

**WORLDWIDE EMERGING ENVIRONMENTAL ISSUES AFFECTING THE U.S. MILITARY**  
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**Summarizing Environmental Security Monthly Scanning**  
**July 2006—December 2006**

The Millennium Project defines environmental security as environmental viability for life support, with three sub-elements:

- preventing or repairing military damage to the environment,
- preventing or responding to environmentally caused conflicts, and
- protecting the environment due to its inherent moral value.

This summarizing paper presents the events and emerging environmental security–related issues identified since June 2006, organized around this definition.

Over 225 items have been identified during the past half-year and about 950 items since August 2002 when the Millennium Project has begun this monthly scanning. All the items and their sources, organized by the month when they were identified, are available on the AEPI web page <http://www.aepi.army.mil/rpt-weei.html>.

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*All our efforts to promote security, development and human rights, and to pursue sustainable development, will be in vain if environmental degradation and natural resource depletion continue unabated... We need clean water, fertile soils and pure air if we are to build a world of peace, freedom and dignity for all.*

Kofi Annan, UN Secretary-General  
message to the International Conference on  
Environment, Peace and the Dialogue among Civilizations



# 1. Environmental Security Monthly Scanning Items

## 1.A PREVENTING OR REPAIRING MILITARY DAMAGE TO THE ENVIRONMENT

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## 1.A Preventing or repairing military damage to the environment

### ENVIRONMENTAL SECURITY RISES ON THE INTERNATIONAL POLITICAL AGENDA

#### UN General Assembly 61st Session Pinpoints Global Warming as a Central Issue for Security

Tackling climate change and environmental degradation were mentioned in parallel with terrorism, fair trade, HIV/AIDS, and human rights as essential issues to be addressed by global action by world leaders at the UN General Assembly, September 19-29. Since the small island developing states are particularly vulnerable to the impacts of global warming and sea level rise, they reiterated the call for renewable energy, a global fund to support these efforts, recognition of the “polluter pays” principle, and the placement of climate change in the center of development considerations. Some declared that the impacts of climate change are the most serious threat to global security. [September 2006. [Military Implications, Source](#)]

#### UN Conflict Prevention Strategy Includes Environmental Dimension

UN Secretary-General Kofi Annan’s Progress report on the prevention of armed conflict is an in-depth review of UN capacities to help prevent crises from escalating into armed conflicts; it outlines a wide range of recommendations to strengthen the UN’s conflict-prevention capacity around the world. Environmental factors are mentioned several times in this 54-page document; e.g., “Environmental degradation has the potential to destabilize already conflict-prone regions, especially when compounded by inequitable access or politicization of access to scarce resources.” (par. 22) The report will be submitted for discussion to the General Assembly on September 7, 2006. [August 2006. [Military Implications, Sources](#)]

#### UK Defence Ministry Highlights the Link between Environment and Security

UK Ministry of Defence published its second annual Sustainable Development Report. The 2005 report identified potential risks from nanotechnology, chemical weapons from the WWII, risks from military sonar, and tungsten and its alloys as emerging sustainability issues related to military activities; and most importantly, acknowledged the link between conflict, security and sustainable development. ‘We must also be ready to act, anywhere in the world, where environmental, social or economic stresses may contribute to the destabilization of society... we have a significant role to play in helping to address these concerns and exploring links between security, conflict and SD with Foreign and Commonwealth Office and Department for International Development,’ the report said (DFID). [For the first Annual report, 2004, See the item *UK Defense Ministry released its first Sustainable Development Report* in the August 2005 environmental security monthly report] [September 2006. [Military Implications, Sources](#)]

#### Civil Society Regional Consultations around the World

In preparation for the 8th Global Civil Society Forum (GCSF) and the 24th session of the Governing Council/Global Ministerial Environment Forum (GC-24/GMEF) to be held in Nairobi, Kenya, in February 2007, representatives of major groups of civil society held regional consultations around the world. The European Regional Consultation took place in Geneva,

October 23–25, and the African Civil Society meeting was held in Nairobi, October 26-27. The discussions were structured around the February GCSF's central themes—globalization and environment, and UN Reform—with focus on such regional aspects as water, chemicals management, sustainable procurement policies and practices, and international and regional processes. [October 2006. [Military Implications, Sources](#)]

### **UK Scientists List 100 Most Vital Ecological Policy Questions**

UK scientists have prepared a list of the 100 biggest questions facing the country's environment. According to Guardian Unlimited, "the list ... of Britain's most pressing ecological problems is based on the suggestions of more than 650 experts in universities, conservation groups and government institutes. It is intended to inform policy-makers and steer research over the next decade to answer key questions in areas such as farming, climate change, pollution and urban development." [August 2006. [Military Implications, Source](#)]

## **CONFLICT AND POST-CONFLICT ENVIRONMENTAL SECURITY ISSUES**

### **CCW Protocol V on Explosive Remnants of War Entered into Force**

Protocol V on Explosive Remnants of War (ERW) of the Convention on Certain Conventional Weapons came into force on 12 November 2006, almost three years after it was adopted. The Protocol stipulates that Parties should take “remedial measures to mark and clear, remove or destroy unexploded ordnance or abandoned explosive ordnance” as early as possible after hostilities have ended, whether they control the territory or not, by cooperating directly or indirectly with all parties involved through quick and accurate information exchange. The Protocol is not retroactive, covering only wars occurring after its entry into force. As of the end of November, there were 27 States Parties to the Protocol.

The Portfolio of Mine Action Projects 2007 found that 26 out of 29 war-ravaged countries or territories surveyed are beleaguered with the lurking remnants of cluster bombs and other explosives. In 2007, the focus of the Projects will be on unexploded ordnance, aiming to deal with the aftermath of conflicts that took place before Protocol V entered into force. [November 2006, [Military Implications, Sources](#)]

### **Hezbollah-Israeli War Threatens an Already Precarious Environment**

Arab countries are among the least environmentally sustainable in the world. The current wars are making this situation worse. The impact of the oil slick caused by Israeli bombing of the Jiyeh power station is an “environmental tragedy which is rapidly taking on a national but also a regional dimension,” warned UNEP Executive Director Achim Steiner. Long-term implications also include the loss to fishing for the Lebanese people, and decline in tourism. Presently the ecological damage spreads along 50 miles of the Lebanese coast; 10,000 tons of crude oil have been released into the Mediterranean, with another 15,000 tons expected to spill very soon. According to the Environmental Sustainability Index of Yale University, Iraq, Sudan, and Kuwait fall within the bottom 5% of the world for sustainability and half of the remaining Arab States scored in the lowest 25%. Without major changes, environmentally induced migrations and more conflicts in the region seem inevitable. [July 2006, [Military Implications, Sources](#)]

### Addressing Post-Conflict Environmental Security Issues

Further on last month's item on the environmental consequences of the Hezbollah-Israeli war, UNEP announced the beginning of the cleanup operation of the massive oil spill caused by Israeli bombing of a fuel depot, which affected some 150 kilometers of Lebanese and Syrian coastline. It is estimated that the cleanup could take up to one year and might cost over \$64 million. The massive damages to the ecosystem are already noticeable. [See also *Hezbollah-Israeli War Threatens an Already Precarious Environment* in July 2006 environmental security report.]

At the end of July 2006, the UN Compensation Commission announced the last disbursement to individuals who suffered because of Iraq's 1990 invasion of Kuwait. The total paid out to date is nearly \$21 billion, while 49 other claims, including environmental ones are still pending. [August 2006. [Military Implications, Sources](#)]

### **Environment to Get Crucial Role in Sudan's Future Peace and Prosperity Strategy**

UNEP is conducting detailed environmental assessments in order to identify environmental impacts, pressures, risks, and priorities for Sudan's post-conflict reconstruction plans. Since December 2005, four field missions were conducted in each of the main geographic areas. These findings will be presented in the UNEP report Sudan – Post-Conflict Environmental Assessment scheduled for release in October 2006 and then incorporated into national policies, plans, and laws for resource management in Sudan. UNEP is also currently preparing a program entitled Capacity Building for Environmental Governance in Sudan, which will cover the period 2007-2009. The UNEP study and recommendations are another example of the importance being accorded to the environmental dimension in post-conflict reconstruction. [July 2006. [Military Implications, Source](#)]

## **NATIONAL/REGIONAL ENVIRONMENTAL STRATEGIES AFFECTING MILITARY ACTIVITIES**

### **Asia-Pacific Should Intensify Green Growth Efforts**

The State of the Environment in Asia and the Pacific 2005 report, published by the United Nations Economic and Social Commission for Asia and the Pacific, notes that the region needs to shift towards ecologically efficient, 'green growth' patterns, if it wants to continue its growth. Acknowledging some efforts on new regulations, it documents that many areas are still in great need of improvement. High population density, low freshwater availability and biologically productive area per capita of all global regions, and the growth of highly energy-intensive and polluting industries, along with increasing waste, are some of the most important concerns. The report offers a comprehensive picture of the region's trends both as problems, and as shortfalls that still have to be regulated. [December 2006. [Military Implications, Sources](#)]

### **New Canadian Strategies for Monitoring the Northwest Passage**

Further on the opening of the Northwest Passage, the Canadian government is undertaking serious military and strategic operations for increased monitoring of the area for actions that might affect its sovereignty over the territory, as well as ecological impacts. In spite of strong disagreement between the Canadian Department of National Defence and Environment Canada

on projections concerning the timing of the Passage's accessibility for commercial and other navigation, new capabilities, funding and apparatus are being considered for increasing control. Those include: enforcing the Arctic Waters Pollution Prevention Act for avoiding ecological disasters; a highly mobile Rapid Reaction Battalions (based in B.C., northern Quebec, Newfoundland, and Ontario); armed icebreakers; and a deep-water port at the passage's eastern entrance. [See also *Northwest Passage to Become "Canadian Internal Waters"* in April 2006, and *Arctic Northern Passage Opens New International Issues of Regulation* in February 2006 environmental security reports.] [August 2006. [Military Implications, Source](#)]

### **Ecuador Gets an Environmentalist Foreign Minister**

President Rafael Correa of Ecuador (to take office in January) has named a US-trained environmentalist, Maria Espinosa, as his foreign minister. The new cabinet member is head of the World Conservation Union in South America and an expert on nature reserves. The nomination comes at a time of growing tensions with neighboring Colombia over spraying of drug crops near the border, which damages Ecuadorian legal crops and the health of people living in the area. [December 2006, [Military Implications, Source](#)]

### **China to Invest \$175 Billion in Environmental Protection over Five Years**

China plans to invest \$175 billion (about 1.5% of GDP) in environmental protection in the next five years, to curb severe water and air pollution, which is causing riots and health problems. The money is to be spent on such measures as control of water pollution, improving air quality in cities, and halting soil erosion. China has 20 of the world's 30 most smog-affected cities, and 2.5% of its grain is estimated to be contaminated by heavy metals. [See also *China Creates 11 Independent Environmental "Watchdog" Centers* in the July 2006, *China's President Hu Ordered Environmental Regulations for Military Activities* in April 2006, *Chinese Research Priorities for the Next Fifteen Years* in March 2006, and other related items in previous environmental security reports.] [September 2006. [Military Implications, Sources](#)]

### **China Creates 11 Independent Environmental "Watchdog" Centers**

China is establishing eleven watchdog centers to monitor and investigate environmental issues free from local government interference. The centers will operate under direct control of the State Environmental Protection Administration (SEPA) and will include five centers for environmental supervision, and six centers to monitor nuclear and radiation security. The main role of this nationwide network is to enforce environmental laws and regulations independent of local governments. The 11 centers will be included in SEPA's 24-hour emergency response system. [See also *China's President Hu Ordered Environmental Regulations for Military Activities* in April 2006, and *Chinese Research Priorities for the Next Fifteen Years* in March 2006, and other related environmental security reports] [July 2006. [Military implications, Source](#)]

## **TECHNOLOGICAL BREAKTHROUGHS WITH ENVIRONMENTAL SECURITY IMPLICATIONS**

### **Computer Technology and Robotics**

#### **UNEP and Google Earth to Pinpoint Environmental Hotspots**

The United Nations Environment Programme has joined together with Google Earth to highlight environmentally plagued regions of the world and to compare them to previous maps of the same regions. This technology grants millions of people around the world access to accurate, easily comprehensible, and timely visuals of rapidly changing environments. This information could help increase public awareness, as well as alerting authorities to prevent eventual security issues due to environmental changes. Additionally, dissemination of this type of information will be beneficial for capacity building, teaching, and stimulating action against environmental degradation. Presently, the “UNEP: Atlas of our Changing Environment,” offers satellite images of 100 environmental hotspots from around the world. Google Earth images are not real-time images but have all been taken in the last three years. The continual improvement and widespread use of the “Atlas of our Changing Environment” could provide unique opportunities to help prevent environmentally related conflicts. [September 2006, [Military implications, Sources](#)]

### **New Detection and Cleanup Techniques**

#### **Nanotech-based Explosives Detector**

Prof. Li Guang-tao of the Key Laboratory of Organic Optoelectronics & Molecular Engineering of the Ministry of Education at Tsinghua University, Beijing, and his group have developed nanocomposite silica films doped with porphyrins (nitrogen-containing macrocyclic molecules) which produce a very fast fluorescence response to trace vapors of explosives such as TNT, DNT and NB (nitrobenzene). These films can be used as the basis for small, cheap, and fast environmental detectors. [December 2006, [Military Implications; Source](#)]

#### **Detector Materials for Cyanogen Halides from Chemical Weapons**

Researchers at the Dept. of Chemistry at MIT, led by Samuel W. Thomas III, have developed new phosphorescent detecting compounds for cyanogen halides, used in chemical weapons. The new materials have greatly improved sensitivity to trace amounts of the toxins in the environment. [December 2006, [Military Implications, Source](#)]

#### **New Spectroscopy Technique Speeds Up Virus Detection**

A nanotech-based diagnostic test that can detect viruses as diverse as influenza, HIV, and respiratory syncytial virus in a minute or less was developed by a veterinary research team at the University of Georgia. The technique referred to as surface enhanced Raman spectroscopy (SERS) measures the Raman frequency shift of a near-infrared laser as it scatters off viral DNA or RNA. The test has the advantage of detecting the viral DNA or RNA itself rather than the indirectly produced antibodies that are the basis of other viral testing. This provides a much more rapid and reliable evaluation of the threat. The basic method was well known but the signals

produced were unusably weak. The breakthrough here was placing silver nanorods at an 86° angle on the specimen slides, an addition that enormously increased the strength of the returns. [November 2006. [Military Implications, Source](#)]

### **New Production Technique for Nanofiber Filters for Chemical Warfare Protection**

A new 3D honeycomb structure of polymer nanofibers, which, when incorporated into protective gear, would be much more efficient in adsorbing and possibly destroying dangerous chemical warfare agents in the environment was developed by scientists led by Dr. Seshadri Ramkumar, Asst. Prof. at the Institute of Environmental and Human Health at Texas Technology University. [October 2006. [Military Implications, Source](#)]

### **Sugar-coated Nanotubes Stop Anthrax Inhalation**

Clemson University chemist Ya-Ping Sun and his team have developed a technique that uses sugarcoated carbon nanotubes to render weaponized anthrax harmless. Finely divided anthrax spores in the environment bind to the sugar coating, forming clusters too large to be inhaled, rendering the weapon useless. [See also *Sugar-Coated Gold Nanoparticles Detect Toxins* in April 2006 environmental security report] [October 2006. [Military Implications, Source](#)]

### **New Spectroscopy Sensor for Environmental Monitoring**

University of Wyoming researchers have developed and patented a sensor that can be used with surface plasmon resonance (SPR) spectroscopy to produce a low-cost system for rapid detection of biological signatures, explosives, and other volatile chemical targets in the environment. The sensor element comprises a specially designed surface optically coupled to an SPR spectrometer. Molecules such as antibodies are held close to the SPR surface, with no intervening liquid/hydrogel layer, maximizing sensitivity. [September 2006. [Military Implications, Source](#)]

### **Nanocantilevers for Ultra-small Sensors**

Researchers at Purdue University are investigating the use of nanocantilevers in designing a new class of ultra-small sensors for quick detection of viruses, bacteria and other contaminants in air and fluids by coating the cantilevers with proteins, including antibodies that attract the contaminants. Nanocantilevers vibrate at different frequencies when contaminants stick to them, revealing the presence of dangerous substances. The work is funded by the National Institutes of Health. [September 2006. [Military Implications, Source](#)]

### **Digital Magnetofluidics Improves Biochemical Analysis**

A technique for more rapid, more accurate, and less costly analysis of biochemical fluids, such as is needed in biological warfare surveillance, was developed by the Department of Bioengineering of the University of Arizona in cooperation with other scientists. Based on magnetic forces, this form of "lab on a chip" minimizes contamination of the sample by the substrate, and saves both time and expensive chemicals. [August 2006. [Military Implications, Sources](#)]

### **Reliable Anthrax Antibodies Developed**

Swiss scientists have developed reliable anthrax-specific antibodies. This is an important achievement, since the similarity of the anthrax spore surface to that of spores of other bacteria, which commonly occur in humans, has previously prevented development of an antibody that would be reliably anthrax-specific for identification. [August 2006. [Military Implications, Sources](#)]

### **Bar-coded Nanowires May Yield Small, Fast Bio Detectors**

A "nanowire bar-code" system developed by researchers at Lawrence Livermore National Laboratory in cooperation with several other institutions may facilitate creating portable sensors capable of identifying multiple airborne pathogens within minutes. The technique consists of coating a nanowire with a distinctive pattern of gold and silver stripes—analogue to a barcode—and then with an antibody for the target threat. The applications of such a system range from detection of biowarfare agents to use during an outbreak of an infectious disease. [August 2006. [Military Implications, Sources](#)]

### **New Low-cost System for Bacteria Identification**

Researchers at Purdue University's Bindley Science Center have developed a new low-cost high-speed system that analyzes scattered laser light to quickly identify bacteria. The technique uses computer analysis of 120 factors in laser light scattered by bacterial colonies growing in a petri dish, costs a tenth as much as conventional methods, and can be completed in five minutes after the culture has grown. [August 2006. [Military Implications, Sources](#)]

### **Quantum Dot Device Provides Fast Detector for DNA Sequences**

Researchers at Quantum Logic Devices, of Austin TX, have constructed a DNA sequence detector that can detect a piece of DNA in less than 30 minutes, compared to 24 hours for a fluorescence technique. [August 2006. [Military Implications, Sources](#)]

### **Sensicore's Lab on a Chip Water Profiler Automates Lab Functions**

This system applies chip technologies in a WaterPOINT device that dramatically shrinks the space and time required to perform sixteen standard water quality and treatment tests. Memory and software permit rapid comparisons and mapping of results for entire systems. The 0.4-millimeter pH electrode illustrates the degree of miniaturization achieved. Several wet chemistry procedures are reduced from hours to minutes in duration without the need for reagents. Additional testing capabilities are in development for promised availability in the near future. [August 2006. [Military Implications, Sources](#)]

### **Deep Cooling Improves Uranium Detection**

Zheming Wang, at the Department of Energy's Pacific Northwest National Laboratory in Richland, Wash., has applied cryogenic fluorescence spectroscopy to detect uranium in contaminated soil at a former nuclear fuel manufacturing site. Use of an ultraviolet laser on the sample cooled to  $-267^{\circ}\text{C}$  produced fluorescence intensity of more than five times that at room temperature, and brought out additional spectral features enabling different forms of uranium,

including uranium carbonate, to be distinguished. [September 2006. [Military Implications, Source](#)]

### **Biodetecting Wipes**

Scientists at Cornell University have started development of an inexpensive and easy-to-use biodegradable absorbent wipe containing polymer nanofibers attached to antibodies for biohazards and chemicals. By changing color, or through another effect, the wipes signal when the antibodies bond to their targets. The 100 nm fibers provide very large surface areas for sensing, and increased absorbency compared to conventional fibers. [September 2006. [Military Implications, Source](#)]

### **Fish Provide Early Warning of Toxic Chemicals**

Bluegills, a small, hardy fish species, are highly sensitive to chemical disturbances in their environment, and react to toxins by convulsively flexing their gills to expel contaminating material. They can be used to monitor the chemical purity of a water supply by keeping them in a continuously re-supplied tank equipped with sensors to watch for changes in their breathing, heartbeat, and swimming patterns. The fish have successfully detected 30 alien chemicals, and have the advantage of requiring no "programming" for specific hazards. Their sensitivity was demonstrated on one occasion when they detected a diesel spill two hours before other sensors. The fish have been incorporated into an operational system by Intelligent Automation Corp. of Poway, CA. [September 2006. [Military Implications, Source](#)]

### **Ultrasound Soil Cleanup Technique**

Researchers at CSIRO Industrial Physics near Sydney, Australia have shown that high-intensity ultrasound can destroy toxic or carcinogenic persistent organic pollutants (POPs) that commonly contaminate land. According to New Scientist, "Cleaning them up is difficult. Incineration can produce toxic breakdown products, while chemical treatment methods can require huge amounts of energy or involve substances almost as toxic as those being cleaned up – risking dangerous leakages." The new technique, which avoids those problems, mixes the soil with water and then passes it through a chamber where the ultrasound produces localized temperatures of 4000° C and pressures of 1000 atmospheres, destroying up to 97% of the contaminants in a few minutes. [October 2006. [Military Implications, Source](#)]

### **New and Improved Water Purification Method**

Delft University of Technology (Netherlands), with Merle de Kreuk as principal researcher, and the DHV engineering consultancy, has developed a compact and environmentally friendly water purification method, in which aerobic bacteria form granules that sink quickly. In this new aerobic granular sludge technology (Nereda™), aerobic bacterial granules are formed in the water that is to be purified. These granules not only sink quickly but their use also has the advantage that only one vessel is needed for the process. The new technique requires 25% of the space and 70% of the energy needed for earlier methods. [July 2006. [Military Implications, Source](#)]

## **Technologies that Could Trigger New Forms of Arms Race**

### **Futuristic Nanotech and Synthetic Bioweapons Regulation**

With the forthcoming ability to write genetic code to create new kinds of life forms from scratch, opening a vast potential for new kinds of synthetic bioweapons, a new regulatory environment should be considered. These developments, along with potentials for nanotech weapons, create unique problems of proliferation, health effects, environmental impacts, and post-conflict cleanups that are not well covered by international treaties. It seems inevitable that treaties governing such futuristic weapons – like treaties that were created for other kinds of weapons in the past – will be negotiated. The factors that make such weapons possible (such as improved computer chips, increased bandwidth, software, nano-engineering) are producing synergistic improvements at an accelerating pace. This makes their speed of development faster than might have been expected. [November 2006. [Military Implications, Sources](#)]

## **Promising Environmental-friendly Technologies**

### **Clean Green Hydrogen-Making Process**

Lanny Schmidt, Brandon Dreyer and colleagues at the University of Minnesota's Department of Chemical Engineering and Material Science have developed a new process called "flash volatilization" that can turn waste biomass into hydrogen. It uses rhodium and cerium as chemical catalysts, is supposed to be 100 times faster than existing techniques, and is scalable. It generates a hydrogen and carbon monoxide gas mixture called synthesis gas, or "syngas" which can be used to make fuels, or its hydrogen can be separated in order to power fuel cells. [December 2006, [Military Implications, Source](#)]

### **Printing Fuel Cells**

EoPlex Technologies, in Redwood City, CA has developed a process, which allows the printing of three-dimensional structures with "ink" containing various materials, such as polymers, metals, and ceramics, layer by layer. Microreactors for chemical and drug processing, miniature fuel cells, wireless sensors, and thermal management systems are just some of the envisioned applications of this technology able to cheaply and easily create microscale devices. [October 2006. [Military Implications, Source](#)]

### **Smog-Eating Materials**

Environment-friendly materials such as "smog-eating" products are increasingly in demand by architects and are developed not just for the façades of buildings, but also for paint, plaster, and paving materials for roads. An EU initiative for "smart" antipollution materials has found that construction products containing titanium dioxide help to destroy air pollutants found in car exhaust and heating emissions. The new environment-friendly substances are being tested in buildings, squares and highways in Europe as well as Japan. [November 2006. [Military Implications, Source](#)]

## **Conferences on Nanotechnology with Environmental Security Implications**

The U.S. National Nanotechnology Coordination Office (NNCO) will hold a public meeting on January 4, 2007, to address the needs and priorities of environmental, health, and safety (EHS) research on engineered nanoscale materials. According to the announcement, the purpose of the meeting is to lay-out "strategic and interim goals for filling the EHS information needs gaps for nanomaterials." It will be structured around the following research areas: instrumentation, metrology, and analytical methods; nanomaterials and human health; nanomaterials and the environment; health and environmental surveillance; and risk management methods. [December 2006. [Military Implications, Sources](#)]

A conference, Nanotechnology - Products and Processes for Environmental Benefit, is to be held in London on 16-17 May 2007 under the auspices of the Royal Society. More information will be available shortly. [December 2006. [Military Implications, Sources](#)]

The 'Nanotechnologies - Safety for Success' conference, held 14-15 September in Espoo, Finland, has published its final report. The conference was attended by 180 specialists from 20 countries. According to the announcement, speakers introduced the audience to the opportunities, unknowns, and potential risks of evolving nanotechnologies, facilitated dynamic stakeholder discussion and identification of coordinated and concerted actions, and identified the key actions for efficient and well coordinated policies on nanotechnologies in Member States, in the European Union and internationally. [December 2006. [Military Implications, Sources](#)]

'Nanotechnology for Security and Crime Prevention' 18 January 2007, The Royal Society, London, will examine a wide spectrum of new scientific developments taking place in the fight against crime, from anti-terrorism laser technology with the potential to revolutionize airport security to the latest research discoveries in nanoforensics. [November 2006. [Military Implications, Sources](#)]

"Health & Environmental Summit on Nano" will be held during Nanotech 2007, May 20-24, 2007 in Santa Clara, California, convened by the Nano Science and Technology Institute (NSTI) in collaboration with the U.S. Food and Drug Administration, to assist with the FDA's fact-finding programs for Nanotechnology in Consumer Goods, including drugs, biologics, food and cosmetics. [November 2006. [Military Implications, Sources](#)]

The 4th NanoSpain Workshop will be held in Seville, 12-15 March 2007, bringing together several hundred participants to discuss the latest developments in nanotechnology. [November 2006. [Military Implications, Sources](#)]

### EU Conference on Nanotechnology Safety Policies

The current Finnish Presidency of the EU held a conference, Nanotechnologies - Safety for Success, in Otaniemi, Finland on 14-15 September 2006, with the goal of facilitating a dialogue on the opportunities and concerns presented by nanotechnologies. Another objective was the development of specific safety recommendations for the application of nanotechnologies. The

conference was attended by 180 experts from 20 countries. The presentations, covering the key actions for efficient and well-coordinated policies, are available on the conference's Web site.

#### International Nanotech Conference to be Held in Egypt, March 2007

An international conference, NanoTech Insight 2007 will be held in Luxor, Egypt, 10-17 March 2007, to discuss the latest trends and discoveries in nanoscience. Topics will include scientific and technical developments, applications, and ethical and environmental impacts. [October 2006. [Military Implications, Sources](#)]

#### OECD Meeting on Manufactured Nanomaterials

The OECD will hold a meeting of the recently established Working Party on Manufactured Nanomaterials in London on 26-27 October 2006 to finalize recommendations for the 2006-2008 Programme of Work regarding human health and environmental safety aspects of manufactured nanomaterials in the chemical sector, to be forwarded to the Chemicals Committee of OECD. The meeting will discuss reports on recent developments in nanotechnologies and nanomaterials, their safety, and related activities in other International Organizations. For example, there will be discussions of taking over the Woodrow Wilson Center's database and cooperating with other databases, such as the International Council for Nanotechnology (ICON)'s. [September 2006. [Military Implications, Sources](#)]

## 1.B Preventing or Responding to Environmentally Caused Conflicts

### MIGRATION TRIGGERED BY ENVIRONMENTAL CAUSES

#### Conference on Desertification Calls for Policies to Address Environmental Refugees

The UN International Year for Deserts and Desertification concluded with a Conference held in Algiers, Algeria, December 17-19, convened by the Canadian-based UNU International Network on Water, Environment and Health (UNU-INWEH), with ten other international agencies and hosted by the Algerian government. About 200 experts from 25 countries discussed policies to address desertification and its consequences, including health, economic, and environmental refugee-related issues. UN experts estimate that desertification threatens 2 billion people and could create more than 135 million refugees. In Africa, if current trends of soil degradation continue, the continent might be able to feed just 25% of its population by 2025, according to Karl Harmsen, Director of UNU's Ghana-based Institute for Natural Resources in Africa. The international community should swiftly adopt adequate policies both to counter the desertification trend and to address desertification-induced migration. "Environmental refugees," although not recognized yet in world conventions, are estimated to outnumber political refugees. [See also *International Year of Deserts and Desertification—2006* in January 2006, and *Desertification Synthesis (MA report 3)* in June 2005 environmental security monthly reports.] [December 2006, [Military Implications, Sources](#)]

#### Rising Sea Levels Claim First Inhabited Island and Threaten Coastal Populations Worldwide

Scientists emphasize that extreme scenarios—as effects of climate change—have to be integrated into the decision-making process. Latest estimates by climatologist Stefan Rahmstorf of the Potsdam Institute for Climate Impact Research show that the world's oceans may rise up to 140 cm (4 ft 7 in) by 2100 due to global warming, considerably higher than the 9-88 cm projected by IPCC. His study is based on air temperatures and past sea level changes rather than computer models. The scientist underlines that the different results obtained “with reasonable methods” show the serious uncertainty concerning sea level forecasts; however, there is compelling evidence that shore communities are particularly at risk.

Rising sea levels have submerged two islands in India's part of the Sundarbans—where the Ganges and the Brahmaputra rivers empty into the Bay of Bengal—and a dozen more islands in the area are at risk, threatening nearly 100,000 people who will have to be evacuated in the next decade. Lohachara, which had a population of 10,000 people, is the first inhabited island to disappear due to rising seas caused by global warming. The people of the Carteret Islands off Papua New Guinea also live under the continuous fear of stronger and more frequent rising tides threatening their entire livelihood and eroding their land. The islands are expected to disappear in about eight years. Similarly, whole island nations, from the Maldives to the Marshall Islands, vast areas of countries from Bangladesh to Egypt, and many coastal cities are at risk as sea levels continue to rise. In Alaska, 184 out of 213 native villages are at some point affected by erosion and flooding due to global warming, threatening the culture and the very survival of the inhabitants. [See also *Rising Sea Level Triggers Rising Refugee Move* in April 2006, *Rising*

*Concerns over Rising Seas* in February 2006, and other previous environmental security reports.] [December 2006. [Military Implications, Sources](#)]

### **Increasing Weather Extremes and Environmental Refugees due to Climate Change**

There might be 200 million climate refugees by 2050, which could increase the likelihood of conflicts in many locations around the world. Experts warn that in addition to the South Pacific low-lying islands that are already affected, millions of people in densely populated countries such as Bangladesh and parts of China, Indonesia, and Vietnam might be forced to move by rising sea levels, while extreme drought might affect 10% of world land by 2050—five times more than now, and 30% by the end of the century (estimate by UK Met Office Hadley Centre). Another study, *Going to the Extremes*, based on advanced computer modeling, warns that by the century's end, the planet will face more weather extremes such as deadly heat waves, prolonged drought, and intense rainstorms due to global warming caused by human emissions of greenhouse gas. [October 2006. [Military Implications, Sources](#)]

### **Coastline Erosion due to Rising Sea Waters Signaled Around the World**

Coastline erosion as one of the effects of rising sea levels is increasingly felt around the world by low-lying communities. Hundreds of people are being displaced on the Carteret Islands, Papua New Guinea, and millions are threatened along the shorelines from Sri Lanka and Bangladesh, to coastal Louisiana and England. Experts warn that England's coastline erosion might accelerate as global warming leads to rising sea levels and harsh weather. Over the next century, half of the 1,125 kilometer coastline in the administration of the National Trust charity—Britain's largest owner of coastline—is expected to be severely affected by erosion. Lyme Regis in Southwestern England is already threatened by rising seawaters that are carving away its harbor and coast. To this, should be added the increasing acidity of ocean waters—due to CO<sub>2</sub> levels that are over the ocean's natural buffering capacity—dissolving calcium and therefore severely affecting marine ecosystems, especially coral reefs that are the main support to many geologically new islands. [See also *Climate change—Research Documents Continued Global Warming Effects and Rising Sea Level Triggers Rising Refugee Move* in April 2006 and other previous environmental security reports.] [August 2006. [Military Implications, Sources](#)]

### **Economic and Security Implications of Climate Change**

The *Economics of Climate Change*, an authoritative report by Sir Nicholas Stern, former chief economist with the World Bank, warns that unless rapid action is taken globally to reduce emissions and tackle climate change within a decade, the world will face deep economic recession, with annual costs of climate change consequences ranging between 5% to 20% of the global economic output (about £3.68 trillion—approx. \$7 trillion US dollars). The report calls for a global framework on climate change that is flexible—considering different countries'/regions' specifics. Another report, *Africa—Up in Smoke 2*, by a coalition of UK aid agencies and environmental groups warns that climate change might annihilate efforts to tackle poverty in Africa and emphasizes the need for human progress and development models that are climate proof and climate friendly. Africa is already 0.5°C warmer than it was 100 years ago and temperature increases over many areas of Africa might be double the global average increase, worsening drought patterns and the strain on already feeble water resources, and therefore aggravating the security situation of the conflict-torn continent. As noted by UK Foreign

Secretary, Margaret Beckett, climate change is not any longer just an environmental problem, but is “a defence problem. It is a problem for those who deal with economics and development, conflict prevention, agriculture, finance, housing, transport, innovation, trade and health.” [October 2006. [Military Implications, Sources](#)]

### **Developing Countries Most Affected by Global Warming**

Consequences of global warming are increasingly felt, mostly by developing nations. Rising sea levels force inhabitants of some South Pacific islands to relocate. The World Bank warns that development programs are jeopardized by climate change in many regions around the world and urges the international community to integrate climate risk concerns in development strategies. [September 2006. [Military Implications, Sources](#)]

## **FOOD AND FRESHWATER**

### ***Living Planet Report 2006***

*Living Planet Report 2006*, by the WWF and the Global Footprint Network, reveals that humanity's impact on the planet has more than tripled since 1961 and Earth's resources are being used faster than they can be replaced by nature, and it warns that, if present trends continue, by 2050 humanity will demand twice as much as the planet can supply. The report breaks down the ecological footprint into components, such as CO<sub>2</sub>, food production needs, infrastructure requirements, etc. The countries with the highest ecological footprint are: the United Arab Emirates, U.S., Finland, Canada, Kuwait, Australia, Estonia, Sweden, New Zealand, Norway and Denmark. [October 2006. [Military Implications, Sources](#)]

### **Unless Water Management Improves, Conflicts over Water Are Inevitable**

The 16th annual conference on water took place in Stockholm, during World Water Week, August 20-26. Reports released during this week warned of possible consequences of future water scarcity, such as increased cost of water, civil unrest, mass migration, and economic collapse. There was consensus that poor management of water resources and soaring water usage are the main causes of water scarcity increasing worldwide faster than expected; and, unless there are drastic policy changes around the world, the grim statistics will only worsen, mostly in the densely populated and poor regions of China, Mexico, and India. A report by The World Wildlife Federation (WWF), *Rich countries, poor water*, warns that wealthy nations are threatened by a water crisis similarly to the drought-plagued poor countries, due to climate change, drought, loss of natural wetlands, and over-consumption by industry, agriculture and big cities. The report suggests seven ways to address the problem. The International Water Management Institute notes that while over the past 100 years water usage had increased six-fold, it is expected to double again by 2050.

The World Bank estimates that 20-40% of water sector finances are lost to corruption. Water experts and businesses formed the Water Integrity Network (WIN) to combat corruption in the water sector. WIN is open to all. Transparency International and water corporations are the initial principal members. WIN seeks reforms to improve regulations and transparency, as well as increase public awareness.

Asia's Coming Water Wars, a comprehensive analysis by The Power and Interest News Report, warns of water problems increasing conflicts in some Asian regions already beleaguered by long-standing historical animosities and internal instabilities. The most vulnerable regions for water-related conflicts are Central Asia, South Asia and the Mekong sub-region in Southeast Asia. Considering these regions' rapid development, growing populations and instabilities, water-related tensions might have wider regional and global significance.

Business in the world of water—WBCSD Water Scenarios to 2025 presents the critical future water situation in three “H2O” scenarios: “H” (Hydro)—urbanization, technical and efficiency-focused, with serious water allocation problems; “2” (Rivers) is a world of water security based on compromise; “O” (Ocean) describes a functional society based on interconnectivity and cooperation of all systems' actors. [August 2006. [Military Implications, Sources](#)]

## **NATURAL DISASTERS**

### **Population Trends and Environmental Impact**

#### U.S. National Report on Population and the Environment

U.S. National Report on Population and the Environment by the Center for Environment and Population (CEP) is the first comprehensive assessment of the impact of U.S. national and regional population trends on the environment. The report addresses the main “America's Population-Environment Challenges”: land use; water; forests; biodiversity; fisheries and aquatic resources; agriculture; energy; climate change; and solid and toxic waste. It highlights that from 1995 to 2005, the U.S. population increased by 10.6% (29 million people)—the highest rate of industrialized countries—and raises concerns over environmental consequences, since the U.S. already has the largest per-capita environmental impact in the world. It warns that in the future the situation might become more critical due to uneven distribution of the population, climate change, rising sea levels, and pollution.

#### World Population in 2025

Mapping Future Population Growth by the Earth Institute at Columbia University is mapping projected population change for the year 2025. It notes that most population growth will continue to be in already densely populated developing countries like India and China, and coastal population will increase by 35%, to 2.75 billion people living within 60 miles of the ocean; therefore, there will be increasing vulnerability to disasters resulting from climate-change and rising sea level. [September 2006. [Military Implications, Sources](#)]

### **Indian Ocean Tsunami Warning System Declared Operational, but Local Coordination still Lacking**

At the end of June, UNESCO announced that the Indian Ocean tsunami warning system, coordinated by its Intergovernmental Oceanographic Commission, is on schedule to become operational for the entire region by the end of July. A network of 26 national information centers will allow countries to receive and distribute warnings of potential tsunamis. However, the tsunami that struck Indonesia on July 17th, caused by an earthquake off the south coast of Java, killed more than 500 people. Although the wave hit the coast 40 minutes after the quake was detected, no warning was issued to the population. [See also *Tsunami Warning and Mitigation*

*System in the Indian Ocean* in December 2005, and other related items in previous environmental security reports.] [July 2006. [Military Implications, Sources](#)]

## **ENERGY SECURITY**

### ***World Energy Outlook 2006 Warns on Energy Security and Environmental Implications of Increasing Energy Demands***

The IEA's *World Energy Outlook 2006*, looking ahead to 2030, names two major issues facing the world over the next 24 years: the threat of "insecure" and "inadequate" energy supplies at reasonable prices, and environmental damages caused by increasing energy demands. The report also suggests that the solutions to these problems are cost effective and reiterates that investment in cleaner energy supplies and more efficient use of energy are vital to cutting energy demand by a significant margin – 10% by 2030. The report notes that energy demand will rise 53% by 2030 and increased nuclear energy and biofuel use are vital to cutting emissions. [November 2006. [Military Implications, Sources](#)]

### **European Action Plan on Energy Efficiency**

The European Commission outlined its Energy Efficiency Action Plan (EEAP) to cut Europe's energy consumption by 20% before 2020. It includes over 75 measures including new energy efficiency standards, and more energy-efficient products and services. The action plan will be introduced over the next six years and targets several priority areas, including: energy-efficiency labeling, possible legislation for meeting car emissions targets; encouraging investment in energy efficiency; more efficient power plants and energy transmission systems; and energy saving taxes and incentives. [See also *New European Energy Policy Developments* in March 2006 environmental security report.] [October 2006. [Military Implications, Sources](#)]

## 1.C Protecting the Environment Due to Its Inherent Moral Value

### ENVIRONMENTAL SECURITY-RELATED INTERNATIONAL REGULATIONS THAT HAVE BEEN OR ARE CLOSE TO COMING INTO FORCE SINCE JUNE 2006

#### **REACH, Europe's Chemical Regulations to Enter into Force on June 1, 2007**

The REACH regulation (Registration, Evaluation, Authorization and Restriction of Chemicals) was approved by the European Parliament and the European Commission and will enter into force on June 1, 2007. REACH is regulating the manufacturing, marketing, import, and use of some 30,000 chemicals and is replacing 40 existing pieces of legislation, thus creating a single system for all chemicals in the European Union. The chemicals have to be registered over the next 11 years with the new European Chemicals Agency (ECHA) in Helsinki, which will be responsible for management of the new requirements. [See also International Controversies over REACH in June 2006, Integration of Chemical Regulations (REACH) Approved by European Council in December 2005, and other related items in previous environmental security reports.] [December 2006, [Military Implications, Sources](#)]

#### **Canadian Chemical Plan May Go beyond REACH as Environmentalists Get New Political Support**

The Canadian government has launched a plan to regulate the use of chemicals harmful to human health and the environment. Although the initial plan targets only 200 chemicals for regulation over the next four years, more could be added to eventually go beyond initiatives in Europe and the U.S. The Canadian efforts to strengthen such environmental policies will be improved by election of Stéphane Dion (former Environmental Minister) this month as the Liberal Opposition Leader. Sources report a rising environmental tide among the public. Previous negotiations for regulations mostly related to climate change, but pollutants are also expected to be revived as the Conservatives' efforts in the environment arena are strongly criticized by the other parties, citizens, and the international community. [Note: This month, the Secretariat of the Commission for Environmental Cooperation (CEC, NAFTA's "environmental arm") issued a determination requesting a response from Canada to a submission asserting that Canada is failing to effectively enforce the federal Species at Risk Act.] [December 2006, [Military Implications, Sources](#)]

### PROPOSED TREATIES AND/OR CHANGES TO EXISTING ONES

#### **Toxic Waste Management**

##### **UN E-Waste Forum and Basel Convention's Conference of Parties**

Electronic devices account for 20-50 million metric tons of waste per year around the world that introduce lead, cadmium, mercury and other hazardous wastes into the land and water supplies. To counter the acceleration of this problem, over 500 experts from more than 150 countries met at the UN offices in Nairobi, Kenya, November 27–December 1 for the Conference of the Parties

(COP8) to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. The conference theme was “Creating innovative solutions through the Basel Convention for the environmentally sound management of electronic waste.” An e-waste declaration and more than 30 decisions were adopted, including synergies and cooperation among the Basel, Rotterdam and Stockholm Conventions (UNEP/CHW.8/CRP.8), safer ship dismantling procedures, amendments to the guidelines for the environmentally sound management (ESM) of persistent organic pollutant wastes, the 2007-2008 program, and implementation of the Strategic Plan for the Implementation of the Basel Convention to 2010. The E-waste Declaration called for wider transfer of information on technologies and e-waste management from developed to developing countries, prevention and fighting e-waste trafficking, introduction of broader and stronger national legislation to control e-waste management, promotion of eco-friendly technologies and phasing-out toxic components, and raising awareness of e-waste issues and integrated systems to reduce and limit damage due to e-waste. The meeting also discussed environmentally sound management of ship dismantling and agreed to a draft ship recycling convention, as well as the need for greater guidance in managing abandoned ships. The next COP will take place in fall 2008, in Indonesia. [See also *Toxic Waste Disposal of Global Growing Concern* in September 2006, *Basel Convention on Hazardous Wastes to be Made More Effective* in July 2005, and other related items in previous environmental security reports.]

[Note: By 2010, an estimated 100 million phones and 300 million personal computers might become waste. In the U.S., it is estimated that 14–20 million personal computers are thrown out each year; developing nations are expected to triple their output of all electronic waste by 2010.]

[December 2006, [Military Implications and Sources](#)]

### **Green Standards to Counter E-waste**

In view of e-waste being the fastest growing category of waste, Greenpeace launched a new e-waste campaign on August 25th. In a preamble to the campaign, it compiled data on progress in eliminating hazardous chemicals and in recycling policies of the main mobile phone and PC-makers and ranked the companies based on their scores. The criteria used in the Greenpeace assessment are tougher than those stipulated by the European Restriction of Hazardous Substances (RoHS) directive, including polyvinyl chloride (PVC) and some brominated flame retardants (BFRs) on the restrictions list. Greenpeace also advocates the “precautionary principle”, requesting companies to avoid chemicals with uncertain environmental impacts. [See also *RoHS Closer to Deadline* in May 2006, *Recycling Regulations in the EU* in August 2005 and *Two E-waste laws entered into force in the EU* in February 2003 environmental security reports.]

The Electronic Product Environmental Assessment Tool (EPEAT) produced by EPA also aims to encourage “green computers.” After working for three years with major computer manufacturers, EPA produced a “greener computers” list that consumers can consult to see what models are more environmentally friendly and why. The standards were developed by the Institute of Electrical and Electronics Engineers and consider 23 required criteria and 28 optional criteria in eight categories, including: content of environmentally sensitive materials (such as mercury, lead and cadmium); power requirements; lifespan; and the “end of life” recycling plans offered by the manufacturers. [August 2006. [Military Implications, Sources](#)]

## **China Issues Electronic Waste Rules**

The Chinese State Environmental Protection Administration has issued new rules to require manufacturers, retailers and users to take responsibility for electronic waste. The rules are partly inspired by China's thriving (and illegal) industry of importing electronic waste and scavenging it in occupationally unsafe small or family workshops. [See also *Global Environmentally Sound E-waste Disposal System is Needed* in November 2005 environmental security report.] [August 2006. [Military Implications, Sources](#)]

## **EU to Increase Environmental Regulations Enforcement**

The European Commission intends to increase the enforcement of environmental regulations by introducing criminal sanctions for serious environmental offences. In light of last month's Ivory Coast incident of toxic waste dumping, it aims to strengthen enforcement of the EU Waste Shipment Regulation and improve international cooperation to prevent illegal waste shipments. The issue will be addressed at the next Basel Convention conference to be held in Nairobi, November 27-December 1, 2006. [See also *Toxic Waste Disposal of Global Growing Concern* in September 2006, as well as *Basel Convention on Hazardous Wastes to be Made More Effective* in July 2005 and other related items in previous environmental security scanning reports.] [October 2006. [Military Implications, Source](#)]

## **Toxic Waste Disposal of Global Growing Concern**

The scandal around the dumping of toxic waste at Abidjan, Ivory Coast has intensified the global debate concerning trade in waste and the adequacy of the Basel Convention. Some African and Asian countries became dumping grounds for hazardous waste, such as radioactive uranium waste, lead, cadmium, mercury, industrial and hospital chemicals, and the rising volume of electronic waste. Although the Basel Convention and its 1995 amendment ban dumping of toxic waste in countries without proper facilities for handling it, the process continues illegally in countries that are not party to the Convention. In addition to environmental and health consequences, a Senegalese ecologist points out the security aspect associated with illegal dumping since "the waste is often accepted by corrupt people or factions who want money to buy weapons". As a consequence of the Ivory Coast scandal, the Prime Minister dissolved his cabinet and elections are jeopardized in a country already tormented by conflicts. [See also *New Measures for Regulating E-waste* in August 2006, as well as *Basel Convention on Hazardous Wastes to be Made More Effective* in July 2005 and other related items in previous environmental security scanning reports.] [September 2006. [Military Implications, Sources](#)]

## **Chemical and Biological Safety**

### **Eleventh Chemical Weapons Convention**

The 11th Conference of States Parties to the Chemical Weapons Convention (CWC) was held in The Hague, December 5-8. One of the controversial issues discussed concerned "incapacitating agents," which Peter Herby, head of the Mines-Arms Unit at the International Committee of the Red Cross, considered toxic chemicals. Some experts also argued that using "nonlethal" materials on the battlefield would violate the CWC. There was also a call to clarify which

chemicals—other than riot control agents—are allowed under the treaty’s exception for law enforcement, and that all these chemicals be publicly declared. The Conference approved the requests from Russia, the U.S. and several other nations for additional time to eliminate their stockpiles of toxic agents. There are now 181 nations party to the CWC, representing about 98% of the world’s population and there are calls that all nations become Party to the Convention before its 10th anniversary, next year. [See also *Five Countries Organize CWC National Authorities* in May 2006, *Micro-reactors Challenge Chemical Weapons Convention Effectiveness* in August 2005, and *Chemical Weapons Convention Annual Conference* in December 2004 environmental security reports.] [December 2006, [Military Implications, Sources](#)]

### **Better International Controls Needed to Prevent Bioterrorism**

“The biological weapons threat is multiplying and will do so regardless of the countermeasures we try to take,” warns Steven Block, a Stanford University biophysicist and former president of the Biophysical Society. The likelihood of SIMAD (Single Individual Massively Destructive), motivated by ideology or personal issues, is increasing fast and there is no adequate international treaty (the Biological Weapons Convention is not enough) or oversight agency to prevent malicious use of biotechnology work. There is no monitoring of the expanding gene-synthesis industry and the supervision of controversial experiments is voluntary and irregular at universities and private laboratories around the world. While scientists are still arguing on what approach would be the best to increase protection against bioterrorism, they agree on the need for swift and intensified international control to impede the accidental or deliberate release of genetically modified organisms. Along the same lines, China has updated its 2002 list of controlled export materials that could be used to produce biological weapons to fight terrorism. The new list added 14 types of viruses, toxins, bacteria, and equipment, and strengthened export control. [July 2006. [Military Implications, Sources](#)]

### ***Human Biomonitoring for Environmental Chemicals***

This is an independent study by the National Research Council (NRC) of the National Academies to address the challenges related to biomonitoring, including improving biomonitoring systems, interpreting the results of biomonitoring data to the public health, addressing ethical uses of the data, and communicating the results of biomonitoring to different forums. The report recommends improving the interpretation of biomonitoring results by expanding the scientific database on many chemicals; better coordination between biomarker development and population biomonitoring and the potential health implications; improved ability to assess the real health risks of detected chemicals; development of strategies for efficient communication of biomonitoring studies’ results; and a review of the bioethical issues concerning biomonitoring, including confidentiality and reporting. [November 2006. [Military Implications, Source](#)]

### **Scientific Community’s Questions Concerning Biodefense Standards**

The American Type Culture Collection (ATCC) convened an Expert Panel on the Development of Standards for Biodefense in Washington, DC, 5-6 April 2006. Considering the critical point reached in the evolution of the biodefense industry, the scientific community agreed that standards are needed to accelerate product development for biodefense-related diagnostics,

therapeutics, and reagents. However, on debating the standards issue, a panel of experts generated a range of questions that still require resolution in several areas, including standard handling protocols—that would include protocols for handling, storage, transport, inactivation, and disposal of biomaterials. [See also *Better International Controls Needed to Prevent Bioterrorism* in July 2006, *Assessment and Recommendations for Biosecurity* in June 2006, and *Recommendation for a Biosecurity Watchdog* in February 2006 environmental security reports.] [August 2006. [Military Implications, Source](#)]

## **Pollution and Greenhouse Gases**

### **Countries Contemplating Tougher Regulations for Mandatory Emission Targets**

In light of last month's report, *The Economics of Climate Change*, the UK announced its intention to introduce new "green" measures to reduce carbon emission, including the Climate Change Bill—to reduce CO<sub>2</sub> emissions by 60% by 2050, and to strengthen official monitoring and reporting. The UK also proposes to set an emissions reduction target of 30% by 2020, and at least 60% by 2050 Europe-wide. Australians polled would favor ratification of the Kyoto Protocol and more stringent reductions, and its government advocates an Asia-wide emissions trading system as part of a planned "new-Kyoto" pact and would invest US\$46.5 million into the world's biggest carbon capture and storage system. [Note: A proposal to allow Clean Development Mechanism (CDM) funds to be used for carbon capture and storage (CCS) projects was deferred by the Climate Change Conference on grounds that the technology is not yet mature.] Japan cannot meet its obligations under the Kyoto Protocol unless it imposes mandatory emission targets on industry and increases spending for carbon credits using Kyoto tools such as the Clean Development Mechanism. [See also *UK Proposes Individual Carbon Trading* in July 2006, *Possible Tougher European Carbon Limits* in May 2006, and other related items in previous environmental security reports.] [November 2006. [Military Implications, Sources](#)]

### **UK Proposes Individual Carbon Trading**

The UK Minister of the Environment has proposed a plan for individual carbon-trading procedures. Under the proposal, all UK citizens would be allocated a certain annual amount of carbon credits that will be reduced each time they purchase non-renewable energy. The points will be stored on an electronic card and those who did not use their full allocation would be able to sell their surplus carbon points into a central bank, while those who run out of points will be charged additionally at the point of sale for the equivalent of the missing points. To reduce total UK emissions, the overall number of points would be reduced each year. Details and the place for launching the pilot project should be announced shortly. If the new UK carbon-trading scheme proves feasible and efficient, it is likely that it will be emulated in other (if not all) EU countries and possibly even other regions of the world strongly committed to reducing their carbon emissions. [See also *Possible Tougher European Carbon Limits* in May 2006 and other related items in previous environmental security reports.] [July 2006. [Military Implications, Source](#)]

## **Europe to Begin Penalizing Jet Pollution in 2011**

The European Commission is moving forward with its proposal for a directive to bring civil aviation into the EU Emissions Trading Scheme (EU ETS) by imposing extra charges on highly polluting carriers. The legally binding rules will apply to all flights within the EU starting in 2011, and from 2012 to foreign carriers landing and taking off from European airports. [See also *Europe to Propose Emissions Targets for All Flights To/From or Within Europe* in November 2006 and *EC Proposed Strategy to Curb Greenhouse Gas Emissions from Air Travel* in September 2005 environmental security reports.] [December 2006. [Military Implications, Sources](#)]

## **November 2006: Europe to Propose Emissions Targets for All Flights To/From or Within Europe**

The European Commission is proposing to introduce a new policy that would impose emissions controls on all flights within and coming into Europe, seeking to strengthen pollution reduction regulations around the world. The proposal, expected to be presented around December 20, requires airlines to meet emissions targets starting January 1, 2011, for all flights within Europe and round-trips to the European Union from any other part of the world. The proposal also outlines a system and timeframe for airlines to buy carbon credits. [See also *EC Proposed Strategy to Curb Greenhouse Gas Emissions from Air Travel* in September 2005 environmental security report.] [November 2006. [Military Implications, Sources](#)]

## **July 2006: Europe Considers Aviation Policies to Reduce Greenhouse Gases**

The European Parliament is increasing its discussions on the impact of aviation on climate change, considering introducing kerosene taxes, and having the industry join the Kyoto Protocol-induced obligations. The World Travel & Tourism Council opposes such measures, which—they say—do not take into consideration the larger picture of the challenges which need to be managed, including jobs, economic impact, and even a negative effect on pollution. [July 2006, [Military Implications, Sources](#)]

## **EU New Directive on Air Pollution**

A new air quality directive approved by the Environment Council is fixing an annual concentration limit for fine dust particles (known as PM2.5) to 25 micrograms per cubic meter averaged over a year, with effect from 1 January 2015 and will require Member States to reduce people's exposure to this group of particles by 20% between 2010 and 2019. The new directive would not change existing air quality standards for other pollutants but would give Member States more flexibility in meeting some of these in zones where they face difficulties. [See also *EU Thematic Strategy on Air Pollution for the CAFE Programme* in September 2005, and *The European Union Environmental Initiatives* in January 2005 environmental security reports.] [October 2006. [Military Implications, Sources](#)]

## **EU to Introduce New Regulations to Combat Surface Waters Pollution**

The European Commission has proposed new rules regulating the amount of chemicals and toxic substances seeping into the continent's surface waters. The new regulation will apply to the 25-nation bloc, and would set new limits on the concentration levels of 41 hazardous chemicals in rivers, lakes and coastal waters. The directive, if approved by member states and the European Parliament, would require EU nations to "achieve the proposed limits for all priority substances

by 2015 and cease discharges and emission of priority hazardous substances into water by 2025," says the Commission statement. [July 2006. [Military Implications, Sources](#)]

## **Post-Kyoto Protocol Negotiations**

### **UN Climate Change Conference with 5,900 Explores Post-Kyoto Regulations**

The twelfth Conference of the Parties (COP 12) to the UN Framework Convention on Climate Change and the second Meeting of the Parties to the Kyoto Protocol (COP/MOP 2), as well as some 130 related side events took place in Nairobi, Kenya, November 6-17, 2006, attended by over 5,900 participants, including 2,300 government officials. The foci were on the future of the Protocol and the Convention, and longer-term action to combat climate change and cope with its consequences. The meetings resulted in the adoption of 10 COP decisions and 11 COP/MOP decisions and in the approval of a number of conclusions by the subsidiary bodies, but no agreements were reached on post-Kyoto cuts or a negotiations timetable. However, the governments recognized that there is compelling scientific evidence for global warming and thus global emissions need to be reduced 50% by 2050. At the insistence of the European Union, a thorough examination of the Protocol will take place in 2008. Important achievements include: a) establishment of the Least Developed Countries (LDC) Fund, Special Climate Change Fund (SCCF), and Adaptation Fund; b) launch of the Ad Hoc Working Group on Annex I future commitments; c) the Dialogue on long-term cooperative action to address climate change by enhancing implementation of the Convention; and d) the assignment of high priority to adaptation activities, mainly in developing countries. It is expected that, at next year's meeting, to be held in Indonesia, governments will start full negotiations for deeper cuts in emissions to keep the rise in global temperatures below the critical 2°C level. [November 2006. [Military Implications, Sources](#)]

### **EU to Move Forward on the Post-Kyoto Negotiations**

The European Environment Council agreed to significantly accelerate global negotiations for a post-Kyoto framework to reduce greenhouse gas emissions. It is ready to assume leadership for completing global negotiations by the end of 2009. [See also *UN Climate Change Conference with 5,900 Explores Post-Kyoto Regulations* in November 2006, *Montreal Conference on Climate Change Reached New Agreements* in December 2005, *UN Meeting Fails to Agree on Post-Kyoto Strategy* in May 2005, and other previous environmental security reports.] [December 2006. [Military Implications, Source](#)]

### **Possible Tougher Policies Concerning Climate Change**

Environment ministers from around the world will meet next month (November 2006) in Nairobi, Kenya, for talks on post-Kyoto policies. Some want clearer timetables and frameworks on the next phase of greenhouse gases cuts. German Chancellor Angela Merkel wants to make addressing climate change a top priority on the agenda as she assumes the top position in both the G8 and the EU in 2007. She also wants to use Germany's presidency of the EU to push for the reduction of energy use, including bringing around the big greenhouse gases emitters that do not yet have adequate reduction policies. [October 2006. [Military Implications, Sources](#)]

## **Biological Diversity**

### **New Sites Added to World's Protected Biosphere Reserves**

UNESCO added 25 new sites to the UN global network of protected biosphere reserves that are managed on sustainable development principles. The new additions include 18 sites in Mexico, three in Spain, one trans-boundary site shared between Spain and Morocco, and one in each of the Russian Federation, Viet Nam, and Malawi. UNESCO's network Man and the Biosphere (MAB) Programme now comprises 507 reserves in 102 countries. [See also *New Protected Ecological Sites* in July 2005 and other previous environmental security reports.] [October 2006. [Military Implications, Source](#)]

### **New Strategy of UNESCO World Heritage Committee for Heritage Sites and Climate Change**

UNESCO's World Heritage Committee is registering protected sites threatened by climate change. These sites will be monitored and actions will be suggested to prevent their damage from climate change. A policy document on the impact of climate change on World Heritage properties will be presented to the World Heritage Committee in 2007. Created in 1972, UNESCO's World Heritage List covers 812 sites around the world. Located in 137 countries, 628 of the World Heritage sites are cultural, 160 are natural and 24 are mixed. [See also *New Protected Ecological Sites* in July 2005, *Nine New Hotspots Added to World's Protected Areas* in February 2005, *Intensified Efforts Needed to Save Biodiversity* in January 2005, and related items on UNESCO World Heritage Sites in November and June 2004, and October 2003 environmental security monthly reports.] [July 2006. [Military Implications, Sources](#)]

## **Marine Environment**

### **The Debate over Use of Sonar by the Navy Continues; Legal Settlement Approved**

After a temporary restraining order issued July 3, blocking the use of high-intensity, mid-frequency sonar by the U.S. Navy during international Rim of the Pacific (RIMPAC) war games taking place in waters around Hawaii, on July 7, the judge has approved a settlement between the Navy and conservation groups, permitting the use of mid-frequency sonar during the eight-nation military exercises. The settlement agreement requires new safeguards, including a buffer zone, increased monitoring for marine mammals through underwater detection and aerial surveillance for marine mammals during sonar drills and the reporting of sightings to a marine mammal response officer. This type of sonar has been associated with mass strandings and deaths of whales, dolphins, and other marine species in U.S. waters and around the world. The conservation groups that filed the lawsuit were: Natural Resources Defense Council, the International Fund for Animal Welfare, the Cetacean Society International, the Ocean Futures Society (OFS), and (OFS) founder and director Jean-Michel Cousteau. [See also *Underwater Sounds from Human Sources Endangering Marine Life* in November 2005, *Coalition Urges UN to Consider Legislation to Curb Harmful Ocean Sounds* in June 2005, and other previous environmental security reports on the same issue.] [July 2006. [Military Implications, Sources](#)]

### **Political Agreement Reached on the European Marine Strategy Directive**

The European Environment Council reached political agreement on the framework directive for EU action on marine environment policy. The Marine Strategy Directive aims to ensure that all EU marine waters are environmentally healthy by 2021 and it is the main component of the Thematic Strategy on the Protection and Conservation of the Marine Environment, which was adopted in October 2005. The Strategy is based on regional assessment of the marine situation, exchange of information, and design of policies to improve ecosystem conservation or rehabilitation, as well as pollution reduction and clean-up. [See also *New EU Environmental Strategies* in September 2005, *Europe to Harmonize Marine Pollution Legislation* in July 2005, *The European Union Environmental Initiatives* in January 2005, and *International Maritime Organization (IMO) wants global rather than many different local or regional rules* of January 2003 environmental security monthly reports.] [December 2006. [Military Implications, Sources](#)]

### **International Conference and Assessments Find Rising Ocean Pollution**

The Second Intergovernmental Review (IGR-2) meeting of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA) attended by over 700 participants from some 115 countries was held in Beijing, October 16-20. The delegates assessed progress so far and the main issues concerning ocean pollution, and addressed the actions needed for the next period 2007-2011. Although no legally binding instruments were adopted, “soft law” timetables and measures offering more flexibility and adaptability to countries’ and regions’ specifics were discussed. New scientific estimates released at the meeting reveal that due to pollution, the number of marine ‘dead zones’ or low oxygenated areas may have reached 200, threatening fish stocks and the livelihood of people who depend on fisheries. And, an estimated 16% of the world’s coral reefs suffered up to 90% mortality. UNEP new report, *The State of the Marine Environment: Trends and Processes*, is a comprehensive assessment of pollution evolution and trends, warning of critical areas and suggesting recommendations to improve control and reduce contamination caused mainly by discharge of untreated wastewater. The report also notes that the number of coastal dead zones has doubled every decade since 1960, and that coastal ecosystems will be further endangered by rising populations in those areas. Highly populated East Asia discharges 90% of its untreated sewage into water. The Beijing Declaration on Furthering the Implementation of the GPA will be submitted for endorsement to the next UNEP Governing Council/Global Ministerial Environment Forum in February 2007. [October 2006. [Military Implications, Sources](#)]

### **Heavy Metals**

#### **Europe Proposes Ban on Mercury Exports**

The European Commission has proposed legislation to ban all European Union exports of mercury starting in 2011, and the European Parliament has drafted a measure that would forbid its use in non-electrical measuring devices, with the exception of barometers and antique instruments. [See also *Mercury Instruments May Be Banned in EU* in February 2006, *EU Sets 2011 Deadline to Ban Mercury Exports* in June 2005, and *Governments Call for Global Assessment and Control of Mercury Pollution* in February 2005 environmental security reports.] [November 2006. [Military Implications, Sources](#)]

## **IMPROVED COMPLIANCE WITH ENVIRONMENTAL REGULATIONS**

### **North America's Commission for Environmental Cooperation to Increase Enforcement of Environmental Regulations and Public Participation**

The Joint Public Advisory Committee (JPAC) of the Commission for Environmental Cooperation (CEC) of Canada, the United States, and Mexico held its third Regular Session for 2006 on 15 September in Montreal, Quebec, to discuss the proposed 2007-2009 Operational Plan. Participants assessed progress on cooperative projects the CEC is implementing to meet the goals and objectives of Looking to the Future: Strategic Plan of the Commission for Environmental Cooperation 2005–2010. The focus was on the implementation of the three program priorities as established by the CEC Council: information for decision-making; capacity building; and trade and environment, mutually reinforcing each other. Proposals called for increased comparability and reliability of environmental data and networks among the U.S., Canada, and Mexico; improved submission and enforcement procedures—to speed the process and increase citizen participation and responsibilities; and creating a North-American comprehensive atlas of all resources, ecosystems, and pollution matters. The Operational Plan will be updated annually, with a rolling three-year horizon, to reflect shifts in programming and associated budget reallocations. [September 2006. [Military Implications, Source](#)]

### **Biological Weapons Convention**

#### **Sixth Review Conference of the Biological Weapons Convention**

The three-week review Conference of the Biological Weapons Convention made some positive steps forward that included giving more power to the present temporary secretariat to oversee the treaty and monitor compliance, and holding, by 2011, four intersessional meetings on the treaty topics—enhancing national implementation, measures to improve biosecurity, scientific codes of conduct, peaceful scientific cooperation, and assistance to any country that does fall victim to biological weapons. One representative criticized the conference for not addressing future issues such as new nonlethal agents and nanotech-related methods for delivering biological agents. [See also PrepCom to Set Agenda for the BWC Review Conference in April 2006, Recommendation for a Biosecurity Watchdog in February 2006, and Time to Strengthen the 1972 Biological Weapons Convention in December 2004 environmental security reports.] [December 2006. [Military Implications, Source](#)]

### **Kyoto/Climate Change**

#### **Lawsuits over Failure to Meet Kyoto Commitments**

The Friends of the Earth threaten to sue the government of Canada over its refusal to adopt adequate policies to cut greenhouse-gas emissions and meet its commitments as agreed under the Kyoto Protocol. The environmental group will file the lawsuit with the Canadian federal court and the Kyoto Protocol Compliance Committee, unless the government changes its position. In

May, South Africa filed with the international Kyoto Committee a complaint against Canada and 14 other countries over failure to report on their progress, as required. [See also *Global Warming Goes to Court* in October 2006 environmental security report.] [November 2006. [Military Implications, Source](#)]

### **Global Warming Goes to Court**

The New Zealand High Court has ruled that climate change factors can be considered during Greenpeace's upcoming appeal against the proposed Marsden B coal-burning power station. Greenpeace appealed the permission granted to the Marsden B power station to start burning coal, on grounds of environmental and mainly climate change consequences. Although this ruling is limited to New Zealand and to a specific industry, it creates a precedent with effects likely to be felt in other jurisdictions and sectors. In November, the U.S. Supreme Court will hear the case of Massachusetts v. Environmental Protection Agency (case 05-1120) filed by twelve states and several cities on EPA's role to regulate CO<sub>2</sub> as a greenhouse gas pollutant under the Clean Air Act. Over 16 other litigations are pending in U.S. federal and state courts against companies whose emissions are linked to global warming; more are expected to come. Swiss Re, the world's largest reinsurance company, estimates that the annual liability costs of global warming will be \$150 billion dollars per year within ten years. [October 2006. [Military Implications, Sources](#)]

## **NEW STANDARDS WITH IMPLICATIONS FOR ENVIRONMENTAL SECURITY**

### **ASTM Issues Standard Terminology for Nanotechnology**

The American Society for Testing Materials (ASTM) International Committee E56 on Nanotechnology has approved its first standard, E 2456, Terminology for Nanotechnology, under the jurisdiction of Subcommittee E56.01 on Terminology and Nomenclature. [December 2006. [Military Implications, Sources](#)]

## **SAFETY ISSUES**

### **Chemical and Biological safety issues**

#### **Toxicogenomics Risk Assessment**

The Use of Toxicogenomics to Understand Toxic Effects and Improve Risk Assessment workshop held by the U.S. National Research Council, Committee on Emerging Issues and Data on Environmental Contaminants, sought to identify how current toxicogenomic information can be used to inform risk assessment today and to identify toxicogenomic research directions to facilitate risk assessment in the future. Two chemicals of regulatory and scientific interest, dibutyl phthalate and benzene, were used as case studies to highlight the current use, controversies, and potential for using toxicogenomic information in risk assessment. [November 2006. [Military Implications, Source](#)]

## **Call for Reinforcements to Chemical Safety**

At the Fifth Session of the Intergovernmental Forum on Chemical Safety, held 25-29 September 2006 at Budapest, Hungary, policymakers and experts reinforced the need for applying the precautionary principle in the context of chemical safety; extending globally the regulations on heavy metals; and tackling the widening gaps among countries in following chemical safety policies. Prior to the Session, a side event was held on health and environmental concerns associated with heavy metals and global needs for further action. [See *also Stockholm Convention Updates* in November 2005, *First Conference of the Parties to Rotterdam Convention* in September 2004, *New Strategy for International Chemicals Management Launched* in November 2003, and other related items in previous environmental security scanning reports.] [September 2006. [Military Implications, Sources](#)]

## **Potential Health and Environmental Threats of Some New Technologies**

### **Nanotechnology**

#### **Grand Challenges for Nanotechnology**

A group led by Andrew Maynard of the Woodrow Wilson Center's Project for Emerging Nanotechnologies suggest five "grand challenges" for nanotechnology over the next 15 years:

- develop instruments to assess exposure to engineered nanomaterials in air and water within next 3-10 years
- create and test ways of evaluating the toxicity of nanomaterials in 5-15 years
- generate models to predict their possible impact on the environment and human health over the next 10 years
- develop ways to assess the health and environmental impact of nanomaterials over their entire lifetime, within the next five years
- organize programs to enable risk-focused research into nanomaterials, within the next 12 months

The leadership of the House of Representatives Science Committee commented, "This paper should be a landmark in the history of nanotechnology research. It lays out a clear, reasonable, prioritized, consensus-based set of priorities for examining the potential environmental and health consequences of nanotechnology over the next decade and a half." [November 2006. [Military Implications, Sources](#)]

#### **UK to Have New Nanotechnology Risk Information Service**

The UK Department of Trade and Industry has announced that a new nanotechnology risk information service, Safenano.org, is due for launch in April 2007, and "will take the form of a web-based information service ... with a regular bulletin service and comprehensive database of relevant publications. Emerging scientific evidence concerning the potential risks of nanoparticles and nanotubes, together with information about Health and Safety, Occupational Hygiene, Toxicology and Risk Assessment will be interpreted and delivered to the audience in an integrated way, to support effective risk management." [November 2006. [Military Implications, Sources](#)]

### Risks of Nanotechnology Applications

A recent article in Nanowerk pointed out the increasing use of nanomaterials in building construction, and the consequent rise in health and environmental risks because of this usage. [November 2006. [Military Implications, Sources](#)]

### Berkeley, California, Considering Nanoparticle Health and Safety Law

The city of Berkeley, California is proposing the world's first local regulation of nanomaterials. It would add a nanoparticles health and safety disclosure to a city law that already requires an inventory and safety plan from any business or other person handling large quantities of hazardous materials. Other localities have discussed such measures, but this is the furthest any has progressed. [November 2006. [Military Implications, Sources](#)]

### Carbon Nanotubes May Spread in Water More Widely Than Thought

A study by Jaehong Kim and colleagues at Georgia Institute of Technology has shown that carbon nanotubes, which are hydrophobic and clump together in water, may nevertheless interact with natural organic matter found in lakes and rivers, in ways that lead to their wider dispersion. [December 2006. [Military Implications, Source](#)]

### Scientists Correlate Nanoparticle Structure and Toxicity

Andre Nel and his team at UCLA's Johnson Cancer Center have been investigating the relationships between the structural characteristics of nanoparticles and their toxicity. According to Meridian Nanotechnology and Development News, this work "contributes to efforts to identify key factors or tests that can be used to predict toxicity, permit targeted screening, and allow materials scientists to generate new, safer nanoparticles with this structure-toxicity information in mind.... [They] found that ambient particles and positively charged polystyrene spheres generated high levels of reactive molecules, and induced oxidative stress in defense cells from the lung called macrophages. Little activity was observed for carbon black, titanium dioxide, and negatively charged polystyrene spheres." [October 2006. [Military Implications, Source](#)]

### Australian New Report and Research Group on Nanotechnology

Options for a National Nanotechnology Strategy, a report by an Australian federal government taskforce, outlines the establishment of a national nanotechnology office and a public awareness campaign on the potential social and ethical implications of nanotechnology. The report notes the insufficient information about the potential health risks of nanoparticles and calls for more research on toxicity and occupational and environmental risks. NanoSafe Australia is a new group of nanotechnology toxicologists formed for investigating risks associated to nanoparticles use and handling. [October 2006. [Military Implications, Source](#)]

### Nanomaterials Handbook

A new 780-page Nanomaterials Handbook has been published by CRC Press. With 27 chapters by 62 authors, this encyclopedic work thoroughly covers the field, and received a very favorable review in Nature. The only significant criticism was its lack of almost all 2005 and later work (a

type of problem difficult to avoid in a very large compendium in a rapidly advancing field).  
[October 2006. [Military Implications, Sources](#)]

#### Characterising the potential risks posed by engineered nanoparticles

Characterising the potential risks posed by engineered nanoparticles—UK Government research—a progress report by the UK Department for Environment, Food and Rural Affairs (DEFRA), covers the work of five Task Forces: Metrology, Characterisation, Standardisation and Reference Materials; Exposures – Sources, Pathways, and Technologies; Human Health Hazard and Risk Assessment; Environmental Hazard and Risk Assessment; and Social and Economic Dimensions of Nanotechnologies. According to the DEFRA announcement, the report includes details of the UK's action plans and assesses progress made towards meeting the 19 research objectives presented in the 2005 report. [October 2006. [Military Implications, Sources](#)]

#### Review of Safety Practices in the Nanotechnology Industry

A Review of Safety Practices in the Nanotechnology Industry - Phase One Report: Current Knowledge and Practices Regarding Environmental Health and Safety in the Nanotechnology Workplace was prepared for the International Council on Nanotechnology by the University of California, Santa Barbara. According to the press release, the report “offers a review and analysis of existing efforts to develop 'best practices'” but “finds that efforts to catalogue workplace practices have not systematically documented current environment, health and safety practices in a variety of workplace settings and geographies.” [October 2006. [Military Implications, Sources](#)]

#### Data Base for Nano Environmental Health and Safety

The International Council on Nanotechnology (ICON), managed by Rice University's Center for Biological and Environmental Nanotechnology, has established the ICON Environmental, Health and Safety (EHS) database, containing summaries (abstracts) and citations for research papers related to the EHS implications of nanoscale materials. The database allows search by keywords and by aspects of the research reported, such as "exposure pathway = inhalation".  
[September 2006. [Military Implications, Sources](#)]

#### Major German Study on Nanotech in Food Industry

The German Federal Institute for Risk Assessment (Bundesinstitut für Risikobewertung (BfR)) is undertaking a major assessment of the potential dangers of nanotechnology in the food industry. The study will involve 100 experts from research, industry, public agencies, consumer associations, and NGOs in a multi-phase interviewing and mutual commenting process. According to Food Production Daily, "the objective is to identify ... nanomaterials, assign them to concrete applications, and then draw conclusions on consumer exposure. ... The applications will then be classified according to the level of probable risk and risk reduction strategies developed." The project is expected to be finished by the end of the year. [September 2006. [Military Implications, Sources](#)]

### Nanotube Toxicity Tests Unreliable

Researchers from the Institute of Toxicology and Genetics at the Karlsruhe Research Center in Germany may have discovered why carbon nanotubes toxicity tests are not consistent. Their investigation revealed that a reaction between the nanotubes and two non-soluble toxicity test reagents, formazan and methylthiazol tetrazolium (MTT), was causing a "false positive" outcome. Three other tests on the same nanomaterial had yielded negative results. [September 2006. [Military Implications, Sources](#)]

### Inhaled Nanoparticles May Have Easy Path to Brain

Studies by scientists at the University of Rochester Medical Center found that nano-sized materials inhaled by rats had rapid and efficient pathways from the nasal cavity to several regions of the brain. They also caused changes in gene expression in the invaded regions. These are preliminary results, in an animal model, and have not shown actual cellular damage, but later proof of deleterious effects in higher models would have a strong effect on the regulation of airborne nanoparticles. [See also *Nanotechnology Health Concerns Highlight Need for International Technology Convention* in April 2004 and *Nanotech Health Dangers Increasingly Understood around the World* in January 2004 environmental security reports.] [September 2006. [Military Implications, Sources](#)]

### Cleanup and Other Nanomaterials May Re-release Pollutants

Research by Prof. Baoshan Xing, of the Department of Plant, Soil & Insect Sciences at the University of Massachusetts has indicated that fullerenes and carbon nanotubes may exhibit reversible adsorption of polycyclic aromatic hydrocarbons, releasing into their environments toxic substances previously adsorbed by them. [September 2006. [Military Implications, Sources](#)]

### Increased Research Needed to Address Environmental, Health, and Security Issues Related to Nanotechnology

The Environmental, Health, and Safety Research Needs for Engineered Nanoscale Materials report by the Nanoscale Science, Engineering, and Technology (NSET) Subcommittee of the U.S. National Science and Technology Council's Committee on Technology identifies environmental, health, and safety (EHS) research and information needs related to understanding and management of potential risks of engineered nanoscale materials.

*A Matter of Size: Triennial Review of the National Nanotechnology Initiative*, a new report from the National Research Council's Committee to Review the National Nanotechnology Initiative, although generally positive on the initiative's work in overseeing the U.S. government's role in developing nanotechnologies, suggests that improvements are needed mostly in the areas of measuring economic return, and addressing potential safety risks associated with nanomaterials. "The body of published research addressing the toxicological and environmental effects of engineered nanomaterials is still relatively small," states the report. Accepting the report's recommendations, in an interview with *The Scientist*, E. Clayton Teague, director of the federal National Nanotechnology Coordination Office, pointed out that the federal budget for environment, health, and safety research regarding nanotechnology will expand from \$38 million in 2005 to \$44 million in 2007, trying to fulfill the research needs suggested by the NSET report in addressing EHS issues related to nanotechnology. [September 2006. [Military Implications, Sources](#)]

### Nanotechnology and the Food and Agriculture Sector

Nanotechnology in Agriculture and Food Production: Anticipated Applications, by Jennifer Kuzma and Peter VerHage from the University of Minnesota's Center for Science, Technology, and Public Policy, discusses possible future nanotech-based food and agriculture applications, their potential benefits and risks, and requirements for environmental, health and safety oversight. Their investigation also resulted in creation of a searchable, online database covering more than 160 research projects. [September 2006. [Military Implications, Sources](#)]

### Reaction to Voluntary Nanomaterial Reporting Scheme

According to Meridian Nanotech News, "The U.K. Department for Environment, Food, and Rural Affairs (Defra) has released a document summarizing and responding to the results of a consultation it published in March seeking opinions on a 'Voluntary Reporting Scheme' for [the properties of] engineered nanomaterials." The scheme met with general support, as did its underlying evidence-based approach for determining the need for risk controls. [September 2006. [Military Implications, Sources](#)]

### FDA Forms Internal Nanotechnology Task Force

The US Food and Drug Administration has announced the formation of an internal Nanotechnology Task Force for determining regulatory approaches that encourage the continued development of innovative, safe and effective FDA-regulated products that use nanotechnology materials, and to identify and recommend ways to address any knowledge or policy gaps that exist, so as to better enable the agency to evaluate possible adverse health effects from FDA-regulated products that use nanotechnology materials. [August 2006. [Military Implications, Sources](#)]

### European Commission Opens Nano2Life Network

According to an announcement from its coordinator, "Nano2Life (N2L) is the first European Network of Excellence in nanobiotechnology supported by the European Commission under the 6th Framework Programme. Its objective is to support ... [Europe's] position as a competitive player and to make it a leader in nanobiotechnology transfer by merging existing European expertise and knowledge in the field of Nanobiotechnology." It comprises 64 organizations and companies, with associate members from South Korea, Japan, Australia, and North America. One of the points in its Programme of Activity is founding the first European Ethical, Legal and Social Aspects Board (ELSA) in the field of Nanobiotechnology. This body will undoubtedly concern itself in a major way with questions of nanotechnology risk, the environment, and regulation. [August 2006. [Military Implications, Sources](#)]

### Chinese and Russian New Nanotechnology Organizations

The Chinese Academy of Science's National Center for Nanoscience and Technology and Institute of High Energy Physics have opened a Laboratory for Biological Effects of Nanomaterials and Nanosafety in Beijing on the IHEP campus. Russia has opened the Pilot Scientific and Technical Center of Excellence for Nanotechnology Development in Moscow. [July 2006. [Military Implications, Sources](#)]

### UK Nanotechnology Policy Review Announced

The UK government has asked the Council for Science and Technology to review national nanotechnology policy commitments and provide written evidence of their findings. This review is in part a follow-up to the 2004 Royal Society report, *Nanoscience and nanotechnologies: opportunities and uncertainties*. [July 2006. [Military Implications, Sources](#)]

### Reports Addressing Nanotechnology Safety

The International Council on Nanotechnology and the University of California at Santa Barbara have issued a new report, *A Review of Current Practices in the Nanotechnology Industry*, the second in a series. [See *Review of Safety Practices in the Nanotechnology Industry*]. According to the announcement, it is "the first comprehensive, international survey of workplace safety practices in the nanotechnology industry" and "documents results from survey data collected from 64 organizations in North America, the European Union, Asia and Australia." The release also says it, ... "finds that many nanotech companies and laboratories believe nanoparticles ... may pose specific environmental and health risks for workers. In response, companies are reporting that they are developing special programs and procedures for mitigating risks to workers and consumers. Yet, due in part to a lack of general information regarding nanomaterials risks, companies and labs have workers using conventional environmental, health and safety (EHS) practices when handling nanomaterials, even though the practices were developed to deal with bulk materials that can have markedly different chemical properties than their nano-sized counterparts." The Director of ICON says "The use of conventional practices for handling nanomaterials appears to stem from a lack of information on the toxicological properties of nanomaterials, as well as nascent regulatory guidance regarding the proper environmental, health and safety practices that should be used with them." [November 2006. [Military Implications, Source](#)]

*RCRA Regulation of Wastes from the Production, Use, and Disposal of Nanomaterials*, by the American Bar Association's Section of Environment, Energy, and Resources, discusses a number of issues related to the EPA's regulation of nanomaterial wastes under the Resources Conservation and Recovery Act (RCRA). Topics include the possible need for new definitions of hazardous nanomaterial characteristics, injunctive relief against imminent and significant risks, and the current practice of relying on the waste generator's process knowledge. [August 2006. [Military Implications, Source](#)]

The Nano Science and Technology Institute (NSTI) has published the Proceedings of its 2006 Conference. Vol. 1, Chapter 6 of that work is entitled *Environmental, Health and Societal Impacts of Nanotechnology*, and includes a paper, *A Framework for Responsible Nanotechnology Standards*, describing a joint effort of Environmental Defense and DuPont. The Proceedings are available in print, or in a 2677-pp. CD-ROM. [August 2006. [Military Implications, Source](#)]

The new report by Woodrow Wilson International Center's Project on Emerging Nanotechnologies, *Nanotechnology: A Research Strategy for Addressing Risk*, makes several recommendations for nanotechnology risk assessment, including that the government: institute a top-down strategic framework for risk-based nanotechnology research, prioritize research, establish joint industry funding, and coordinate research activities internationally. [August 2006. [Military Implications, Source](#)]

The final report of Defra (UK organization), *Environmental Regulatory Gaps Study on Nanotechnologies*, addresses environmental regulation gaps concerning potential risks posed by products and applications of nanotechnologies, and it identifies measures that can be put in place to ensure adequate protection for human health and the environment. It is a comprehensive overview, analyzing each sector concerning nanotech—from substances, production and application, to environmental impacts—with respect to existing regulations, and highlighting the eventual gaps. [August 2006. [Military Implications, Source](#)]

The International Risk Governance Council ([www.irgc.org](http://www.irgc.org)) has issued a white paper, *Nanotechnology Risk Governance*, which uses the IRGC's risk governance framework, published in 2005, to analyze and identify current deficits in nanotechnology risk governance, separately considering current and future developments. It then offers initial recommendations for how decision makers may choose to deal with these risk governance gaps. These recommendations will be subject to further work, including discussions with appropriate stakeholders. [July 2006. [Military Implications, Source](#)]

The UNESCO World Commission on the Ethics of Scientific Knowledge and Technology has published a 25-page report, *The Ethics and Politics of Nanotechnology*. The work discusses "Nanotechnology Research Now" and "Ethical, legal, and political implications of nanotech", and it concludes with a list of the most recent reports that have been released covering nanotechnology, its implications, and the social, political and ethical issues surrounding it. [July 2006. [Military Implications, Source](#)]

The European Commission Scientific Committee on Emerging and Newly Identified Health Risks has issued a 79-page "modified opinion" on the appropriateness of existing methodologies to assess the potential risks associated with engineered and adventitious products of nanotechnologies. This report discusses in detail the scientific rationale, including risk assessment methodologies and prioritization of needs in knowledge, and concludes with Committee and minority opinions, and references. [July 2006. [Military Implications, Source](#)]

## **POLLUTION ISSUES**

### **New Predictions for the Atmosphere by 2030**

Research funded by the EU network ACCENT assessed the state of the global atmospheric environment and evaluated the likely changes by 2030 in conjunction with current regulations. It presents three scenarios: Current Legislation Scenario—based on current air quality legislation; the Maximum technically Feasible Reduction scenario—based on implementation of technological breakthroughs to achieve maximum emissions reduction; and the Intergovernmental Panel on Climate Change (SRES-A2) scenario--- a relatively pessimistic approach is shown in contrast to the two more optimistic scenarios. The results suggest that current international legislation on air pollutant emissions is not adequate to reduce ozone and ecosystem damage (mainly caused by elevated nitrogen pollution.) [October 2006. [Military Implications, Source](#)]

### **Greenhouse Gas on the Rise**

At the same time, methane—22 times more powerful than CO<sub>2</sub> for global warming—is emitted as result of melting permafrost at a rate five times faster than thought, and could become a significant factor in global warming, representing a “a climate time bomb,” warn scientists. Most of the methane-releasing permafrost is in Siberia. Another study reveals that carbon trapped in this type of permafrost could be 100 times the amount of carbon released into the air each year by the burning of fossil fuels.

Deep ice drilled out of Antarctica confirms that carbon dioxide levels are substantially higher now than at any time in the last 800,000 years. [September 2006. [Military Implications, Sources](#)]

### **Polluted Skies and Global Warming Puzzle Decoded**

A team of U.S. and Israeli scientists seem to have found the link between global warming and cloud formation. The pattern they identified shows that light-reflecting pollution favors cloud formation, while light-absorbing aerosols impede it by warming the air, which impedes moisture condensation. This finding helps better understand and predict climate change, as well as the role of different kinds of pollution in cloud formation and rain activity. [July 2006. [Military Implications, Sources](#)]

### **European New Web-based Air Pollution Monitoring System**

Users of the new Ozone Web released by the European Environment Agency can monitor and track ground level ozone across Europe. The Web site-based database is updated on an hourly basis with data from more than 500 air quality monitoring stations. Users can access the information on air quality in any part of Europe either by entering a place name or by clicking on a map of Europe. The Web site will also include information on the health implications of the respective ozone values. [July 2006. [Military Implications, Sources](#)]

### **Ozone Hole Worst Ever Recorded**

In addition to pollution, climate change is increasingly recognized as a cause for upper atmosphere ozone depletion. A new UN report revealing continuous ozone depletion, notes that this year’s Antarctic ozone hole covered 29.5 million square kilometers and the ozone mass deficit was 40 million tonnes (European space Agency, ESA, measurements on October 2), the largest ever recorded. The assessment is based on a compilation of data provided by NASA and the ESA, and observations by the WMO Global Atmosphere Watch (GAW) ozone network. Scientists warn that the trend might continue for the next two decades unless measures are taken to curb climate change and diminish levels of ozone destroying substances in the atmosphere, and countries generally adhere to and enforce the Montreal Protocol and Vienna Convention on phasing out of ozone-destroying chemicals. At a Montreal Protocol meeting, held in New Delhi, October 28-November 3, UNEP will be presenting a 10-year road map for governments to follow in protecting the ozone layer. [October 2006. [Military Implications, Sources](#)]

### **Mission to Study Arctic Environmental Changes**

The UN launched a two-year scientific mission in the Arctic to monitor changes in global climate, thinning of the ozone layer, and impacts of chemical pollution. There is evidence that the Arctic climate is warming rapidly and that more serious changes are looming, which,

although with global effect, would most drastically affect indigenous communities and polar biodiversity. [July 2006. [Military Implications, Sources](#)]

### **Burning Fossil Fuels Acidifies Oceans, Erodes Coral Reefs**

Impacts of Ocean Acidification on Coral Reefs and Other Marine Calcifiers, a report co-authored by scientists from Australia, Canada, France, Germany, Japan, Monaco, New Caledonia, and the United States, is a comprehensive analysis of marine calcifiers, documenting that worldwide emissions of carbon dioxide from fossil fuel burning is making the oceans more acidic, dramatically altering ocean chemistry and threatening marine biodiversity, mainly causing coral decalcification. Although recommending further research for determining the extent of the impacts, it predicts that calcification rates might decrease as much as 60% within the 21st century. [July 2006. [Military Implications](#)]

### **Accelerating Environmental Health Crises in China**

Tens of millions in southwest China suffer because of coal plants. The Yellow River, a water source for 140 million people, is drying up, due to agricultural and industrial demands, falling water tables, and changes in glacial and snow-cap melting patterns. On November 20, Beijing's air quality was rated as 'hazardous' and residents were warned to stay indoors. While per capita emissions remain low compared to developed nations, the growing impact of China on climate change, along with severe intra-country air pollution, is of increasing concern to environmentalists and policy makers. The World Energy Outlook 2006 reports that China will surpass the U.S. in 2009 as the biggest emitter of carbon dioxide. This is nearly a decade ahead of previous predictions. [See also *China Creates 11 Independent Environmental "Watchdog" Centers* in July 2006, *China's President Hu Ordered Environmental Regulations for Military Activities* in April 2006, and other related items in previous environmental security reports.] [November 2006. [Military Implications, Sources](#)]

## **CLIMATE CHANGE**

### Extreme Weather Conditions Increasing

Preliminary findings by the World Meteorological Organization (WMO) show that 2006 might be the sixth warmest year on record, with the average temperature estimated to be 0.42°C above the 1961-1990 annual average. It notes heat waves and prolonged drought in some regions, heavy rainfall, storms, and flooding in others, and the continuously decreasing Arctic sea ice. Along the same lines, analysts note that in Europe, this fall, continental temperatures were 1.8°C higher than the long-term average, and the past ten autumns have been the warmest on record. Also in Australia, this year the weather has been exceptionally warm and rainfall in many regions has been at near record lows. Drying has increased significantly in Africa in the past three years, reveals Gravity Recovery and Climate Experiment satellite data. New findings show that glaciers are melting fast around the world from Africa's Kilimanjaro—projected to completely disappear sometime in the next 20—50 years, to South America's Andes Mountains, Europe's Alps, and Asia's Himalayas. Tibet's glaciers may disappear within 100 years, threatening hundreds of millions of farmers in China's western regions. The Chinese Ministry of

Science and Technology warns that global climate change will increase "extreme weather events", threatening China's food production. (A comprehensive government assessment is likely to be released in the first half of 2007.) Central India's extreme rainstorms rose in number and strength over the past fifty years, most probably due to global warming. [December 2006, [Military Implications, Sources](#)]

With extreme heat waves in Europe and the hottest summer in North America, scientists argue whether global warming is the cause; most of them agree that it is. "Ten of the last 12 years were the warmest since 1850. The global temperature (since then) rose 0.7 degrees Celsius and most climate models suggest it's going to continue to warm by 2 to 5 degrees Celsius this century," says Philip Jones, climate research professor at Britain's East Anglia University. He also adds that globally, sea levels are rising by around 1.5 millimeters (0.06 inches) per year and have risen some 20 centimeters (7.8 inches) since the late 19th century. Warmer seas due to global warming will most probably also cause changes in precipitation patterns and increase intensity of hurricanes. (The IPCC's Fourth Assessment draft text, which will be released next year, forecasts a 2–4.5° C warming by 2050—a faster change than their 2001 forecast of 1.4–5.8° C warming by 2100). [July 2006, [Military Implications, Sources](#)]

#### Increasing Risk of Natural Disasters

Global warming will increase the risk of natural disasters over the next two centuries, even if harmful emissions were cut now, warn climate scientists from the University of Bristol's Department of Earth Sciences. Compiling data from more than 52 climate models looking at the impact of greenhouse gas emissions, the researchers calculated the risks induced by climate change to the world's key ecosystems based on levels of warming (less than 2°C (3.6°F) to over 3°C (5.4°F)) and for each group assessed the probability of changes in forest cover, the frequency of wildfires, and changes to freshwater supplies over the next 200 years. The findings are expected to be used to explore measures to reduce hazards as much as possible. [August 2006. [Military Implications, Sources](#)]

A new study, Global temperature change, by a group of scientists, reveals that global surface temperature has increased approx.0.2°C per decade in the past 30 years, and the world is the warmest it has been in the last 12,000 years. Scientists estimate that pollution from human activity, combined with the loss of snow and ice cover, will accelerate future temperature increase. Also, since warming is not uniform around the globe, the likelihood of strong El Niños and other harsh weather phenomena increases. A global temperature rise of approx. 1°C might represent a threshold with "dangerous" consequences, as sea levels rise and species become extinct.

Strong correlation between global warming and severe storms is also revealed by a study based on more than 80 simulations using 22 sophisticated computer models of the climate system. The simulations show with 84% probability that for the period 1906-2005, human activity—mainly greenhouse gas emissions—are responsible for about two-thirds of the temperature increases in hurricane formation regions of the Atlantic and Pacific Oceans. The research team that produced the study includes 19 hurricane and climate scientists from ten research centers. [September 2006. [Military Implications, Sources](#)]

## Melting Rates Are Increasing

Greenland's ice melting rate had tripled between April 2002 and November 2005, compared to the rate between 1997 and 2003, according to research by Jianli Chen and colleagues at the University of Texas in Austin and published in the journal *Science*. Although controversial, the results definitely indicate that rise in sea levels this century will likely be higher than originally forecasted. "If the Greenland cap melted completely, it would raise global mean sea level by about 6.5 meters. If this were to occur, most of the world's coastal regions would be subject to flooding," warn the authors. Meanwhile, the glaciers of Southeast Alaska are shrinking twice as fast as previously estimated, according to a study by Fairbanks and Juneau glaciologists, published in the *Journal of Geophysical Research*. Sea ice is also melting at a record pace near the North Pole, due to a record hot summer that arrived in many northern settlements a full month earlier, following an unusually mild winter and spring, say locals. Inuit peoples of the far north in Canada began ordering air conditioning. The town of Kuujuaq, at about 1,500 kilometers north of Montreal, has purchased 10 air-conditioning units as the inside temperature reached 31° Celsius (88° F.) in late July.

Ice is melting at an increasing rate around the globe, and scientists warn that this might indicate that the effects of global warming are showing up faster than previously expected. Based on the latest calculations, Greenland ice loss increased by 250% between May 2004 and April 2006 compared with the two years between April 2002 and April 2004, which translates to an equivalent global sea level rise of about 0.5mm (0.02 inches) per year. Likewise, 95% of the glaciers in southeast Alaska (stretching from Yakutat Bay to the Stikine Icefield in British Columbia) are thinning at twice the rate that was previously estimated, according to a new study.

The National Snow and Ice Data Center reported that the North Pole ice melted again at a record rate this summer, meaning that the Arctic could be ice-free in summer far sooner than predicted a year ago. Similarly, based on data from Envisat's Advanced Synthetic Aperture Radar (ASAR), European scientists determined that around 5%-10% of the Arctic's perennial sea ice has been fragmented by late summer storms and the ice had retreated to the point of opening a navigation passage from northern Siberia or the Norwegian island of Spitzbergen to the North Pole. "If this anomaly trend continues, the North-East Passage or 'Northern Sea Route' between Europe and Asia will be open over longer intervals of time, and it is conceivable we might see attempts at sailing around the world directly across the summer Arctic Ocean within the next 10-20 years" says Mark Drinkwater of ESA's Oceans/Ice Unit. New evidence also suggests that Antarctica has warmed about 1.4° per century—a fact that was masked at the end of the 20th century by large temperature variations. [September 2006. [Military Implications, Sources](#)]

## Climate Change Conference 2006

During the Climate Change Conference held in Nairobi many reports and papers documenting new climate change-related evidence and challenges were released. Noteworthy ones include: A report by German scientists is renewing the call on nations to promptly consider strategies for dealing with "sea level refugees"—population living in coastal areas endangered by the rising sea levels and increasing frequency of extreme storms. Canada's northern native peoples might become environmental refugees, being increasingly isolated as their ice roads and paths to supplies melt.

The Global Carbon Project report shows that carbon dioxide emissions over the last five years grew four times faster than in the preceding 10 years. Global growth rates in 2000–05 reached

3.2%, compared to 1990–1999's 0.8%. The report also draws attention to environmental inertia, by which the environment stores up part of the energy generated by greenhouse gas emissions; causing global temperatures to continue to increase for two or more centuries after emissions are stabilized or begin to drop.

According to the Office of Maritime Transportation and Hydrography in Hamburg, the North Sea was 2.4°C warmer in October 2006 than the 1968-1993 average; and, since 1988 is in its strongest heating period since the start of recording (1873). Another German institute of research, WGBU, notes that everywhere seas and oceans are transformed by the climatic change: the surface water is heated, the sea level rises, the oceans become more acid, the storms are stronger.

Some diseases such as malaria, heart ailments and dengue fever appear on the rise with warmer temperatures, reported health experts, citing surges of such diseases in Kenya, China and Europe. *Adaptation and Vulnerability to Climate Change: The Role of the Finance Sector*, a report by UNEP, warns that by 2040, there will be a “peak year” in which losses from extreme weather could reach \$1 trillion and calls for a financing mechanism that would help developing countries cope with the effects of climate change. [November 2006. [Military Implications, Sources](#)]

## **NEW ORGANIZATIONS WITH MANDATES WITH EVENTUAL ES IMPLICATIONS**

### **Global Facility for Disaster Reduction and Recovery to Mitigate Impact of Natural Disasters**

The Global Facility for Disaster Reduction and Recovery, set up by the UN International Strategy for Disaster Reduction in cooperation with the World Bank, is a new initiative aiming to improve preparatory and recovery actions to lower the risks and consequences of natural disasters. The Facility will mainly ensure that disaster risk reduction is considered a priority in development projects in countries at risk, and will provide expertise and technical assistance for including risk reduction in strategic planning. The World Bank Global Hotspots Study identifies 86 vulnerable countries with risks of high mortality and economic loss. [See also *ICSU Launched Global Disaster Research Program* in October 2005, and *New Developments for Addressing Natural Disasters* in July 2005 environmental security reports.] [October 2006. [Military Implications, Sources](#)]

### **FAO Launched New Crisis Management Centre**

In collaboration with the World Organisation for Animal Health, the UN Food and Agriculture Organization launched a new Crisis Management Centre to fight avian influenza outbreaks and other major animal health or food health-related emergencies. The center continuously monitors disease information around the globe and is able to respond in less than 48 hours, when a suspected outbreak is reported. [See also *Bird Flu Spreads Increasing Threats of a Human Pandemic* in February 2006 and other previous environmental security reports on this issue.] [October 2006. [Military Implications, Sources](#)]

### **WHO-sponsored pandemic flu task force holds first meeting in Geneva**

The Ad Hoc Influenza Pandemic Task Force held its first meeting to discuss best actions in case of an outbreak. The Task Force is providing independent risk assessments and advising WHO on possible measures to be taken. These could include rapid containment effort, warning

governments of risks and accelerating vaccine production. The Task Force includes 21 experts and will function until June 15, 2007, when WHO's revised International Health Regulations come into effect. [October 2006. [Military Implications, Sources](#)]

### **UN Creates Secretariat of the Global Bioenergy Partnership at FAO**

The recently inaugurated Secretariat of the Global Bioenergy Partnership (GBEP) will help UN efforts to promote “green” fuels by facilitating a global political forum to support bioenergy production, marketing and use, and assisting international exchanges of know-how and technology. The focus will be mainly on helping developing countries’ governments and institutions formulate sustainable bio-energy policies and strategies to help reduce dependency on fossil fuel, as well as encouraging investments in multilateral projects for bio-energy development. It will also assist in formulating guidelines for measuring greenhouse gas emission reductions due to the use of bio-fuels. The GBEP Secretariat is located at the UN Food and Agriculture Organization headquarters in Rome and is supported by the Italian Ministry for the Environment, Land and Sea. [See also *UN Commission on Sustainable Development Fosters Energy Security* in May 2006 environmental security report.] [September 2006. [Military Implications, Sources](#)]

### **‘3R’—Reduce, Reuse and Recycle New Environmental Think Tank for Asia**

The ‘3R’—Reduce, Reuse and Recycle—is a new initiative launched by the Asian Development Bank, Asian Institute of Technology, UNEP, and the UN Economic and Social Commission for Asia and the Pacific (UNESCAP) to promote sustainable use of natural resources and increase environmental efficiency. The center will be located at the Asian Institute of Technology in Bangkok. It will function as a think tank on environmental technology, knowledge dissemination, research capacity building, regulations, and policy related to 3R practices in cooperation with other related Asian initiatives. [August 2006. [Military Implications, Source](#)]

## **NEW INITIATIVES AIMING TO INCREASE ECO-EFFICIENCY**

### **Switching to Green: A renewable energy guide for office and retail companies**

The World Resources Institute (WRI) published a guidebook, *Switching to Green: A renewable energy guide for office and retail companies*, to provide organizations with easily understandable information on how to switch to renewable energy. [October 2006. [Military Implications, Source](#)]

## 2. Military Implications and Sources

### A Preventing or repairing military damage to the environment

#### ENVIRONMENTAL SECURITY RISES ON THE INTERNATIONAL POLITICAL AGENDA

##### UN General Assembly 61st Session Pinpoints Global Warming as a Central Issue for Security

###### *Military Implications:*

In addition to the military implications of the increasing scientific evidence of climate change listed in previous Millennium Project monthly reports, the military should consider the opportunities created for collaboration on preparedness strategies; as well as, the increased political attention to the polluter pays principle.

###### *Source:*

UN General Assembly 61st Session, General Debate (19-29 September 2006)  
webcasts and texts of statements <http://www.un.org/ga/61/>

##### UN Conflict Prevention Strategy Includes Environmental Dimension

###### *Military Implications:*

Relevant military personnel should study the Progress report to see if there are preventive measures that might be adapted to improve military practice and better anticipate emerging issues in UN policies to prevent conflicts, and to explore new areas for cooperation.

###### *Sources:*

Annan maps out ways to bolster UN ability to prevent armed conflict, save lives  
<http://www.un.org/apps/news/story.asp?NewsID=19587&Cr=Armed&Cr1=>  
Progress report on the prevention of armed conflict. Report of the Secretary-General  
<http://www.un.org/Docs/journal/asp/ws.asp?m=A/60/891> (select “English”)

##### UK Defence Ministry Highlights the Link between Environment and Security

###### *Military Implications:*

Relevant military personnel should study the report for useful insights to improve U.S. military environmental strategy and assess how the military could coordinate with USAID and other potential partners on sustainability issues.

###### *Sources:*

Ministry of Defense Sustainable Development Annual Report 2005  
<http://www.mod.uk/DefenceInternet/AboutDefence/WhatWeDo/HealthandSafety/DSC/SustainableDevelopmentAnnualReport2005.htm>  
Map on Oversea Deployment and Environmental Change in UK MoD, *Sustainable Development Report 2005*

##### Civil Society Regional Consultations around the World

###### *Military Implications:*

Review of the outputs of those recent meetings and subsequent discussions provides an important heads up on the agenda and issues to be discussed and the potential for new environment-related regulations likely to arise in the UNEP February 2007 Forum. If military cooperation with environmental NGOs is likely to increase, then a review of the positions of various NGOs in these meetings could provide information for deciding which environmental NGOs to cooperate with about what, and where in the world.

*Sources:*

Civil Society Regional Consultations Take Off in Geneva

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=392&ArticleID=5396&l=en>

Civil Society Regional Consultations Take Off in Nairobi

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=392&ArticleID=5398&l=en>

## **UK Scientists List 100 Most Vital Ecological Policy Questions**

*Military Implications:*

It is very likely that this list, published in the August 2006 issue of the Journal of Applied Ecology, will serve as a source of future UK and EU environmental regulatory efforts. Military personnel should review the list and the accompanying material to determine which of these problems may have military applications and implications.

*Source:*

The key questions at the heart of the UK's environmental future

<http://www.guardian.co.uk/science/story/0,,1854855,00.html>

## **CONFLICT AND POST-CONFLICT ENVIRONMENTAL SECURITY ISSUES**

### **CCW Protocol V on Explosive Remnants of War Entered into Force**

*Military Implications:*

While the U.S. is not yet a party to Protocol V, it would be wise to assume and plan for the seeming eventuality that future international agreements will begin to include retroactive responsibilities. Protocol V is another example of the increasing international consensus in favor of the “polluter pays” principle. Protocol V has no clear implementation mechanisms or deadlines. To provide some leadership, if not already in existence, relevant military personnel might be tasked to create an information system to help responsible countries prioritize their future cleanup operations and, in anticipation, their legacy remnants of war.

*Sources:*

CCW Protocol V on Explosive Remnants of War Enters into Force

[http://www.icbl.org/layout/set/print/news/ccw\\_protocol\\_v](http://www.icbl.org/layout/set/print/news/ccw_protocol_v)

Protocol on Explosive Remnants of War (Protocol V to the 1980 Convention), 28 November 2003 <http://www.icrc.org/ihl.nsf/INTRO/610>

Portfolio of Mine Action Projects <http://www.mineaction.org/section.asp?s=projects>

Annan hails entry into force of new pact on speedy clearance of unexploded weaponry

<http://www.un.org/apps/news/story.asp?NewsID=20588&Cr=landmine&Cr1>

The need for urgent international action on cluster munitions

<http://www.icrc.org/web/eng/siteeng0.nsf/htmlall/cluster-munition-statement-061106?opendocument>

Perils of unexploded remnants of war stressed in UN mine report

<http://www.un.org/apps/news/story.asp?NewsID=20601&Cr=mines&Cr1>

## **Hezbollah-Israeli War Threatens an Already Precarious Environment**

### *Military Implications:*

Military liaisons with Arab countries should explore the possibilities of convening a regional or pan-Arab conference on environmental security. This could be an opportunity to further the Army Strategy on the Environment and communicate its value in the region. The conference might be hosted by Egypt, as part of post-conflict planning. Exploratory meetings should include those responsible for implementing the Abu Dhabi Declaration. Since 2006 is the International Year for Deserts and Desertification, military liaisons in the region might also explore how such an environmental security conference might build upon or complement plans already underway in relation to the international year.

### *Sources:*

Environmental 'crisis' in Lebanon

<http://news.bbc.co.uk/2/hi/science/nature/5233358.stm>

UN environment agency backs response to Lebanon oil slick emergency

<http://www.un.org/apps/news/story.asp?NewsID=19351&Cr=Leban&Cr1=>

Rescue Lebanon's Coast; Oil Spill Crisis

<http://www.moe.gov.lb/rescuelebanon.htm>

Abu Dhabi Declaration on Environment and Energy

<http://www.unep.org/bh/Publications/DTIE%20Final/AbuDhabiDeclarationEn.pdf>

Environmental Sustainability Index

[http://www.yale.edu/esi/ESI2005\\_Main\\_Report.pdf](http://www.yale.edu/esi/ESI2005_Main_Report.pdf)

"Environmental Sustainability in the Arab World"

[http://www.yale.edu/envirocenter/Environmental%20Sustainability%20in%20the%20Arab%20World\\_Esty%20Levy%20and%20Winston.pdf](http://www.yale.edu/envirocenter/Environmental%20Sustainability%20in%20the%20Arab%20World_Esty%20Levy%20and%20Winston.pdf)

## Addressing Post-Conflict Environmental Security Issues

### *Military Implications:*

The international community is still paying for environmental cleanups for past conflicts. Since weapons and technologies steadily become more sophisticated, resulting damages are worse and so are costs of restoration, mainly those of the environment. Hence, it is likely that there will be increasing pressure for increased precision with decreased environmental impact in future R&D products. Events with consequences, such as the oil spill in Lebanon, are likely to increase calls for updating laws, assigning liability, and defining redress issues concerning environmental damages in war. [See also related items in *Conflict and Post-Conflict Environmental Security Issues* section of *Chapter 9.1 Emerging Environmental Security Issues* on the CD accompanying the 2006 *State of the Future* report by the ACUNU Millennium Project]

### *Sources:*

UN environment agency set to begin aerial surveillance of Lebanese oil spill

<http://www.un.org/apps/news/story.asp?NewsID=19577&Cr=Leban&Cr1=>

Lebanon Oil Spill Cleanup May Take A Year

[http://www.terradaily.com/reports/Lebanon\\_Oil\\_Spill\\_Cleanup\\_May\\_Take\\_A\\_Year\\_999.html](http://www.terradaily.com/reports/Lebanon_Oil_Spill_Cleanup_May_Take_A_Year_999.html)  
UN reparations panel pays out nearly \$396.5 million for Iraq's invasion of Kuwait  
<http://www.un.org/apps/news/story.asp?NewsID=19318&Cr=Iraq&Cr1=>

## **Environment to Get Crucial Role in Sudan's Future Peace and Prosperity Strategy**

### *Military Implications:*

Lessons learned by military and their civilian contractors from post-conflict environmental reconstruction activities should be shared with UNEP and relevant Sudanese officials, as should offers of military-to-military assistance in environmental reconstruction when more stable conditions prevail.

### *Source:*

UN Environment at Sudan National Planning Environmental Management Workshop  
<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=483&ArticleID=5313&l>

## **NATIONAL/REGIONAL ENVIRONMENTAL STRATEGIES AFFECTING MILITARY ACTIVITIES**

### **Asia-Pacific Should Intensify Green Growth Efforts**

#### *Military Implications:*

Military personnel with environmental security responsibilities in the Asian region should review the document for potential new regulations, areas for cooperation, and opportunities for military-to-military training and assistance.

#### *Sources:*

State of the Environment in Asia and the Pacific 2005  
<http://www.unescap.org/esd/environment/soe/2005>  
UNESCAP Report: Asia-Pacific Environment at Boiling Point  
<http://www.unescap.org/unis/press/2006/dec/g61.asp>

### **New Canadian Strategies for Monitoring the Northwest Passage**

#### *Military Implications:*

It is likely that discussions for clear international regulations concerning Northwest Passage navigation will increase rapidly and more military action will be called for to ensure the safety of individuals and ecosystems. Relevant military personnel should cooperate with their counterparts in other countries and international organizations in developing adequate national and international regulations and enforcement procedures regarding the Arctic region. By exercising sovereignty, Canada could regulate future shipping through the passage and impose its own rules for the Northwest Passage, including the right to require vessels to conform to certain environmental and construction standards to avoid disasters in this ecologically fragile region.

#### *Source:*

Northwest Passage 'could open in 2015'  
<http://www.canada.com/vancouver/news/story.html?id=a2af425d-74ca-4f49-963b-9795fed6d754&k=8211>

## **Ecuador Gets an Environmentalist Foreign Minister**

### *Military Implications:*

Military personnel in Quito involved in possible military-to-military contacts with the Ecuadorian forces might be able to use this appointment to aid in approaching them about discussions on the military's role in environmental security. For example, if the U.S. military is involved in the spraying of drug crops, new efforts could reduce the environmental impacts on the border area. And, the U.S. military could be a mediating agent between Colombia and Ecuador.

### *Source:*

Environmentalist Named Ecuador Foreign Minister

<http://www.planetark.com/dailynewsstory.cfm/newsid/39473/story.htm>

## **China to Invest \$175 Billion in Environmental Protection over Five Years**

### *Military Implications:*

This decision may also result in China becoming a more active and positive influence in international environmental protection efforts. Military liaisons in Beijing might consider contacting the State Environmental Protection Administration to offer advice and assistance, especially on the military's role in environmental security.

### *Sources:*

China to Invest US\$175 Billion in Environment Clean-Up

<http://www.planetark.com/dailynewsstory.cfm/newsid/37328/story.htm>

China's growing air pollution reaches American skies

<http://www.statesman.com/news/content/news/stories/nation/08/5chinapollution.html>

## **China Creates 11 Independent Environmental “Watchdog” Centers**

### *Military implications:*

These new centers could provide early warning of environmental security changes in China.

### *Source:*

New environment watchdogs freed from local govt meddling

[http://news.xinhuanet.com/english/2006-07/31/content\\_4901813.htm](http://news.xinhuanet.com/english/2006-07/31/content_4901813.htm)

## **TECHNOLOGICAL BREAKTHROUGHS WITH ENVIRONMENTAL SECURITY IMPLICATIONS**

### **Computer Technology and Robotics**

#### **UNEP and Google Earth to Pinpoint Environmental Hotspots**

##### *Military implications:*

The military should create procedures to review what parts of its more advanced means and images of earth observation and ground-truthing can be shared on an ongoing basis to continually improve the Atlas of our Changing Environment. It should also seek ways in which this new tool could help prevent environment-related conflicts. As precision improves, environmental damages caused by conflicts could be made more defined and available, increasing accountability and responsibility for military actions.

*Sources:*

Flying Around the Globe on a Time Machine

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=487&ArticleID=5350&l=en>

## **New Detection and Cleanup Techniques**

### **Nanotech-based Explosives Detector**

*Military Implications:*

The military should explore this technology for explosives detection, post-conflict clean up and other environmental monitoring usage. This information could also be forwarded to the Transportation Safety Agency, in case they are, as yet, unaware of the development.

*Source:*

Portable, cheap and fast explosives detector built with nanotechnology

<http://www.nanowerk.com/spotlight/spotid=1138.php>

### **Detector Materials for Cyanogen Halides from Chemical Weapons**

*Military Implications:*

The military should investigate the possible applications of these materials for explosives detection and in environmental monitoring systems.

*Source:*

Out of the dark. Highly sensitive chemosensors for cyanogen halides. 14 December 2006

<http://www.nature.com/materials/news/news/061214/portal/m061214-1.html> (by subscription only)

### **New Spectroscopy Technique Speeds Up Virus Detection**

*Military Implications:*

The military should follow this development for potential improved environmental biological weapons surveillance systems.

*Source:*

Researchers use laser, nanotechnology to rapidly detect viruses

<http://www.physorg.com/news82816307.html>

### **New Production Technique for Nanofiber Filters for Chemical Warfare Protection**

*Military Implications:*

The military should follow this development and its applicability to protect the personnel exposed to a chemically hazardous environment. The materials might also be useful for protecting hazardous material and wastes handlers.

*Source:*

Nanofilter suit for chemical warfare

<http://www.hindu.com/seta/2006/10/12/stories/2006101200611500.htm>

## **Sugar-coated Nanotubes Stop Anthrax Inhalation**

### *Military Implications:*

If not already done so, the military should follow this development for eventual field applicability.

### *Source:*

Clemson Researchers Develop Nanotechnology to Stop Weaponized Anthrax in Its Tracks  
[http://clemsonews.clemson.edu/WWW\\_releases/2006/October/anthrax.html](http://clemsonews.clemson.edu/WWW_releases/2006/October/anthrax.html)

## **New Spectroscopy Sensor for Environmental Monitoring**

### *Military Implications:*

The military should investigate the incorporation of this new technology into environmental surveillance and scanning systems.

### *Source:*

UW Invention Targets Terrorist Weapons  
<http://www.physorg.com/news75561848.html>

## **Nanocantilevers for Ultra-small Sensors**

### *Military Implications:*

There are a wide range of applications of such sensors from protecting against food poisoning to detecting viruses, bacteria and other pathogens in the environment.

### *Sources:*

'Nanocantilevers' yield surprises critical for designing new detectors  
<http://www.purdue.edu/UNS/html4ever/2006/060828.Bashir.nanocant.html>  
Anomalous resonance in a nanomechanical biosensor  
<http://www.pnas.org/cgi/content/abstract/0602022103v1>

## **Digital Magnetofluidics Improves Biochemical Analysis**

### **Reliable Anthrax Antibodies Developed**

### **Bar-coded Nanowires May Yield Small, Fast Bio Detectors**

### **New Low-cost System for Bacteria Identification**

### **Quantum Dot Device Provides Fast Detector for DNA Sequences**

### **Sensicore's Lab on a Chip Water Profiler Automates Lab Functions**

### *Military Implications:*

Those relevant military personnel with responsibilities for environmental surveillance, who are not already informed of these, should be made aware of these developments for potential applications.

### *Sources:*

Magnetism and mimicry of nature hold hope for better medicine, environmental safety  
<http://www.physorg.com/news72620450.html>  
Anthrax Detector Developed  
<http://www.physorg.com/news74967063.html>  
Nanowires built to fight bioterrorism  
[http://articles.techrepublic.com.com/2100-1009\\_11-6103410.html](http://articles.techrepublic.com.com/2100-1009_11-6103410.html)  
Purdue creates new low-cost system to detect bacteria

<http://www.physorg.com/news73231402.html>

Digital DNA detector spots single molecules

<http://www.newscientisttech.com/article/dn9744-digital-dna-detector-spots-single-molecules.html>

Kahn, M. Sencicore's Lab on a Chip Water Profiler Automates Lab Functions, tech talk, G. Miner, ed., Journal of the American Water Works Association, July, 2006, 98(7), 46-48. (by subscription only)

### **Deep Cooling Improves Uranium Detection**

*Military Implications:*

This technique should be studied for its feasibility for locating post-conflict areas needing cleanup of uranium contamination and managing the cleanup and disposal processes.

*Source:*

Cold Shot

<http://www.physorg.com/news77290661.html>

### **Biodetecting Wipes**

*Military Implications:*

The military should follow this development as it progresses toward practical application and, when it is available, consider its application to detection and cleanup of contaminated environments.

*Source:*

Biodegradable napkin could quickly detect biohazards

<http://www.physorg.com/news77201571.htm>

### **Fish Provide Early Warning of Toxic Chemicals**

*Military Implications:*

The military should investigate this development for its applicability to environmental water supply monitoring, especially in a post-conflict areas, where chemical pollution might be taking place.

*Source:*

Fish Used to Detect Terror Attacks

<http://www.enn.com/today.html?id=11282>

### **Ultrasound Soil Cleanup Technique**

*Military Implications:*

A scaled down and portable version of this system might have good field applicability for post-conflict and installation cleanup.

*Source:*

Treating toxic waste with sound waves

<http://www.csiro.au/csiro/content/standard/ps9b,,.html>

## **New and Improved Water Purification Method**

### *Military Implications:*

The military should investigate the application of this method to cleanup of post-conflict environments and force protection, as well as at permanent installations.

### *Source:*

New water-purification method promises radical improvement  
<http://www.physorg.com/news70621194.html>

## **Technologies that Could Trigger New Forms of Arms Race**

### **Futuristic Nanotech and Synthetic Bioweapons Regulation**

#### *Military Implications:*

Military forecasters of such weapons should meet with diplomats to create an agenda to begin the process of creating treaties to better control such futuristic weapons and weapons systems and the effects of their residuals.

#### *Sources:*

Military nanotechnology - how worried should we be?

<http://www.nanowerk.com/spotlight/spotid=1015.php>

Israel to pursue nanotechnology weapons <http://www.foresight.org/nanodot/?p=2366>

Israel developing bionic arsenal <http://www.smh.com.au/news/Technology/Israel-developing-bionic-arsenal/2006/11/18/1163266789754.html>

## **Promising Environmental-friendly Technologies**

### **Clean Green Hydrogen-Making Process**

#### *Military Implications:*

The new technology should be explored and eventually encouraged for future applicability in green (hydrogen) power, as well as for biomass recycling aspects.

#### *Source:*

Clean green hydrogen-making machine created. NewScientist.com, 03 November 2006

[http://www.newscientisttech.com/article.ns?id=dn10441&feedId=energy-fuels\\_rss20](http://www.newscientisttech.com/article.ns?id=dn10441&feedId=energy-fuels_rss20)

### **Printing Fuel Cells**

#### *Military Implications:*

The military should consider investigating how this versatile technology could be useful for creating microscale devices (e.g. to fabricate fuel cells for recharging communication or other devices used in field operations), and hence reduce greenhouse gas emissions and other pollution. The technology could be adaptable for biological and chemical analysis.

#### *Source:*

Printing Fuel Cells

[http://www.technologyreview.com/read\\_article.aspx?id=17626&ch=energy](http://www.technologyreview.com/read_article.aspx?id=17626&ch=energy)

## **Smog-Eating Materials**

### *Military Implications:*

If the "smog-eating" products prove to be useful, the military should request its contractors to consider them in new buildings and infrastructure development.

### *Source:*

Architecture in Italy goes green

<http://www.iht.com/articles/2006/11/22/news/smog.php>

## **Conferences on Nanotechnology with Environmental Security Implications**

### *Military Implications:*

Appropriate military personnel should consider attending or obtaining the proceedings of these meetings for possible input to their own work.

### *Sources:*

Public Meeting on Research Needs and Priorities Related to the Environmental, Health, and Safety Aspects of Engineered Nanoscale Materials

[https://nnco.nano.gov/public\\_ehs/](https://nnco.nano.gov/public_ehs/)

Nanotechnology - Products and Processes for Environmental Benefit

<http://www.nano.org.uk>

Success and Outcomes from the Finnish Presidency Conference on "Nanotechnologies – Safety for Success"

[http://www.fmnt.fi/ntss/FIN\\_Presidency\\_Nanotechnologies\\_report.pdf](http://www.fmnt.fi/ntss/FIN_Presidency_Nanotechnologies_report.pdf)

'Nanotechnology for Security and Crime Prevention', email

Health & Environment Summit on Nano" at Nanotech 2007

[http://home.businesswire.com/portal/site/google/index.jsp?ndmViewId=news\\_view&newsId=20061026005829&newsLang=en](http://home.businesswire.com/portal/site/google/index.jsp?ndmViewId=news_view&newsId=20061026005829&newsLang=en)

4th NanoSpain Workshop <http://www.nanospain.org/Workshop4>

Finland Conference site: <http://www.fmnt.fi/ntss>

Egypt Conference site: <http://www.nanoinsight.net>

Safety of Manufactured Nanomaterials

[http://www.oecd.org/department/0,2688,en\\_2649\\_37015404\\_1\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/department/0,2688,en_2649_37015404_1_1_1_1_1,00.html)

## **B. Preventing or Responding to Environmentally Caused Conflicts**

### **ENVIRONMENTAL CAUSES TRIGGERED MIGRATION**

#### **Conference on Desertification Calls for Policies to Address Environmental Refugees**

### *Military Implications:*

Those developing military programs to prevent environmentally induced conflicts should follow the outcomes of such meetings and cooperate with other militaries, international agencies, and NGOs to create new policies and strategies to counter desertification and help cope with its consequences.

### *Sources:*

Joint International Conference—Desertification and the International Policy Imperative  
<http://www.inweh.unu.edu/inweh/drylands/IYDD.htm>

Experts Advise World Policies to Cope with Causes, Rising Consequences of Creeping Desertification

[http://www.inweh.unu.edu/inweh/drylands/Algiers\\_news\\_release-Final.pdf](http://www.inweh.unu.edu/inweh/drylands/Algiers_news_release-Final.pdf)

Forced migration key issue at desert meeting

<http://allafrica.com/stories/200612150974.html>

Looming desertification could spawn millions of environmental refugees

<http://news.mongabay.com/2006/1214-unu.html>

Droughts to set off exodus

<http://www.thestar.com/article/151381>

Rising Sea Levels Claim First Inhabited Island and Threaten Coastal Populations Worldwide  
Increasing Weather Extremes and Environmental Refugees due to Climate Change

Coastline Erosion due to Rising Sea Waters Signaled Around the World

Economic and Security Implications of Climate Change

Developing Countries Most Affected by Global Warming

*Military Implications:*

Extreme weather conditions, threats to food supply, and loss of livelihood (mostly in highly populated regions such as India and China) might increase unrest and threaten global stability.

The U.S. Army Corps of Engineers—having the logistics and know-how—should consider worldwide collaboration with counterparts and international organizations (e.g. the UNU Institute for Environment and Human Security in Bonn) to determine priorities on which communities need what kind of help from a network of state and international agencies. Also, the issue of environmental refugees should be tackled swiftly to avoid conflicts that this rising segment of world population might cause.

*Sources:*

Disappearing world: Global warming claims tropical island

<http://news.independent.co.uk/environment/article2099971.ece>

Rising sea levels engulfing Indian world heritage islands

<http://www.terradaily.com/2006/061221015453.078uvrt9.html>

The last tide could come at any time. Then these islands at the end of the Earth will simply vanish

<http://www.timesonline.co.uk/article/0,,3-2513189,00.html>

In many villages, Alaskans face physical and cultural erosion

<http://www.signonsandiego.com/news/nation/20061225-0916-alaskaerosion.html>

Oceans May Rise up to 140 cms by 2100 Due to Warming

<http://www.planetark.com/dailynewsstory.cfm/newsid/39504/story.htm>

London-on-Sea: the future of a city in decay. By Roger Highfield, Telegraph.co.uk, 27/12/2006

<http://www.telegraph.co.uk/news/main.jhtml?xml=/news/2006/12/27/nlondon27.xml>

INTERVIEW - Refugees, Disease Big Risk from Global Warming – UN

<http://www.planetark.com/dailynewsstory.cfm/newsid/38588/story.htm>

Climate water threat to millions

<http://news.bbc.co.uk/2/hi/science/nature/6068348.stm>

*Feeling the Heat*, report by Tearfund, member of the Disasters Emergency Committee

<http://www.tearfund.org/webdocs/Website/News/Feeling%20the%20Heat%20Tearfund%20report.pdf>

Expect a Warmer, Wetter World this Century, Computer Models Agree

<http://www.ucar.edu/news/releases/2006/wetterworld.shtml>

Global Warming Could Spread Extreme Drought

<http://www.ens-newswire.com/ens/oct2006/2006-10-05-01.asp>

The ocean is slowly claiming Malasiga. They say it's global warming

<http://www.chicagotribune.com/news/nationworld/chi-0608200380aug20,1,3457454,print.story?ctrack=1&cset=true>

(by free subscription only)

Britain is falling into the sea (or bits of it, anyway)

<http://www.canada.com/montrealgazette/news/insight/story.html?id=f3247666-19da-4a02-9c8e-ea2fe464b728> (article available free for a limited time)

Ocean acidification: the other CO<sub>2</sub> problem

<http://www.newscientist.com/channel/earth/mg19125631.200> (by subscription only)

Tackle climate change or face deep recession, world's leaders warned

<http://www.guardian.co.uk/frontpage/story/0,,1931685,00.html>

Preparation Environment Council, 23 October 2006

<http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/06/389&format=HTML&aged=0&language=EN&guiLanguage=en>

Stern Review sets out economic imperative of climate change

[http://www.wwf.org.uk/news/n\\_0000003037.asp](http://www.wwf.org.uk/news/n_0000003037.asp)

£3.68 trillion: The price of failing to act on climate change

[http://observer.guardian.co.uk/uk\\_news/story/0,,1934381,00.html](http://observer.guardian.co.uk/uk_news/story/0,,1934381,00.html)

British government report: global warming will devastate world economy

[http://ca.news.yahoo.com/s/capress/britain\\_global\\_warming](http://ca.news.yahoo.com/s/capress/britain_global_warming)

Climate inaction 'has high cost'

<http://news.bbc.co.uk/2/hi/science/nature/5398784.stm>

Dangerous climate change is hitting Africa hard say top aid and environment groups

<http://www.neweconomics.org/gen/africaupinsmoke.aspx>

Africa—Up in Smoke 2. The second report on Africa and global warming from the Working Group on Climate Change and Development

[http://www.neweconomics.org/gen/z\\_sys\\_PublicationDetail.aspx?pid=232](http://www.neweconomics.org/gen/z_sys_PublicationDetail.aspx?pid=232)

Merkel to Target Climate Change as G8, EU Leader

<http://www.dw-world.de/dw/article/0,2144,2188336,00.html>

Rising sea forces islanders to relocate

<http://www.earthsky.org/shows/show.php?date=20060814>

Global warning: Devastation of an atoll

<http://news.independent.co.uk/environment/article1222595.ece> (article available free for a limited time)

World Bank: Climate threatening programs

[http://www.businessweek.com/ap/financialnews/D8JQ7VIG1.htm?sub=apn\\_home\\_up%26chan=db](http://www.businessweek.com/ap/financialnews/D8JQ7VIG1.htm?sub=apn_home_up%26chan=db) (article available free for a limited time)

Development Under Climate Threat

<http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:21035991~pagePK:34370~piPK:34424~theSitePK:4607,00.html>

Global warming is more than just a green issue, says Secretary-General

<http://www.un.org/apps/news/story.asp?NewsID=20091&Cr=climate&Cr1=change>

The ocean is slowly claiming Malasiga. They say it's global warming

<http://www.chicagotribune.com/news/nationworld/chi-0608200380aug20,1,3457454.print.story?ctrack=1&cset=true> (by free subscription only)

Britain is falling into the sea (or bits of it, anyway)

<http://www.canada.com/montrealgazette/news/insight/story.html?id=f3247666-19da-4a02-9c8e-ea2fe464b728> (article available free for a limited time)

Ocean acidification: the other CO2 problem

<http://www.newscientist.com/channel/earth/mg19125631.200> (by subscription only)

## **FOOD AND FRESHWATER**

### ***Living Planet Report 2006***

#### *Military Implications:*

This report should be studied by those with responsibilities for implementing the Army's Strategy for the Environment. This report is another addition in the long series warning on humanity's unsustainable practices. It is expected that pressure to improve performance will increase mostly on the countries that top the ecological footprint list.

#### *Sources:*

Living Planet Report 2006 outlines scenarios for humanity's future

[http://www.footprintnetwork.org/newsletters/gfn\\_blast\\_0610.html](http://www.footprintnetwork.org/newsletters/gfn_blast_0610.html)

"Living Planet Report 2006"

[http://www.ourplanet.com/imgversn/footprint/living\\_planet\\_report.html](http://www.ourplanet.com/imgversn/footprint/living_planet_report.html)

### **Unless Water Management Improves, Conflicts over Water Are Inevitable**

#### *Military Implications:*

These findings should be used to argue for increased military attention to how it can prevent water-related conflicts. Key military water and/or corruption experts should join the Water Integrity Network.

#### *Sources:*

World Water Week in Stockholm; 20-26 August, 2006

<http://www.worldwaterweek.org/>

Business in the world of water

<http://www.wbcsd.org/DocRoot/OpBmbDCToPi3uCskR9Ie/h20-scenarios.pdf>

Cost of water shortage: civil unrest, mass migration and economic collapse

<http://www.guardian.co.uk/water/story/0,,1851712,00.html>

WBCSD Floats Water Scenarios Project

[http://www.greenbiz.com/news/news\\_third.cfm?NewsID=33576&CFID=13072466&CFTOKEN=61764226](http://www.greenbiz.com/news/news_third.cfm?NewsID=33576&CFID=13072466&CFTOKEN=61764226)

Report: Water crisis hits rich countries

[http://www.panda.org/news\\_facts/newsroom/index.cfm?uNewsID=77900](http://www.panda.org/news_facts/newsroom/index.cfm?uNewsID=77900)

New Alliance Seeks to Fight Water Sector Corruption

<http://www.enn.com/today.html?id=11110>

"Asia's Coming Water Wars"

[http://www.pinr.com/report.php?ac=view\\_report&report\\_id=545&language\\_id=1](http://www.pinr.com/report.php?ac=view_report&report_id=545&language_id=1)

Water, water everywhere?

[http://www.economist.com/agenda/displaystory.cfm?story\\_id=7815561&fsrc=nwl](http://www.economist.com/agenda/displaystory.cfm?story_id=7815561&fsrc=nwl) (by subscription only; see full text further in this [Appendix](#))

A Third of the World Population Faces Water Scarcity Today

[http://www.iwmi.cgiar.org/Press/releases/CA%20Launch%20Press%20Release\\_Final.pdf](http://www.iwmi.cgiar.org/Press/releases/CA%20Launch%20Press%20Release_Final.pdf)

“A Thirsty World”, Eds. Yeston, Coontz, Smith & Ash, *SCIENCE*, 313, 25 Aug 2006, pp 1067-1090. (by subscription only)

## **NATURAL DISASTERS**

### **Population Trends and Environmental Impact**

*Military Implications:*

Relevant military personnel should review these reports for population projections that are important for developing adequate early warning and preparedness systems, as well as for developing strategies for preventing eventual conflicts due to scarcities and increasingly probable disasters—mostly in coastal areas.

*Sources:*

U.S. National Report on Population and the Environment

[http://www.cepnet.org/documents/USNatlReptFinal\\_000.pdf](http://www.cepnet.org/documents/USNatlReptFinal_000.pdf)

Press Release <http://www.cepnet.org/documents/USNatlReptPressReleaseFINAL8-30-06.doc>

Mapping Future Population Growth

<http://www.signonsandiego.com/news/science/20060817-9999-lz1c17popula.html>

Where will people live in the year 2025? (PDF) map

<http://www.signonsandiego.com/uniontrib/20060817/images/world.pdf>

### **Indian Ocean Tsunami Warning System Declared Operational, but Local Coordination still Lacking**

*Military Implications:*

Since the military has the capability to help in the event of another major tsunami, it should have some appropriate connection with the central warning system and eventually—until local connections are better established—try to help coordinate local warning and evacuation situations.

*Sources:*

Indian Ocean Tsunami Warning System up and running

[http://portal.unesco.org/en/ev.php-](http://portal.unesco.org/en/ev.php-URL_ID=33442&URL_DO=DO_TOPIC&URL_SECTION=201.html)

[URL\\_ID=33442&URL\\_DO=DO\\_TOPIC&URL\\_SECTION=201.html](http://portal.unesco.org/en/ev.php-URL_ID=33442&URL_DO=DO_TOPIC&URL_SECTION=201.html)

UN-backed tsunami early warning system set to become operation in Indian Ocean

<http://www.un.org/apps/news/story.asp?NewsID=19030&Cr=tsunami&Cr1=>

Latest tsunami shows need for complete warning system: UN regional group

<http://www.un.org/apps/news/story.asp?NewsID=19286&Cr=tsunami&Cr1=>

## ENERGY SECURITY

### **World Energy Outlook 2006 Warns on Energy Security and Environmental Implications of Increasing Energy Demands**

#### *Military Implications:*

Military institutions have to develop rigorous strategies to combat the two main issues of insecure and inadequate energy supplies, and environmental damage, and to look beyond the upfront investment costs of making these changes in order for their operations to be more cost effective in the long run. There is a paradox to be resolved; the energy input to military materiel and operations has historically been on an upward curve, as potential and actual combatants seek to overwhelm opponents by sheer force.

#### *Sources:*

WEO 2006 <http://www.worldenergyoutlook.org/2006.asp>

The *World Energy Outlook 2006* Maps Out a Cleaner, Cleverer and More Competitive Energy Future

[http://www.iea.org/Textbase/press/pressdetail.asp?PRESS\\_REL\\_ID=187](http://www.iea.org/Textbase/press/pressdetail.asp?PRESS_REL_ID=187)

### **European Action Plan on Energy Efficiency**

#### *Military Implications:*

The military should consider following the EU new environmental regulations and new standards policies and the consequently emerging strategies, to ensure that its activities in the region comply with the new requirements.

#### *Sources:*

Saving 20% by 2020: European Commission unveils its Action Plan on Energy Efficiency

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1434&format=HTML&aged=0&language=EN&guiLanguage=en>

## C. Protecting the Environment Due to Its Inherent Moral Value

### ENVIRONMENTAL SECURITY-RELATED INTERNATIONAL REGULATIONS THAT HAVE BEEN COMING INTO FORCE SINCE JUNE 2006 (listed in alphabetical order)

#### Europe's Chemical Regulations (REACH) to Enter into Force on June 1, 2007

##### *Military Implications:*

The military should assess the REACH system's impacts on military operations in Europe in relation to existing SOFAs and other agreements, and intensify efforts to find safer alternatives to banned chemicals or those deemed to be of high concern for human health.

##### *Sources:*

REACH: Commission welcomes European Parliament vote on new EU chemicals legislation

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1799&format=HTML&aged=0&language=EN&guiLanguage=en>

Environment: Commission welcomes Council action on REACH, climate change and marine protection

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1826&type=HTML&aged=0&language=EN&guiLanguage=en>

Japan Chemical Industry Concerned over New EU Rules

<http://www.planetark.com/dailynewsstory.cfm/newsid/39501/story.htm>

EU law has Del. companies watching

<http://www.delawareonline.com/apps/pbcs.dll/article?AID=/20061226/NEWS/612260355/-1/NEWS01>

#### Canadian Chemical Plan May Go beyond REACH as Environmentalists Get New Political Support

##### *Military Implications:*

Considering the strong collaboration between Canada and the U.S., as well as the CEC rules on cross-border pollution, the military should follow the development of the new Canadian environmental policies and be prepared—along with its contractors—to comply with new regulations that might affect its operations.

##### *Sources:*

Harper's slow action on chemicals is toxic, says Dion

[https://www.liberal.ca/news\\_e.aspx?type=news&id=12111](https://www.liberal.ca/news_e.aspx?type=news&id=12111)

Rising tide

<http://www.ekos.com/admin/articles/TheStar09Dec2006c.pdf>

Conservatives cracking down on toxic chemicals

<http://www.cbc.ca/canada/newfoundland-labrador/story/2006/12/08/toxic-chemicals.html>

Species at Risk. Submission ID: SEM-06-005

<http://www.cec.org/citizen/submissions/details/index.cfm?varlan=english&ID=114>

Determination [http://www.cec.org/files/pdf/sem/06-5-DET14\\_1\\_2\\_en.pdf](http://www.cec.org/files/pdf/sem/06-5-DET14_1_2_en.pdf)

## PROPOSED TREATIES AND/OR CHANGES TO EXISTING ONES

### Toxic Waste Management

#### UN E-Waste Forum and Basel Convention's Conference of Parties

##### *Military Implications:*

Relevant military personnel should review the 30 decisions to identify opportunities for international cooperation, furtherance of the Army's Strategy on the Environment, and to better anticipate potential new directives, such as e-waste management additions to the Basel Convention and a ship recycling procedure.

##### *Sources:*

Basel Convention COP8 website <http://cop8.basel.int/>

Basel Convention website <http://www.basel.int/>

Summary of the Eighth Conference of the Parties to the Basel Convention

<http://www.iisd.ca/basel/cop8/>

Dealing with toxic computer waste

<http://news.bbc.co.uk/2/hi/business/6110018.stm>

#### Green Standards to Counter E-waste

##### *Military Implications:*

Considering the increasing e-waste issue and the influence these organizations have in the global arena, it is fair to speculate that versions of these green measures will be considered for future e-waste regulations. The military should follow these new developments and be prepared to comply with eventual new directives. Also, it should not wait to begin using the lists in its acquisition of electronics to encourage greener companies. That would be consistent with the stewardship goal in the Army's Environmental Strategy.

##### *Sources:*

How green is your Apple? The Economist print edition, Aug 25th 2006

[http://www.economist.com/business/displaystory.cfm?story\\_id=7836504](http://www.economist.com/business/displaystory.cfm?story_id=7836504) (by subscription only)

Your guide to green electronics

<http://www.greenpeace.org/international/news/green-electronics-guide-ewaste250806>

EPEAT <http://www.epeat.net>

#### China Issues Electronic Waste Rules

##### *Military Implications:*

Considering the huge problem of e-waste pollution from electronic imports in developing countries, Chinese measures are likely to inspire other countries in the region to institute tougher restrictions in line with the Environmentally Sound Management (ESM) of Electronic and Electrical Wastes (e-waste) program of action for the Asia-Pacific region. Military organizations, especially those operating in East Asia, should review their policies and practices on electronic waste to ensure that they are prepared to cooperate with such actions.

##### *Source:*

China Targets Rising Mountain of High-Tech Junk

<http://www.enn.com/today.html?id=11121>

## **EU to Increase Environmental Regulations Enforcement**

### *Military Implications:*

The military should consider following the EU new environmental regulations and new standards policies and the consequently emerging strategies, to ensure that its activities in the region comply with the new requirements.

### *Source:*

Preparation Environment Council, 23 October 2006

<http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/06/389&format=HTML&aged=0&language=EN&guiLanguage=en>

## **Toxic Waste Disposal of Global Growing Concern**

### *Military Implications:*

Considering the increasing attention to waste disposal processes and regulation enforcement, as well as their link to security, it is likely that the Basel Convention will be strengthened and/or special regulations will be set for toxic waste treatment. The military should carefully follow these new developments and be prepared to comply with eventual new directives. Furthermore, it should eventually incorporate observing hazardous waste disposal procedures and trade as part of its security actions in countries where it has peacekeeping forces. This would also be consistent with the stewardship goal in the Army's Environmental Strategy.

### *Sources:*

Deadly toxic waste dumping in Côte d'Ivoire clearly a crime – UN environmental agency

<http://www.un.org/apps/news/story.asp?NewsID=20083&Cr=ivoire&Cr1=>

Africa: The world's 'septic tank'

[http://www.mg.co.za/articlePage.aspx?articleid=284851&area=/insight/insight\\_africa/](http://www.mg.co.za/articlePage.aspx?articleid=284851&area=/insight/insight_africa/)

Poisonous days

[http://www.electriceconomist.com/world/africa/displaystory.cfm?story\\_id=7923227](http://www.electriceconomist.com/world/africa/displaystory.cfm?story_id=7923227) (by subscription only)

Ivory Coast Tragedy Prompts Call for Stricter Toxic Waste Treaty

<http://www.ens-newswire.com/ens/sep2006/2006-09-11-03.asp>

Toxic waste mystery in Ivory Coast deepens

<http://www.newscientist.com/article/dn10097-toxic-waste-mystery-in-ivory-coast-deepens.html>

## **Chemical and Biological Safety**

### **Eleventh Chemical Weapons Convention**

#### *Military Implications:*

The state of current and potential future non-lethal weapons should be reviewed in light of possible violations of the CWC. [Similar to previous on the same issue] Those with responsibilities that might be affected by the results of the conference should visit the U.S. Chemical Weapons Convention website <http://www.cwc.gov>, noting national and international opportunities for assisting in compliance with the CWC regulations.

#### *Sources:*

Chemical Incapacitants Must Be Kept From War, Experts Say

[http://www.nti.org/d\\_newswire/issues/2006\\_12\\_7.html#C1839F43](http://www.nti.org/d_newswire/issues/2006_12_7.html#C1839F43)

Weapons of Terror

[http://www.wmdcommission.org/files/Weapons\\_of\\_Terror.pdf](http://www.wmdcommission.org/files/Weapons_of_Terror.pdf)

Annan calls on governments to destroy 'cruel and inhumane' chemical weapons

<http://www.un.org/apps/news/story.asp?NewsID=20854&Cr=chemical&Cr1=weapon>

U.S., Partners to Offer New Program of CWC Support

[http://www.nti.org/d\\_newswire/issues/2006\\_12\\_7.html#95296BAD](http://www.nti.org/d_newswire/issues/2006_12_7.html#95296BAD)

Nations Get CW Treaty Extensions

[http://www.nti.org/d\\_newswire/issues/2006\\_12\\_11.html#263C85C9](http://www.nti.org/d_newswire/issues/2006_12_11.html#263C85C9)

### **Better International Controls Needed to Prevent Bioterrorism**

*Military Implications:*

Relevant military and diplomatic personnel should liaise with those drafting improved international legal and enforcement frameworks to prevent bioterrorism, and then cooperate with their international counterparts for the improved control regimes.

*Sources:*

Custom-Built Pathogens Raise Bioterror Fears

<http://www.washingtonpost.com/wp-dyn/content/article/2006/07/30/AR2006073000580.html>

(by subscription only)

The Secretive Fight Against Bioterror

<http://www.washingtonpost.com/wp-dyn/content/article/2006/07/29/AR2006072900592.html?sub=AR> (by subscription onlyx)

A spy among us?

<http://www.baltimoresun.com/news/nationworld/bal-te.detrick30jul30,0,2573448.story>

No action on bio-terrorism loophole

<http://www.guardian.co.uk/science/story/0,,1834550,00.html?gusrc=rss&feed=18>

China to tighten biological export control

[http://english.people.com.cn/200607/29/eng20060729\\_287991.html](http://english.people.com.cn/200607/29/eng20060729_287991.html)

### **Human Biomonitoring for Environmental Chemicals**

*Military Implications:*

Military personnel concerned with biomonitoring should review the report since its findings and recommendations might find their way in new national and possibly international policies on biomonitoring. Also, they might be useful for improving military biomonitoring strategies.

*Source:*

Human Biomonitoring for Environmental Chemicals

<http://www.nap.edu/catalog/11700.html>

### **Scientific Community's Questions Concerning Biodefense Standards**

*Military Implications:*

Although the panel focused on the U.S., the problem is of international concern. Relevant military personnel should consider the outcomes of this panel's discussions along with other material on biosafety and advance the issue at the concerned forums to accelerate the adoption of international standards for the biodefense industry and related activities.

*Source:*

The Need for Biodefense Standards

<http://www.the-scientist.com/article/display/24075/> (by subscription only)  
Expert Panel on the Development of Standards for Biodefense  
<http://www.biodefensestandards.org/>

## **Pollution and Greenhouse Gases**

### **Countries Contemplating Tougher Regulations for Mandatory Emission Targets**

#### *Military Implications:*

Leadership by the EU, Japan and Australia may stimulate others to set mandatory emission targets, eventually bringing increased attention to military emission practices. Military liaisons in these countries might seek opportunities for collaboration in emissions reductions.

#### *Sources:*

Factbox - UK Response to Stern Review on Climate Change  
<http://www.planetark.com/dailynewsstory.cfm/newsid/38740/story.htm>  
Analysis - Japan Needs Policy Overhaul to Avoid Kyoto Failure  
<http://www.planetark.com/dailynewsstory.cfm/newsid/38709/story.htm>  
Australia to Push for "New Kyoto" in Asia  
<http://www.planetark.com/dailynewsstory.cfm/newsid/38807/story.htm>  
Australia plans world's largest carbon storage system  
<http://www.terradaily.com/2006/061123072009.p1jncbk1.html>

### **UK Proposes Individual Carbon Trading**

#### *Military Implications:*

It is not clear at this point if the points-based system will affect just individuals, or will also be extended to industry sectors including the military. If it is extended to military activities and personnel, then training for reduced carbon emissions should be explored for personnel based in the UK.

#### *Source:*

Miliband unveils carbon swipe-card plan  
<http://www.guardian.co.uk/climatechange/story/0,,1824241,00.html> (article accessible free for a limited time; otherwise, subscription required)

### **Europe to Begin Penalizing Jet Pollution in 2011**

#### *Military Implications:*

Although the proposed EU regulation now refers just to civil aviation, the military should explore impacts on its European operations and be prepared for an eventually more inclusive regulation.

#### *Sources:*

Climate change: Commission proposes bringing air transport into EU Emissions Trading Scheme  
<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1862&format=HTML&aged=0&language=EN>  
Europe Acts to Penalize Jet Pollution  
<http://www.nytimes.com/2006/12/21/business/worldbusiness>

## **Europe to Propose Emissions Targets for All Flights To/From or Within Europe**

### *Military Implications:*

Since the proposed EU regulation mentions no exceptions, the military should explore impacts on its European operations and consult with allied military forces on the significance of that apparent omission.

### *Sources:*

EU wants cap on airline emissions as of 2011

<http://www.euractiv.com/en/environment//article-159741>

EU takes aim at airline emissions

<http://iht.com/articles/2006/11/14/business/emit.php>

## **EU New Directive on Air Pollution**

### *Military Implications:*

The military should consider following the EU new environmental regulations and new standards policies and the consequently emerging strategies, to ensure that its activities in the region comply with the new requirements.

### *Sources:*

Commission welcomes Council agreements on air quality directive, hazardous waste

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1447&format=HTML&aged=0&language=EN&guiLanguage=en>

Climate Change and Air Quality: Press Statement at the Environment Council

<http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/06/624&format=PDF&aged=0&language=EN&guiLanguage=en>

## **Europe Considers Aviation Policies to Reduce Greenhouse Gases**

### *Military Implications:*

This issue should be monitored to see what new requirements might apply to military aviation.

### *Sources:*

EU Parliament Wants Aviation Tax, Emissions Trade

<http://www.planetark.com/dailynewsstory.cfm/newsid/37117/story.htm>

WTTC reacts to EU aviation tax debate

<http://www.breakingtravelnews.com/article/2006071407510441>

## **EU to Introduce New Regulations to Combat Surface Waters Pollution**

### *Military Implications:*

The military units in the EU should follow the development of the new directive and prepare for eventual necessary changes in order to comply with the new regulations.

### *Sources:*

Commission takes action to combat surface water pollution from dangerous substances

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1007&format=HTML&aged=0&language=EN&guiLanguage=en>

Priority substances under the Water Framework Directive

[http://ec.europa.eu/environment/water/water-dangersub/pri\\_substances.htm](http://ec.europa.eu/environment/water/water-dangersub/pri_substances.htm)

## **Post-Kyoto Protocol Negotiations**

### **UN Climate Change Conference with 5,900 Explores Post-Kyoto Regulations**

#### *Military Implications:*

The military should continue to accelerate efforts to reduce their own greenhouse gas emissions. These remarks are offered with the realization that the U.S. military may already be among the institutions most compliant with greenhouse gas emission standards, but that good performance might not be good enough in coming years. New international environmental security-related policies and cooperation to avoid potentially large-scale disasters and conflicts seem inevitable. Hence, the military should follow the evolution of these discussions to better anticipate future requirements.

#### *Sources:*

Summary of the Twelfth Conference of The Parties To The UN Framework Convention On Climate Change and Second Meeting of The Parties To The Kyoto Protocol

<http://www.iisd.ca/vol12/enb12318e.html>

United Nations Climate Change Conference - Nairobi 2006

[http://unfccc.int/meetings/cop\\_12/items/3754.php](http://unfccc.int/meetings/cop_12/items/3754.php)

### **EU to Move Forward on the Post-Kyoto Negotiations**

#### *Military Implications:*

The military should continue to accelerate efforts to reduce their own greenhouse gas emissions. These remarks are offered with the realization that the U.S. military may already be among the institutions most compliant with greenhouse gas emission standards, but that good performance might not be good enough in coming years. New international environmental security-related policies and cooperation to avoid potentially large-scale disasters and conflicts seem inevitable. Hence, the military should follow the evolution of these discussions to better anticipate future requirements.

#### *Source:*

Environment: Commission welcomes Council action on REACH, climate change and marine protection

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1826&type=HTML&aged=0&language=EN&guiLanguage=en>

### **Possible Tougher Policies Concerning Climate Change**

#### *Military Implications:*

There is compelling evidence of the consequences of anthropogenic climate change, and a growing world demand for action. The military should continue to accelerate efforts to reduce their own greenhouse gas emissions. New international environmental security-related policies and cooperation to avoid potentially large-scale disasters and conflicts seem inevitable.

#### *Sources:*

Dangerous climate change is hitting Africa hard say top aid and environment groups

<http://www.neweconomics.org/gen/africaupinsmoke.aspx>

Africa—Up in Smoke 2. The second report on Africa and global warming from the Working Group on Climate Change and Development

[http://www.neweconomics.org/gen/z\\_sys\\_PublicationDetail.aspx?pid=232](http://www.neweconomics.org/gen/z_sys_PublicationDetail.aspx?pid=232)

Merkel to Target Climate Change as G8, EU Leader

<http://www.dw-world.de/dw/article/0,2144,2188336,00.html>

## **Marine Environment**

### **The Debate over Use of Sonar by the Navy Continues; Legal Settlement Approved**

#### *Military Implications:*

As pointed out by Joel Reynolds, a senior attorney at the Natural Resources Defense Council (NRDC) and director of its Marine Mammal Protection Project, "this settlement confirms that measures to protect our oceans can and must be part of the Navy's training for submarine defense." Although this time a settlement was reached, it is likely that at some point, in case of more evidence that sonars are harmful, or more pressure from conservation groups, they might be banned completely. In any event, monitoring of marine mammals' presence in case of sonar use should become incorporated in Navy policy.

#### *Sources:*

Court Allows Sonar in RIMPAC War Games With New Restrictions

<http://www.ens-newswire.com/ens/jul2006/2006-07-09-01.asp>

### **Political Agreement Reached on the European Marine Strategy Directive**

#### *Military Implications:*

Relevant military personnel should be alert to new requirements imposed by the Marine Strategy Directive. Although the Directive's power is limited to EU waters, increased international cooperation could generate new regulations and marine environmental pollution monitoring systems elsewhere.

#### *Sources:*

Environment: Commission welcomes Council action on REACH, climate change and marine protection

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1826&type=HTML&aged=0&language=EN&guiLanguage=en>

Strategy for the marine environment

<http://europa.eu/scadplus/leg/en/lvb/l28164.htm>

A Marine Strategy to save Europe's seas and oceans

<http://ec.europa.eu/environment/water/marine.htm>

Regionalization of the EU waters

<http://www.eurocean.org/contents.php?id=392>

### **International Conference and Assessments Find Rising Ocean Pollution**

#### *Military Implications:*

Environmental surveillance and data analysis is improving the amount and quality of the information needed to help reduce marine pollution. In addition to improving its own

environmental performance, the military should consider offering assistance in regions where pollution control is inadequate.

*Sources:*

Integrated Water Management Key to Cleaning-up Oceans

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=486&ArticleID=5387&l=en>

Concern Over Oceans Despite Receding Oil & Chemical Threats

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=486&ArticleID=5364&l=en>

Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities

<http://www.gpa.unep.org/bin/php/home/index.php>

*The State of the Marine Environment: Trends and Processes*

[http://www.gpa.unep.org/document\\_lib/en/pdf/report2-webversion\\_\(global\\_soe\).pdf](http://www.gpa.unep.org/document_lib/en/pdf/report2-webversion_(global_soe).pdf)

Further Rise in Number of Marine ‘Dead Zones’

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=486&ArticleID=5393&l=en>

Curbing Coastal Pollution Aids Recovery of Heat-Stressed Corals

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=486&ArticleID=5392&l=en>

## **Heavy Metals**

### **Europe Proposes Ban on Mercury Exports**

*Military Implications:*

Logistics personnel should review these measures to determine their effect on military materiel planning, and should be prepared to comply with the final set of regulations, as appropriate under status of forces agreements. This development could complicate repatriation of materiel or movement to non-EU nations.

*Sources:*

Environment: Commission proposes ban on EU mercury exports

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1481&format=HTML&aged=0&language=EN&guiLanguage=en>

EU Parliament Backs Plans to Ban Mercury

<http://www.physorg.com/news82736827.html>

## **Biological Diversity**

### **New Sites Added to World’s Protected Biosphere Reserves**

### **New Strategy of UNESCO World Heritage Committee for Heritage Sites and Climate Change**

*Military Implications:*

The military should keep up-to-date with the list of protected and/or endangered sites and plan its operations accordingly. Citing the Army’s “Strategy for the Environment,” the military should seek new opportunities to participate in dialogues among scientists, politicians, environmental NGOs, and economic decision-makers for improving biodiversity management strategies, as well as in planning its own operations. Also, Arctic missions may provide new information on global

environmental changes and may be relevant to the U.S. military's interest in the Northwest Passage. Military scenarios should also be considered to respond to disasters affecting indigenous arctic peoples.

*Sources:*

Twenty-five biosphere reserves added to UNESCO's Man and the Biosphere (MAB) Network

[http://portal.unesco.org/en/ev.php-URL\\_ID=35389&URL\\_DO=DO\\_TOPIC&URL\\_SECTION=201.html](http://portal.unesco.org/en/ev.php-URL_ID=35389&URL_DO=DO_TOPIC&URL_SECTION=201.html)

World Heritage Committee adopts strategy on heritage and climate change

<http://whc.unesco.org/en/news/262>

Swiss Map Permafrost After Signs Alps Crumbling

<http://www.planetark.com/dailynewsstory.cfm/newsid/37442/story.htm>

Global Warming Puts 12 US Parks at Risk – Report

<http://www.planetark.com/dailynewsstory.cfm/newsid/37391/story.htm>

## **IMPROVED COMPLIANCE WITH ENVIRONMENTAL REGULATIONS**

### **North America's Commission for Environmental Cooperation to Increase Enforcement of Environmental Regulations and Public Participation**

*Military Implications:*

CEC projects are a relatively untapped source of information for relevant military personnel dealing with environment and health issues and potential future regulations affecting the military in North America. [Note: a staff member of the Millennium Project participated in the Montreal discussions of the Operational Plan.]

*Source:*

Operational Plan of the Commission for Environmental Cooperation 2006-2008

[http://www.cec.org/files/PDF/PUBLICATIONS/OpPlan2006-Summary\\_en.pdf](http://www.cec.org/files/PDF/PUBLICATIONS/OpPlan2006-Summary_en.pdf)

### **Biological Weapons Convention**

#### **Sixth Review Conference of the Biological Weapons Convention**

*Military Implications:*

Without better international controls, terrorist access to biological weapons seems inevitable. Great progress has been made on bioweapons sensors over the past several years, some of which have been referenced in these monthly reports for AEPI. Relevant military personnel should consider making recommendations at the upcoming intersessional meetings.

*Source:*

BWC Review Conference Hailed as Success

[http://www.nti.org/d\\_newswire/issues/2006\\_12\\_11.html#60E54D1D](http://www.nti.org/d_newswire/issues/2006_12_11.html#60E54D1D)

Draft Declaration

[http://www.unog.ch/80256EDD006B8954/\(httpAssets\)/1CEE7A27069559C5C125723E00647FBF/\\$file/BWC+CONF.VI+CRP.4-altered+as+ammended.pdf](http://www.unog.ch/80256EDD006B8954/(httpAssets)/1CEE7A27069559C5C125723E00647FBF/$file/BWC+CONF.VI+CRP.4-altered+as+ammended.pdf)

Biological and Toxin Weapons Convention (BTWC) website <http://www.opbw.org/>

## **Kyoto/Climate Change**

### **Lawsuits over Failure to Meet Kyoto Commitments**

#### *Military Implications:*

[Similar to previous on related issues] Lawsuits may one day be filed against the military for its greenhouse gas emissions. The sooner military efforts to reduce greenhouse gas emissions are fully compliant with “best practices” and documented, the less likely it is that the military will be sued for damages. The military should be prepared for more stringent decisions and regulations worldwide against atmospheric emissions. These remarks are offered with the realization that the U.S. military may already be among the institutions most compliant with greenhouse gas emission standards, but that good performance might not be good enough in coming years.

#### *Source:*

Canada faces lawsuit over failure to meet Kyoto commitment

<http://www.terradaaily.com/2006/061031230116.bm84p217.html>

### **Global Warming Goes to Court**

#### *Military Implications:*

Lawsuits may one day be filed against the military for its greenhouse gas emissions. The sooner military efforts to reduce greenhouse gas emissions are fully compliant with “best practices”, the less likely the military will be sued for damages. The military should be prepared for more stringent decisions and regulations worldwide against atmospheric emissions. These remarks are offered in realization that the U.S. military may already be among the institutions most compliant with greenhouse gas emission standards, but that good might not be good enough in coming years.

#### *Sources:*

Marsden B - A Bad Idea

<http://www.greenpeace.org.nz/campaigns/climate/MarsdenB.asp>

Update: Massachusetts v. EPA

[http://www.treehugger.com/files/2006/10/massachusetts\\_v\\_epa.php](http://www.treehugger.com/files/2006/10/massachusetts_v_epa.php)

Global Warming: Here Come The Lawyers

[http://www.businessweek.com/magazine/content/06\\_44/b4007044.htm](http://www.businessweek.com/magazine/content/06_44/b4007044.htm)

Climate Security: Risks and Opportunities for the Global Economy

[http://www.cfr.org/publication/11511/climate\\_security.html](http://www.cfr.org/publication/11511/climate_security.html)

## **NEW STANDARDS WITH IMPLICATIONS FOR ENVIRONMENTAL SECURITY**

### **ASTM Issues Standard Terminology for Nanotechnology**

#### *Military Implications:*

Military organizations preparing nanotech-related documents should consult this work to ensure that industry-standard terminology is being used.

#### *Sources:*

Terminology for Nanotechnology Standard Now Available from ASTM International

<http://69.7.224.88/viewnews.aspx?newsID=996&s=E56>

## **SAFETY ISSUES**

### **Chemical and Biological safety issues**

#### **Toxicogenomics Risk Assessment**

##### *Military Implications:*

Military personnel working in environmental risk assessment should review the available presentations from this meeting for eventual input in improving their own toxicogenomic risk assessment processes.

##### *Source:*

Fourteenth meeting of the Committee on Emerging Issues and Data on Environmental Contaminants. Use of Toxicogenomics to Understand Toxic Effects and Improve Risk Assessment: A Workshop. November 13, 2006

[http://dels.nas.edu/emergingissues/toxicogenomics\\_meet14.shtml](http://dels.nas.edu/emergingissues/toxicogenomics_meet14.shtml)

#### **Call for Reinforcements to Chemical Safety**

##### *Military Implications:*

The military should follow the work of the Intergovernmental Forum on Chemical Safety and eventually provide input to new safety policies. Although these might not result in legally binding agreements, the discussions will most probably assess the effectiveness of existing chemical safety-related legislation and eventually generate new enforcement and/or safety issues for resolution.

##### *Sources:*

Forum V; Chemical Safety for Sustainable Development

<http://www.who.int/ifcs/forums/five/en/index.html>

Health and environmental concerns associated with heavy metals; global needs for further action?

[http://www.who.int/ifcs/documents/forums/forum5/side\\_events/en/index.html](http://www.who.int/ifcs/documents/forums/forum5/side_events/en/index.html)

### **Potential Health Threats Of Some New Technologies**

#### **Nanotechnology**

##### Grand Challenges for Nanotechnology

UK to Have New Nanotechnology Risk Information Service

Risks of Nanotechnology Applications

Berkeley, California, Considering Nanoparticle Health and Safety Law

##### *Military Implications*

Relevant military personnel should consider these new information resources for inputs to their own nanotech research and applications.

##### *Sources:*

Five-step check for nano safety

<http://news.bbc.co.uk/2/hi/science/nature/6153814.stm>

Nature report proposes nanotech safety strategy

[http://www.smalltimes.com/display\\_article/277298/109/ARTCL/none/none/Nature\\_report\\_proposes\\_nanotech\\_safety\\_strategy](http://www.smalltimes.com/display_article/277298/109/ARTCL/none/none/Nature_report_proposes_nanotech_safety_strategy)

Berkeley considering need for nano safety

<http://www.sfgate.com/cgi-bin/article.cgi?file=/c/a/2006/11/24/MNGP9MJ4KI1.DTL>

Safe handling of nanotechnology. Nature 444, 267-269. Published online 15 November 2006 (by subscription only)

IOM's SAFEnano Initiative announced as DTI's newest Nanotechnology Centre

[http://www.iom-world.org/news/nanotech\\_centre.php](http://www.iom-world.org/news/nanotech_centre.php)

Risks in architectural applications of nanotechnology

<http://www.nanowerk.com/spotlight/spotid=1007.php>

### Carbon Nanotubes May Spread in Water More Widely Than Thought

*Military Implications:*

The military should investigate these results to see whether previous assessments of risk for carbon nanotubes in aqueous environments need to be modified, and should take them into account in future studies and use of nanotubes.

*Source:*

Carbon nanomaterials may disperse more widely in waterways

<http://www.physorg.com/news84458690.html>

### Scientists Correlate Nanoparticle Structure and Toxicity

Australian New Report and Research Group on Nanotechnology

*Military Implications:*

The military should follow these efforts and use the results to aid in environmental risk assessment and health education for new nanomaterials.

*Sources:*

Nanotoxicology: Signs of stress

<http://www.nature.com/nnano/journal/v1/n1/full/nnano.2006.69.html>

Options for a National Nanotechnology Strategy Report

<http://www.industry.gov.au/content/itrinternet/cmscontent.cfm?objectID=E2FE4F8A-4E44-4785-A6A01BE137E0E524>

NanoSafe Australia Newsletter

<http://cohesion.rice.edu/CentersAndInst/ICON/emplibrary/NanoSafeAustNewsletter1-Aug2006.pdf>

Nanotechnology - it's a small, small world

<http://www.smh.com.au/news/science/nanotechnology--its-a-small-small-world/2006/10/04/1159641392822.html>

### Nanomaterials Handbook

*Military Implications:*

Military personnel with an interest in nanotech and related subjects might find this handbook useful due to its broad perspectives on the domain.

*Sources:*

Nanomaterials Handbook. Yury Gogotsi, Drexel University, Philadelphia, Pennsylvania  
[http://www.crcpress.com/shopping\\_cart/products/product\\_detail.asp?sku=2308&pc=/shopping\\_c  
art/categories/categories\\_products.asp?parent\\_id=1174](http://www.crcpress.com/shopping_cart/products/product_detail.asp?sku=2308&pc=/shopping_cart/categories/categories_products.asp?parent_id=1174)  
Book Review: <http://www.nature.com/nnano/journal/v1/n1/full/nnano.2006.64.html>

Characterising the potential risks posed by engineered nanoparticles

Review of Safety Practices in the Nanotechnology Industry

*Military Implications:*

Military personnel concerned with nanotech safety should review these reports for insights on nanotech environmental risk assessment.

*Sources:*

Characterising the potential risks posed by engineered nanoparticles  
<http://www.defra.gov.uk/environment/nanotech/research/reports/progress-report061019.pdf>  
A Review of Safety Practices in the Nanotechnology Industry - Phase One Report  
[http://cohesion.rice.edu/CentersAndInst/ICON/emplibary/Phase%20I%20Report\\_UCSB\\_ICON  
%20Final.pdf](http://cohesion.rice.edu/CentersAndInst/ICON/emplibary/Phase%20I%20Report_UCSB_ICON%20Final.pdf)  
Press release: [www.icon.rice.edu](http://www.icon.rice.edu)

Data Base for Nano Environmental Health and Safety

Major German Study on Nanotech in Food Industry

Nanotube Toxicity Tests Unreliable

Inhaled Nanoparticles May Have Easy Path to Brain

Cleanup and Other Nanomaterials May Re-release Pollutants

*Military Implications:*

Relevant military personnel should follow the progress of these new discoveries in order to improve their own nanotech risk assessment processes, analytical procedures and materiel development programs.

*Sources:*

ICON database: <http://icon.rice.edu/research.cfm>  
Experts and consumers convene on nano risks  
<http://www.foodproductiondaily.com/news/ng.asp?n=70058-nanotechnology-bfr-toxicity>  
Carbon-Nanotube Toxicity Test Tricks Scientists  
<http://www.physorg.com/news76672397.html>  
Tiny inhaled particles take easy route from nose to brain  
<http://www.urmc.rochester.edu/pr/news/story.cfm?id=1191>  
The Flip Side of Using Carbon Nanotubes for Environmental Pollutants Removal  
<http://www.nanowerk.com/spotlight/spotid=780.php>

Increased Research Needed to Address Environmental, Health, and Security Issues Related to Nanotechnology

Nanotechnology and the Food and Agriculture Sector  
Reaction to Voluntary Nanomaterial Reporting Scheme  
FDA Forms Internal Nanotechnology Task Force  
European Commission Opens Nano2Life Network

*Military Implications:*

Relevant military personnel should study these reports for inputs in improving understanding of risk assessment and management of nanomaterials, as well as to prepare for eventual new safety regulations.

*Sources:*

Nanotechnology report urges better safety standards

<http://www.the-scientist.com/news/daily/24910/> (by subscription only)

A Matter of Size: Triennial Review of the National Nanotechnology Initiative

<http://www.nap.edu/catalog/11752.html>

Environmental, Health, and Safety Research Needs for Engineered Nanoscale Materials report

[http://www.nano.gov/NNI\\_EHS\\_research\\_needs.pdf](http://www.nano.gov/NNI_EHS_research_needs.pdf)

Report and data base: <http://www.nanotechproject.org/50>

<http://biz.yahoo.com/prnews/060907/dcw073a.html?.v=1>

Defra Consultation on a Voluntary Reporting Scheme for Engineered Nanoscale Materials: Summary of Findings and Government's Response, August 2006

FDA Forms Internal Nanotechnology Task Force

<http://www.fda.gov/bbs/topics/NEWS/2006/NEW01426.html>

Nano2Life [www.nano2life.org](http://www.nano2life.org)

Chinese and Russian New Nanotechnology Organizations

*Military Implications:*

Military liaisons in Russia and China should establish contact with these institutions, to exchange information on nanotechnology and related environmental security issues.

*Sources:*

Laboratory for Biological Effects of Nanomaterials and Nanosafety Established in China

<http://www.azonano.com/news.asp?newsID=2507>

Russia opens new nanotech center

<http://www.eetimes.com/news/semi/showArticle.jhtml?articleID=190400109>

UK Nanotechnology Policy Review Announced

*Military Implications:*

Military environmental representatives in the UK should follow the progress of this effort and review the Council's report when it comes out, as its findings are very likely to have an impact on future UK internal policies and international regulatory negotiations.

*Source:*

UK. Nanotechnology Policy Review Announced

<http://www.bymnews.com/new/content/view/31988/82/>

Reports Addressing Nanotechnology Safety

*Military Implications:*

Military personnel concerned with nanotech safety and regulation of environmental hazards from nanomaterials should consider reviewing these reports for insights on nanotech environmental risk assessment.

*Sources:*

A Review of Current Practices in the Nanotechnology Industry

<http://cohesion.rice.edu/CentersAndInst/ICON/emplibary/ICONNanotechSurveyFullReduced.pdf>

ICON website <http://icon.rice.edu>

RCRA Regulations of Wastes from the Production, Use, and Disposal of Nanomaterials

Report: <http://www.abanet.org/environ/nanotech/pdf/RCRA.pdf>

Technical Proceedings of the 2006 NSTI Nanotechnology Conference and Trade Show, Volume 1  
Chapter 6: Environmental, Health and Societal Impacts of Nanotechnology. A Framework for

Responsible Nanotechnology Standards

<http://nsti.org/procs/Nanotech2006v1/6/W37.06>

*Nanotechnology: A Research Strategy for Addressing Risk*

<http://www.nanotechproject.org/67/7-19-06-nanotechnology-a-research-strategy-for-addressing-risk>

A scoping study to identify gaps in environmental regulation for the products and applications of nanotechnologies

[http://www.defra.gov.uk/science/project\\_data/DocumentLibrary/CB01075/CB01075\\_3373\\_FRP.doc](http://www.defra.gov.uk/science/project_data/DocumentLibrary/CB01075/CB01075_3373_FRP.doc)

*Nanotechnology Risk Governance*

[http://www.irgc.org/irgc/b/contentFiles/IRGC\\_white\\_paper\\_2\\_PDF\\_final\\_version.pdf](http://www.irgc.org/irgc/b/contentFiles/IRGC_white_paper_2_PDF_final_version.pdf)

*The Ethics and Politics of Nanotechnology*

Report: <http://unesdoc.unesco.org/images/0014/001459/145951e.pdf>

SCIENTIFIC COMMITTEE ON EMERGING AND NEWLY IDENTIFIED HEALTH RISKS (SCENIHR) modified Opinion (after public consultation) on The appropriateness of existing methodologies to assess the potential risks associated with engineered and adventitious products of nanotechnologies

[http://ec.europa.eu/health/ph\\_risk/committees/04\\_scenihr/docs/scenihr\\_o\\_003b.pdf](http://ec.europa.eu/health/ph_risk/committees/04_scenihr/docs/scenihr_o_003b.pdf)

## **POLLUTION ISSUES**

### **New Predictions for the Atmosphere by 2030**

*Military Implications:*

Since these scenarios help identify and understand gaps in current legislation, they may also become the basis for new international regulations and technological applications affecting the military.

*Source:*

New Predictions for the Global Atmospheric Environment by 2030

<http://ec.europa.eu/environment/integration/newsalert/pdf/37na4.pdf>

### **Greenhouse Gas on the Rise**

*Military Implications:*

There is compelling evidence of the consequences of anthropogenic climate change, and a growing world demand for action. The military should continue to accelerate efforts to reduce

their own greenhouse gas emissions. New international environmental security-related policies and cooperation to avoid potentially large-scale disasters and conflicts seem inevitable.

*Sources:*

Scientists find new global warming threat from melting permafrost

[http://www.usatoday.com/tech/science/discoveries/2006-09-06-permafrost-warming\\_x.htm?POE=TECISVA](http://www.usatoday.com/tech/science/discoveries/2006-09-06-permafrost-warming_x.htm?POE=TECISVA)

Diary: Siberia and climate change

<http://news.bbc.co.uk/2/hi/science/nature/5323964.stm>

Science tempers fears on climate change

<http://www.theaustralian.news.com.au/story/0,20867,20332352-601,00.html> (article available free for a limited time)

### **Polluted Skies and Global Warming Puzzle Decoded**

*Military Implications:*

This new discovery might increase attention to different pollutants, and consequently change or trigger new regulations globally or by region, pending on weather patterns. Also, since weather conditions (floods, drought, and related consequences) are increasingly incorporated in human security strategies, the new findings might be useful to military activities relying on rain patterns.

*Sources:*

Polluted Skies and Global Warming Puzzle Decoded

<http://www.ens-newswire.com/ens/jul2006/2006-07-14-01.asp>

Air Pollution's Color Determines Its Effect On Clouds

<http://www.jyi.org/news/nb.php?id=745>

### **European New Web-based Air Pollution Monitoring System**

*Military Implications:*

Considering the increased role of citizens in shaping Europe's regulations, it is reasonable to speculate that such Web-based information accompanied by health implications related to air pollution might trigger requests for even more stringent regulations on pollutants across Europe. The impacts of military bases could be made more evident and objective with such a system than has been true in the past.

*Sources:*

New web-based air pollution monitoring system

<http://org.eea.europa.eu/documents/newsreleases/Ozone2006-en>

The Ozone Web

<http://www.eea.europa.eu/maps/ozone/welcome>

### **Ozone Hole Worst Ever Recorded**

#### **Mission to Study Arctic Environmental Changes**

*Military Implications:*

There is compelling evidence of the consequences of anthropogenic climate change, and a growing world demand for action. The military should continue to accelerate efforts to reduce their own greenhouse gas emissions. New international environmental security-related policies and cooperation to avoid potentially large-scale disasters and conflicts seem inevitable.

*Sources:*

Antarctic ozone hole is worst ever recorded, UN reports  
<http://www.un.org/apps/news/story.asp?NewsID=20108&Cr=Ozone&Cr1=>  
Record ozone loss during 2006 over South Pole  
[http://www.esa.int/esaCP/SEMQBOKKKSE\\_index\\_0.html](http://www.esa.int/esaCP/SEMQBOKKKSE_index_0.html)  
Ozone Depletion Crisis Not Yet Over  
<http://www.ens-newswire.com/ens/oct2006/2006-10-27-08.asp>  
UNEP Ozone Secretariat  
[http://ozone.unep.org/Treaties\\_and\\_Ratification/index.asp](http://ozone.unep.org/Treaties_and_Ratification/index.asp)  
Swiss Map Permafrost After Signs Alps Crumbling  
<http://www.planetark.com/dailynewsstory.cfm/newsid/37442/story.htm>  
Global Warming Puts 12 US Parks at Risk – Report  
<http://www.planetark.com/dailynewsstory.cfm/newsid/37391/story.htm>

### **Burning Fossil Fuels Acidifies Oceans, Erodes Coral Reefs**

*Military Implications:*

Citing the Army’s “Strategy for the Environment,” the military should seek new opportunities to participate in dialogues among scientists, politicians, environmental NGOs, and economic decision-makers for improving biodiversity management strategies, as well as in planning its own operations.

*Sources:*

Report Warns about Carbon Dioxide Threats to Marine Life  
<http://www.ucar.edu/news/releases/2006/acidification.shtml>  
UN supports two-year expedition probing Arctic climate change  
<http://www.un.org/apps/news/story.asp?NewsID=19156&Cr=UNEP&Cr1=>

### **Accelerating Environmental Health Crises in China**

*Military Implications:*

Since future environmental migrations could lead to internal conflicts, and since China is about 20% of the world, alternative forecasts and plans for how to address potential instabilities in China should be explored. In the meantime, China is increasing pressure (as previously cited in these monthly reports) on its military to take the environment into account in all its activities. Hence, there are opportunities for military-to-military cooperation with the China Environmental Health Project (partially supported by the U.S. Agency for International Development) to encourage research and training projects focused on finding solutions to safe drinking water and reducing pollution in China.

*Sources:*

A Troubled River Mirrors China’s Path to Modernity. New York Times, November 19, 2006  
<http://www.nytimes.com/2006/11/19/world/asia/19yellowriver.html?ex=1321592400&en=8c861ff8995a67dd&ei=5088&partner=rssnyt&emc=rss>  
Environmental Health Crises in Southwest China (WWIC conference video archived)  
[http://www.wilsoncenter.org/index.cfm?fuseaction=events.event\\_summary&event\\_id=206921#](http://www.wilsoncenter.org/index.cfm?fuseaction=events.event_summary&event_id=206921#)  
China to Pass U.S. in 2009 in Emissions  
[http://www.stopglobalwarming.org/sgw\\_read.asp?id=4393611102006](http://www.stopglobalwarming.org/sgw_read.asp?id=4393611102006)  
Beijingers told to stay indoors as smog hangs, China Daily (November 20, 2006)

[http://www.chinadaily.com.cn/china/2006-11/20/content\\_738054.htm](http://www.chinadaily.com.cn/china/2006-11/20/content_738054.htm)

World Energy Outlook 2006, International Energy Agency

<http://www.iea.org/w/bookshop/add.aspx?id=279>

## CLIMATE CHANGE

Extreme Weather Conditions Increasing

Increasing Risk of Natural Disasters

Melting Rates Are Increasing

*Military Implications:*

Extreme weather conditions, threats to food supply, and loss of livelihood (mostly in highly populated regions such as India and China) might increase unrest and threaten global stability. The U.S. Army Corps of Engineers—having the logistics and know-how—should consider worldwide collaboration with counterparts and international organizations (e.g. the UNU Institute for Environment and Human Security in Bonn) to determine priorities on which communities need what kind of help from a network of state and international agencies. Also, the issue of environmental refugees should be tackled swiftly to avoid conflicts that this rising segment of world population might cause.

*Sources:*

Global Warming May Explain India's Extreme Storm Rise -- (AFP -- November 30, 2006)

[http://www.terraily.com/reports/Global\\_Warming\\_May\\_Expose\\_India\\_Extreme\\_Storm\\_Rise\\_999.html](http://www.terraily.com/reports/Global_Warming_May_Expose_India_Extreme_Storm_Rise_999.html)

WMO Statement on the Status of the global Climate in 2006

[http://www.wmo.ch/web/Press/PR\\_768\\_English.doc](http://www.wmo.ch/web/Press/PR_768_English.doc)

Europe's warmest autumn in 500 years

<http://www.bioedonline.org/news/news.cfm?art=2978>

Australia ponders climate future

<http://news.bbc.co.uk/2/hi/science/nature/6204141.stm>

Satellites weigh Africa's water

<http://news.bbc.co.uk/2/hi/science/nature/6174689.stm>

Climate Change Melts Kilimanjaro's Snows

<http://www.washingtonpost.com/wp-dyn/content/article/2006/12/16/AR2006121600431.html>

Tibet: Disappearing Glaciers Threaten China, UN Says

<http://www.unpo.org/article.php?id=5838>

Tibet's Disappearing Glaciers Threaten China -- (Bloomberg -- November 14, 2006)

[http://www.bloomberg.com/apps/news?pid=20601086&sid=as.VsLN0AqhA&refer=latin\\_america](http://www.bloomberg.com/apps/news?pid=20601086&sid=as.VsLN0AqhA&refer=latin_america)

Ministry of Science and Technology's Web site [www.most.gov.cn](http://www.most.gov.cn)

World 'warmest for 12,000 years'

<http://news.bbc.co.uk/2/hi/science/nature/5381456.stm>

Global temperature change

<http://www.pnas.org/cgi/content/full/103/39/14288>

Human Activities Are Boosting Ocean Temperatures in Areas Where Hurricanes Form, New Study Finds

<http://www.ucar.edu/news/releases/2006/oceantemps.shtml>

Study Strengthens Link Between Global Warming, Fiercer Storms

<http://www.ens-newswire.com/ens/sep2006/2006-09-12-02.asp>

Deep ice tells long climate story

<http://news.bbc.co.uk/2/hi/science/nature/5314592.stm>

Overview of current sea ice conditions

[http://nsidc.org/news/press/2006\\_seaiceminimum/20060816\\_arcticseaicenews.html](http://nsidc.org/news/press/2006_seaiceminimum/20060816_arcticseaicenews.html)

Melting Greenland Ice Sheet Spells More Bad News On Climate Change

[http://www.terraily.com/reports/Melting\\_Greenland\\_Ice\\_Sheet\\_Spells\\_More\\_Bad\\_News\\_On\\_Climate\\_Change\\_999.html](http://www.terraily.com/reports/Melting_Greenland_Ice_Sheet_Spells_More_Bad_News_On_Climate_Change_999.html)

Melting glaciers in southeast Alaska have scientists worried

[http://www.mailtribune.com/archive/2006/0922/life/stories/melting\\_glaciers.htm](http://www.mailtribune.com/archive/2006/0922/life/stories/melting_glaciers.htm)

Arctic summer ice anomaly shocks scientists

[http://www.esa.int/esaEO/SEM7ZF8LURE\\_index\\_0.html](http://www.esa.int/esaEO/SEM7ZF8LURE_index_0.html)

New Evidence Shows Antarctica Has Warmed In Last 150 Years

[http://www.terraily.com/reports/New\\_Evidence\\_Shows\\_Antarctica\\_Has\\_Warmed\\_In\\_Last\\_150\\_Years\\_999.html](http://www.terraily.com/reports/New_Evidence_Shows_Antarctica_Has_Warmed_In_Last_150_Years_999.html)

Climate 'time bomb' forecast

[http://www.boston.com/news/nation/articles/2006/09/07/climate\\_time\\_bomb\\_forecast/](http://www.boston.com/news/nation/articles/2006/09/07/climate_time_bomb_forecast/) (article available free for a limited time)

Scientists find new global warming threat from melting permafrost

[http://www.usatoday.com/tech/science/discoveries/2006-09-06-permafrost-warming\\_x.htm?POE=TECISVA](http://www.usatoday.com/tech/science/discoveries/2006-09-06-permafrost-warming_x.htm?POE=TECISVA)

Diary: Siberia and climate change

<http://news.bbc.co.uk/2/hi/science/nature/5323964.stm>

Science tempers fears on climate change

<http://www.theaustralian.news.com.au/story/0,20867,20332352-601,00.html> (article available free for a limited time)

More fires, droughts and floods predicted

<http://www.bristol.ac.uk/news/2006/1053.html>

A climate-change risk analysis for world ecosystems

<http://www.pnas.org/cgi/content/abstract/0601816103v1?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=Marko+Scholze&searchid=1&FIRSTINDEX=0&resourcetype=HWCIT> (Abstract)

Disaster-Prone China Takes Heed of Global Warming

<http://www.planetark.com/dailynewsstory.cfm/newsid/37869/story.htm>

No Dice for Greenland Ice

<http://sciencenow.sciencemag.org/cgi/content/full/2006/810/3>

Greenland ice cap may be melting at triple speed

<http://www.newscientist.com/article/dn9717-greenland-ice-cap-may-be-melting-at-triple-speed.html>

(by subscription only; full text in the [Appendix](#))

Greenland Ice Sheet Is Melting Faster, Study Says

[http://news.nationalgeographic.com/news/2006/08/060810-greenland\\_2.html](http://news.nationalgeographic.com/news/2006/08/060810-greenland_2.html)

Greenland Ice Sheet Is Melting Faster, Study Says

<http://www.cosmosmagazine.com/node/539>

Alaska glacier melt rate a surprise

[http://www.agrnews.org/?section=archives&cat\\_id=39&article\\_id=1056](http://www.agrnews.org/?section=archives&cat_id=39&article_id=1056)

Once-icy Arctic now Great 'Wet' North

<http://www.canada.com/edmontonjournal/news/story.html?id=aa5d2a48-6a62-4bb0-a0fe-0d7ff4cedef3&k=86833>

Hydro-Quebec adjusts rates as air-conditioners appear in north

<http://www.canada.com/montrealgazette/news/story.html?id=1f9bf9a9-0872-4bb0-995c-557894a39854>

In Warmer World, Even Inuit Buy Air Conditioners

<http://www.planetark.com/dailynewsstory.cfm/newsid/37558/story.htm>

Climate change behind summer heat waves?

<http://msnbc.msn.com/id/13993578/>

Earth from Space: A cloudless UK

[http://www.esa.int/esaEO/SEMHAZ715QE\\_index\\_0.html](http://www.esa.int/esaEO/SEMHAZ715QE_index_0.html)

## **Climate Change Conference 2006**

### *Military Implications:*

[Similar to previous on the same issue] There is compelling evidence of the consequences of anthropogenic climate change, and a growing world demand for action. The military should continue to accelerate efforts to reduce their own greenhouse gas emissions. New international environmental security-related policies and cooperation to avoid potentially large-scale disasters and conflicts seem inevitable.

### *Sources:*

Scientists Say Millions Could Flee Rising Seas

<http://www.planetark.org/dailynewsstory.cfm?newsid=38918&newsdate=10-Nov-2006>

Ice-melt isolates remote communities in Canada

<http://www.sciam.com/article.cfm?chanID=sa003&articleID=5E80048377635F2A67E0E5BE24012F09>

Carbon emissions rising faster than ever

<http://www.newscientist.com/article/dn10507-carbon-emissions-rising-faster-than-ever.html>

Global Carbon Project

<http://www.globalcarbonproject.org/>

2,4 degrees Celsius: the North Sea is heating up (original:2,4 degrés : la mer du Nord se réchauffe)

<http://www.lemonde.fr/web/article/0,1-0@2-3228,36-834748@51-816848,0.html> (French)

Diseases appear on rise with temperature

<http://www.physorg.com/news82749082.html>

New forms of insurance against ravages of climate change needed in poor nations – UN

<http://www.un.org/apps/news/story.asp?NewsID=20594&Cr=climate&Cr1=>

## **NEW ORGANIZATIONS WITH MANDATES WITH EVENTUAL ES IMPLICATIONS**

### **Global Facility for Disaster Reduction and Recovery to Mitigate Impact of Natural Disasters**

#### *Military Implications*

This new entity provides one more point of coordination and information sharing for military disaster support planners.

#### *Sources:*

World Bank-ISDR partnership to promote resilience of nations and communities to disasters  
<http://www.unisdr.org/eng/media-room/press-release/2006/pr-2006-10-WB-ISDR-partnership.pdf>

Global Facility for Disaster Reduction and Recovery  
<http://www.unisdr.org/news/CFDRR-WB.doc>

Global Facility for Disaster Reduction and Recovery  
<http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTURBANDEVELOPMENT/EXTDISMGMT/0,,contentMDK:21021166~menuPK:2848225~pagePK:210058~piPK:210062~theSitePK:341015,00.html>

Natural Disasters on the Rise, 2005 The Zenith Year  
<http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:21085895~pagePK:34370~piPK:34424~theSitePK:4607,00.html>

## **FAO Launched New Crisis Management Centre**

### **WHO-sponsored pandemic flu task force holds first meeting in Geneva**

#### *Military Implications:*

The military should continue collaboration with these centers to strengthen military-to-military assistance and training in fighting pandemics, to become more globally integrated and for assisting in planning and performing emergency actions, if needed.

#### *Sources:*

New Crisis Management Centre launched by FAO  
<http://www.fao.org/newsroom/en/news/2006/1000421/index.html>

WHO-sponsored pandemic flu task force holds first meeting in Geneva  
[http://www.iht.com/articles/ap/2006/09/26/europe/EU\\_MED\\_UN\\_Pandemic\\_Task\\_Force.php](http://www.iht.com/articles/ap/2006/09/26/europe/EU_MED_UN_Pandemic_Task_Force.php)

## **UN Creates Secretariat of the Global Bioenergy Partnership at FAO**

#### *Military Implications:*

Military personnel involved in biofuel R&D should seek appropriate liaison with the GBEP Secretariat to explore potentials for mutual collaboration, new equipment, and exchanging views and regulations regarding biofuels.

#### *Sources:*

UN Efforts to Promote New “Green” Fuels Move Ahead  
<http://www.un.org/apps/news/story.asp?NewsID=20002&Cr=FAO&Cr1=>

Global Bioenergy Partnership Secretariat up, running  
<http://www.fao.org/newsroom/en/news/2006/1000405/index.html>

Redesigning Crops to Harvest Fuel  
<http://www.nytimes.com/2006/09/08/business/08crop.html?ex=1159416000&en=b4b46ba4cfa7706&ei=5070> (by subscription only)

Global meltdown feared: UN report  
<http://www.canada.com/vancouver/features/energy/story.html?id=62464470-b75f-4b26-8360-f17b9a8e5249>

Energy review ignores climate change 'tipping point'  
<http://www.guardian.co.uk/science/story/0,,1864802,00.html>

## **‘3R’—Reduce, Reuse and Recycle New Environmental Think Tank for Asia**

### *Military Implications:*

Environmental security military personal with Asian regional responsibilities should liaise with this new think tank to share “best practices” and emerging environmental security issue information.

### *Source:*

Partnership Launched to Create '3R' Knowledge Hub in Bangkok

<http://unescap.org/unis/press/2006/aug/g33.asp>

## **NEW INITIATIVES AIMING TO INCREASE ECO-EFFICIENCY**

### **Switching to Green: A renewable energy guide for office and retail companies**

#### *Military Implications:*

The military should make this available to those with responsibilities for increasing the use of renewable energy sources and promoting the Army Strategy on the Environment.

#### *Source:*

Switching to Green: A renewable energy guide for office and retail companies

[http://www.wri.org/climate/pubs\\_description.cfm?pid=4250](http://www.wri.org/climate/pubs_description.cfm?pid=4250)