American Council for the UNU
Millennium Project
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WORLDWIDE EMERGING ENVIRONMENTAL ISSUES AFFECTING THE U.S. MILITARY

Contract No: DAAD19-02-D-0001/ Delivery Order 0456 with Battelle Columbus Operations for the U.S. Army Environmental Policy Institute

FEBRUARY 2008 REPORT

Note to Readers: Pages 1-14 comprise the summary and analysis of this report. Expanded details for some items are in the Appendix beginning on page 15.

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
FEB 2008		**00-00-2008 to 00-00-2008**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Worldwide Emerging Environmental Issues Affecting the U.S. Military. February 2008	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **The Millennium Project ,4421 Garrison Street, N.W. ,Washington,DC,20016-4055**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**20**	

Item 1. Environmental Ministers Advance Global Consensus at UNEP Forum

More than 100 environment ministers met in Monaco for the 10th Special Session of the Governing Council/Global Ministerial Environment Forum of the United Nations Environment Programme (UNEP) on February 20-22. The UNEP Medium-term Strategy 2010-2013 was adopted, which upgrades UNEP's ability to be more effective in addressing climate change, disasters and conflicts, ecosystem management, environmental governance, harmful substances and hazardous waste, and resource efficiency – sustainable consumption and production. The theme of the Special Session was "Globalization and the Environment—Mobilizing Finance for the Climate Challenge". Issues discussed included long-term predictable carbon prices, building public-private partnerships, regionally balanced distribution of funds, UNEP management to implement the Bali Strategic Plan, and better implementation of multi-lateral environmental agreements (see the Appendix for more information). [The ad hoc joint working group on the Basel, Stockholm and Rotterdam Conventions will hold its third meeting next month.]

Military Implications:
The military should respond to UNEP's increased focus on partnerships and linkages with other organizations by exploring alternative scenarios for a global alliance between UNEP and the world's national militaries to improve environmental security.

Sources:
New and Forward Looking Strategy for UNEP Authorized
http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=528&ArticleID=5752&l=en
10th Special Session of the Governing Council /Global Ministerial Environment Forum
http://www.unep.org/gc/gcss-x/
Final Report: Mid-Term Strategy for the Period 2010-2013
http://www.emwis.net/thematicdirs/news/PDF/MTS_Final_Draft

Item 2. Branson calls for War Room on Climate Change at the United Nations

During the special UN General Assembly session "Addressing Climate Change: The United Nations and the World at Work," Sir Richard Branson, chairman of the Virgin Group, offered a $25 million prize for technology to clean CO_2 from the atmosphere and challenged the world to help him create a war room to manage the attack on climate change. Although it would be independent of the UN, it would include the participation of the UN, corporations, governments, NGOs, and universities in its design, information systems, and management. Key themes of the General Assembly speeches were: 1) partnerships among UN, government, business, NGOs, and universities; 2) global alliances for action; 3) better UN coordination to address Climate Change; 4) rich nations pay for poorer nations' adaptations to meet climate change challenges (since the poorer countries contribute the least to greenhouse gases, but will suffer the most from global warming; hence, the richer nations should pay for the poorer nations adaptation measures); 5) need for a global long-term strategy; 6) shared but differential responsibilities among nations to address climate change; 7) technology transfer and issues of intellectual property rights; 8) early warning systems for adaptation; and 9) "it is too late to say later."

Military Implications:
The military should consider how it might participate in the creation of such a war room and its potential liaison protocols, and then contact Virgin Unite to determine appropriate modes of participation.

Sources:
Press Conference on General Assembly Climate Change Thematic Debate
http://www.un.org/News/briefings/docs/2008/080211_Climate_Change.doc.htm
'War room' to Battle Warming Proposed
http://www.msnbc.msn.com/id/23129533
Email traffic between Virgin Unite's CEO and J. Glenn (Millennium Project) who was a special guest of the President of the UN General Assembly during the Climate Change session.

Item 3. New Standards for Handling Robotic Environmental Equipment

ASTM International has released a new standard, ASTM E2592-07 - "Standard Practice for Evaluating Cache Packaged Weight and Volume of Robots for Urban Search and Rescue", that lays out specific ways to describe requirements for the storage, shipping and deployment of urban search and rescue robots. These recommendations apply equally well to the handling of robotic devices for environmental assessment and cleanup.

Military Implications:
Military personnel responsible for logistical planning for environmental services equipment and for managing emergency operations should familiarize themselves with the contents of this standard relating to the logistics attributes that would help field components integrate the devices into their operations.

Sources:
'Nitty-Gritty' but Vital Data Helps Field Rescue Robots
http://www.physorg.com/news121529153.html
Department of Homeland Security Urban Search and Rescue Robot Performance Standards
http://www.isd.mel.nist.gov/US&R_Robot_Standards

Item 4. Nigerian Government Resolves to Push Effective Environmental Enforcement

On the occasion of a visit from a UK Environment Agency team, the director-general of the Nigerian National Environmental Standards and Regulations Enforcement Agency (NESREA) stated the government's increased commitment to ensure a cleaner and healthier environment for Nigerians through effective enforcement of environmental laws.

Military Implications:
Appropriate personnel from AFRICOM should contact NESREA to explore potential military-to-military assistance in environmental security. This could also be a potential area for US-China military cooperation, due to China's increasing role in Nigeria.

Source:
'FG to ensure healthy environment'
http://www.thetidenews.com/article.aspx?qrDate=02/13/2008&qrTitle=%E2%80%98FG%20to%20ensure%20healthy%20environment%E2%80%99&qrColumn=ENVIRONMENT

Item 5. New Environmentally Friendly City in UAE Offers Cooperation Opportunity

A new mini-municipality, Masdar City, being built adjacent to Abu Dhabi, is intended as a hub for academic and corporate research on nonpolluting energy technologies, according to an article in the International Herald Tribune. The walled city of 2.3 square miles will be car-free and produce all its own energy from sunlight.

Military Implications:
CENTCOM personnel should consider contacting UAE authorities to explore how environmental security issues could be included in research and training programs at the Masdar Institute, an MIT-affiliated graduate-level academic research center that will be the first phase of the project to be completed.

Source:
Car-free, solar city in Gulf could set a new standard for green design
http://www.iht.com/articles/2008/02/05/healthscience/05city.php

Item 6. Technological Advances with Environmental Security Implications

6.1 Future Proliferation of Autonomous Ground and Air Robot Weapons

Although today's robotic weapon systems include humans in decisionmaking, future autonomous systems may be developed by major military powers to act without human intervention. This technology could be relatively easy to build and at relatively low costs, making proliferation possible. One robotics expert has called on national governments and the international community to assess these risks and seek controls before they become more commonly available.

Military implications:
The distinctions between future systems of nanosensors to detect chemical, biological, and radiological presence and future support for ground and air robotic weapons could become blurred. Since it is likely that one day there will be an international agreement governing the use of robot weapons, the military should develop language to distinguish between defensive early warning or detection systems vs. offensive robot weapons and their support systems.

Sources:
Killer Military Robots Pose Latest Threat To Humanity, Robotics Expert Warns
http://www.sciencedaily.com/releases/2008/02/080226213451.htm
Robot wars 'will be a reality within 10 years'
http://www.telegraph.co.uk/earth/main.jhtml?xml=/earth/2008/02/27/scirobots127.xml

6.2 New Detection and Cleanup Technologies

6.2.1 Water Purification Techniques

Researchers at the University of Nottingham have developed a technique that uses bacteria to consume contaminants that build up on the membranes used in some water purification systems. This allows the filters to be cleaned within the closed system, without removing the membranes. In another advance, researchers at the University of South Australia have developed a low cost, efficient technique for removing organic material from water. It involves the use of silica particles coated with a nanometer-thin layer of active material based on a hydrocarbon with a silicon-containing anchor. The coated particles are stirred in the contaminated water for up to an hour and the powder is then filtered out.

Military Implications:

The military should investigate the usefulness of these advances for providing clean water for conflict, post-conflict, and humanitarian disaster environments.

Sources:

Bacteria and nanofilters — the future of clean water technology
http://research.nottingham.ac.uk/NewsReviews/newsDisplay.aspx?id=444
Cleaner water through nanotechnology
http://www.physorg.com/news122733688.html

6.2.2 Chemical Tests on Cells Rather than Animals

The U.S. Environmental Protection Agency, the NIH Chemical Genomics Center, and the National Institute of Environmental Health Sciences have announced collaboration to change how chemicals are tested for risks they pose to humans. The agencies will research and implement a new approach that will move away from traditional animal testing and toward tests that use cells. The approach is explained in the National Research Council's 2007 report *Toxicity Testing in the 21st Century: A Vision and a Strategy*.

Military Implications:

The military should explore the usefulness of this work in the development of biosensors for environmental analysis and participate in the development of these new approaches with the civilian scientific agencies.

Sources:

Agencies to Change How Chemicals are Tested for Safety
http://nationalacademies.org/headlines/20080219.html
NIH Collaborates with EPA to Improve the Safety Testing of Chemicals
http://www.nih.gov/news/health/feb2008/nhgri-14.htm
Toxicity Testing in the 21st Century: A Vision and a Strategy
http://www.nap.edu/catalog.php?record_id=11970

6.3. New Technique Might Power Nano-based Environmental Devices

Researchers at the Georgia Institute of Technology have developed a microfibre–nanowire hybrid structure for energy scavenging. According to the abstract, "Solar, thermal and mechanical (wind, friction, body movement) energies are common and may be scavenged from the environment", and the Editor's Summary describes their work as "a system that converts low-frequency vibration/friction energy into electricity using piezoelectric zinc oxide nanowires grown radially

around textile fibres. By entangling two fibres and brushing their associated nanowires together, mechanical energy is converted into electricity via a coupled piezoelectric-semiconductor process. This work shows a potential method for creating fabrics which scavenge energy from light winds and body movement."

Military Implications:
Although this work is at an early stage, the military should follow its further development as it might apply to power sources for nanotechnology-based environmental surveillance devices and augmenting electrical requirements on uniforms and portable equipment.

Source:
Microfibre–nanowire hybrid structure for energy scavenging
http://www.nature.com/nature/journal/v451/n7180/abs/nature06601.html

Item 7. Updates on Previously Identified Issues

7.1 Methyl Bromide a Continuing International Concern

The Green Party in New Zealand is calling for an immediate halt to methyl bromide fumigation at Wellington's port, after it was learned that the ozone-destroying chemical, regulated under the Montreal Protocol, was being used in the heart of the city. This action, together with the coming into force in January of Indonesia's ban on its import, is likely to increase international attention to the hazards it presents and support for adherence to the Protocol. [See also *Call for Expanding Montreal Protocol on Ozone-Depleting Substances* in September 2007, and other similar items on this issue in previous environmental security reports.]

Military Implications:
The military should review its and its contractors' worldwide usage of methyl bromide to ensure compliance with existing restrictions, and be prepared for further regulatory actions.

Sources:
Hazardous fumigation must be halted – Greens
http://www.scoop.co.nz/stories/PA0802/S00065.htm
Montreal Protocol: http://www.unido.org/doc/50444

7.2 Stockholm Convention on Persistent Organic Pollutants Is Succeeding in Europe

A recent study has evaluated the effectiveness of the Convention on Long-range Transboundary Air Pollution (LRTAP) in the UN Economic Commission for Europe countries, excluding Canada and the US. The research revealed that many persistent organic pollutants (POPs) decreased considerably and will continue to decrease as the LRTAP POP protocol is becoming fully implemented by all countries. These results are significant for the global Stockholm Convention on Persistent Organic Pollutants and for developing a global monitoring plan for POPs. The study also included preliminary assessments for eight "candidate" POPs (Hexachlorobutadiene (HBU); Pentabromodiphenyl ether (PBDE); Pentachlorobenzene (PCBe); Polychlorinated naftalenes (PCN); Pentachlorophenol (PCP); Endosulfan, Dicofol; and short chain chlorinated paraffins (SCCPs)) which could be added to the POP list in the future. [See also *Stockholm Convention on POPs Adopts Evaluation but not Non-compliance Mechanisms* in May 2007, *New Chemicals*

Proposed to be Added to Stockholm Convention on POPs in 2005, and other related items in previous environmental security scanning reports.]

Military Implications
This study gives good insights for improving the monitoring system of POPs. Although the U.S. did not ratify the Stockholm Convention, it should be prepared to comply with its requirements when acting in countries Party. Thus, in addition to the preparation for phase-out of the POPs banned, it should consider the military implications of those proposed for addition to Convention coverage.

Source:
Evaluating emission protocols for persistent organic pollutants
http://ec.europa.eu/environment/integration/research/newsalert/pdf/95na6.pdf

7.3 France Bans 30 Pesticide Components

As of February 2008, France banned the sale of 1,500 pesticides containing any of 30 chemicals deemed hazardous, planning to gradually phase out a total of 53 phytosanitary substances.

Military Implications:
The military should review its usage of any materials containing the 53 designated chemicals to ensure that it appropriately complies with this and is prepared for possible similar future bans wherever U.S. Forces are stationed or materiel is sold in nations that follow the French lead in such matters.

Sources:
France scraps licenses for 1,500 pesticides
http://www.enn.com/top_stories/article/30282
French Pesticide Ban Hits Major Listed Firms
http://www.planetark.org/dailynewsstory.cfm/newsid/46752/story.htm

7.4 New Marine Environment Protection Measures

7.4.1 Concerns over Maritime Air Pollution Increase

A new report by the International Maritime Organization reveals that emissions from shipping are rising rapidly; annual CO_2 emission from the world shipping industry reached 1.12 billion tonnes in 2007, representing about 4.5% of global CO_2 emission—three times higher than previously thought—and by 2020 is expected to rise by 30%, making shipping responsible for nearly 6% of global emissions. Sulphur dioxide emissions from ships now stand at 16.2m tonnes a year and are expected to increase by 40%, to 22.7m tonnes by 2020. Nevertheless, emissions from shipping are difficult to regulate by international treaties, due to the complexity of attributing them to individual states. The International Maritime Organization is now assessing regulation proposals and the Sub-Committee on Bulk Liquids and Gases submitted draft amendments to the International Convention for the Prevention of Pollution from Ships (MARPOL) Annex VI and amendments to the Emission of Nitrogen Oxides from Marine Diesel Engines Technical Code. If approved by the Marine Environment Protection Committee (which meets at the end of March) the amendments could enter into force in March 2010 (or on a date to be decided.) The EPA put forward to the IMO a proposal that vessels be required to switch to cleaner fuel or use clean-up technology to reduce toxic grit from emissions when they are closer to shore, and it hopes that it would be adopted as an

international regulation by 2011. EPA also plans to issue its own rules in 2009. Designing more efficient ships, reducing speed, and using higher quality fuel might be some of the easiest and fastest measures for reducing emissions.

Military Implications:
Although emissions from military ships make up only a tiny fraction of this polluting source, the Navy should be prepared for new international anti-pollution regulations that may not exempt military craft.

Sources:
BLG Sub-Committee agrees technical proposals for reduction of air pollution from ships
http://www.imo.org/Newsroom/mainframe.asp?topic_id=1709&doc_id=9015
Ship CO2 emissions at 3.5 pct of global total: IMO
http://www.planet2025news.net/ntext.rxml?id=6196&photo=
Pollution from ships big worry
http://www.charleston.net/news/2008/feb/23/pollution_from_ships_big_worry31612/
True scale of C0 emissions from shipping revealed
http://www.guardian.co.uk/environment/2008/feb/13/climatechange.pollution
Shipping boom fuels rising tide of global CO2 emissions
http://www.guardian.co.uk/environment/2008/feb/13/climatechange.pollution1?gusrc=rss&feed=uknews
Emissions concerns rise over ships' fuel
http://www.gloucestertimes.com/punews/local_story_031233139.html?keyword=topstory

7.4.2 Global Map of Human Impacts to Marine Ecosystems

The first-ever comprehensive atlas showing the impact of human activities on the planet's marine environment is now available online. The international team of scientists combined the impact data of 17 different activities—ranging from fishing and commercial shipping to pollution and climate change—for 20 different marine ecosystems. The database could be used to monitor further future modifications in the global marine environment. The map (see Appendix) reveals that while no ecosystem is completely unaffected, human activities had high impact on over 40% of the world's ocean-covered area. The biggest human impact seems to be in the North Sea, the South and East China Seas, the Caribbean, and North America's East Coast. Although the Arctic and the Antarctic areas are the least affected today, scientists are concerned that increased melting of the ice sheets will increase human activities into these areas.

Military Implications:
The new Atlas might add focus for increased action to protect marine environments. The military should increase its efforts to reduce its environmental footprint, and anticipate how it might be called upon to help enforce environmental agreements on international waters.

Sources:
A Global Map of Human Impact on Marine Ecosystems, *Science*, 15 February 2008
http://www.sciencemag.org/cgi/content/abstract/319/5865/948 (abstract)
A Global Map of Human Impacts to Marine Ecosystems
http://www.nceas.ucsb.edu/GlobalMarine

7.4.3 New Pacific Marine Protected Area Is World's Largest

Kiribati has established the Phoenix Islands Protected Area, covering 410,500 square kilometers in the central Pacific. A representative of the New England Aquarium, which is advising the Kiribati government, stated, "The new boundary includes extensive seamount and deep-sea habitat, tuna spawning grounds and as yet un-surveyed submerged reef systems."

Military Implications:

Naval authorities in the region should ensure that their operations conform to the restrictions imposed on this new Marine Protected Area.

Source:

Kiribati creates world's largest marine reserve
http://uk.reuters.com/article/idUKSP23110320080214?pageNumber=3&virtualBrandChannel=0&sp=true

7.5 Deforestation Not Yet Adequately Addressed by International Regulations

The UN Convention on Biological Diversity held a five-day meeting in Rome, Italy, to discuss how agricultural and forest biodiversity are affected by climate change. A focus was on mangrove: according to scientists, 20% of mangrove forests have been lost, and economic and environmental damages should be addressed. Mangroves' destruction could cause biodiversity loss in tropical areas, increase CO_2 emissions, and destroy people's livelihoods. There are no strategies yet to deal with the situation, although scientists warn that if not addressed now, in the next ten years the crisis could get out of control. Along the same lines, African forestry protection organizations and the Food and Agricultural Organization (FAO) held a meeting on specific climate change issues, discussing strategies to find the best compromise between humans' interests, food crops, deforestation, and wildlife. Environmental degradation and loss of livelihood due to deforestation are underlying and/or multiplier causes of conflict, mainly in already fragile states or conflict-torn regions.

Military Implications:

In addition to considering forest protection in its planning, military deployed in areas vulnerable to undesirable deforestation should work with the local communities to find strategies to avoid unsustainable practices and help capacity-building to increase sustainable development.

Sources:

Forests play key role against climate change, UN tells African-Near East meeting
http://www.un.org/apps/news/story.asp?NewsID=25665&Cr=climate&Cr1
UN: Mangrove Forests Vanishing at an "Alarming" Rate
http://www.ens-newswire.com/ens/feb2008/2008-02-03-01.asp
With Africa leading, UN says world fells trees at 'alarming' rate
http://canadianpress.google.com/article/ALeqM5gggsgsXc-FLgGsLpo3A2ZwqOAdvw

7.6 Climate Change

More details on the items are available in the Appendix. This is just a brief summary:

7.6.1 Food Shortages and Increasing Prices could lead to social instability

UN officials warn that the number of riots around the world is likely to increase as the number of people at risk of malnutrition increases due to the surge of world commodity prices.

Using computer models, analysts assessed how the 12 most food-vulnerable areas are likely to be affected by climate change in the next 20 years. Findings show that South Asia and southern

Africa are the areas where, unless intense adaptation strategies are adopted, climate change could cause severe crop losses. The study also identified the likely effects by crop, thereby providing important information for building a comprehensive adaptation approach.

Food's Failed Estates = Paris's Hot Cuisine; Food Sovereignty – à la Cartel? by ETC Group warns that the world's number of hungry people could rise by 50% by 2025.

Lack of fresh water threatens the west of North America as snowpack across the mountain ranges is shrinking. South Africa already uses 98% of available water resources and it could run out of water by 2025.

7.6.2 Melting Glaciers and Sea Ice

Permafrost in Siberia is thawing at an alarming pace, causing the expansion of lakes and marshes, which in some areas were about 3.5 times larger in 2007 than in 2000. The annual average ground temperatures at the depth of 1.2 meters from the surface rose gradually from minus 2.4°C in the period from 1998–2004 to minus 0.4°C in 2006.

If present trends continue, ice discharge from parts of West Antarctica could lead to a 1.5m rise in global sea level.

7.6.3 Climate Modeling

The World Meteorological Organization (WMO) urged scientists to improve climate predictions that would help adaptation to climate change, and could help save lives.

A study by some of the most respected climate policy researchers revealed that there is no time for postponing the cutting of CO_2 emissions, and the delay limit is much closer then expected—maximum 10–20 years.

7.6.4 Post-Kyoto Negotiations

The GLOBE forum, organized prior to the July G8 summit, discussed a draft post-Kyoto Protocol treaty plus strategies to help developing nations improve practices for reducing emissions.

Japan is considering strengthening national regulations, such as introducing compulsory caps on greenhouse gas emissions and a domestic emissions trading scheme for the companies that resist reducing emissions. It is also expected to make tougher commitments in the post-Kyoto Protocol phase.

UN Secretary-General Ban Ki-moon's message to the UNEP Global Ministerial Environment Forum called for a "decisive and deep regime for emissions reductions after 2012" and for the development of "financial incentives and mechanisms so markets can respond to the opportunities of a rising carbon price" under the guidance of the Bali road map.

Military Implications:

[Same as previous on similar issues] Increasingly more compelling evidence and warnings on climate change amplify international discourse and increase the emergence of international policies trying to tackle the causes and develop strategies to mitigate climate change effects. Hence, the military should be doing its part in reducing greenhouse gas emissions and preparing to help mitigate the human-made and natural catastrophes that could ensue.

Sources: (see a more expanded list in the Appendix)

The World's Growing Food-Price Crisis
http://www.time.com/time/world/article/0,8599,1717572,00.html
Climate 'could devastate crops'
http://news.bbc.co.uk/2/hi/science/nature/7220807.stm

Food's Failed Estates = Paris's Hot Cuisine; Food Sovereignty – à la Cartel?
http://www.etcgroup.org/en/materials/publications.html?pub_id=673
Human-Induced Changes in the Hydrology of the Western United States. *Science*, Jan 31, 2008
http://www.sciencemag.org/cgi/content/abstract/1152538
'SA's water could run out by 2025'
http://www.int.iol.co.za/index.php?set_id=1&click_id=14&art_id=vn20080214113314841C685433
Asia: Global warming thaws permafrost in Siberia
http://www.asahi.com/english/Herald-asahi/TKY200802140059.html
Ice cores show faster global warming
http://www.upi.com/NewsTrack/Science/2008/02/01/ice_cores_show_faster_global_warming/7287/
UN-backed meeting urges governments, scientists to bolster climate predictions
http://www.un.org/apps/news/story.asp?NewsID=25528&Cr=climate&Cr1=change
No time to lose in cutting CO2 emissions. *New Scientist*, 27 February 2008
http://environment.newscientist.com/channel/earth/climate-change/mg19726454.500-no-time-to-lose-in-cutting-cosub2sub-emissions.html (by subscription only; full text in the Appendix)
Brazil calls on G8 to meet Kyoto Protocol goals
http://www.terradaily.com/2007/080221223113.rumu8gc4.html
Japan Considers Emissions Cap And Trade System
http://www.planetark.com/dailynewsstory.cfm/newsid/47080/story.htm
Secretary-General says environment ministers can offer 'new generation of solutions' in message to Monte Carlo global forum
http://www.un.org/News/Press/docs/2008/sgsm11434.doc.htm

7.7 Nanotechnology Safety Issues

Some recent noteworthy nanotechnology safety activities are:

The European Commission has adopted a Code of Conduct for Responsible Nanosciences and Nanotechnologies Research, and is recommending to the Member States the adoption of the Code to govern research in this field. The Code is based on seven principles such as sustainability (non-threatening to the present or future environment) and accountability, and provides guidelines for their implementation.

European Commission grants $587,000 to London School of Economics researchers to conduct an international research project on regulating nanotechnologies in the European Union and the United States.

Technology Roadmap for Productive Nanosystems by Foresight Nanotech Institute and Battelle, according to the announcement, "… is a first attempt to map out the R&D pathways across multiple disciplines to achieve atomically precise manufacturing." It provides a detailed technical background for consideration of the environmental problems that might arise during these processes.

Strategy for Nanotechnology-Related Environmental, Health, and Safety Research published February 2008 by the National Science and Technology Council describes the National Nanotechnology Initiative's (NNI) strategy for addressing priority research on the environmental, health, and safety (EHS) aspects of nanomaterials. The report assigns priorities to research and information needs that were identified in the NSET Subcommittee document Environmental,

Health, and Safety Research Needs for Engineered Nanoscale Materials, published on September 21, 2006.

Risks of nanotechnology remain uncertain published in the American Chemical Society's Environmental Science & Technology Online is a comprehensive overview of the current state of nanotechnology risk assessment, emphasizing the paucity of solid scientific results in that important field and giving useful examples and references.

Military Implications:
Military personnel concerned with nanotech issues should contribute their views to these activities. Also, relevant military personnel should review the information generated by such activities to improve military and contractor practices, as well as to assist and cooperate with the organizations working on those issues for enriching their studies.

Sources:
European Commission adopts Code of Conduct for Responsible Nanosciences and Nanotechnologies Research
http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/193&format=HTML&aged=0&language=EN&guiLanguage=en
European Commission gives grant to investigate transatlantic oversight of nanotechnology
http://www.nanowerk.com/news/newsid=4410.php
Regulating Nanotechnologies in the EU and US. Towards Effectiveness and Convergence
http://www.lse.ac.uk/nanoregulation
EU nanotechnology R&D in the field of health and environmental impact of nanoparticles provides summary information on each of 106 projects, 14 of them from the EU's Framework Programme and the other 92 from the EU Member States, together representing a total of some €79 million in grants.
EU nanotechnology R&D in the field of health and environmental impact of nanoparticles
ftp://ftp.cordis.europa.eu/pub/nanotechnology/docs/final-version.pdf
Technology Roadmap for Productive Nanosystems
http://foresight.org/roadmaps/
From Here to There: Nanotechnology Roadmap
http://www.foresight.org/cms/press_center/282
Strategy for Nanotechnology-Related Environmental, Health, and Safety Research
http://www.nano.gov/NNI_EHS_Research_Strategy.pdf
Strategy for nanotechnology-related environmental, health and safety research
http://www.physorg.com/news122212014.html
Risks of nanotechnology remain uncertain
http://pubs.acs.org/subscribe/journals/esthag-w/2008/feb/science/nl_nanorisks.html

Item 8. Reports Suggested for Review

8.1 UNEP's Year Book 2008

UNEP's Year Book 2008 highlights the impacts of global warming (from the melting of permafrost and glaciers to extreme weather events), also showing the changes in policies and actions of leaders of governments, companies, and the UN itself in addressing issues related to climate change. It shows that business begins to see climate change as an opportunity rather than a

burden, as a growing numbers of companies embrace environmental policies and investments in clean technology and renewable energies are increasing.

Military Implications:
As one of the most authoritative reports on environmental issues, it provides indications of UN priorities and eventual possible international regulations.

Sources:
UNEP Year Book 2008
http://www.unep.org/geo/yearbook/yb2008/
Climate Change Resulting in Shift to 'Green' Economies, Says UN Agency
http://www.un.org/apps/news/story.asp?NewsID=25681&Cr=climate&Cr1=change
Breaking Down the Barriers to a Green Economy
http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=528&ArticleID=5748&l=en

8.2 North American Environmental Atlas Online

The Commission for Environmental Cooperation (CEC) launched the online *North American Environmental Atlas,* http://www.cec.org/naatlas, which allows visualizing significant North American environmental issues at a continental scale. It features the terrestrial ecological regions of North America and interactive thematic maps such as priority conservation areas, renewable energy capacity, and population, as well as links to data and related sources. The Atlas is in continuous development with new features and information to be added in the coming months, and suggestions for making the Atlas the most useful possible are welcome.

Military Implications:
The *North American Environmental Atlas* offers a one-stop shop for the most important environmental issues, including protected areas (continuing to be developed), therefore being a useful reference tool for military planning activities.

Source:
Mapping North American Environmental Issues
http://www.cec.org/naatlas/

8.3 New Report on Dangers of Radiation Sources

According to announcements, the US National Research Council has released a report, *Radiation Source Use And Replacement*, that "examines the use of high-risk radioactive materials [e.g. cesium chloride] found in medical and research equipment that could be accidentally dispersed or utilized to make a dirty bomb in a terrorist attack." It also "identifies lower-risk alternatives that would not change the performance of the devices, and recommends options to remove and replace the high-risk sources." The National Research Council recommends that U.S. research and medical facilities reduce their use of devices containing cesium chloride and urged U.S. officials to "stop licensing the cesium chlorine irradiators, halt their import and export and promote decommissioning of existing machines." [See also Millennium Project's January 2003 report on this issue: *Commercial radioactive components recognized as "dirty bomb" hazard*.]

Military Implications:
Civilian-military cooperation should continue to improve methods of preventing abuse of these materials.

Sources:
Radiation Source Use and Replacement. National research Council (Prepublication copy)
http://books.nap.edu/openbook.php?record_id=11976&page=R1
Radioactive Cesium Chloride Should Be Replaced in Medical Equipment
http://nationalacademies.org/morenews/20080220a.html
U.S. urged to curb use of "dirty bomb" ingredient
http://www.reuters.com/article/topNews/idUSN2036258220080220
Government Should Spur Replacement Of Radioactive Cesium Chloride In Medical And Research Equipment; Alternatives Could Lower Potential For Theft And Misuse
http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=11976

8.4 State of Green Business 2008

The State of Green Business report provides an example of a set of evaluations of environmental accomplishments. It takes stock of green business activities in the United States, and features the debut of the GreenBiz Index, a set of 20 indicators of green business progress that measures how efficiently companies are using resources, reducing toxics, purchasing green fleet vehicles and renewable power, and reporting social and environmental performance. It also features ten key green business trends of 2007 as well as lists of books, websites, reports, business initiatives, and other resources of the past year.

Military Implications:
The report is a good reference for improving “green” practices.

Source:
Just published — State of Green Business 2008
http://stateofgreenbusiness.com

APPENDIX

Reference Details

This Appendix contains expanded background information on some items.

Item 1. Environmental Ministers Advance Global Consensus at UNEP Forum

[More details on the Forum's outcomes]

The 10th Special Session of the Governing Council/Global Ministerial Environment Forum of the United Nations Environment Programme took place in Monaco on February 20-22, under the theme "Globalization and the Environment—Mobilizing Finance for the Climate Challenge", gathering environment ministers and representatives of business, science, and civil society from around the world. The discussions and ministerial consultations focused on:

- policy issues and strategies for mobilizing finances to address climate challenges, with the main issues being related to: a coherent international framework for addressing climate change; long-term predictable carbon prices; building public-private partnerships; and a balanced distribution of funds by region and scope;
- strengthening international environmental governance and UN reform, mainly related to UNEP organizational aspects, and to improving the environmental international regulations system, by addressing synergies between existing multilateral environmental agreements in order to simplify understanding of the MEAs' implementation, and compliance monitoring. Although there is consensus on the need to strengthen international environmental governance (IEG), there is no agreement on how to do it. Views range from supporting a more powerful and coherent IEG (including an eventual UNEO) with reform negotiations starting at the General Assembly's 63rd session, to favoring the status quo with slight improvements. An interesting suggestion was made by Botswana, who noted that for an effective transboundary ecosystem management, neighboring countries should be parties to the same conventions. The US asked that the final report include language requesting that cooperation among MEAs should be subject to the approval of their governing bodies.

The Forum adopted decisions in five areas:

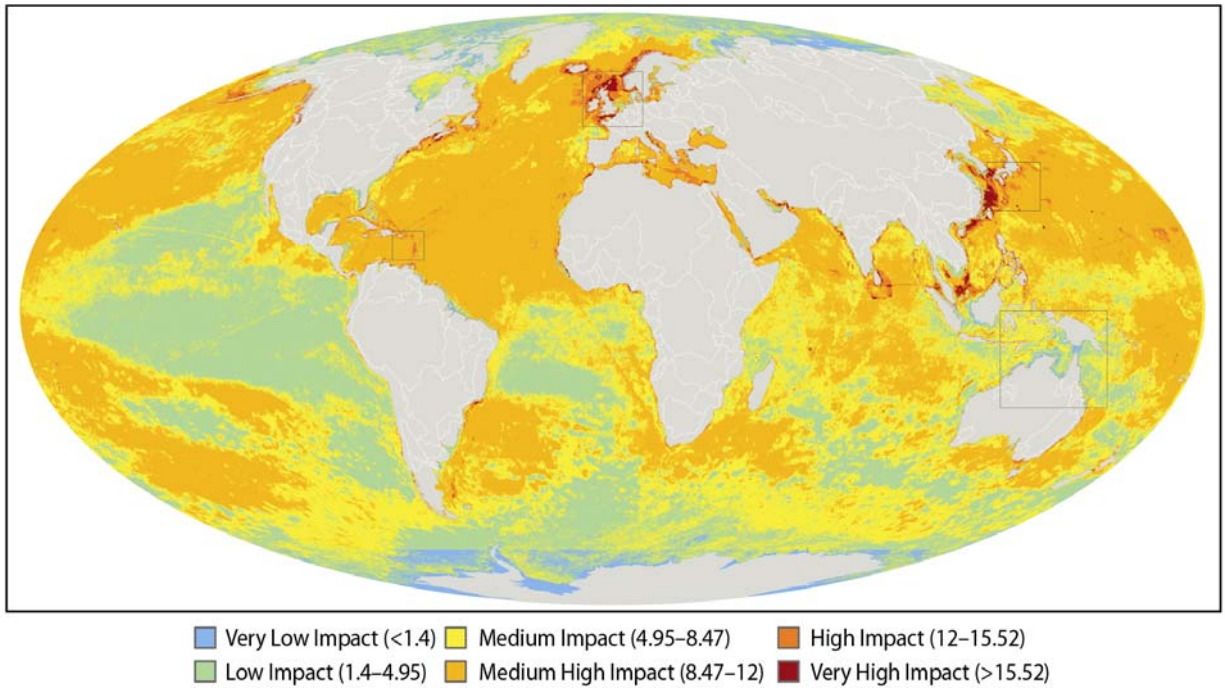
- the UNEP Medium-term Strategy 2010-2013—formulating the strategic frameworks and programs of work and budgets
- chemicals management, mainly concerning the implementation of the decisions related to reducing hazards from mercury, and improving waste management;
- improving the Global Environment Outlook (GEO), including the development of a global assessment of environmental change and its implications;
- inviting ECOSOC to declare 2010-2020 the International Decade for Addressing Climate Change;
- sustainable development of the Arctic region, mainly continuous environmental assessment (including increased international scientific collaboration) and addressing legal aspects.

At the Forum, UNEP also launched the Climate Neutral Network (CN Net) to assist nations and interested actors with reducing greenhouse as emissions (http://www.climateneutral.unep.org)

7.4 New Marine Environment Protection Measures

7.4.2 Global Map of Human Impacts to Marine Ecosystems

Global Map of Human Impacts to Marine Ecosystems



Source: http://www.nceas.ucsb.edu/GlobalMarine

7.6 Climate Change

A more detailed description of the items:

7.6.1 Food Shortages and Increasing Prices could lead to social instability

The number of riots is likely to rise around the world as the number of people at risk of malnutrition grows due to commodity prices' increase, warn UN officials. The WFP, which feeds 73 million people in 78 countries (representing less than 10% of world's total undernourished) noted that it will face serious difficulties this year in helping to mitigate malnutrition. Food prices rise rapidly, driven mainly by decrease of supply as harvests are reduced by climate change effects (drought, floods, and extreme weather conditions); increasing food demand from countries such as China and India; increasing demand by the biofuel industry; and soaring oil prices. Additionally, the governments of some important food-exporting countries tend to put restrictions on exports, in order to assure their own food security.

Using computer models, analysts assessed how the 12 most food-vulnerable areas are likely to be affected by climate change in the next 20 years. This included the regions where most of world's malnourished people live: much of Asia, sub-Saharan Africa, and the Caribbean and Central and South America. The findings reveal that South Asia and southern Africa are the areas

where climate change could cause severe crop losses, unless intense adaptation strategies are undertaken. The study also identified the likely effects by crop, therefore providing governments and aid agencies important information for building a comprehensive adaptation approach.

Food's Failed Estates = Paris's Hot Cuisine; Food Sovereignty – à la Cartel? by ETC Group analyzes food security prospects and policy failures and needs. It looks at all aspects that might drive food out of the reach of the marginalized, and warns that, without adequate action, the number of hungry people could increase by 50% by 2025.

The west of North America is seriously threatened by possible future lack of access to fresh water, as snowpack across the mountain ranges is shrinking, according to a computer analysis published in the journal *Science*. Using a complex system of factors' interplay, the results show that up to 60% of the climate change trends in the area are human-induced.

The World Wide Fund for Nature - South Africa (WWF-SA) is warning the country's government about a "looming water crisis for South Africa in the same way that it was warned a decade ago about the present energy crisis." The country already uses 98% of available water resources and it could run out of water by 2025.

7.6.2 Melting Glaciers and Sea Ice

The Japan Agency for Marine-Earth Science and Technology revealed that permafrost in Siberia is thawing at an alarming pace. In some areas the depth of the melted permafrost doubled compared to 2000. Thus the lakes and marshes expand, in some areas being about 3.5 times larger in 2007 than in 2000, consequently accelerating the melting process even more. The research also shows that the annual average ground temperatures at the depth of 1.2 meters from the surface rose gradually from minus 2.4°C in the period from 1998–2004 to minus 0.4°C in 2006. An additional negative result of permafrost melting is the release of high quantities of methane, further promoting global warming.

New research by climatologists from Bern University on ice cores from Greenland and Antarctica shows that Earth warmed faster in the 20th century than at any other time in the past 22 millennia, and concentrations of greenhouse gases are increasing at a faster rate.

UK scientists have found instability trends in the ice of part of West Antarctica, which could lead to a significant rise in global sea level. They warn that if the discharge of glacier ice into the sea continues, the Pine Island Glacier alone could raise global sea level by 25 cm and accelerate neighboring glaciers' discharge, which could raise the sea by 1.5m.

7.6.3 Climate Modeling

At a meeting held in Geneva, Switzerland, the World Meteorological Organization (WMO) urged scientists to improve climate predictions that would help adaptation to climate change. The session focused on improving the science of seasonal climate prediction to help save human lives. The three-day convention was a preamble for the World Climate Conference focusing on climate prediction and its impact for decision-making, scheduled to be held next year.

A study by some of the most respected climate policy researchers revealed that there is no time to postpone cutting CO_2 emissions. By quantifying the impact of every year of delay, they found that the more reduction action is delayed, the more difficult mitigation becomes, and at some point, it becomes too late and no mitigation action could help. The maxim limit delay is much closer then expected—a maximum of 10–20 years.

7.6.4 Post-Kyoto Negotiations

The two-day GLOBE forum (Global Legislators Organization for a Balanced Environment) was organized as a preamble to the G8 summit to be held in July. It was attended by about 100

lawmakers from the Group of Eight industrial countries (Britain, the United States, France, Germany, Italy, Russia, Canada and Japan) and fast-developing nations (China, Brazil, India, South Africa and Mexico). The main subjects were: discussing a draft post-Kyoto Protocol treaty, the need for G8 countries to intensify efforts to meet the Kyoto targets, and strategies to help developing nations improve practices for reducing emissions.

Japan is considering strengthening national regulations (such as introducing compulsory caps on greenhouse gas emissions and a domestic emissions trading scheme for the companies that resist reducing emissions). It is also expected to make tougher commitments in the post-Kyoto Protocol phase.

UN Secretary-General Ban Ki-moon's message to the UNEP Global Ministerial Environment Forum called for a "decisive and deep regime for emissions reductions after 2012" and for the development of "financial incentives and mechanisms so markets can respond to the opportunities of a rising carbon price" under the guidance of the Bali road map.

Sources: (a more expanded list)

Feed the world? We are fighting a losing battle, UN admits
http://www.guardian.co.uk/environment/2008/feb/26/food.unitednations
The World's Growing Food-Price Crisis
http://www.time.com/time/world/article/0,8599,1717572,00.html
Prioritizing Climate Change Adaptation Needs for Food Security in 2030. *Science*, 1 Feb. 2008
http://www.sciencemag.org/cgi/content/abstract/319/5863/607 (abstract)
Climate 'could devastate crops'
http://news.bbc.co.uk/2/hi/science/nature/7220807.stm
Food's Failed Estates = Paris's Hot Cuisine; Food Sovereignty – à la Cartel?
http://www.etcgroup.org/en/materials/publications.html?pub_id=673
Human-Induced Changes in the Hydrology of the Western United States. *Science*, Jan 31, 2008
http://www.sciencemag.org/cgi/content/abstract/1152538
Water troubles in the West may worsen
http://www.latimes.com/news/local/la-sci-water1feb01,1,7686108.story?ctrack=1&cset=true
(Requires free subscription)
Lakes Mead and Powell could run dry by 2021
http://www.csmonitor.com/2008/0213/p25s05-usgn.html
'SA's water could run out by 2025'
http://www.int.iol.co.za/index.php?set_id=1&click_id=14&art_id=vn20080214113314841C685433

Asia: Global warming thaws permafrost in Siberia
http://www.asahi.com/english/Herald-asahi/TKY200802140059.html
Ice cores show faster global warming
http://www.upi.com/NewsTrack/Science/2008/02/01/ice_cores_show_faster_global_warming/7287/
Antarctic glaciers surge to ocean
http://news.bbc.co.uk/2/hi/science/nature/7261171.stm

UN-backed meeting urges governments, scientists to bolster climate predictions
http://www.un.org/apps/news/story.asp?NewsID=25528&Cr=climate&Cr1=change

WMO plans conference on improving climate predictions
http://www.terradaily.com/reports/WMO_plans_conference_on_improving_climate_predictions_999.html
Atmospheric stabilization and the timing of carbon mitigation. *Climatic Change*, Feb 13, 2008
http://www.springerlink.com/content/y30j24p29m112g64/ (abstract)
No time to lose in cutting CO2 emissions. *New Scientist*, 27 February 2008
http://environment.newscientist.com/channel/earth/climate-change/mg19726454.500-no-time-to-lose-in-cutting-cosub2sub-emissions.html (by subscription only; full text in the Appendix)
Lawmakers Gather In Brazil To Discuss Climate Change
http://www.planetark.com/dailynewsstory.cfm/newsid/47050/story.htm
Brazil calls on G8 to meet Kyoto Protocol goals
http://www.terradaily.com/2007/080221223113.rumu8gc4.html
Japan Considers Emissions Cap And Trade System
http://www.planetark.com/dailynewsstory.cfm/newsid/47080/story.htm
Secretary-General says environment ministers can offer 'new generation of solutions' in message to Monte Carlo global forum
http://www.un.org/News/Press/docs/2008/sgsm11434.doc.htm

No time to lose in cutting CO2 emissions
New Scientist, 27 February 2008
http://environment.newscientist.com/channel/earth/climate-change/mg19726454.500-no-time-to-lose-in-cutting-cosub2sub-emissions.html (Paid subscription required for full access to journal.)

WE SHOULD not wait to cut back on burning fossil fuels until we have developed greener technology to supply our energy needs, despite what many economists are advising their respective governments. Such a waiting game may have deadly consequences.

The US administration often objects to emissions cuts on the grounds that it is cheaper to delay until low-carbon technologies are available. Now a study by some of the most respected climate-policy researchers has quantified the impact of every year of delay. It concludes that reducing greenhouse gas concentrations in subsequent decades will be far harder than we thought - not that anyone thought it was going to be easy in the first place. What's more, the team says that current delays mean the world is virtually certain to overshoot the limits of greenhouse gas concentration advocated by the European Union and many environmental groups. "It's a sobering assessment of where we are," says Bryan Mignone, a climate policy expert at Princeton University.

Mignone and his colleagues examined how levels of greenhouse gases in the atmosphere will change if emissions increase, flatten out sometime later this century and then decline. Most policy experts assume this will happen, but the effect on global temperatures will be determined by two key unknowns: how long it will take before emissions peak, and how quickly will they fall thereafter.

Even immediate and drastic cuts will not prevent dangerous temperature rises, the researchers warn. The EU, for example, hopes to limit global temperature increases to 2 °C - a rise that could

avoid the more catastrophic consequences of climate change. To achieve that, carbon dioxide concentrations in the atmosphere must stabilise at about 450 parts per million - levels are currently at about 380ppm. But to keep concentrations under that limit, Mignone's analysis shows, global emissions would have to peak within a decade and then keep falling at 3 per cent every year - a rate many consider unfeasible. Experts have little faith in such a turnaround: "Even if aggressive mitigation were to begin today, 450ppm appears to be virtually impossible," say the authors (Climatic Change, DOI: 10.1007/s10584-007-9391-8).

A limit of 550ppm is seen by some as more realistic, but Mignone says that we are already on the verge of ruling that out, too. And emissions are still increasing, so delays will become more and more costly in the future. At current rates of emissions, a five-year delay before the peak would lead to an increase of 34ppm in CO2 levels. If the peak has still not been reached 40 years from now, a five-year span of emissions at that time would result in a further leap of 54ppm. Even if new technology means emissions fall faster, the concentration of CO2 may already be too great by then for some stabilisation targets to be met. To keep levels below 550ppm, for instance, emissions should start falling much sooner, probably within 20 years, the study concludes.

"One message to take away is that if our ability to reduce emissions is constrained to less than 3 per cent per year, then mitigation had better start soon, very soon," says Roger Pielke, a climate policy expert at the University of Colorado in Boulder. "Another message is that effective mitigation requires that we explore options to more rapidly reduce emissions." Pielke points out that the new model ignores the possibility that future technologies may allow for more rapid cuts. Direct removal of CO2 from the atmosphere - a process known as air capture - might provide one such solution. Mignone also notes that his model does not deal with complexities that could impact the results, such as the amount of carbon taken up by land.

For some experts, Mignone's analysis is simply another indication that we have already fumbled our chance to limit greenhouse gases to some pre-determined level. "We may be at the point at which the luxury of choosing a target has disappeared," says Hugh Pitcher, an emissions modeller at the University of Maryland in College Park.