

# CHAPTER VI

## MULTILATERAL APPROACHES TO SECURITY COOPERATION ON ENVIRONMENTAL ISSUES

### Introduction

Mr. Curtis Bowling, Principal Assistant Deputy Under Secretary of Defense (Installations and Environment) moderated this panel discussion. The objectives of the session were to promote environmental cooperation between defense and environmental authorities, identify opportunities for multilateral and interagency cooperation, explore the processes and mechanisms available to address consequence management planning, and describe the practical application of information age tools to enhance disaster response and consequence management planning

### Coordinating Regional Disaster Response Activities

Mr. Gary Barrett  
Office of Foreign Disaster Assistance,  
United States Agency for International Development

Ladies and gentlemen, I am very pleased to be here this morning. First of all, I would like to thank our Qatari hosts, the Qatari Armed Services, as well as extend my appreciation to the U.S. Central Command, the Near East South Asia (NESAs) Center, and the United States Army War College, for their kind invitation for me to speak today. I will provide an introduction to the United States Agency for International Development's (USAID) Office of Foreign Disaster Assistance (OFDA).

I will present an overview of what the Office of Foreign Disaster Assistance does. I hope to cover what a disaster is, versus a humanitarian assistance operation, the humanitarian coordination framework we work within, some of the coordination challenges, how OFDA deals with consequence management, and lessons learned from various relief operations.

OFDA is responsible for the coordination of the U.S. Government's (USG) nonmilitary response to international disasters. The overarching tasks within this mission are to save lives, alleviate suffering of disaster victims, reduce the economic impact of the disaster, and support prevention, mitigation, and preparedness activities. The U.S. Government, through our office, may respond if the disaster is beyond the ability of the affected country to respond adequately, if the affected country requests (or will accept) outside assistance, and if response is in the interest of the U.S. Government.

So, who can declare a disaster? Normally the requests are received from the Ambassador, Chief of Mission, or the Assistant Secretary of State from the affected area or region (e.g. Somalia and Northern Iraq).

OFDA has a wide range of response options. These options include, but are not limited to, deploying regional advisors and assessment teams, and funding non-governmental organizations (NGOs), international organizations (IOs), and United Nations Relief organizations directly. Funds are also available through U.S. Embassy and USAID missions.

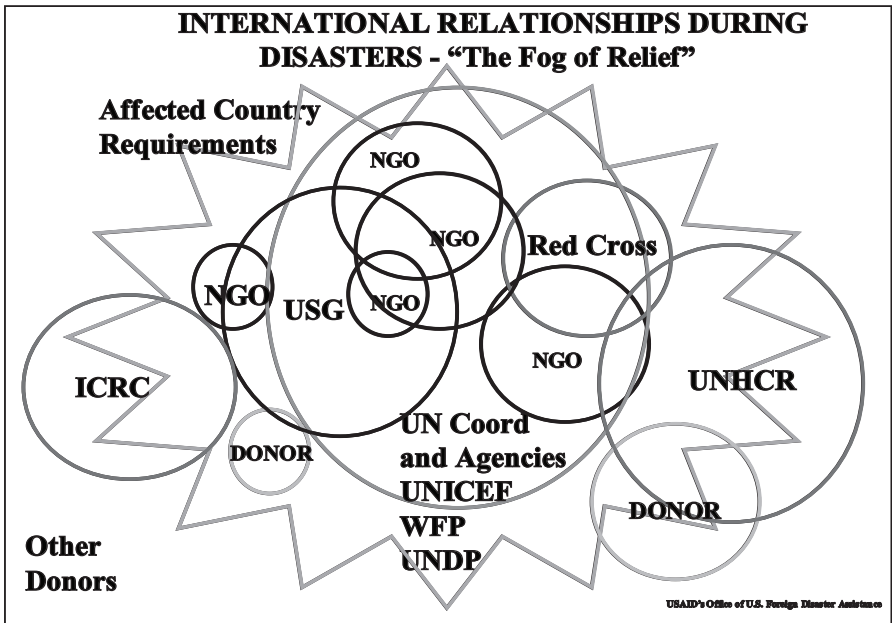


FIGURE 6-1: INTERNATIONAL RELATIONSHIPS DURING DISASTERS - "THE FOG OF RELIEF"

OFDA can provide disaster relief commodities, and/or deploy a Disaster Assistance Response or Ground Operations Teams (DART/GO).

During a disaster, there are a large number of organizations and donors providing assistance to the affected country (figure 6-1). There is what we call, “the fog of relief.” Each organization has their agenda and purpose for providing assistance and the ability of the affected country to organize and foster international relationships toward a common goal is necessary to provide maximum effort without wasting limited resources. The humanitarian framework consists of six major organizations: the affected country, military organizations, NGOs, the U.S. Government, the International Committee of the Red Cross (ICRC), and United Nations (UN) organizations.

As stated earlier, based on the donor’s purpose and charter, the challenge is coordinating the relief efforts. The lack of common language between different corporate cultures will result in a communications challenge. Who is in charge? Who is defining roles and responsibilities for each organization? The affected country and donor organizations need to link their political strategies to field operations. A key factor is the change of personnel.

How can we overcome the “fog of relief”? The affected country needs to develop and articulate a clear political strategy to the relief organizations. If military organizations are used, the military needs to understand that short-term actions can affect the long-term situation. During the planning phase, the operations plan needs to phase in the transition to a purely civilian effort, not during the execution phase. Finally, the more complex the situation, the more challenging it is to create a shared vision and a commonsense integrated strategy.

What are the lessons learned? Civil-military relations must be developed and fostered based on mutual support. Humanitarian intervention is a people-intensive process, and there is a continuum of effort in which all parties have a proper role to play in the relief effort.

I would like to shift the focus from humanitarian assistance operations to consequence management. Consequence Management is “where there is a contaminant.” Presidential Decision Directives (PDD)

39 (June 1995) and 62 (1998) are policy directives for responding to a terrorist threat or use of a weapon of mass destruction in the United States or overseas. The PDDs established that the Department of State has the responsibility for leading and managing the Foreign Emergency Support Team (FEST) and Consequence Management Response Team (CMRT) for WMD incidents, and that membership in the FEST/CMRT will include the capability for responding to nuclear, biological, or chemical threats in a consequence management cell.

As an independent federal government agency, USAID receives overall foreign policy guidance from the Secretary of State. As a part of USAID, OFDA's role in consequence management is to provide humanitarian assistance to victims or populations affected by a WMD event, to provide financial and/or technical support in characterization, remediation, and guidance to host nation (HN) and U.S. mission field personnel, NGO partners, etc., and to participate in interagency planning and exercises. OFDA takes an all-hazards approach to a WMD event.

The U.S. Government determines whether the WMD event was intentional or a natural event. If a large population movement is caused by threat of contamination, OFDA determines if the affected government infrastructure can or will be overwhelmed and unable to support the needs of the affected population. Further, OFDA determines the prevalence of contamination to the population and environment, whether medical response, isolation, and decontamination personnel and equipment are required, and if there is a perceived threat to the population.

OFDA can assist in the development of institutional relationships with technical cooperators through Interagency Agreements, coordinate with DOS/DOD and other agencies on consequence management (CM) planning, training, and exercises, conduct ongoing training programs, provide a cadre of responders and technical expertise, and can establish an equipment cache for contingencies.

United States Public Health Service's (USPHS) Agency of Toxic Substances and Disease Registry (ATSDR) and Center for Disease Control and Prevention (CDC) are responsible for chemical/radiological/biological training and response. These agencies conduct embassy and mission chemical profiling, assist in the preparation of chemical,

biological, radiological, and nuclear (CBRN) annexes, and provide chemical and radiological hazards training modules.

Some of the most recent OFDA consequence management related responses were Djibouti 2002, Dominican Republic 2002, El Cajon 1999, Nipa Virus 1999, Nairobi 1998, and Lake Nyos 1986.

So, in summary, the foundation is here. I was very pleased to hear about the military and civilian exercises that take place, and you are certainly to be lauded for the kind of cooperation and initiatives that you have already taken.

## **Environmental Post-Conflict Assessments: A New UN Tool Developed by UNEP**

**Mr. Pekka Haavisto  
Chairman of the Afghanistan Task Force,  
United Nations Environment Program**

Military conflicts always bring human suffering, but what do we know about their environmental consequences? What risks do they pose to human health and the recovery process, and how can the environment be integrated into reconstruction efforts? Since spring 1999, the United Nations Environmental Programme (UNEP) has been working in areas of the world where the natural and human environment has been damaged as a direct or indirect consequence of conflict. The focus has been on investigating the environmental impacts of conflicts, recommending strategic priorities for cleanup and remediation, and strengthening the capacity of authorities for environmental management and protection, as well as catalysing and mobilising international support for environmental projects.

In February 2003, activities underway by UNEP included, among others, desk studies and field missions in the Occupied Palestinian Territories, in Afghanistan, and in Bosnia-Herzegovina. Post-conflict assessment work began in UNEP in 1999, in the Balkans region, to determine the environmental risks of the Kosovo conflict, to prioritise urgent needs for cleanup and remediation, and to take practical steps to raise financial resources to address the concerns identified in the UNEP post-conflict environmental assessment. UNEP's activities in the Balkans now cover Kosovo, Serbia, Montenegro, Macedonia, and Albania. In Autumn 2002, a new assessment of the use of weapons with depleted uranium (DU) was launched in Bosnia-Herzegovina, where DU remains a concern even seven years after the Bosnian war ended.

The positive reactions to the work conducted by UNEP in the Balkan countries led to the establishment of the UNEP Post-Conflict Assessment Unit (PCAU) in 2001, when the pioneering work in the Balkans was extended to other conflict-stricken areas of the world.

As a result of the experience gained through the practical and action-oriented environmental assessments, a framework and approach has evolved. In order to develop further environmental assessment as a new tool for the international community in tackling both pre- and post-conflict situations, a full understanding of different types of conflict-related environmental risks is required. Guiding principles in the development of the practical assessment and cleanup work have been the deeper analysis of the reasons of the conflicts and a better understanding of the different kind of environmental impacts, taking into account the changing character of contemporary conflicts. The development of the new types of weapons and military strategies poses additional challenges to the protection of the environment during conflicts and in a post-conflict environmental assessment scenario. In particular, terrorism, and the recent global phenomenon of the counter-reaction of war against terrorism, presents a new challenge on how to address the environmental consequences of conflict at the global level.

## **Human Health and Biodiversity under Threat**

Environmental risks are compounded by the fact that civilian and military activities very often take place in close locations, which are usually also in the middle of or near densely populated areas. The risks arising from chemicals are not limited exclusively to urban areas; chemicals can also be used as a weapon in rural areas, for example against guerrillas. One of the first cases of this kind was reported in Malaysia, where the British used herbicides for defoliation in the late 1940s and early 1950s. The most famous use of herbicides (e.g. “Agent Orange”) occurred during the Vietnam War.

In many African conflicts, the fighting, the over-exploitation of natural resources for income to supply the fighting troops, and the huge flows of refugees have raised concerns about drinking water, sanitation, forests, and biodiversity. For instance, it has been noted that the various armed conflicts in Ethiopia have put the considerable biodiversity and natural resources and many endemic species under constant conflict-related risk through deleterious habitat modifications, such as destruction of protected area assets, deforestation, overgrazing, and soil erosion. Also, the civil war in Sierra Leone has been a topic of concern: related biodiversity studies have pointed out that, in addition to the traditional

causes of biodiversity loss, the civil war has become a new serious cause, both because of its own inherent destructive capacity and its domino effect. In Rwanda there has been concern over the impact of civil war on the conservation of protected areas.

Generating income for troops and military purposes is one side of “warlordism,” or the privatisation of wars. Whether it is the question of diamond resources in Angola or the illegal cutting of forests in Afghanistan and in South-East Asia, one of the driving forces behind the overexploitation of natural resources is to provide military funding.

Destruction of the environment on purpose as an act of war was seen in the Persian Gulf War in 1991, when the Iraqi troops intentionally set fire to the Kuwaiti oil wells. These burning oilfields and the consequences of the oil leakages remain a long-term environmental concern for the Kuwaitis as well as for the international community. The process of providing compensation for this environmental damage is ongoing under the United Nations Compensation Commission (see <http://www.uncc.ch>). Environmental concerns have also been raised with regard to ongoing conflicts. A case in point is the civil war in Columbia, where chemicals are being employed for the destruction of drug cultivations, and in Chechnya, where the destruction in towns and villages has also led to environmental concerns.

## **Sources of Environmental Damage**

At the general level, a fundamental aim of UNEP’s environmental post-conflict assessments has been to offer a new tool for the international community to assist countries and regions in their post-conflict recovery and reconstruction period. As a significant “by-product,” this also helps to build awareness on consequences and costs of military conflicts that are not immediately obvious. Modern warfare has associated environmental impacts that appear in various ways and with different time lags. Conflicts can lead to a complex array of direct and indirect environmental impacts that can be characterised as being immediate or delayed, temporary or persistent, localised or transboundary.



From this perspective, a useful way to grasp analytically the broader issue of environment and warfare is to concentrate on the different possible environmental risks in military conflicts. Different types of action lead to different risks, and the objects under threat vary accordingly. The possible pre-, during- and post-conflict protection and cleanup activities also vary according to the nature of the assumed risk. In general, pre-conflict preventative action ought to be guided by learning from the sometimes-painful lessons of earlier conflicts, and plans should be made accordingly to safeguard people and the environment in the regions where a military conflict is impending. During conflict, efforts should be focussed on minimising the effects for people and the environment. Post-conflict measures range from humanitarian assistance and the safe return of refugees and internally displaced persons (IDPs), to cleanup, reconstruction, and capacity building.

Environmental impacts can be caused by many factors. They range from destruction of industrial sites to impacts of refugees and military troop movements. As an additional group, the impacts caused by boycotts or sanctions adopted by the international community might, in some cases, lead to environmental consequences, for instance by causing extra strain on certain (sanction-free) types of transport or by directing certain prohibited industrial production—and related imports and exports—beyond the reach of normal controls, and thus outside of the official environmental norms and regulations. Import restrictions on state-of-the-art technologies can also put limitations on the technologies used for environmental protection, including the limiting of polluting emissions from cities and industries.

In figure 6-2, these impacts are further analysed by presenting possible risks as well as suitable protection and cleanup methods, respectively. A connecting factor between movements and camps of military forces and those of refugees, as well as the targeting of vulnerable natural sites, is the risk posed to biodiversity. In such cases, the most suitable type of mitigation action—in addition to preparedness, risk identification, and other pro-active measures—includes cleanup and protection of the soil and groundwater, as well as waste and sewage treatments.

Type of Action	Risks – object under threat	Protection – Cleanup
Destruction of industrial sites, civil or military	Oil and chemical risks, nuclear risks	Evacuation, decontamination, cleanup of polluted sites, protection of groundwater and surface waters
Direct targeting of environmental resources, including forests, water, and food supplies	Biodiversity, protected species, nature, agricultural products	Rehabilitation programmes, quality control of water and food supplies
Use of conventional weapons	Traditional risks of warfare (increased when targeting nuclear, biological, or chemical facilities)	Preparedness, evacuation, cleanup
Use of non-conventional weapons	Risks of nuclear, biological, or chemical damage of the weapons used	Preparedness, evacuation, civil protection, decontamination
Use of new type of weapons:  - Depleted uranium (DU) - Cluster bombs (CB) - Fibre bombs (FB)	Ongoing risk evaluation. DU: radiological and toxicological risks; CB: biodiversity risks, future of nature areas; FB: PCB risks from burning transformer stations, slowing the returning of the refugees	Cleanup of polluted sites, destroying unexploded ordnance, informing the local population of the polluted areas
Use of landmines	Heavy metals in nature, risks to the everyday life of civilians after the conflict, limits the use of the areas (like forests and agricultural land), slowing the return of refugees and IDPs	Mine-clearance, mine-awareness campaigns
Use of environmental resources by refugees and displaced persons, movement of refugees, refugee camps	Biodiversity, groundwater, surface waters	Good sound planning, waste and sewage treatments, provision of fire wood supplies, subsequent cleanup afterwards
Use of environmental resources to finance military operations	Biodiversity, forests, desertification	International monitoring and control, code of conduct
Troop and vehicle movements, military camps	Oil and chemical risks, groundwater, damage to biodiversity	Identification of risks in advance, preparedness, protection of groundwater, “greening the armies”
International trade in goods and services, or flight sanctions, boycotts	Use of old technologies, slow down of cleanup processes, isolation from international environmental co-operation	International monitoring of impacts and related control checks, “clever” sanctions or boycotts

FIGURE 6-2: FACTORS CAUSING ENVIRONMENTAL IMPACTS

## **From Desk Study to Field Mission**

The UNEP Post-Conflict Assessment Unit works with a global scope to investigate environmental impacts of conflicts and pre-existing chronic environmental problems. The unit's work includes identifying risks to human health and environment, recommending strategic priorities for cleanup and remediation, and promoting an environmental agenda and regional environmental cooperation. In doing so, it strengthens the capacity of authorities for environmental management and protection, catalyses and mobilises international support for environmental projects, and integrates environmental considerations into the recovery and reconstruction process.

UNEP's approach is to demonstrate the linkages between environmental degradation, public health, and sustainable development in order to identify risks and promote sustainable resource use. When possible, assessments are carried out using a combination of international and national experts and UNEP's in-house specialists in order to share knowledge, build local capacities, and ensure recommendations reflecting local circumstances and realities. When needed, laboratory analysis and computer-aided geographic analyses are carried out using state-of-the-art equipment and techniques. Following assessment activities, a series of workshops and seminars are provided to help build capacity for environmental management and protection and to ensure that environmental considerations are integrated into the reconstruction and recovery process.

Typically, the process consists of four different phases, although the design of each activity is adjusted to suit the particular special features of the situation in question. Figure 6-3 illustrates the phases of environmental post-conflict assessment in detail. The outcome of the first phase is usually a publication in the form of a desk study or feasibility study. The study collates and gathers the key information, for instance on the targets of military operations, quantity and type of weapons used, and environmental sensitivities. This first phase also identifies the main actors with regard to impacts and remedial steps: the key stakeholders, related institutional arrangements, and possible refugees and IDPs. This information serves as the foundation on which the next phases of the operation can be built.

One or several field missions generally follow, at the location of the conflict itself, to investigate firsthand the situation on the ground, to carry out interviews with local experts and populations, or to carry out scientific sampling of key environmental indicators. In some cases, these have occurred immediately after the conflict (UNEP mission to Kosovo in 1999 or to Afghanistan in 2002), in other cases, during the conflict (UNEP activities in the Occupied Palestinian Territories 2002) or one or more years after the conflict has ended (depleted uranium missions in Kosovo in 2000, in Serbia and Montenegro in 2001, and in Bosnia-Herzegovina in 2002). The field missions draw upon senior scientific and environmental experts, and they are planned in close collaboration with responsible authorities and local experts as well as any key UN and other institutional partners already active in the region in question. In most of the assessments carried out so far, samples are collected during the visits

Phase I: Desk Study	Phase II: Field mission	Phase III: Reporting	Phase IV: Implementing
<p><i>Collect and evaluate information on:</i></p> <ul style="list-style-type: none"> <li>- Targets hit and chemicals released</li> <li>- Quantity and type of weapons used</li> <li>- Environmentally sensitive areas</li> <li>- Ongoing environmental projects</li> <li>- Refugee flows</li> <li>- Institutional arrangements</li> <li>- Key stakeholders</li> </ul>	<p>Recruit scientific experts with skills needed to address issues identified by desk studies</p> <p>Plan mission in collaboration with responsible authorities, local experts and UN agencies</p> <p>Visit key sites identified in desk studies</p> <p>Collect and analyse e.g., air, soil, water, and vegetation samples</p>	<p>Use sample results and complementary data to identify key “hot spots” —sites that pose significant risks to health and environment</p> <p>Identify key environmental challenges</p> <p>Develop strategic recommendations for:</p> <ul style="list-style-type: none"> <li>- Urgent environmental actions and priorities</li> <li>- Clean-up and remediation at the ‘hot spots’</li> <li>- Improving institutional capacity</li> </ul>	<p>Provide technical assistance for clean-up and remediation activities (i.e. best practice)</p> <p>Raise awareness and support for assistance</p> <p>Conduct feasibility studies at ‘hot spots’</p> <p>Conduct workshops and training on:</p> <ul style="list-style-type: none"> <li>- Hazardous waste management</li> <li>- Multilateral environmental agreements</li> <li>- Local environmental action plans</li> <li>- Emergency preparedness</li> </ul>

FIGURE 6-3: THE PHASES OF ENVIRONMENTAL POST-CONFLICT ASSESSMENT

to the sites. The analysis of air, soil, water, vegetation, and other collected samples takes place subsequently, in several highly ranked laboratories in different countries. Diversity is sought in the choice of analysing laboratories to provide greater impartiality and weight to the results.

The third phase—that of reporting—follows the field mission; in this phase, the focus is on distilling the essence of the scientific findings into a readable and pragmatic format accessible to policy-makers and key local and international stakeholders. Translation into appropriate languages, including other than the official ones of the United Nations, ensures that the report is accessible also to those who will ultimately be involved in any implementation activities.

The key findings and recommendations of the report provide the guidelines for the final phase, namely the implementation of short-, medium- and long-term recommendations. These activities include, *inter alia*, the provision of technical assistance for cleanup and remediation activities, the raising of local and international awareness, the carrying out of further studies on “hot spots,” and the arranging of workshops and training.

## **Experience from the UNEP Post-Conflict Activities**

The UNEP post-conflict activities started with its task force in Kosovo in 1999, after the Balkan wars. Since then, the focus of the work has expanded to include other areas of the world. In November 2002, UNEP had ongoing post-conflict activities in Afghanistan, in the Occupied Palestinian Territories, Bosnia-Herzegovina, in the Federal Republic of Yugoslavia (FRY), and in Albania. All of these operations have been funded outside of UNEP’s regular budget, by voluntary pledges from donor countries (figure 6-4).

## **Kosovo Conflict: Oil leakages and Chemical Risks**

During the spring of 1999, when the war in Kosovo was still ongoing, environmental sensibilities worldwide were shocked by images of burning oil refineries in Pancevo and Novi Sad, of oil products and chemicals leaking into the Danube River, and of biodiversity sites being targeted in the Federal Republic of Yugoslavia. The conflict in the Balkans has given rise to a revamped discussion about modern warfare and its

Activity	Years	Scope	Budget (USD millions)	Donor countries	Follow-up
Environmental Assessment after Kosovo conflict + Feasibility Study	1999-2000	War damage in Kosovo, Serbia and Montenegro	2.2	Austria, Belgium, Czech Republic, Denmark, Finland, France, Italy, Netherlands, Norway, Sweden, UK	Cleanup activities at "hot spots"; environment as part of humanitarian assistance; environment as part of the Stability Pact for South-Eastern Europe
Cleanup at four "hot spots" in Serbia	2000-2003	Clean-up of polluted soil	12.5	Finland, France, Denmark, Germany, Ireland, Luxemburg, Netherlands, Norway, Sweden, Switzerland	Environmental capacity building for local authorities; preparing of UN guidelines for environmental post-conflict cleanup
Macedonia assessment	2000-2001	Refugee flow from Kosovo; long-term environmental degradation	0.55	Netherlands	
Albania assessment + Feasibility study	2000-2002	Refugee flow from Kosovo; long-term environmental degradation	0.98	Netherlands, Sweden	Cleanup of one "hot spot" (Sharra landfill); possible further action by World Bank and donors
Depleted uranium assessment in Kosovo	2000-2001	Use of depleted uranium during Kosovo conflict	0.2	Switzerland	Recommendations for UNMIK, KFOR, and Kosovo authority
Depleted uranium in Serbia-Montenegro	2001-2002	Use of depleted uranium during Kosovo conflict	0.2	Switzerland	Recommendations to FRY authorities; verifying ongoing cleanup activities
Afghanistan post-conflict environment assessment	2002-2003	Long-term environmental degradation	1.0	Canada, Finland, Luxemburg, Switzerland	Capacity building; integrating environment to reconstruction
Environment assessment in the Occupied Palestinian Territories	2002-2003	Environmental consequences of the occupation; environment as a bridge-building tool	0.2	Norway	(To be confirmed)
Depleted uranium in Bosnia-Herzegovina	2002-2003	Use of depleted uranium in Bosnian war 1994-95	0.2	Italy, Switzerland	Capacity building; recommendations for decontamination
United Nations Compensation Commission (UNCC)	2002-2004	Establishing a databank to assist UNCC's Environmental Panel when processing environmental claims of the Iraqi invasion and Gulf War of 1991	2.0	UNCC	

FIGURE 6-4: UNEP POST-CONFLICT ENVIRONMENTAL ACTIVITIES

environmental consequences. New types of weapons—such as cluster bombs and ammunition with depleted uranium—and the consequences for chemical facilities required new approaches to cleanup activities.

The Kosovo conflict was the first where the United Nations and UNEP took the initiative to undertake a post-conflict environmental assessment as quickly as possible. When the Kosovo war was still ongoing, UNEP took part in the United Nations Interagency Humanitarian Needs Assessment Mission of spring 1999. The UNEP Balkans Task Force started its fieldwork in summer 1999, just a few weeks after the conflict ended. More than sixty scientists from nineteen countries undertook four field missions, including visits to targeted sites, research work on the River Danube, sampling at biodiversity sites, and working on human settlements in Kosovo.

The Task Force submitted its report in October 1999, only five months after the conflict had ended. It concluded that pollution detected at four environmental “hot spots” (Pancevo, Kragujevac, Novi Sad, and Bor—all in Serbia) was serious and posed a threat to human health. It called for immediate cleanup action as part of humanitarian assistance to the region. But it also concluded that much of this pollution pre-dated the conflict and that there was widespread evidence of long-term deficiencies in treating hazardous waste. The team was welcomed in Pancevo—a few weeks after the end of the conflict—by some local non-governmental organizations (NGOs), with the words: “You are here at last! We have been waiting for you for ten years!” An independent environmental assessment was certainly needed. People had long suffered from different pollution-related diseases: the team learned of a special “Pancevo cancer”—liver cancer caused by petrochemicals.

The report broke new ground by making a clear link between the environment and humanitarian assistance. This was politically important because, in the summer of 1999, the FRY was still led by Milosevic, and many governments were unwilling to provide finance for any activities connected with reconstruction. However, the international community was willing to support the first cleanup activities in the area as part of humanitarian assistance. While during the conflict a major claim had been made by the FRY government about environmental destruction, after the war had ended, environment was no longer among the top

priorities in the country. Though technically the government could deal with part of the problem, much of it still required assistance from the international community.

A central thesis of the report was that local people working on reconstruction after a conflict are at serious risk when polluted sites have not been properly cleaned up. Typical problems at industrial sites include the risks of pollution near drinking water sources; the treatment or removal of surface soil contaminated with heavy oil, polychlorinated biphenyls (PCBs), heavy metals and other hazardous substances; and the demands of continued monitoring of air, water, soil, agricultural products, and human health.

At the four “hot spots”—Pancevo, Novi Sad, Kragujevac, and Bor—the level of contamination was very serious. At the Pancevo industrial complex, for example, a wastewater canal flowing into the Danube was seriously contaminated with sixty different chemicals, including dichloroethane (EDC) and mercury. At the Zastava car plant in Kragujevac, PCB and dioxin contamination urgently needed cleaning up.

UNEP’s recommendations distinguished between short-term actions aimed at immediate cleanup, and longer-term recommendations. The essential immediate action included detailed groundwater studies; remedial treatment or removal of contaminated surface soil; a detailed disposal plan, coupled with monitoring of air, water, soil, agricultural products and human health; and communication of these results to the local population. Site-specific recommendations as well as general recommendations on biodiversity, human settlement, and long-term institution building were also made. Feasibility studies and cleanup operations followed the assessment work, and a sizeable project undertaken by UNEP for the cleanup of polluted soil was still ongoing in the autumn of 2002 in Serbia. The cost of this cleanup project is estimated at 16 million USD; it is funded by voluntary contributions by donors. In addition to the “hot spots,” UNEP has been providing capacity building through workshops and training activities.



## Depleted Uranium in the Balkans

Fieldwork conducted by UNEP after the Kosovo conflict showed that new types of weapons had been used. These included cluster bombs, which consist of plastic boxes containing several hundred bomblets that were dropped from planes. The usual targets are vehicles and especially convoys. When these had been in natural parks, many of the bomblets stayed unexploded in the trees or in the grass. The cleaning of these areas was difficult, and several accidents with cluster bombs occurred long after the conflict had ended. A second type of new weapon used was the fibre bomb, which had often been used at transformer stations or on main electricity lines. These do not explode, but they cause an electrical short-circuit severing the electricity service, which can also cause the burning of the transformer stations. Since transformers usually contain oil for cooling, the use of these types of weapon can cause oil leaks or combustion. In some cases in Kosovo and Serbia, the oil contained PCBs, the burning of which released substances such as dioxins.

But perhaps the type of new weapon used with the most complex environmental impacts was depleted uranium ammunition. Depleted uranium (DU) is a by-product of the process used to enrich natural uranium ore for use in nuclear reactors and nuclear weapons. There are multiple military applications of DU. As in the civilian sector, DU may serve as counter-ballast, in both aircraft and missiles. Not all counter-ballast is made of depleted uranium, and less DU is now used for this purpose than in the past. Because of its density and resistance to penetration by anti-armour munitions, DU can also be used in the armour of tanks.

During the Kosovo conflict, depleted uranium was used in the NATO air campaign, but both during and after the conflict, there was a lack of detailed environmental information about its use. In the autumn of 1999, UNEP visited several sites where DU had been rumoured to have been used, but at these sites, initial inspection revealed no indications of the use of DU. Consequently, a desk study of the impacts of the use of DU was carried out in Autumn 1999, which found that additional information from NATO would be needed to measure the impacts of DU after the Kosovo conflict.

It was not until the summer of 2000 that the United Nations received from NATO a detailed map of the sites where ammunition with depleted uranium had been used. This showed 112 targets, mostly in Kosovo, where, in all, more than 30,000 rounds of depleted uranium ammunition had been used. This is equivalent to nine tons of DU. UNEP was able to begin assessing the effects of depleted uranium in November 2000, almost one and a half years after the conflict. A team of fourteen scientists from several countries and from the International Atomic Energy Agency (IAEA) carried out the field assessment. The team carried out its work in close cooperation with the United Nations Mission in Kosovo (UNMIK) and the NATO Kosovo Force (KFOR). UNEP field missions visited eleven of the 112 sites that were identified as being targeted by ordnance containing DU. The UNEP team collected soil, water, and vegetation samples and conducted smear tests on buildings, destroyed army vehicles, and DU penetrators.

No higher-level ground contamination was found in the investigated areas. Therefore, the corresponding radiological and chemical risks were judged insignificant, even if the low-level contamination was widespread. There were a great number of contamination points in the investigated areas, but no significant risk was found related to these points in terms of possible contamination of air or plants.

One finding of the report was that it is highly likely that many penetrators are still lying on the ground surface; this has associated risks. If a fragment was put into a pocket or somewhere else close to the human body, there would be external beta radiation of the skin, leading to quite high local radiation doses after some weeks of continuous exposure. However, skin burns from radiation are unlikely. Remaining penetrators and jackets that may be hidden at several meters depth in the ground, as well as any on the ground surface, constitute a risk of future DU contamination of groundwater and drinking water. One interesting finding during the Kosovo DU mission was that the penetrators found and analysed do not only include depleted uranium, but very small amounts of transuranic elements like plutonium. This indicates that, in the production process of DU, materials or facilities are contaminated with materials of higher radioactivity.

Although the Kosovo mission findings showed no cause for alarm, the report describes specific situations where risks could be significant. There are also scientific uncertainties relating to the longer-term behavior of DU in the environment. For these reasons, UNEP called for certain precautionary actions. According to UNEP, this precautionary action should include visiting all DU sites in Kosovo, removing radioactive penetrators and jackets on the surface, decontaminating areas where feasible, signing and fencing areas that have not yet been decontaminated, and providing information to local populations on precautions to be taken if DU were to be found. During the Kosovo conflict, a few sites outside Kosovo, in Serbia and Montenegro, had also been targeted with ordnance containing DU. Following the precautionary approach advocated by UNEP and to reduce uncertainties about the environmental impacts of DU, it was evident that a second phase of scientific work would be needed to assess the impacts in these other areas.

This second phase started in September 2001 and was concluded in March 2002 with the publication of the report *Depleted Uranium in Serbia and Montenegro—Post-Conflict Environmental Assessment in the Federal Republic of Yugoslavia*. This report provided additional information and revealed important new discoveries on the environmental behaviour of DU.

For example, it was learned that, more than two years after the end of the conflict, particles of DU dust could be detected from soil samples and from sensitive bio-indicators like lichen. However, as the levels were extremely low, it was only through the use of state-of-the-art laboratory analyses that detection could be achieved. Based on the findings, UNEP could confirm that contamination at the targeted sites was widespread, though no significant level of radioactivity could be measured. Furthermore, during this assessment, through modern air sampling techniques, the UNEP team detected airborne DU particles at two sites. While all levels detected are still below international safety limits, these results add valuable new information to the scientific body of knowledge concerning the behaviour of DU and have important implications for site decontamination and construction works.

One of the most significant findings of the assessment is that future risks to groundwater may be posed by the gradual corrosion of

DU penetrators. While there are major scientific uncertainties related to the rate and scale of corrosion, and therefore the corresponding environmental and health impacts, monitoring is needed to ensure that targeted sites remain risk free. Based on the DU risks found in Kosovo and in Serbia and Montenegro, UNEP recommended a third study to be made in Bosnia-Herzegovina, where around three tonnes of DU was used during the Bosnian war from 1994 to 1995. A field mission to collect samples took place in October 2002, during which a total of fifteen sites were visited and measurements taken in Bosnia-Herzegovina, including Republica Srpska.

Slightly radioactive DU material was found on the surface a full seven years after the conflict, and at some locations, such as the Hadzici tank repair facility near Sarajevo and the Han Pijesak garrison in Republica Srpska, proper cleanup had not been carried out after the conflict. Depleted uranium dust could still be found in the targeted buildings that are currently in active use, and therefore, UNEP recommended as an immediate precautionary measure the decontamination of these buildings.

UNEP also conducted soil, air, bio-indicator and water sampling in Bosnia-Herzegovina to analyse the long-term consequences of the DU in nature. Two other UN organisations, the International Atomic Energy Agency (IAEA) and the World Health Organization (WHO) joined the UNEP mission to Bosnia-Herzegovina. The final report of the Bosnia-Herzegovina mission with conclusions and recommendations will be published by UNEP in March 2003.

In the spring of 2002, UNEP also participated in a DU mission by the IAEA to Kuwait to analyse the DU situation after the Gulf War of 1991. The amount of DU used during the Gulf War is much higher than in the Balkans. In Iraq and Kuwait more than two hundred tonnes of DU were used, whereas the amount was nine tonnes in Kosovo and three tonnes in Bosnia-Herzegovina.

## **Macedonia and Albania: Refugees and Environment**

In September 2000 an international team of experts assembled by UNEP visited Albania and the Former Yugoslav Republic of Macedonia

to assess the environmental damage caused by the Kosovo conflict as well as the institutional capacity of the two governments to address environmental problems.

The issue of the impact of refugees was the main reason for carrying out a post-conflict environmental assessment. While Albania and the Former Yugoslav Republic of Macedonia were not the focus of fighting during the conflict, their natural environment was subjected to stress from hundreds of thousands of civilians who, fleeing the Kosovo conflict, crowded into refugee camps in this territory. In addition, before the study was conducted, it was expected that there might also be pre-conflict “hot spots” of industrial pollution that had since not received attention, as the governments concerned were confronted with enormous social and economic problems created by the conflict and its aftermath. Furthermore, one core area of concern in these assessments was the institutional capacities for environmental protection in Albania and Macedonia.

During the field missions, UNEP specialists met with local experts, and authorities visited sites and took samples, enabling the mapping of pollution sources and of seriously contaminated sites requiring urgent attention. A central finding of the assessment was that the most severe environmental challenges were caused by pre-conflict industrial pollution. In comparison, the refugee issue had relatively modest impacts.

UNEP identified five “hot spots” in Albania and Macedonia where swift attention was required to prevent further risks to human health and the environment. Some of the “hot spots” concerned industrial plants that had already been closed, while others were still operational and of importance to the countries’ economies. In Albania, UNEP recommended the development and implementation of risk reduction strategies. A second general recommendation called for strong leadership and sustained investment to support local environmental experts in addressing hazardous waste management, solid waste disposal, wastewater treatment, soil and groundwater protection, monitoring, and enforcement. In Macedonia, the two key areas needing improvement were the implementation of environmentally acceptable industrial processes and the adequate handling, storage, treatment, and disposal of waste.

With regard to the management of the environmental consequences of the refugee crisis, for both Albania and Macedonia, UNEP stressed the importance of government-based co-ordinating bodies with precise legal mandates, “life-cycle assessment,” the environmental guidelines of the Office of the United Nations High Commissioner for Refugees (UNHCR), funding of rehabilitation work for the areas with refugees, environmental technology, the campsite selection process, minimal or biodegradable packaging of food products and durable goods, and wastewater management. Site-specific recommendations were also given.

Concerning the institutional capacities for environmental management, the recommendations emphasised issues such as the responsibilities of the state, environmental awareness, management instruments, local authority and privatisation, waste management, water and air, chemicals, and biodiversity. In Albania, the initial assessment was later followed by cleanup feasibility studies at some of the “hot spots.” In November 2002, work continued on the cleanup of Sharra Landfill, which is the principal disposal site used by Tirana for municipal solid waste. It has operated for about nine years as an uncontrolled open dumpsite with constant open and deep fires burning.

### **Afghanistan: Thirty Years of Environmental Degradation**

In the process of supporting the December 2001 Bonn negotiations, the international community made the commitment to support the Afghan Administration in achieving political stability, in reconstruction, and in the safe return of millions of Afghan refugees. The environment of Afghanistan is among the victims of the past three decades of conflict. During almost thirty years of conflict, the environment of Afghanistan has been heavily damaged due to military activities, refugee movements, overexploitation of natural resources, and a lack of management and institutional capacity. The drought between 1999 and 2001 has further added to this damage. It is estimated that Afghanistan has lost up to 30% of its forests since 1979, with less than 2% of the country remaining forested. Similar degradation has occurred with rangelands and watersheds and desertification of agricultural regions and a host of other environmental sectors. Furthermore, despite the biodiversity contained within the country, the six existing protected areas cover less than one percent of the land base.

The economic and social recovery of Afghanistan has to be based on the principles of sustainable development. Special attention should be paid to streamlining the environment into the humanitarian and reconstruction efforts in Afghanistan. This means integrating environmental considerations into all policy areas at all levels to ensure universal access to clean air, clean water, sanitation and solid waste disposal. For example, the safe return of refugees will be dependent on living conditions in both urban and rural areas. There are concerns that the returning refugees will stay in the urban centres due to environmental degradation in the rural areas, thus slowing the rural recovery of the country and creating more urban environmental problems. Environment protection, management, and remediation can also create job opportunities for urban and rural populations.

UNEP conducted an environmental assessment in Afghanistan to analyse the country's environmental conditions and to recommend projects to improve the environmental situation. The basic components of the assessment were field and remote sensing assessment of forests, wetlands, protected areas, and pollution "hotspots," supported by technical field missions and laboratory analyses when needed; strategic capacity assessment of environmental institutions; and international environmental conventions opportunities assessment.

The long-term aim of UNEP's activities was to ensure that environmental considerations are integrated throughout the reconstruction and recovery process and that adequate information is made available to make sustainable land and resource use decisions. Therefore, UNEP recommended the development of an environmental impact assessment (EIA) as a tool for all sectors in Afghanistan. UNEP also supported the development of environmental legislation in the country, including a proposal to include the right to a healthy environment in the constitution that is under preparation. UNEP integrated the Afghan administration and Afghan experts into all phases of the UNEP activities.

The final report of UNEP's environmental assessment of the country was published in January 2003. Five teams, totalling twenty Afghani and international scientists and experts, collected samples and examined sites around the country in the first-ever effort to assess how over two decades of conflict have affected Afghanistan's environment. The report

included the findings and recommendations of these five field teams that toured the country in September 2002. The report also contains the results of laboratory analyses of the samples taken and results of the desk studies on regional and international environmental co-operation.

Using a combination of field study missions and state-of-the-art remote sensing techniques, UNEP conducted a rapid strategic environmental assessment of forests and deforestation, wetlands, existing and potential protected areas, and pollution “hotspots.” Field mission activities included a combination of field site surveys, collection of background information, and interviews with government officials, NGOs, local people, and other relevant stakeholders. UNEP assessed existing institutions and provided recommendations for structuring the environmental administration based on Afghan needs and best international practices. Strategic recommendations were also provided for developing environmental laws and policies, sustainable management practices, and mechanisms for monitoring, enforcement, funding, and public participation.

The full results are available in a report published in January 2003, which recommends projects to improve or remediate environmental threats, improve the institutional framework, increase Afghanistan’s capacity for environmental management and protection, create jobs in the environmental sector, and improve the implementation of international environmental agreements. Capacity building and co-ordination form an integral part of UNEP’s post-conflict activities. In implementing recommendations of the report, Afghan experts will be integrated into all activities and necessary training will be provided.

In Afghanistan, which is recovering from a long period of conflicts, there is no structure or legislation for environmental protection. Also, very basic data on environment is lacking, co-operation between authorities has to be re-established, and regional level and local administration developed. Environmental administration must be built from scratch. Capacity building activities, therefore, have a high priority.

Afghanistan has also suffered from the regime of warlords, under which a source of income for the military groups has been the illegal timber trade from Afghanistan over the border to Pakistan. This has



resulted in the loss of forests and accelerated erosion and land degradation. The absence of countrywide forestry planning and a lack of sufficient tree nurseries and reforestation programmes, along with the severe drought, are major causes of desertification.

## **Palestine: Troubled Waters**

In February 2002, in Cartagena, UNEP's Governing Council decided to launch a desk study on the state of environment in the Occupied Palestinian Territories (OPT) that would identify major areas of environmental damage requiring urgent attention. The Cartagena decision was motivated by the wish to investigate the possible environmental consequences of the occupation period, but also by a desire to try to use the environment as a bridge-building component between the parties involved. This desk study was completed in January 2003.

Initial concerns about the pollution of water, dumping of waste, loss of natural vegetation, and the pollution of coastal waters prompted the report to focus on issues related to water, waste management, land use, and environmental administration. While for the most part, recommendations of a general nature are made, the findings of the desk study also pinpoint environmental "hot spots" that require on-the-ground studies to establish likely impacts on the environment. Recommendations have been made on how areas of environmental concern can be improved, such as appropriate cleanup and disposal operations for wastes, which would be for the benefit of all the people in the area. Any subsequent field studies deemed necessary would have the objective of proposing remedial programmes to improve the environmental situation in the Occupied Palestinian Territories.

The findings of the desk study—the first phase of the operation—show that the occupation has had a range of environmental impacts, for instance, from the perspective of infrastructure and groundwater. Further, the occupation has led to the creation of an almost complete "double-infrastructure," one for use by Palestinians and the other for Israeli settlements. In addition to the separate and dual transport network, duplicate infrastructure exists for drinking water and waste treatment. Due to curfews that have prevented access to other towns

and parts of the Occupied Territories, the planning of the Palestinian Authority increasingly aims to provide basic services separately in each and every town. This kind of infrastructure is not only unsustainable and inefficient, but also very expensive to build and maintain.

The scarcity of water resources, pollution of the aquifers, problems of transporting waste to the existing landfills due to closure and curfews, illegal waste dump sites, illegal burning of waste, and the lack of treatment of hazardous waste or the low capacity of waste water treatment plants are among the topics addressed by the UNEP desk study. Since the outbreak of the second Intifada, which began in September 2000, the administrative contacts between Israel and the Palestinian Authority have decreased and are now minimal, which causes extra risks and damage to the environment. There is no functioning mechanism to address the issues of transboundary pollution between Israel and the Occupied Palestinian Territories.

There are numerous cases of transboundary pollution between Israel and the Occupied Palestinian Territories. In the very fragile situation in the region, questions also arise on the “geopolitics of environmental risks.” Many landfills and wastewater treatment plants are located extremely close to the border areas, an arrangement that puts environmental infrastructure at risk, which would be better suited to peaceful conditions. In the times of conflicts or hostilities, the access to these sites and their maintenance is limited, thus causing additional environmental concerns. Part of the transboundary problems in the area occurs from the Israeli settlements. There are political obstacles to any joint environmental projects between the settlers and the Palestinian Authority; this causes either a higher environmental load or a more expensive double infrastructure.

The amount extracted and the quality of groundwater has become a controversial *hydro-political* issue in the Middle East where the scarcity of the water is a key political factor. Disagreement over the allowed pumping quantities is a phenomenon that has also caused disputes between Lebanon and Israel. In Gaza, the tentative findings give reason to assume that future use of the groundwater of that area is limited, as water quality has suffered from over pumping, intrusion of salty seawater to the aquifers, and pollution by pesticides and other chemicals. The alternative

way of obtaining drinking water through desalination of seawater leads to very high energy costs, and subsidies will be needed. Rising prices of water will increase costs of agricultural products, and a higher water price will also become a social issue in the region. The various political aspects of the water question will keep the environmental issues highly topical far into the future.

If something positive can be seen in the current situation, it is, perhaps, the strong interest of all parties in the water. A sign of this is that Israelis and Palestinians have signed a declaration to try to keep water out of the current Intifada. Maybe based on this kind of real common interest, water and environment could be used also as a bridge-building tool in the Israeli-Palestinian conflict.

### **Conclusions: Green Wars or No Wars?**

The UNEP post-conflict environmental assessments show that, after a political and military crisis, there is almost always an environmental crisis. The central lesson to be learned is how to manage the environmental crises after conflicts in the most comprehensive and rapid way to minimize the risks for human health and the environment. Taking care of the environment—and, concomitantly, of human health and sustainable development—should be one of the first actions undertaken by the international community.

Furthermore, better knowledge of environmental rules and constraints for modern warfare is required. The awareness of the environmental impacts of conflicts is evidently steadily growing. When political decisions are made at the international level on the use of military force in crises, the environmental consequences and the related costs are increasingly becoming a factor that must be taken seriously. What has already been observed is that environmental information has been used to build political argumentation concerning a forthcoming or past conflict. Herbicides and the burning oil fields in past conflicts still causes debates.

One central feature of the new (post-modern, privatised, unofficial, degenerated) wars, as some label them, has been the increasing difficulties in distinguishing between civilians and soldiers. It is widely known that,

during the Kosovo conflict, Serbian soldiers or paramilitaries were using civilian clothing, vehicles and buildings as a deliberate part of their tactics. In addition to the obvious risks to and suffering of the civilian population, from an environmental perspective, this “convergence” of civilians and military may also have other serious impacts. The findings of UNEP operations in the Balkans show that bombing of vulnerable natural sites—like protected national parks—has taken place as a result of military units using them as shelters. As a result, risks to biodiversity are unavoidable. Other general findings in this context have been that using civilian buildings as military storage sites or shelters can lead to targeting of sites located very close to inhabitants. Oil and chemical products are usually used both for civilian and military purposes. These industrial facilities are usually located near other industrial and densely populated areas. In addition, chemical risks are likely to occur when industrial sites are used for the production of military material. The immediate risk is even bigger when such sites are located in the vicinity of residential areas.

With regard to the new types of conflicts, the open question remains: In the end, whose fault are the environmental consequences—is the bomber to blame or the soldiers hiding in civilian sites? International legal agreements do not always offer unequivocal answers to the dilemmas the environmental perspective might raise.

For instance, in Pancevo and in other Danube areas, the lesson has been that the chemical impacts during conflicts, for example the bombing of chemical plants, will affect primarily the civilian population. Furthermore, there seem to be considerable deficiencies in international law concerning the treatment of chemical industrial facilities in military conflict situations.

Concerning the new types of weaponry, such as depleted uranium, in its post-conflict environmental assessments, UNEP continues to call for action based on the precautionary principle. In addition to these findings and ongoing studies, closer investigations and laboratory analyses are needed. This is the case especially concerning groundwater in the context of depleted uranium, where it is necessary to clarify the question of the possible links between groundwater, the food chain, and food production. Generally, the findings on depleted uranium will

continue to cause pressures to regulate the use and production of new and unconventional types of weapons.

The UNEP post-conflict environmental assessments have clearly shown that all environmental damage is not caused by the conflict; there might be a long legacy of pollution—for instance, from the industries in the Balkans—or just overall environmental degradation—like the illegal cutting of forests and collapse of the irrigation systems in Afghanistan. In post-conflict environmental studies, the whole environmental history of the region should be included.

Based on the lessons learned, will the wars of the future become greener? The only way to minimise environmental and health risks is through stricter regulations of warfare by limiting possible targets or types of weapons used.

Damage caused to the environment is only an additional negative result of the warfare, additional to the ones that are already well known: human casualties, refugee problems, damage to infrastructure, and huge recovery and reconstruction costs. Adding environmental costs to this long list of negative consequences of conflicts and wars should make it even more attractive to look for nonviolent alternatives to conflicts.

No wars are better than green wars.

All the UNEP reports mentioned are available at:

<http://postconflict.unep.ch>

Photos/maps available at:

<http://postconflict.unep.ch>

## Existing Qatar and Gulf Cooperation Council Organizations and Mechanisms: Protection of the Environment

Mr. Khalid Al-Ali  
Secretary General,

Supreme Council of Environment and Natural Reserves in Qatar

In the name of God, the Merciful, the Beneficent, peace be upon you.

Ladies and Gentlemen, my brothers, I would like to thank you for being in Doha and for your interest in learning the steps Qatar is taking to protect the environment.

I will discuss the roles and objectives, major water and air monitoring programs, and environmental tracking and assessment mechanisms of The Supreme Council for the Environment and Natural Reserves (SCENR). I will review the law strengthening the Council's ability to respond to an environmental incident; the Council is the State of Qatar's lead agency.

The SCENR was established in July 2000 by Law Number 11 of the year 2000, with four major objectives: to protect the environment through sustainable development, to conserve wildlife, and to protect their natural habitats, create public awareness, and develop human resources through training programs. These objectives are implemented through a number of sections and centers within the Council. The Council uses a three-legged approach to environmental management, which is a continuous process (figure 6-5). First, the Council determines

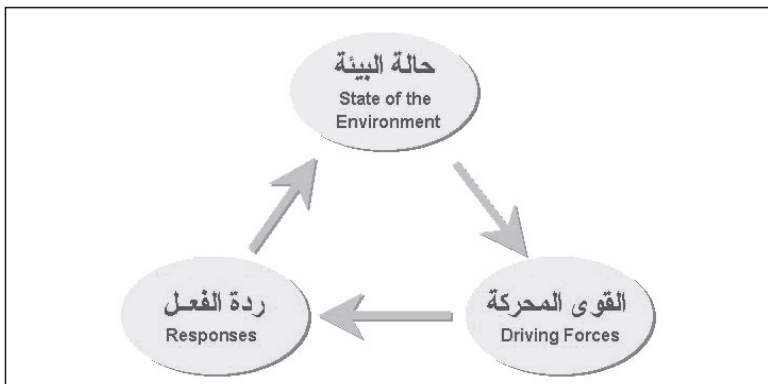


FIGURE 6-5: ENVIRONMENTAL MANAGEMENT METHODOLOGY

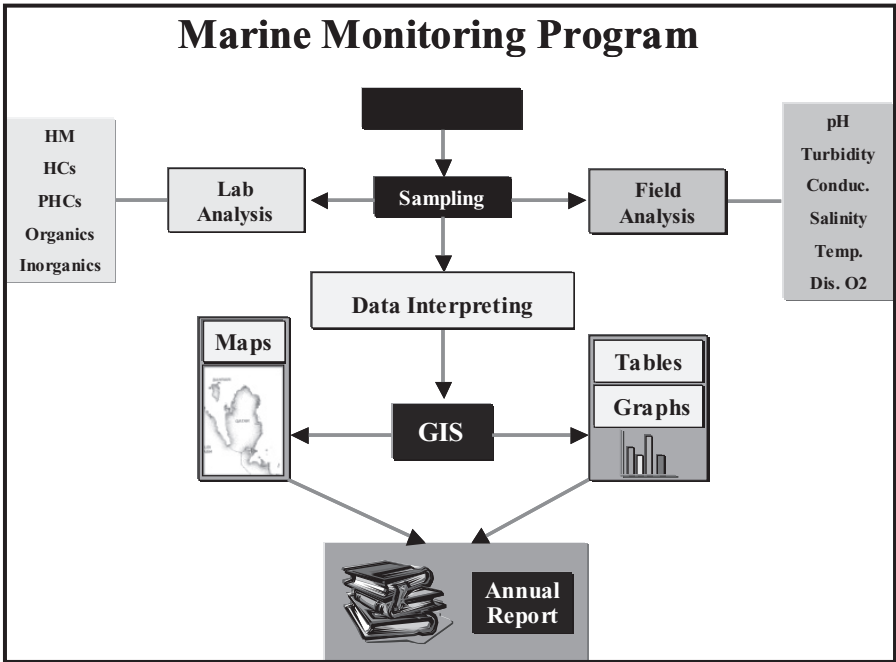


FIGURE 6-6: MARINE MONITORING PROGRAM

the current state of the environment, the driving forces causing change (if any), and then determines and implements responses to mitigate the effects of the change if needed.

I would like to discuss some of the programs of the SCENR. The Council conducts continuous environmental monitoring of Qatar’s coastal waters. The Council gives special attention to the marine environment because it is an important source of food (7,139 metric tons of fish/year), the main source of desalinated drinking water (22 million gallons/year), which is important for the development of the country, and it is a historical and cultural symbol. The program includes approximately fifty monitoring stations covering the area from the Khor-Alodaid to Salwa, through the cities of Mesaieed, Al-Wakra, Doha, Al-Khor, and Ras-Laffan. Samples are taken from seawater at different depths and from the sediments. Each monitoring station conducts a field analysis and sends a sample to a lab for additional analysis. The data is interpreted, compared to historical samples, and published in an annual report (figure 6-6).

The SCENR's Air Quality Management Unit is implementing a two-phase ambient air quality-monitoring program. Phase I of the program consisted of installing five fixed stations and one mobile station in Doha and Al-Wakra cities. All the stations are connected to a central computer in the SCENR for simultaneous monitoring. Phase II, when completed, will connect all the stations within the industrial cities to the SCENR network. The stations gather air quality samples for levels of pollutants to include, nitrogen oxides ( $\text{NO}_x$ ), sulfur dioxide ( $\text{SO}_2$ ), ground level ozone ( $\text{O}_3$ ), carbon monoxide ( $\text{CO}$ ), hydrocarbons (HC), and inhalable particulate matter (PM-10).

The SCENR developed the Environmental Site Assessment and Management System (ESAMS). ESAMS is a comprehensive system for supporting decisionmaking by using the geographic information system (GIS). The system produces a detailed analytical report for the available environmental information, which is grouped in fifteen information categories including, ground water, geological composition, urban growth, distribution of farms, and sensitive areas. The ESAMS system was awarded the best application prize in the first workshop for teaching GIS in the Middle East.

The SCENR is responsible for controlling and monitoring the import, export, and use of chemicals and radioactive substances in Qatar. The SCENR developed a database containing information on more than 10,000 chemical materials. The database includes the chemical and common names, chemical abstracts service (CAS) number, usage data, quantities imported, and previous and present dates of importation. The SCENR maintains this information on 530 private and governmental organizations importing chemicals, including the company name, address, main activities, location of their storage facilities, and types and quantities of all chemicals imported.

One of the programs developed by the SCENR was the Environmental Impact Assessment (EIA). This program was adopted and applies to all development projects. The assessment consists of a series of inspections to determine if the development is within the current pollution guidelines (figure 6-7). If the development is not in compliance, the inspector issues a pollution non-conformity report (NCR) and develops agreements on corrective action. The inspector conducts follow-up inspections to



# Environmental Impacts Assessment EIA

A comprehensive EIA system has been built and was discussed with all concerned parties in the state. This system has also been adopted and applied to all development projects.

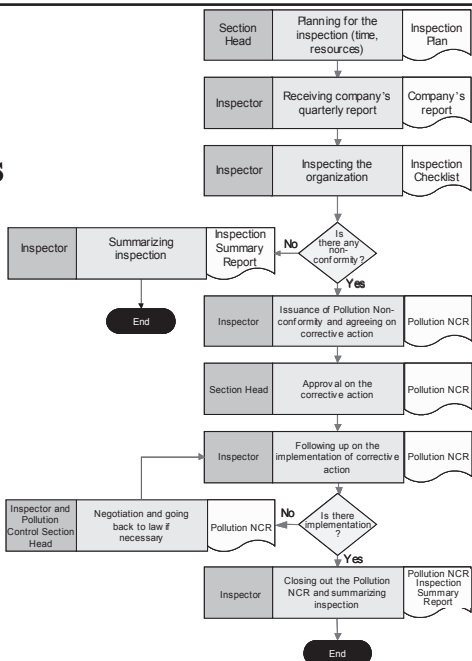


FIGURE 6-7: ENVIRONMENTAL IMPACTS ASSESSMENT

ensure corrective actions were taken. If so, the inspector completes the pollution NCR summary report.

The company must submit an application for consent to operate with the EIA section. An inspection is conducted to check that all conditions are met. After successful completion, the EIA section issues a clearance letter with needed conditions (if any exist). Environmental clearance is issued to companies only after their expected releases to the environment are modeled using the current U.S. EPA approved ISC3 model and Qatar meteorological data for dispersion.

The SCENR is also responsible for monitoring waste management. The SCENR grants approval for all chemical wastes disposed of by any industry. SCENR also recommends whether hazardous waste is stored on site or disposed of to a facility outside Qatar. Presently an incineration facility is available for clinical waste.

The SCENR’s Environment Monitoring Program (EMP) requires a quarterly report from every major company on the quality and quantity of gaseous, liquid, and solid waste released during the quarter.

Companies are required to report accidental and planned releases, to include the reason and corrective action in the case of accidents. SCENR must report all chemical releases into the Gulf, as a part of oil and gas production, every six months to the Regional Organization for the Protection of Marine Environment (ROPME). The ROPME Secretariat assesses the total releases from all countries in the ROPME Sea Area.

The SCENR reviews and provides input in the development of environmental regulations and laws, such as the Qatar Environment Protection Law, Environment Impact Assessment Law, Law on the Control of Ozone Depleting Substances, Law on Trading in and Dealing with Endangered Fauna and Flora, Law on Hunting Wild Animals, Birds, and Reptiles, and Law on Dealing with Radioactive Materials.

Qatar has taken positive steps to improve the functioning of the Council by passing a law that describes the functions of the General Secretariat. The functions are outlined in Section 4 of the law:

- Article 2 requires the Secretariat to identify, evaluate, and follow up incidents of environmental pollution, set up emergency plans, and take necessary steps to mitigate the effects of environmental catastrophes.
- Article 25 requires that the Council, in coordination with the concerned authorities in the State, establish an emergency plan to face and handle environmental catastrophes. The Council is responsible for collecting data (both local and foreign) on how to deal with catastrophes, to evaluate capabilities locally, regionally, and internationally before adopting the best method, and to organize and run training courses and drills in order to know the extent of readiness in the event of a catastrophe.
- Article 26 requires the Council to identify different types of catastrophes, including radiation fallout, to establish a Central Operations Room, and to form a working group to follow up operations dealing with a catastrophe.

The SCENR has established international linkages to enhance its ability to respond to an environmental catastrophe; these include: Human and Environmental Affairs Sector, GCC Secretariat; Kuwait

Convention on the Protection of the Marine Environment (ROPME); GCC and Iran; Council of Arab Ministers Responsible for Environment (CAMRE); Arab Countries; and the United Nations Environment Program (UNEP).

The SCENR is the national point of contact for the various international conventions and agreements to which the State of Qatar has become a party, such as the UN Framework Convention for Climate Change, UN Convention for Biological Diversity, UN Convention for Combating Desertification, International Convention on Trading in Endangered Species (CITES), Convention on Transboundary Movement of Hazardous Waste, Vienna Treaty for the Protection of the Ozone Layer, and the Kuwait Convention for the Protection of the Marine Environment.

In conclusion, our goal is a Qatar clean and green. Thank you.

## **Multilateral Approaches to Consequence Management—A Medical Perspective**

**Brigadier General (Doctor) Mohammed Al-Abbadi  
Director, Field Medicine, Royal Jordanian Medical Service**

Thank you very much. It is my pleasure to be with you here today and to share with you some of the medical viewpoints on response to emergencies. First of all, I would like to thank our Qatari hosts and the Qatari Armed Services for their kind invitation for me to come and speak today.

Today I will discuss multilateral approaches to consequence management from a medical perspective, focusing on the management of a multiple casualty incident (MCI). First I need give a couple of definitions to provide a common ground. A disaster is, “a sudden catastrophic event that overwhelms natural order and causes great loss of property and or life.” An incident management system is, “a written plan to help control, direct, and coordinate emergency personnel and equipment from the scene of a multiple casualty incident (MCI) to the transportation of the patients to definitive care.”

To talk about MCI management, we have to talk a little bit about some of the principles of MCI management. Medical response and other emergency services are part of MCI management. Proper MCI management ensures that there is enough and proper care available during the disaster. The overall site manager ensures emergency vehicles are properly positioned and that transporting patients is accomplished efficiently. The last part of MCI management for patient care is ensuring that adequate follow-up care is provided. In fact the general principles are the same and could be applied in all cases with some variations.

There are common objectives involved to ensure and maintain efficient MCI management. The most important one is to conduct thorough preplanning to minimize the negative effects of the disaster. The medical incident manager needs to possess the ability to quickly implement a plan and to fully use emergency personnel as they arrive on scene. The plan must have the ability to adapt to meet special conditions

and must avoid simply relocating the disaster from the scene to the local hospital. Conditions will continue to change; therefore, it is important to continue to monitor and analyze the situation and to change the plans accordingly when necessary. The plan must include contingency plans if a local hospital is unavailable or shelters are needed for the homeless due to the disaster.

Upon arrival at the scene, the Medical Incident (MI) Manager needs to establish a readily identifiable Command and Control Center. The personnel manning the center needs to consist of individuals who are known, respected, and experienced in disaster assistance. The team should include representatives from the various organizations who are familiar with their roles, the equipment, capabilities, and any unique requirements. These personnel need the authorization to make decisions. In the case of disasters, it is very difficult to go back to people in authority and wait for their decision. As stated in Professor Erdik's presentation and reinforced during Dr. Mosleh's presentations, "waiting for a decision causes delay and saving the lives of individuals depends a great deal on rapid response." The Command and Control Center's personnel should know the capabilities and locations of surrounding hospitals.

The MI manager has many responsibilities in addition to establishing the Command and Control Center. The manager must conduct an assessment of the scene using the acronym ETHANE: exact location of the disaster, type of incident, hazards, access to the site, number of victims, and emergency services needed to respond. Communications is very important to facilitate the coordination among the various organizations involved at the site, such as the police, civil defense, military personnel, and medical staff. The staffs must have the capability to communicate horizontally and vertically among the officials of the MCI sectors, as well as between themselves and their own higher authorities, to include the police, fire brigade, ambulance services, and hospitals. Coordination of services among these bodies is very important to achieve effective management. The MI manager appoints a triage officer in charge of the triage team at the site. The MI manager determines what treatment will occur at the casualty treatment station and the level of treatment for casualties being transported to higher levels of care. The MI manager determines the types and amount of transport required for the movement of personnel and casualties from the scene. The MI manager

is responsible for managing the various MCI medical sectors: treatment sector, transportation sector, staging sector, supply sector, triage sector, extraction sector, and the mobile command sector.

I am not going to discuss the various sectors in great detail, however I will focus on the triage officer and his or her team. Triage is a system used for sorting patients to determine the order in which they will receive medical care or transportation to definitive care. It is a dynamic ongoing process that is repeated at different levels of the medical care system. The goals of triage are to assess the patient's condition, determine the medical urgency, assign a priority to treatment, and then transport to suitable medical facilities. The objective of this exercise is to move the casualties to the right place at the right time and to make the best use of the available resources.

The principles of triage are to accomplish the greatest good for the greatest number of injured people in each special circumstance, to properly manage the patient whose condition requires rapid evaluation, to reduce the time lapse from initial injury to definitive care, to prevent unnecessary suffering and to improve morale, and to realize the need for and benefits of rapid medical evacuation of casualties—to save life and limbs. You might find somebody who is badly injured and cannot be saved even if he is transferred to the medical services. This kind of casualty is called an expectant priority. Even though the injured is still alive, the injury is of such an extent that you know there is no chance of saving his life. This type of injury will use up a lot of the resources that might be used to save a large number of people.

The key concepts of triage are, to remove patients from a dangerous area regardless of their injury, to limit treatment for those awaiting triage to airway management and control of severe bleeding, and if any rescuer breaks down or becomes hysterical during the operations, to evacuate that rescuer to a hospital.

In the Jordanian Medical Services, we use a four category tagging system (figure 6-8). The labeling system should be easy to understand, standardized, highly visible, waterproof, easy to attach, difficult to remove, easy to change the triage category in either direction, easy to fill

in (casualty details) rapidly, and have a space for serial observation and for trauma scoring.

This is a changeable and repetitive operation, and it uses color codes. First priority assistance (Urgent Category) is red, Delayed Category is yellow, Minimal Category, where assistance may be delayed somewhat, is Green, Expectant Category, which I mentioned above, where the injured is not expected to survive, is black.

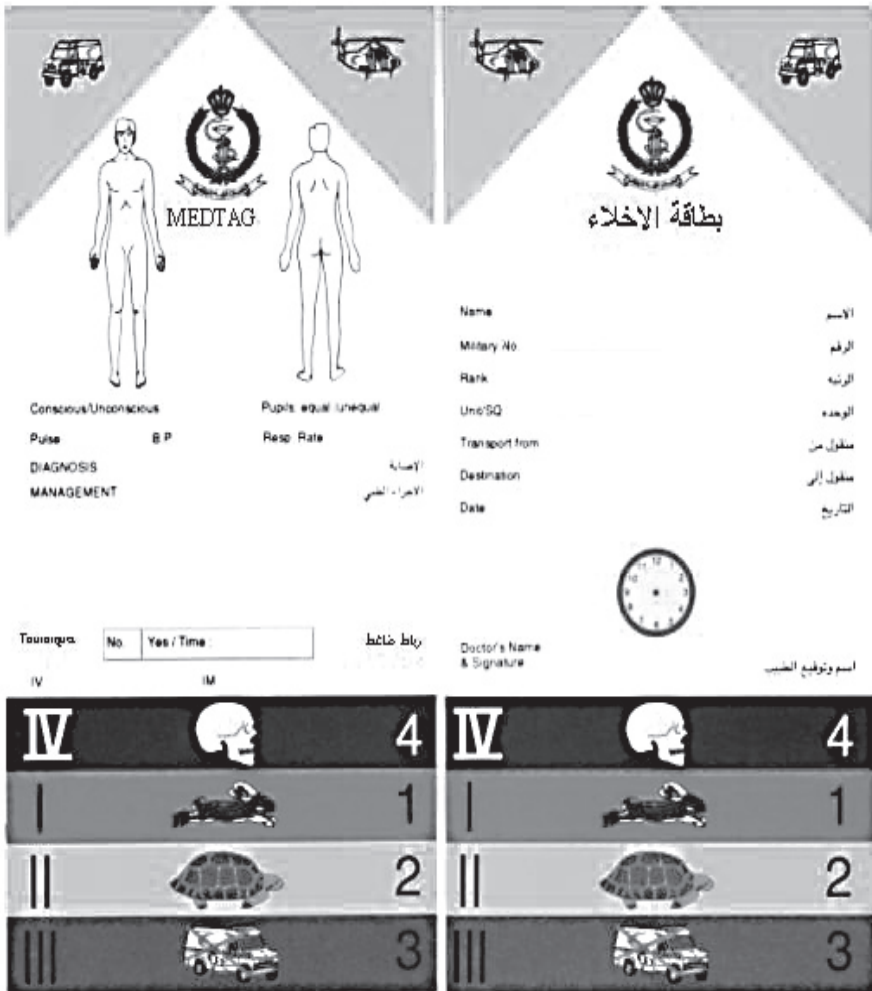


FIGURE 6-8: TRIAGE TAGGING SYSTEM

I would like to take a few minutes to describe each category.

- a. Urgent Category (red) requires urgent intervention if death is to be prevented. Examples are asphyxia, respiratory obstruction from mechanical causes, sucking chest wounds, tension pneumothorax, severe internal hemorrhage unresponsive to volume replacement, vascular wounds with limb ischemia, incomplete amputations, and central nervous system (CNS) wounds with deteriorating neurological status.
- b. Delayed Category (yellow) applies to casualties who can tolerate delay prior to operative intervention. Some examples are stable abdominal wounds with probable visceral injury, soft tissue wounds requiring debridement, maxillofacial wounds without airway compromise, vascular injuries with adequate collateral circulation, genitourinary tract disruption, fractures requiring operative manipulation debridement and external fixation, and most eye and CNS injuries.
- c. Minimal Category (green) applies to casualties with superficial wounds that require cleansing, minimal debridement, tetanus toxoid, and first aid and dressing. Some examples are burns of less than 15% upper extremity fractures, sprains, and abrasions.
- d. Expectant Category (black) applies to casualties whose injuries are so extensive that, even with optimal medical resource application, their survival still would be very unlikely. For example, unresponsive patients with penetrating head wounds, high spinal cord injuries, mutilating explosive wounds involving multiple anatomical sites and organs, second- and third-degree burns in excess of 60% total body surface area, and profound shock with multiple injuries.

This is the procedure for classification. It is not complicated. Even the nonmedical person can carry out this process at the site of the incident. As stated by Dr. Mosleh, “there are certain responsibilities for the medical team that arrive at the site of the incident, responsibilities for the paramedics, and plans for the medical team at the hospital. Making treatment available to save lives is very important, to avoid additional casualties.”



The triage officer should establish the treatment area on high ground, upwind, covered and lighted; it should be a safe distance from the incident, and clearly marked. The emergency personnel should remove patients from the triage sector to the treatment sector in order of their medical priority. The treatment sector has some key concepts to remember:

- a. A small number of casualties will require prompt intervention, whereas the majority of wounded will tolerate varying degrees of delay.
- b. The treatment sector cannot waste time with multiple life-threatening wounds.
- c. The most gravely injured are first to be evacuated.
- d. Simple lifesaving procedures should be given the highest priority.
- e. Life takes precedence over limb.

The overall team leaders in the MCI sectors need to ensure measures are implemented to reduce stress on themselves and others. A disaster is a tense and stressful event and requires measures to reduce stress. Some simple ways to relief stress are to rest at regular intervals, effectively rotate rest periods, fully explain each team's responsibilities, assign tasks appropriate for the skill and experience of the responders, provide plenty of food and beverages, and encourage talking, which helps relieve stress.

I thank you very much for your kind attention.

