is predictable and robust response and follow up in all cases.

Taking a neutral stance

The importance of being able to take a neutral position in collaborative arrangements and dealing with a disaster has been shown by some of the case studies illustrated in Chapters 2–4. For example, in response to transboundary emergencies or when a health scare affects political stability, the benefits of multilateral assistance are clear since it is much more impartial and neutral than a bilateral or national response.

It is interesting to note that the number of requests to the Joint Environment Unit for assistance increased markedly once their focus widened from addressing mainly 'classic' or technological emergencies to including those precipitated by natural disasters. Vladimir Sakharov explains why:

"Although we use the term 'natural disasters', I think it is misleading. There are natural phenomena, but disasters are created by man. Earthquakes kill people because houses are not built to withstand the shocks;

floods destroy towns and villages because they are built in the wrong places. But even so, in the case of natural disasters, affected countries do not hesitate to request international assistance, because it is felt that nobody is responsible. It is totally different in the case of industrial accidents. By definition, there is always someone responsible and this leads often to secrecy and reluctance to request outside assistance. Some 15 years ago, when we were establishing a special response mechanism, we thought countries would rush to us asking for environmental assistance. That was an illusion. However, we are not discouraged; we are explaining to countries that our aim is not to put blame, but to provide neutral and impartial assistance."

Spanish rescue teams searching for earthquake survivors in Muzaffarabad, Pakistan in 2005. European donors currently provide the majority of international environmental emergency response support

"There is a great opportunity, but also a challenge, for the United Nations to play a major role in developing standards for effective cooperation in environmental emergencies."

Johann Goldammer, Global Fire Monitoring Center

Widening the net

Over the past 15 years a wide network of collaboration has been established with donors in Europe and North America, who are often called upon to provide the expertise and equipment needed to respond quickly to environmental emergencies around the world. And the speed of response has improved greatly over the years: "UNDAC teams now get out faster and send more precise, detailed indications of needs. This allows partner countries to decide if they have appropriate equipment and expertise, whether to offer to send, and to send the right response units quickly," says Kathy Jones, United States Environmental Protection Agency (USEPA).

However, despite the development of many positive arrangements, there is still a need for stronger collaboration with nations in other regions of the world. "It's preferable to respond to a disaster in a certain country from within the same region, because deployments should be faster and less expensive and there should be fewer linguistic and cultural issues to overcome," says Matthew Conway, Programme Officer at the Joint Environment Unit.

It is also important to ensure response is available in case of travel restrictions, as would occur in the case of a global pandemic. Unit staff have therefore initiated discussions on how to go beyond traditional donors and extend the resource base to Africa, Asia, the Pacific and Latin America. "We need to increase local capacity particularly in light of the likely rise in number and intensity of environmental emergencies in developing countries due to increased industrialization, trans-boundary effects and climate change," adds Conway.

Chris Dijkens, Head of the Department for Crisis Management within the Netherlands' Ministry of Housing, Spatial Planning and the Environment agrees: "At present we are too dependent on a few Western countries for environmental emergency expertise and the reaction time is too long," he says. "We need to develop more local capacity and wider geographic distribution and networks of countries with focal points in the developing world. Now we have tools such as FEAT, HIT and the mobile laboratory, we can 'copy and paste' them, thereby improving the whole environmental emergency response mechanism."

The AGEE is playing an important role in working to improve the international response system (see box). This includes anchoring emergency response into a broader framework and developing international guidelines, says current AGEE Chair, Ambassador Toni Frisch (also Assistant Director General and Head of the Humanitarian Aid Department of

Improving the international environmental emergency response system

Following the seventh AGEE meeting held in Rosersberg, Sweden, it was agreed that while the existing international system for environmental emergency response was effective in many ways, it lacked coordination, with gaps in areas of response and preparedness, including lack of an official notification system. It was therefore decided to introduce a new initiative aimed at improving the existing system for international environmental emergency response and preparedness. This became known as the *Rosersberg Initiative*. The aim is to make priority recommendations and enable members to implement them in a participatory manner. Action will be taken it three thematic areas:

1. Awareness raising, engagement, training and capacity building: aiming to increase the awareness of stakeholders and encourage their engagement in environmental emergency preparedness and response through increased communication and advocacy activities
2. Improving the international legal system in environmental emergencies: commissioning a baseline study of existing international systems governing environmental emergencies
3. Improving national structure and mechanisms: helping countries to improve their operational structures and mechanisms to ensure a better, more coordinated and more effective response in case of disasters.

Towards better systems and procedures

When dealing with environmental emergencies, it may appear that the international community is faced with more questions than answers. For example: what kind of emergency warrants multilateral assistance? Is there an agreed threshold of severity? Is there an obligation to report an environmental emergency and to whom? How is an official request or offer for assistance communicated?

In addition, once the need for assistance is confirmed, can special procedures be employed to speed up the process of granting visas and import/export procedures? Who pays for transport and accommodation in the recipient country?

Problems like these are not unique to international environmental assistance; they are encountered by all parties involved in providing humanitarian assistance in conflict situations and following natural disasters. The difference is that, while humanitarian assistance to conflict situations is rendered according to a well-defined and almost universally adopted legal framework – the ***Geneva Conventions*** – hardly anything exists at the global level for the international response to natural disasters and environmental emergencies. International treaties exist only to address two specific challenges (nuclear and transboundary incidents, see page 27).

The need for greater coordination in emergency response is well recognized and in recent years both national and international organizations have established a growing number of agreements, institutions and guidelines. As the second thematic area of the *Rosersberg Initiative*, the *Bruch Report* examined the experiences of numerous regional and international approaches, including lessons learned from 20 frameworks and 15 agreements covering international watercourses.

The Report makes several recommendations on how to improve the international system governing the response to environmental emergencies:

- Operational measures: develop and implement a joint management plan, guidance for response and a certification system for response to environmental emergencies
- Capacity-building and awareness-raising measures: strengthen regional response systems, conduct training, build awareness, institutionalize technical assistance and capacity building
- Legal and policy measures: secure a political mandate for improving international environmental emergency governance systems and develop a new international legal instrument governing notification and response to environmental emergencies.

"I would expect to see in the near future that the international response to environmental emergencies should become easier, as structures and procedures are put in place and streamlined."

Dave Wright, US Environmental Protection Agency

the Swiss Agency for Development and Cooperation). In his view, AGEE can play a major role in building awareness and in sharing information and knowledge through the networks it is building.

Preparedness is the new priority

Limited capacity to deal with disasters remains a major burden, particularly in developing countries, where an estimated 97 percent of worldwide natural disaster-related deaths occur every year. During the past few years, the Joint Environment Unit has therefore changed its focus away from pure response missions. Staff are now working to improve human and institutional analytical and methodological capacity for environmental emergency prevention, preparedness and mitigation, particularly in developing countries, where rapid industrial development is taking place but where capacity to prevent, prepare for and respond to disasters is limited. The idea is that, once capacity is developed, the benefiting countries will be in a position to address all elements of disaster management without necessarily having to rely on international assistance.

Activities in this area are focused on the strengthening of national capacities of countries and to lay the foundation for regional cooperation in cases of environmental emergencies. Prevention measures provide for outright avoidance of the adverse impacts of environmental emergencies, while preparedness implies measures taken in advance to ensure effective response to their impacts, including issuing effective early warning. Mitigation, on the other hand, entails structural and non-structural measures to limit the adverse impacts of natural hazards, environmental degradation and technological hazards.

Franklin Thévenaz, Deputy Permanent Representative of Switzerland to the United Nations Food and Agriculture Organization (FAO),

"Environmental emergencies don't usually create such big headlines as humanitarian ones so we need to work harder to raise concern… Preparedness missions are almost never reported, but I am pleased to see the issue being raised higher on the international agenda, particularly through links with climate change."

Toni Frisch, AGEE Chair

Keep valuable information safe!

Collating and distributing information, particularly on 'lessons learned' and readiness activities will have lasting value only if it is retained in a useful form. Vladimir Sakharov describes how doing this could have saved many lives during the Izmit earthquake in Turkey in 1999.

"A few weeks after our mission to Turkey, we learned that a decade earlier there had been an APELL workshop – bringing together all key stakeholders to discuss who does what, when, where and how – conducted in Izmit by colleagues from UNEP. Yet no record or trace of this important exercise could be found 10 years later. This proved to be an invaluable lesson that no matter how excellent such a workshop might be – and the APELL workshops run by UNEP were certainly of this high calibre – that without proper follow-up, any gains risk being completely lost over time."

International Fund for Agricultural Development (IFAD), and World Food Programme (WFP), in Rome, has witnessed a changing focus in crisis management: "The past emphasis was mainly on response. Now there is much more focus on preparedness, risk prevention, capacity building and longer-term awareness-raising of risk. Response is still there; but mainly response management. But the future belongs to preventing disaster."

In recognition of its increasing role in disaster preparedness, the Joint Environment Unit was integrated into the Emergency Preparedness Section of OCHA in 2008. Other initiatives, such as the

"That the Joint Environment Unit has built systems to help countries respond and prepare for environmental emergencies themselves is an incredible achievement."

Kathy Jones, US Environmental Protection Agency

Rosersberg Initiative, will further develop the work of the Unit in this direction.

"The most important thing is to follow up emergency response by building capacity and more effective governance systems for emergencies within the affected country," says Johann Goldammer. "We find that countries are increasingly reluctant to accept disaster relief but much more willing to accept follow-up or future prevention support."

Towards greater awareness and advocacy

Over the past 15 or 20 years, people in general have become much more aware of environmental issues. "They are interested and understand the problems more, so it has become easier to work at policy level and to raise funds and there is greater political will to deal with hazardous waste," notes Laurent Nicole, consultant chemical engineer and specialist in occupational health and safety.

Recognizing the need to build further awareness and advocacy, AGEE and the *Rosersberg Initiative* have encouraged the development of a new awards scheme. The *'Green Star Awards'* is a joint initiative among UNEP, OCHA and Green Cross International, and has been introduced to recognize those who have made remarkable efforts to prevent, prepare for, and respond to environmental disasters around the world. The awards scheme is intended to raise the profile of environmental emergencies and to underline the connection between environmental impacts of natural disasters, technological accidents and complex emergencies, and their consequences for affected populations and providers of humanitarian assistance. It is hoped that this raised awareness will prompt increased international participation in preventing, preparing for and responding to environmental emergencies.

Winners of the inaugural *Green Star Awards* in 2009

- Individuals: Michael Cowing, a specialist in the management of hazardous and municipal waste and contaminated land at UNEP's PCDMB. He was one of the first 'on-the-ground' environmental experts to participate in the Early Recovery Needs Assessment in Gaza in early 2009.
- Organizations: The Center for Scientific Support in Disaster Situations (CENACID), Brazil and the Spiez Laboratory, which is the Swiss institute responsible for protection against nuclear, biological and chemical threats and hazards.
- Donor Governments: the Netherlands, which has been a driving force in recent years in improving international preparedness and response and was instrumental in developing the Flash Environmental Assessment Tool and the Environmental Assessment Module; and Sweden, notably through the Swedish Civil Contingencies Agency (MSB), together with the Swedish International Development Cooperation Agency (SIDA) that have been funding most of MSB's deployments. Sweden has been one of the most prominent actors in efforts to prepare for, and respond to environmental emergencies around the world.

Winners of the inaugural *Green Star Awards* in 2009. From left to right: Renato de Lima of The Center for Scientific Support in Disaster Situations (CENACID) of Paraná Federal University in Brazil; Nils Svartz of Sweden; Marc Cadisch of Spiez Laboratory in Switzerland; Chris Dijkens and Niek de Regt of the Netherlands; and Mike Cowing of UNEP

Linking with sustainable development

The Environmental Emergencies Partnership (EEP) was launched by UNEP and OCHA in 2002 at the World Summit on Sustainable Development in Johannesburg, South Africa. The idea was based around the need to enhance environmental emergency management in developing countries and countries with transition economies by bridging gaps between phases of the disaster management cycle (prevention, preparedness and response) and between different disaster management stakeholders.

A wide range of national authorities and regional and international organizations support the partnership, with the Joint Environment Unit acting as Secretariat. The EEP has shown particular value as a tool for engaging countries in preparedness activities. For example, it provided the impetus and context for Joint Environment Unit response preparedness missions to Iran in 2005, and to Turkey in 2007.

There are five categories of awards: individuals, organizations, donor governments, aid-recipient governments and corporations. The selection criteria include dedication to response through working in a professional, collaborative and transparent manner; major improvements in internal capacity and preparedness to deal with environmental emergencies; efforts to support international response missions; and international capacity-building missions aimed at helping countries prepare for environmental emergencies.

Primed for the future

As this chapter shows, there is a general consensus among environmental disaster professionals that much has been learned over the past 15 years. Furthermore, they believe that this knowledge has both prompted and enabled those involved in the multilateral response system to increase their focus on preparedness activities. Such readiness is likely to become all the more relevant as the world faces significant new challenges, as the final chapter explains.

6

Floods in Hanoi, Vietnam in 2008. The frequency and intensity of natural disasters, particularly floods and storms, is increasing with global climate change

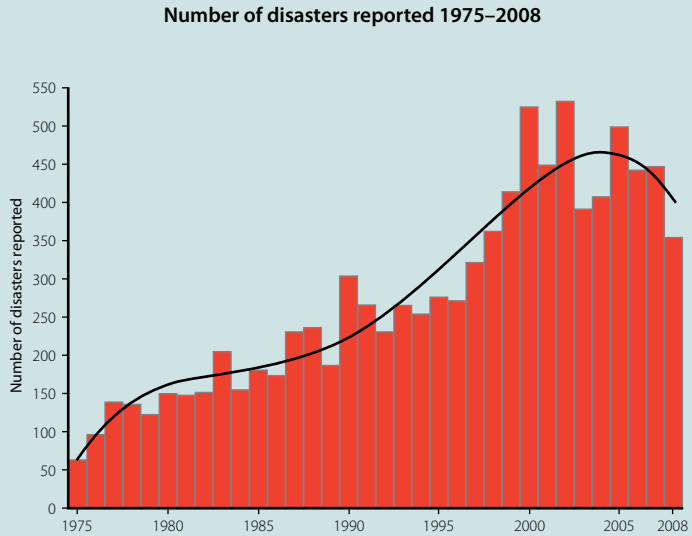
Stepping up preparedness activities: Meeting the challenge of climate change

Climate change is already increasing the frequency and intensity of natural disasters, particularly floods, storms and droughts. It is estimated that around 70 percent of such disasters are now related to climate, up from around 50 percent only 20 years ago. Furthermore, disasters are now taking a heavier human toll and costing more to deal with. During the past 10 years, 2.4 billion people were affected by climate-related disasters, compared with 1.7 billion in the previous decade. And the cost of responding to disasters rose tenfold between 1992 and 2008.

As the world's deserts encroach on formerly productive agricultural land and the sea begins to flood coastal settlements and low-lying islands, climate change is starting to re-draw world maps of population density and resource availability. In the face of increasing competition for scarce resources – such as water and fertile land – migration, political instability and even violent conflict are likely to rise, especially when at-risk areas also have high rates of population growth.

While the effects of climate change are being felt all over the world, the people who are already most vulnerable to the effects of disasters – the poor, the socially marginalized, women, children and the elderly, and those who lack the capacity to prepare themselves – are most at risk.

Emergency relief services cannot afford to stand by and watch as the destructive effects of repeated climate disasters overwhelm vulnerable



Natural disasters with serious impact on human life are recorded systematically serving to set priorities in preparedness and prevention work

Source: Guha-Sapir D. and Vos F. (2009) Quantifying global and environmental change impacts: Methods, criteria and definitions for data on hydro-meteorological hazards, forthcoming in: Bausch H.G. et al. (Eds). *Coping with Global Environmental Change, Disasters and Security Threats.* Springer-Verlag: Berlin.

communities. So how is climate change likely to affect people and the environment? And how is the international response system preparing itself for future demands?

What are the likely effects of climate change?

According to the Inter-governmental Panel on Climate Change (IPCC), climate change is likely to be manifested by an increase in the frequency of climate-related hazards, especially floods and storms, with heavier precipitation and stronger winds. Hurricane Katrina showed how easily

Large-scale land-use fires and wildfires (such as here in Indonesia), contribute to global warming by releasing large quantities of stored carbon from the trees themselves and from the peat in which they grow

"Climate change is increasingly expected to trigger the causes behind natural disasters. This, in turn, might lead to environmental emergencies much larger in scope, and much more complex, than we have experienced so far."

Her Excellency Gunilla Carlsson, Swedish Minister for International Development Cooperation, speaking at the seventh meeting of AGEE in 2007

a relatively small increase in storm strength could overwhelm even a developed country's existing local preparedness capacity. Together with increasing climate unpredictability, storms of greater magnitude will expose larger and often less well prepared regions to the risk of extreme weather events and associated environmental emergencies.

Crops were ruined and agricultural land smothered in mud in the aftermath of Cyclone Indlala in Madagascar in 2007

An increase in the frequency of severe weather events is likely to lead to severe financial losses, holding back economic growth and development. This may have the effect of further widening the gap between countries that can afford prevention measures and those that still lack the required capacity.

Over the longer term, sea level rise is likely to put hundreds of millions of people living in coastal communities at a greater risk of the impacts of floods and storms. At the other extreme, droughts are likely to become more prolonged and to affect wider geographical areas, something that is already becoming apparent in eastern Africa.

Droughts, floods and storms also have severe consequences for agricultural production. Added to this is the risk that major glaciers, for example those in the high Himalayas that feed the major rivers of South and South East Asia, will disappear. River flow is likely to become seasonal rather than year-round, with enormous effects on agricultural production and food security.

Coastal flooding, shoreline erosion, drought, natural resource degradation and food shortages can precipitate mass migration and increase the potential for conflict. They can also spark political unrest, with similar consequences. The example of Darfur in Sudan (see page 57) shows what can happen next.

Ambassador Toni Frisch, current Chair of the Advisory Group on Environmental Emergencies (AGEE), feels strongly that the occurrence of natural disasters is increasing due to climate change, and it is important that people take note and understand that this will mean more environmental problems. "The dangers associated with flooding – including siltation, oil spills and chemical contamination – are often underestimated," he says. "The world talks about the number of deaths, and that is a tragedy, but the consequences

for the environment can be most severe in cases where there are few deaths and where less international attention is drawn." There is therefore a need to increase awareness of the link between climate change and environmental emergencies and to underline the importance of collaboration in prevention and response initiatives.

What does climate change mean for international environmental emergency response?

Climate change is now registering at the top of the international agenda. At the United Nations Climate Change Conference to be held in Copenhagen in December 2009, 180 nations are meeting in an attempt to agree targets to reduce greenhouse gas emissions and commit funds to support development of renewable energy solutions. At the same time, preparations are in progress for a 2011 IPCC Special Report on: *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation.* These and other high-profile events provide opportunities for the United Nations disaster-response agencies to come together with the scientific community to strengthen understanding of and consensus on the major issues and the way forward.

The effect of climate change is already straining the disaster relief system and adapting to climate change will require a rethink of current humanitarian and environmental emergency response systems. In hazard hotspots, there is a need to shift focus and invest in better disaster planning and preparedness to reduce the effects of extreme weather on communities. Rather than react to emergencies, disaster professionals must learn to act sooner and act smarter.

"The world is changing and we need to re-evaluate our mission, says Vladimir Sakharov. "We should be better equipped to respond to

"The importance of environmental issues in humanitarian assistance is better-recognized now than ever before. This momentum will only continue to grow, particularly in the face of global challenges like climate change, which is already creating significant humanitarian consequences. Environmental emergency preparedness and response are vital, on a global basis, to meet these challenges."

Achim Steiner, United Nations Under-Secretary-General and Executive Director United Nations Environment Programme and John Holmes, United Nations Under-Secretary-General for Humanitarian Affairs and Emergency Relief Coordinator

the need for preparedness, we need to be creative keeping in mind limited resources."

In addition to increased funding to help countries prepare, this implies a need for greater efficiency, both within the United Nations itself, and in its ways of working with other development partners. It also means focusing more on an integrated, multi-disciplinary approach to prevention and preparedness and on building local capacity, thereby reducing demand for international response.

A number of recent directional shifts are affecting the United Nations system itself. There is renewed emphasis on the future evolution of international environmental governance, including calls for greater coherence within the United Nations system, for harmonization of aid under a new architecture, for increased focus on the role of the private sector, for national ownership of development programmes and for results-based management (see box, page 84). Hassan Partow, Environmental Affairs Officer at UNEP's Post-Conflict and Disaster Management Branch (PCDMB), believes that, interestingly, climate change gives the environment – and the field of environmental emergencies – more weight. He sees this being reflected already in the current United Nations reform process and recent General Assembly Resolutions or UNEP Governing Council decisions.

In UNEP's Medium Term Strategy for 2010 to 2013, disasters and conflicts take a higher profile, being highlighted as one of the agency's six priority areas. The Strategy sets out the next phase in the evolution of UNEP as it becomes a more effective, efficient and results-focused entity, meeting the expectations of governments and other stakeholders in responding to global environmental challenges and opportunities.

Spreading the word

As discussed in Chapter 5, the Advisory Group on Environmental Emergencies (AGEE) introduced the *Rosersberg Initiative* in recognition of the fact that there is a need for improvement in the existing system for environmental emergency response. One of the gaps identified was that of sharing knowledge and information. While an extensive body of experience in the domain of international emergency assistance has

OCHA's Jesper Lund speaking to the media following the earthquake in northern Pakistan in 2005

Delivering as One

Recognizing that it needed to change in order to respond to the challenges of a changing world, the United Nations launched its *Delivering as One* pilot initiative in 2007. This initiative aims to test how the United Nations family could provide development assistance in a more coordinated way.

Eight countries (Albania, Cape Verde, Mozambique, Pakistan, Rwanda, Tanzania, Uruguay, and Vietnam) volunteered to host pilot studies in an effort to work out how best to capitalize on the comparative advantages of the different United Nations agencies. This includes experimenting with ways to increase the system's impact through more coherent programmes, reduced transaction costs for governments, and lower overhead costs for the United Nations itself.

The aim of the initiative is to reduce duplication and transaction costs so that the United Nations can use resources more effectively to support partner countries in achieving their development goals. There are indications from some donors that they will pursue a more coherent and coordinated approach by pooling funds at the country level to support the work of the United Nations.

"These pilots show the United Nations' commitment to bringing together the expertise, experience and capacities of the entire United Nations family to support national development strategies," said Kemal Dervi, Chair of the United Nations Development Group (UNDG). "The specialized agencies have a wealth of knowledge and commitment to offer, and much closer cooperation between the Funds and Programmes and our wider family can yield great benefits."

The pilot country teams report that their Governments are exercising increased national leadership over United Nations programmes and taking a stronger role in steering United Nations agencies to support national development priorities. They are also better aligning their capacity to the needs of country programmes, and the use of pooled funds is showing the potential to be an important country-level source of predictable funding.

The Joint Environment Unit represents such a model of cooperation between agencies, preceding the *Delivering as One* initiative. By building on potential synergies between OCHA and UNEP, the Unit maximizes complementarities and reduces duplication of effort. The Joint Unit's funding model also moves beyond United Nations traditions.

OCHA colleagues René Nijenhuis (left) and Stephen Tull (right) were part of the UNDAC team deployed following Typhoon Morakot in August 2009

© Sawyer Mars

Source: www.undp.org

"Improving our ability to respond effectively to increasing and increasingly extreme climatic events is now a priority part of our business. This calls for a systemic shift of attention, resources and expertise to improve disaster preparedness."

John Holmes, Under-Secretary-General for Humanitarian Affairs and Emergency Relief Coordinator

been amassed, much of this knowledge is not commonly known or used outside of its primary users, the relief responders. Thus there is a gap between response on the one side and prevention and preparedness on the other.

At the same time there are opportunities to bridge this gap. Firstly, by making better use of the experiences and expertise available in industrialized countries by sharing them with the countries that need assistance. Secondly, there is scope to improve access to the lessons

National Focal Point personnel participating in the eighth meeting of the Advisory Group on Environmental Emergencies in 2009

learned from past disasters and the latest thinking on environmental emergencies. And thirdly, existing voluntary guidelines, such as those prepared by the Joint Environment Unit (see Chapter 1), could be promoted more widely.

> ***"The year 2012 provides a once-in-a-decade opportunity to focus world attention on environmental emergencies"***
>
> *René Nijenhuis, Joint Environment Unit*

AGEE is playing a leading role in the push for change. Member countries are being encouraged to promote a greater awareness of the environmental dimension of crises and the importance of addressing these as an integrated part of humanitarian response. Through their own national authorities, they will also encourage knowledge of – and adherence to – recommendations, guidelines and technical standards that exist or are being developed in this field (such as the guidance note on *Humanitarian Action and the Environment,* see Chapter 5).

Children sit amidst the rubble of their home in Balakot, Pakistan in 2005. Hazard contingency plans are part of the re-building exercise

"The Joint Environment Unit has established and strengthened the connection between response and preparation. Many recipient countries don't want just response teams, they want to be prepared so they can respond by themselves."

Kathy Jones, US Environmental Protection Agency

René Nijenhuis believes it will also be important for the Joint Environment Unit to address the issue that not all potential recipients of assistance are aware of what could be available to them. "Countries that need our help often don't know how to request assistance. So one of our priorities will be to develop and distribute guidelines on the kind of international support available through the multilateral system, who provides it, and how to request it."

Environmental experts checking for contamination following the collapse of a uranium mine in the Democratic Republic of Congo in 2004

Preparedness in action: saving lives in Mozambique

At the end of February 2007, Mozambique was reeling from the double impact of two catastrophic natural disasters. While the Zambezi and Save rivers were already flooded, a Category Four cyclone brought more rain inland and devastated the southern coast, affecting over 300,000 people. The disaster also caused damage to local infrastructure costing approximately US$171 million and destroyed 277,000 hectares of crops, including an estimated 80 percent of the cereal crop in the affected areas.

In a country where more than half the population lives below the poverty line, these recurring disasters exacerbate people's existing vulnerabilities and represent major economic setbacks. The loss of assets such as homes, livestock, clothing, agricultural tools and seeds had a devastating impact on a population that depends on subsistence agriculture and fishing. Poverty and the lack of any viable alternative to living in the flood plain underlie this exposure to repeated shocks.

Ironically, damming the Zambezi to control flooding has put more people at risk. The ability to control the annual floods encouraged encroachment onto the lowlands of the lower Zambezi, where the land is very fertile. However, major flood events overwhelm the capacity of the dams and they are becoming more frequent. The communities currently living in the flood plain are essentially accepting the risk of major floods in return for better harvests and fishing. From a risk reduction perspective, one solution is to encourage permanent resettlement on higher ground, but many do not see this as a viable alternative to the more fertile flood plains. The national disaster management authority estimated that of those evacuated during the 2000, 2001 and 2007 floods, some 40 percent returned to the flood plains.

Although limited in scale, the 2007 floods provide insight into the elements that make up an effective national and international response. The response has been considered a success as there was no widespread suffering or avoidable deaths. This is credited largely to effective national preparedness and response coordination with international donors and agencies in support. While evaluations have identified numerous best practices, the key preparedness elements that ensured a successful response were:

- Strong national leadership and political commitment to preparedness: In particular, the clear political support and direction that led to the creation of the National Disaster Management Institute (INGC) and subsequent implementation of extensive preparedness measures
- Availability of resources, technical support and funds for preparedness: In addition to national resources, international donor investment and support to the INGC and related preparedness action was instrumental
- Active involvement of communities, civil society and agencies in the implementation of disaster preparedness measures in advance
- Strong international and national working relations in preparedness activities (such as the October 2007 simulation exercises)
- Rapid availability of sufficient funds via the United Nations Central Emergency Response Fund (CERF).

Guidelines will also be prepared on how countries that want to provide international support should go about this. "Many actual and potential donors have identified this as a problem area," he continues. "They do not always know what they are 'getting into', what is expected from them, what they may expect in return for their participation in multilateral assistance, and what is expected by the recipient country".

Further attention will also be paid to the need to strengthen the international governance system for environmental emergency response. The year 2012 provides a once-in-a-decade opportunity to focus world attention on environmental emergencies, says René Nijenhuis, since the next global summit is likely to be held that year. The year also marks the end of the *Rosersberg Initiative*, the end of the Medium Term Plan of the Millennium Development Goals and the expiration of the *Kyoto Protocol*. Following on from the *Bruch Report* (see Chapter 5), the next step is to guide the process towards a United Nations General Assembly Resolution or UNEP Governing Council Decision to formalize global frameworks for responding to environmental emergencies.

Many developing countries are in the process of designing multi-hazard contingency plans at national level. Promoting inclusion of environmental emergencies within these would help ensure better preparedness if a disaster strikes and reduce the need for international emergency assistance.

Johann Goldammer, Director of the Global Fire Monitoring Center, has a vision for the future that includes attention to more decentralized working. "The problem is that financial resources are linked to requests for assistance and these often are not forthcoming. Countries will have to play a more proactive role by themselves."

A final word

After 15 years of international effort to tackle environmental emergencies, much has been accomplished. However, there is still space for growth and improvement. Renewed efforts are required in the face of the major challenges facing the Earth due to the pressures of development, population growth and climate change. But as this publication shows, there is a strong spirit of collaboration among nations and a deep desire to minimize environmental damage. With guidance from the United Nations and drive from the Advisory Group on Environmental Emergencies and the Joint Environment Unit, the plans described in this chapter can be achieved within the next five years, bringing about further real and vital progress in the way the world deals with environmental emergencies.

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