NATO
OTAN

The environment and security

"The whole notion of security as traditionally understood – in terms of political and military threats to national sovereignty – must be expanded to include the growing impact of environmental stress – locally, nationally, regionally, and globally."

World Commission on Environment and Development

Security has traditionally been defined as individual or collective safety achieved through the protection of territorial integrity, political sovereignty and national interests. However, the understanding of security has evolved over time. It has been recognised that environmental factors have an impact on conflicts and levels of stability.

Even though the causes of conflict and insecurity are often complex, evidence suggests that environmental degradation and resource depletion are a source of tension in many regions of the world. Land degradation, climate change, water quality and quantity, and the management and distribution of natural resources (e.g. oil, forests, minerals) are factors that can contribute directly to conflict or be linked to them by exacerbating other causes such as poverty, migration, infectious diseases, poor governance and declining economic productivity. In sum, environmental problems can threaten human livelihoods and contribute to social and economic inequalities.

Concern for the environment has grown and the need to integrate environmental policies into security measures has therefore been and continues to be a priority. The scarcity of renewable resources and the cross-border character of environmental issues have led the international community to take an active role in initiating environmental projects.

Did you know?

"Today, we are faced with a challenge that calls for a shift in our thinking, so that humanity stops threatening its life-support system." Wangari Maathai, a Kenyan ecologist who won the Nobel Peace Prize in 2004. Maathai's Nobel Prize is the first to acknowledge environmentalism as a means of building peace.

A big step towards promoting the link between environmental issues and security and stability was made in 2002 by the Organization for Security and Co-operation in Europe (OSCE), the United Nations Environment Programme (UNEP) and the United Nations Development Programme (UNDP) with the launch of the joint Environment and Security (ENVSEC) initiative. This initiative focuses on vulnerable regions such as the Balkans, Caucasus and Central Asia.

On the invitation of the OSCE, UNDP and UNEP, NATO has become associated with the ENVSEC initiative and now coordinates its environmental security projects with these three international organisations. NATO's environmental security projects are initiated through its Security through Science Programme and the Committee on the Challenges of Modern Society (CCMS).

>> What is the NATO Programme for Security through Science?

The NATO Programme for Security through Science contributes to security, stability and solidarity among different countries by applying cutting-edge science to problem-solving. A further aim is to catalyse democratic reform and support economic development in NATO's Partner countries in transition. The Security through Science Programme offers grants in support of collaborative activities in the areas of defence against terrorism, countering other threats to security and Partner-country priorities. Topics supported also include environmental security.

>> What is the Committee on the Challenges of Modern Society?

This committee was created in 1969 by the North Atlantic Council with the initial aim of addressing problems affecting the environment and quality of life of citizens living in member countries. It is a forum where member and Partner countries can share knowledge and experience on technical, scientific and policy aspects of social and environmental matters in both the civilian and military sectors. Its main objective is to tackle environmental security and societal problems already under study at the national level and, by combining the expertise and technology available in NATO and Partner countries, arrive fairly rapidly at valid conclusions and make recommendations for action.

Did you know?

> Among environmental issues, water is considered to be the top priority for the Balkans, Caucasus and Central Asia.

The younger generation and non-governmental organisations in Central Asia perceive environmental issues to be one of the main threats to the security and well-being of their populations.

By directly or indirectly contributing to 2-3 million deaths annually, unsafe drinking water poses a primary challenge to human security.

Every year, NATO's Security through Science Programme brings together some 10 000 scientists from NATO and Partner countries to initiate cooperation and establish enduring links. One of the support mechanisms of this programme is Science for Peace (SfP), under which applied research and development projects are conducted. SfP projects bring together scientists and end-users from research laboratories, universities and industry to find solutions to a number of civil science issues that have security implications, such as human health, disaster preparedness and prevention, protective materials and the environment.

Every year, the Security through Science Programme supports numerous environmental security projects related to issues such as water management, seismic risk, different forms of pollution, disposal of radiological waste and other potential hazards. Funding is provided for equipment, training, and travel, while individual NATO member countries contribute by providing national experts to assist in these studies.

To follow are just a few illustrations of what NATO does in the environmental security field.

Decontaminating air from chemical and biological impurities

Chemical Warfare Agents (CWA) production and stockpiling are strictly prohibited by the UN, and the problem remains that traditional methods of destruction (incineration and neutralisation) produce large quantities of harmful by-products. NATO has initiated a project on a promising alternative: photo catalysis. This process completely degrades CWA into benign products. The photo catalysts and reactors have a wide area of application for the decontamination of air from chemical as well as biological impurities. The project has already improved knowledge of pathways and mechanisms of photo catalytic degradation of CWA simulants.

What is a chemical warfare agent?

A 1969 UN report defines chemical warfare agents as "chemical substances, whether gaseous, liquid or solid, which might be employed because of their direct toxic effects on man, animals and plants." The Chemical Weapons Convention defines them as including not only toxic chemicals but also ammunition and equipment for their dispersal. Toxic chemicals are stated to be "any chemical which, through its chemical effect on living processes, may cause death, temporary loss of performance, or permanent injury to people and animals".

Figure to the left shows a small photo catalytic reactor for air purification in small rooms and vehicles that was developed as a result of the NATO project.

Did you know?

> The Chemical Weapons Convention is the first disarmament agreement negotiated within a multilateral framework that provides for the elimination of an entire category of weapons of mass destruction.

> The largest quantities of CWA are stored in the United States and Russia.

The environment

>> Investigating radiological contamination in Kazakhstan

Soviet nuclear bomb testing during the Cold War, at Semipalatinsk in north-eastern Kazakhstan, has had a significant impact on the environment over an area of 18 500 km^2. The explosions contaminated farmland, making it unusable as a consequence of the radionuclides that were released.

They also provoked the disturbance of hydro-geological cycles, distortions in regional production and infrastructure, and significant isolation of the region resulting from past secrecy.

In 1997, the International Atomic Energy Agency (IAEA) confirmed that, potentially, there were serious health risks linked to the existence of the test site and the same year, the UN passed a resolution calling for collective international action to “fund a viable solution for the ecological problems at the Semipalatinsk test site.”

As a consequence, a joint venture between scientists from Kazakhstan and the West was launched by the UN to examine radiation contamination levels in the area. NATO responded by initiating the SEMIRAD project in January 2000 as part of the UNDP coordinated Semipalatinsk Rehabilitation Programme. Scientists from the United Kingdom and Kazakhstan worked together to determine the radioactive contamination level in the Tel’kem valley – an area located in the south-west of the test site, close to the village of Sarzhal. The project was successfully completed in December 2002 and has been succeeded by SEMIRAD II, which started in Autumn 2004.

SEMIRAD II aims to study a new site that lies south-west of Maisk – in the north-eastern region of the test site – for radionuclide concentrations that in some cases could be high enough to present a security threat. The area covered is larger and more diverse than that of the Tel’kem valley, and includes features such as mud and salt lakes for which monitoring methods have still to be developed. SEMIRAD II will use new methods to increase the speed of site evaluation and results will be regularly reported to the IAEA and the Kazakh authorities. This will help to define the parameters of rehabilitation and development strategies for the area.

The SEMIRAD I team during a monitoring expedition in July 2001, standing at the entrance of a crater produced by the detonation of three nuclear devices in November 1968.

The Semipalatinsk site was closed by presidential edict on 29 August 1991.

and security

>> Studying radioactive waste disposal sites in Turkmenistan

Turkmenistan is one of the biggest producers of iodine after Chile, Japan and the United States. Iodine compounds are used in medicine, photography and dyes. For instance, iodine is used in the diagnosis and treatment of thyroid disease. The raw material for iodine production is highly mineralised underground water containing iodine and bromine. An unfortunate side product of the extraction process is radioactively contaminated waste.

At this moment, 18 000 tons of radioactive waste are stored in inadequate conditions near the Caspian Sea, and several km^2 of land have been contaminated. In 1998, NATO launched a Science for Peace project which includes the implementation of a radiochemical laboratory in Ashgabat, the installation and operation of radio-protection equipment and the training of Turkmen teams. In the mid- to long-term, this will enable Turkmenistan to gain scientific and technical autonomy in waste characterisation and radio protection.

>> Assessing seismic risk in Uzbekistan and the Kyrgyz Republic

Central Asia's earthquake activity has long been recognised as one of the highest in the world. Tashkent in Uzbekistan and Bishkek in the Kyrgyz Republic have experienced highly damaging earthquakes, and will continue to do so in the future. With fragile economies, these countries risk economic collapse making the need for effective urban planning and special building measures essential.

NATO has therefore launched a Science for Peace project to collect data on the seismological and geological characteristics of the region and develop seismic hazard maps and earthquake ground motion models for Bishkek and Tashkent. NATO has purchased and installed Geographical Information System equipment and software and trained young local scientists. This project is expected to serve as a model for seismic hazard reduction studies in Central Asia.

>> Use of land and water resources in Karakalpakstan, Uzbekistan

Uzbekistan has experienced severe desiccation of the Aral Sea, the basin in which it lies. This phenomenon is largely due to the mismanagement of irrigation that has substantially diminished inflow from two tributary rivers into the Aral Sea, causing severe ecological and economic problems.

The World Health Organization (WHO), the United Nations Environment Programme (UNEP), the United Nations Development Programme (UNDP) and the Food and Agriculture Organisation (FAO) have referred to the state of the Aral Sea region as an environmental disaster. Water logging, secondary salinisation, dust and salt blown from the dried sea bottom have ruined formerly rich agricultural land.

Floral and faunal biodiversity is rapidly shrinking and the population suffers from acute medical problems associated with difficult living conditions and a degraded environment.

NATO therefore launched a Science for Peace project to study the Aral Sea ecosystem. It equipped and put into operation a Geographical Information System Centre at the Karakalpakstan State University in Nukus. With the support of Russia, the centre developed forecast models to detect changes in the ecosystem and early crop-yield estimation models. Scientists were also trained to ensure the improvement of water management and agricultural planning.

The results of this study were transferred to the Interstate Coordination Water Management Commission, as well as to relevant government branches of Uzbekistan and Karakalpakstan, and to non-governmental organisations.

>> Use of landscape sciences for environmental assessment

In the past, environmental policies were reactive, as opposed to preventive, and efforts focused on short-term, local problems such as the reduction of pollution. Currently, environmental management philosophy is evolving towards the examination of critical environmental problems over larger areas and the assessment of cumulative risk resulting from multiple sources of difficulty. Environmental managers, urban planners, and decision-makers are increasingly expected to examine environmental and economic problems in a larger geographic context in order to develop management strategies and alternatives that could help reduce environmental and economic vulnerability.

Within this context, the assessment of land use – and the consequences it can have on the environment – is an extremely important activity for contemporary land management. Human land-use practices have a considerable degree of influence over natural resource management at local, regional, national, and global levels.

In 2001, NATO launched a pilot study to explore the possibility of quantifying and assessing environmental conditions. It is co-directed by the United States and Germany, and involves representatives from NATO member and Partner countries. The project aims to encourage the exchange of information on landscape science approaches used for environmental assessment and transfer landscape assessment technologies to environmental protection and preservation programmes.

Many areas in Europe and the United States have been selected for this study, which will observe the process of land degradation and its subsequent impact on natural and human resources. In order to do this, the study will combine some advanced practical technologies such as remote sensing and geographic information systems. It will also use process models that benefit from the input of landscape sciences, which offer a more academic approach.

>> Prevention and remediation issues in the industrial sector

In October 2002, a pilot study was launched to define and explore best practices to reduce the effects of soil and groundwater deterioration provoked by the industrial sector, on health and the environment.

The purpose of this project is to explore the techniques and technologies that can prevent and avoid discharge to soil and groundwater and share the results with industry and the private sector at large at a transnational level. The countries participating in this project are Austria, Belgium Canada, France, Germany, Ireland, Italy, Latvia, Lithuania, Moldova, Romania, Russia, Slovenia, Switzerland, Turkey, the United Kingdom, and it is being led by the United States.

The contribution of this pilot study, which in fact makes it unique, is its role in synthesizing information on best practices, successes, failures and the uncertainties that still remain.

One Minute Interview

>> Nicholas Priest, NATO Project Director, Professor of Radiobiology and Environmental Toxicology, Middlesex University, London

What risks can the population living in the polluted area around Semipalatinsk incur?

Risks of exposure occur at the time of testing and the only remaining concerns lie with dispersed 'hotspots' within the test site. These may be contaminated to unacceptable levels and could be a hazard if locals were to choose to live or work close to them. At present, the location of these 'hotspots' is not completely understood and this is a worry.

How could the risk spread to other countries and affect NATO countries?

The main risk stems from the removal of radioactively contaminated materials from the test site itself. Former local inhabitants have a history of collecting scrap metal and selling the contaminated material to other countries – principally China – for recycling. There is also a fear that terrorists could collect material for the construction of dirty radiological weapons since there are a few places where radionuclide levels – particularly those of plutonium – are high enough to be a cause of concern. Regional and western defence agencies are aware of these risks and are active on the Semipalatinsk Nuclear Test Site.

What are the main benefits of the SEMIRAD project for the Kazak population?

Firstly, it provides equipment, training and improved access to western specialists and consequently improves the ability of local organisations to manage the test site and many other contaminated sites in Kazakhstan. Secondly, it has equipped and facilitated a regional, educational Centre of Excellence for the training of students in radiological sciences at the Al-Farabi Kazakh National University, Almaty. Thirdly, the studies have provided contamination data that can be used to develop effective land utilisation strategies for the test site. Lastly, it has contributed to the development of an integrated site evaluation by the IAEA.

How does this project complement the efforts of other organisations?

SEMIRAD was the first internationally funded Kazakh study of contaminated lands within the test site that involved close cooperation with western specialists. Its team members provided the largest single input to the IAEA coordination initiative to evaluate the site and it has become central to studies that followed. Four projects are directly linked to SEMIRAD: SEMIRAD II; ADVANCE a study funded by Framework 5 of the EU; a land-utilisation study funded by the UK Department for International Development; and a study relating to waste disposal funded by the UK Department for Trade and Industry. It will also link with a helicopter survey of the site, coordinated by the IAEA and funded by the EU TACIS programme, and its outcome will undoubtedly be evaluated by international defence agencies.

For more information see:

- NATO Programme for Security through Science – www.nato.int/science/index.html
- Committee on the Challenges of Modern Society – www.nato.int/issues/eapc/index.html
- ENVSEC reports – www.envsec.org

NATO Public Diplomacy Division, 1110 Brussels, Belgium – email: natodoc@hq.nato.int

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