

WORLDWIDE EMERGING ENVIRONMENTAL ISSUES AFFECTING THE U.S. MILITARY
Control No. (TCN) 08152 with Battelle Chapel Hill Operations for the U.S. Army Environmental Policy Institute

JANUARY 2009 REPORT

Note to Readers: Pages 1-15 comprise the summary and analysis of this report. Expanded details for some items are in the Appendix beginning on page 16.

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Item 1. U.S. Policy Shift May Improve International Environmental Security

Appointments of environmental scientists to the new U.S. administration, presidential memoranda, and speeches all signal that the new White House will give special attention to environmental matters from energy security to international cooperation for addressing climate change. [See [Appendix](#) for more detail].

Military Implications:

As the military was called upon to play a key role in racial integration, it may be called upon to play a key role in the accelerated adoption of green technology in the U.S. and around the world. The Army Strategy for the Environment should be brought to the attention of President Obama, as military environmental security capabilities might receive more attention from the new U.S. Administration. International military-to-military environmental programs could receive higher profiles. Since climate change is a new top priority, the military should identify all its resources and programs for reducing GHGs and responding to effects of climate change, update information continuously, forecast how it may be called upon for both mitigation and adaptation, and perform a gap analysis in anticipation of future requests.

Sources: (additional sources in the [Appendix](#))

Barack Obama makes history as he takes office with green agenda

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=556&ArticleID=6040&l=en>

SUBJECT: The Energy Independence and Security Act of 2007

http://www.whitehouse.gov/the_press_office/Presidential_Memorandum_fuel_economy/

SUBJECT: State of California Request for Waiver Under 42 U.S.C. 7543(b), the Clean Air Act

http://www.whitehouse.gov/the_press_office/Presidential_Memorandum_EPA_Waiver/

World-Class Environmental Scientists Take Leadership Positions on Obama's Team

<http://blog.nature.org/2009/01/obamas-scienceteam>

'Climate hope' in economic plans

<http://news.bbc.co.uk/2/hi/science/nature/7851227.stm>

Stepping on the gas

http://www.economist.com/daily/news/displaystory.cfm?story_id=13009620&fsrc=nw1

Item 2. Green Economy a Solution for Addressing the Global Economic Crises

Fiscal stimulus packages adopted around the world to help address the economic crises include important measures involving renewable energy and environmental issues. Energy and climate change themes also dominated the World Economic Forum 2009, highlighting that industries related to energy-efficiency are a growing jobs-creating sector. The report *Green Investing: Towards a Clean Energy Infrastructure*, launched at the Forum, states that clean energy investment should more than triple—to at least \$515 billion a year between now and 2030—to prevent emissions reaching unsustainable levels. In the same spirit, UN Secretary-General Ban Ki-moon suggests creating a global Green New Deal. Such initiatives could be important also to reduce potential social unrest in developing countries that could experience a reversal of progress due to the global financial crisis. The crisis could reverse progress by cutting access to capital markets, income from trade and remittances, money from voluntary contributions for UN and other international development efforts, and increasing economic nationalism. As tensions triggered by the economical crises already led to social unrest in several countries around the

world, and climate change warnings increase, green economy policies should be implemented without delay as a comprehensive strategy to address both. [See also *Briefings on Environmental Security at NATO Conference* in April 2008 and other related items in previous environmental security reports.]

Military Implications:

The Defense Advanced Research Projects Agency should explore how it could accelerate R&D for green technology and coordinate with related efforts of the national labs, National Science Foundation, and key technology firms to play its role in creating the future green technologies and fulfilling the military's potential requirements for technology transfer.

Sources:

Ban urges leaders at Davos to forge 'Green New Deal' to fight world recession

<http://www.un.org/apps/news/story.asp?NewsID=29712&Cr=Ban&Cr1=Climate+change>

World Economic Forum Report: US \$515 Billion needed in Green Investments

<http://www.investorideas.com/news/012909f.asp>

World Economic Forum 2009, Davos

www.reuters.com/davos

World Economic Forum Explores Green Strategies for Recovery

<http://www.ens-newswire.com/ens/jan2009/2009-01-29-02.asp>

The other global warming

http://www.boston.com/bostonglobe/ideas/articles/2009/01/25/the_other_global_warming/

Item 3. European Energy Security Strategies

The recent natural gas crises caused by the Russia/Ukraine clash prompted Europe to address energy security more aggressively. The European Commission proposed a €3.5 billion (approx. \$4.5 billion) program for new gas pipelines and electricity networks and offshore wind projects; earmarked €250 million (approx. \$320 million) for the politically controversial Nabucco project (the outstanding balance to the estimated €8 billion (approx. \$10.25 billion) to be covered by member states and private companies); and Germany is promoting the Nord Stream pipeline project. Europeans might also emulate the U.S. super-grid scheme to carry solar energy from the Sahara, geothermal energy from Iceland, hydropower from Scandinavia, and wind power from the North Sea. [See also *EU Renewable Energy Policy becomes Legally Binding* in December 2008 and other related items in previous environmental security reports.]

Military Implications:

Military stationed in EU member states should review their actions to coordinate with the EU energy policy and seek opportunities to apply the *Army Strategy for the Environment*.

Sources:

Worst-hit EU states get least in post-gas crisis plan

<http://euobserver.com/9/27493/?rk=1>

Merkel puts pressure on EU for Russian pipeline

<http://euobserver.com/9/27497/?rk=1>

As Europe Fiddles, U.S. May Take Lead on Climate Change

http://www.alternet.org/environment/119300/as_europe_fiddles%2C_u.s._may_take_lead_on_climate_change_/?page=2

Item 4. Global Plan to Address Freshwater Supplies Negotiated

In preparation for the 5th World Water Forum to be held in March 2009 in Istanbul, senior officials from more than 60 countries met in Rome, January 21-23, to negotiate a global plan of action for addressing issues of freshwater resources and improving water governance. Industrial and agricultural use, growing population, pollution of ground and underground reservoirs, and effects of climate change all reduce the amount of clean water available and threaten water security. The Rome meeting is expected to negotiate a Ministerial Statement to be adopted by the Ministerial Conference at the World Water Forum. [The outcomes of the meeting were not available at the time of this writing.] Meanwhile, addressing the meeting “Managing our Future Water Needs” held in Davos, UN Secretary-General Ban Ki-moon underlined, “The problem is that we have no coordinated global management authority in the UN system or the world at large. There is no overall responsibility, accountability or vision for how to address the related problems of climate change, agricultural stress and water technology.” [See also *Unless Water Management Improves, Conflicts over Water Are Inevitable* in August 2006 and other related items in previous environmental security reports.]

Military Implications:

Since water tables are falling on all continents and 40% of the world gets their water from watersheds controlled by two or more countries, improving fresh water availability can reduce the potential for future conflicts. Water experts from the military should attend the Forum to offer knowledge and to find opportunities for collaboration to prevent water-related conflict. Experts should also report back on new strategies, concepts, and potential regulations to improve global water governance.

Sources:

Moving closer to a global plan of action for water

<http://www.worldwatercouncil.org/index.php?id=2279>

"Unique Insights to the World's Water Problems"

http://www.worldwatercouncil.org/fileadmin/wwc/News/WWC_News/Guest_view-magazine_ISO.pdf

5th World Water Forum

<http://www.worldwaterforum5.org/>

Davos, Switzerland, 29 January 2009 - Secretary-General's remarks at event entitled "Managing our Future Water Needs" [as prepared for delivery]

<http://www.un.org/apps/sg/sgstats.asp?nid=3682>

Item 5. The Woodrow Wilson International Center Opens Synthetic Biology Project

Genomic pioneer Craig Venter has said that we will write genetic code to create artificial biology, as we wrote computer code to create software. Synthetic biology holds great promise but also may create unintended consequences and a new weapons source for bioterrorists of the future. The Woodrow Wilson International Center for Scholars launched the Synthetic Biology Project in January within the Center's Foresight and Governance Project to “foster informed public and policy discourse concerning synthetic biology” by providing “independent, rigorous analysis that can inform critical decisions affecting the research, commercialization and use of synthetic biology.” Some experts estimate that by 2015 a fifth of the chemical industry could be

dependent on synthetic biology. A Wilson Center panel exploring unresolved synthetic biology ethical questions remarked that, although threats related to synthetic biology are not different from those related to most sciences, regulations are lagging, opening the possibility for misuse. Hence, they suggested that the problem to be addressed is to get policy and commercial organizations to adopt ethical criteria, standards, and policies.

Military Implications:

Relevant military personnel working on biological and chemical safety issues should consider collaboration with such initiatives.

Sources:

Synthetic Biology: Is Ethics a Showstopper?

http://www.wilsoncenter.org/index.cfm?fuseaction=events.event&event_id=492968

Synthetic Biology Project

<http://www.synbioproject.org/about/>

WMD Detection Facility Opens in Singapore

http://gsn.nti.org/gsn/nw_20090121_2237.php

Item 6. Technological Advances with Environmental Security Implications

6.1 New Process Improves Water Desalination Efficiency

Yale University researchers have developed a new energy-saving forward osmosis technique for water purification. The method, which is claimed to require only 10% as much power as previous ones, uses a new formulation for the “draw solution” in the osmosis process. Oasys Water, Inc. has been formed to exploit the discovery.

Military Implications:

The military should follow this development as it is scaled up toward commercialization for eventual use in addressing water scarcity.

Sources:

A Low-Energy Water Purifier. A Yale spinoff hopes to solve the big problem with desalination

<http://www.technologyreview.com/business/21934/?nlid=1636&a=f>

Global Challenges in Energy and Water Supply: The Promise of Engineered Osmosis

<http://pubs.acs.org/doi/full/10.1021/es800812m?prevSearch=McGinnis+osmosis&searchHistoryKey=>

6.2 Another “Green” Concrete Announced

In a press release, Ekocrete, Inc. announced, “...the availability of a new ‘green’ concrete that uses 90% recycled and by-product materials without sacrificing strength or durability.” The new product uses crushed recycled concrete for aggregate, plus fly ash waste from coal mills, and other industrial byproducts that provide nano-fibers for crack reduction and nano-particles for surface density to reduce water penetration. [See also *Environmentally Polluting Ash Turned into Concrete-like Structural Material* in November 2008 environmental security report.

Military Implications:

The military should investigate the possible use of this environmentally friendly product in military construction. However, the presence of nano materials in this product implies that a suitable risk assessment should be considered before it is used.

Sources:

Ekocrete Launches 'Green' Concrete That Uses 90% Recycled and By-Product Materials

<http://www.nanowerk.com/news/newsid=8868.php>

Information: info@ekocrete.com (Email address for obtaining more information.)

6.3 New Material Makes Biodegradable Plastic Bags

A research group led by Truong Phuoc Nghia at the Ho Chi Minh City University of Sciences has developed a nanocomposite plastic bag material that is less expensive than others, made from renewable sources, and is biodegradable in landfills. Its application may be somewhat limited by the facts that the resultant bags are reusable only if they do not come in contact with water, and that they rely on bacterial degradation for their low environmental impact.

Military Implications:

Considering the increased restrictions adopted by many countries, as well as the recycling issues, the military should follow this development for its applicability. [See Item 7.6 *India to Enact Regulation Curbing Plastic Bags Use* in this report.] However, the presence of nano materials in this product implies that a suitable risk assessment should be considered before it is used.

Source:

Vietnamese scientists come up with natural plastic

<http://www.thanhniennews.com/print.php?catid=4&newsid=45235>

6.4 New Technique Provides Cheaper LEDs

A team at Cambridge University, led by Colin Humphrey, has developed a new production technique for gallium nitride LEDs that allows them to be grown on a silicon wafer and brings their price down to levels competitive with other types of light sources. [See *Light Emitting Diodes Offer Big Environmental Advantages* in December 2008 environmental security report.]

Military Implications:

Although commercial availability of this particular technique is expected to be up to five years off, the military should follow its development and be ready to exploit the less expensive products as the technology matures.

Source:

Cheap, super-efficient LED lights on the horizon

<http://www.newscientist.com/article/dn16496-cheap-superefficient-led-lights-on-the-horizon.html?DCMP=OTC-rss&nsref=online-news>

6.5 New Detection and Cleanup Techniques

6.5.1 New Techniques for Multi-nanowire Detection Arrays

A team from the Electrical Engineering Department at Pennsylvania State University has developed an improved, potential mass production technique for assembling detector nanowires into an array on a silicon chip, using an electric field. Once in place, with electrodes on top of them, the set of treated wires yields a portable and very sensitive detector for multiple toxins or pathogens. A nanowire detectably changes its conductivity when a target substance (say, a toxin) binds to the specific complementary coating on the wire. Harvard chemist Charles Lieber earlier

devised a competing technique to line up nanowires using polymer bubbles, and Prof. Mark Reed at Yale attacked the problem using an etching process.

Military Implications:

The military should follow these lines of research, as they possibly lead to improved battlefield and environmental assessment devices and systems.

Sources:

Nanosensors Made Easy. A trick to assemble nanowires on silicon could lead to cheap, tiny sensing devices

<http://www.technologyreview.com/computing/21974/?a=f>

Practical Nanowire Devices. A way to align nanowires could lead to better sensors and flexible displays

<http://www.technologyreview.com/computing/18802/?a=f>

Easy-to-Make Nanosensors. Tiny electronics-based detectors could provide simple tests for cancer or bioterror agents

<http://www.technologyreview.com/biomedicine/18127/>

6.5.2 Manure Aids in Removing Hydrogen Sulfide from Biogas

SulfaMaster is a product combining manure and other ingredients to produce a filtering material that removes hydrogen sulfide, an acid rain- and corrosion-causing component, from biogas, a renewable energy source derived from the breakdown of animal waste. It is especially suitable for small biogas-producing operations that cannot afford large scrubbers. The developers are Gary Harman, professor of plant biology at the New York State Agricultural Experiment Station in Geneva, and Terry Spittler, a retired analytical chemist at Cornell.

Military Implications:

The military should investigate the use of this technology in community aid situations in countries where small biogas-producing operations could yield environmental benefits.

Source:

Cornell technology makes biogas greener

http://www.enn.com/top_stories/article/39043

6.5.3 New Deep Water Marine Sensors Being Developed

Prof. Hywel Morgan from the UK's University of Southampton's School of Electronics and Computer Science and Dr. Matt Mowlem at the National Oceanography Centre, Southampton, have performed initial testing of new technology marine sensors that are "capable of measuring harsh environments [and] can be deployed for months at a time", according to a University announcement. The four-year project's two goals are said to be "to develop lab-on-a-chip chemical and biochemical analyzers to detect nutrients and pollutants at the ultra-low concentrations found in the ocean, and to develop small chips to identify individual phytoplankton in the oceans". The researchers foresee applications wherever the condition of environmental water needs to be assessed.

Military Implications:

The military should follow this work as it proceeds to determine its usefulness in assessing the condition of water in battlefield monitoring and environmental management.

Source:

World's first deep-sea 'lab-on-a-chip' sensors proved to work
http://www.soton.ac.uk/mediacentre/news/2008/dec/08_233.shtml

Item 7. Updates on Previously Identified Issues**7.1 New Chemicals Considered for Toxic Lists**

Health Canada and Environment Canada are recommending adding diethyl sulphate to the country's list of toxic substances. The compound is used in the production of fabric softeners, flocculants, pharmaceuticals, fragrances, and dyes. Various foreign jurisdictions, including the European Commission, consider it a possible carcinogen. The agencies also designated butane and isobutane for further assessment.

Concerns over the use of formaldehyde in pressed-wood products are getting increased attention. California issued new rules on these products, and the EPA published an Advance Notice of Proposed Rulemaking.

An investigation by CDC is underway to determine if antimony in fire-resistant clothing is posing a health risk. The issue was triggered by complaints in the Boca Raton FL Fire Dept.

The European Parliament voted to prohibit around 22 substances used in pesticides due to their potential health hazards. Two separate bills address the issue: one banning the very hazardous substances from pesticides and another considering use reduction of all pesticides. Three transborder geographical regions within the EU—rather than countries—can rule on the use of specific products, while countries can ban a product because of specific environment or agricultural circumstances. [See also *New Hazardous Substances to be Banned* in October 2008 and other related items in previous environmental security reports.]

Military Implications:

In anticipation of potential future restrictions, as well as for obvious health reasons, if not already done so, the military should maintain a comprehensive database with all compounds and substances believed to present health and/or environmental hazards and considered for regulations, regions/countries where those apply, and possible implications for the military.

Sources: (additional sources in the [Appendix](#))

Backgrounder on Batch 4 of the Chemicals Management Plan

http://www.chemicalsubstanceschimiques.gc.ca/challenge-defi/batch-lot-4/background-information_e.html

Formaldehyde Emissions from Pressed Wood Products

<http://www.epa.gov/opptintr/chemtest/formaldehyde/index.htm>

Ailing Boca Raton firefighters blame chemical in pants

http://www.palmbeachpost.com/localnews/content/local_news/epaper/2009/01/10/a1a_boca_pants_0111.html

Toxic pesticides banned in Europe

<http://euobserver.com/9/27399/?rk=1>

7.2 New Jersey Ports Pushing for Toxic Diesels Ban

The New Jersey Port Authority is considering imposing a ban of some kind on polluting diesel trucks at the ports of Newark and Elizabeth, perhaps similar to the one already set up in Southern

California. [See Item 1 above and *Aviation and Shipping should be Subject to Emissions Cuts* in September 2008 environmental security report.]

Military Implications:

Military logistics planners should continue their preparations for the worldwide spread of restrictions of this kind. Additional domestic bans are becoming more likely as a result of the federal policy proposal to allow increased state-level imposition of anti-pollution measures.

Source:

N.J. pushing for restrictions on diesel trucks at ports

http://www.northjersey.com/environment/NJ_pushing_for_restrictions_on_diesel_trucks_at_ports.html

7.3 Chemical and Biosecurity Issues

Reportedly, the al-Qaeda cell that shut down operations in the Tizi Ouzou province in Algeria after an accident might have been developing chemical and biological weapons. Last year, it was reported that allegedly up to 100 potential terrorists had attempted to enter postgraduate programs in Britain to gain access to laboratories. Experts and security organs repeatedly warn that the security measures to stop eventual development and use of such weapons by terrorist groups are insufficient and inadequate.

Six-legged Soldiers: Using Insects as Weapons of War by Jeffrey A Lockwood warns about the possibility of terrorists developing an insect-based weapon and conducting a biological attack more easily than a chemical or nuclear strike. He therefore urges governments to create an effective “pest management infrastructure” able to detect insects carrying a deadly disease.

Countries with inadequate safety standards for pharmaceutical and food production combined with insufficient import verification mechanisms open a new avenue for terrorist activity. In an increasingly globalized world with greater access to S&T knowledge and software, international standards, information-sharing agreements, common ground for cooperation with the local authorities, improved inspections and testing systems, and stronger and more comprehensive import safety regulations (especially for pharmaceutical and food production) are needed. [See also *Better International Controls Needed to Prevent Bioterrorism* in July 2006, *Call for Reinforcements to Chemical Safety* in September 2006, and other items on this theme in previous environmental security reports.]

Military Implications:

The military and its relevant contractors should consider collaborating in the establishment of international safety standards and procedures, as well as anticipating potential regulations in the planning of future R&D in these areas. Meanwhile, research on detection and countermeasures should increase.

Sources:

http://gsn.nti.org/gsn/nw_20090121_4538.php

Experts Debate Threat of Nuclear, Biological Terrorism

http://gsn.nti.org/gsn/nw_20090113_7105.php

Al-Qaeda cell killed by Black Death 'was developing biological weapons'

<http://www.telegraph.co.uk/news/worldnews/africaandindianocean/algeria/4294664/Al-Qaeda-cell-killed-by-Black-Death-was-developing-biological-weapons.html>

Bioterrorists Could Employ Insects, Expert Warns

http://gsn.nti.org/gsn/nw_20090106_5074.php

Book Review: Six-Legged Soldiers: Using Insects as Weapons of War

http://www.sciencenews.org/view/generic/id/39506/title/Book_Review_Six-Legged_Soldiers_Using_Insects_as_Weapons_of_War_by_Jeffrey_A._Lockwood

Drug Safety Watchdog Sees Al-Qaeda Risk to U.S. Food, Drug Imports

http://gsn.nti.org/gsn/nw_20090129_3617.php

7.4 Arctic Security and Sovereignty Debate Continues

Delegates to a NATO meeting held in Iceland discussed the security implications of Arctic thawing and the potential need for a NATO military presence in the region. In view of the arguments among powerful nations over sovereignty and resources, NATO Secretary-General Jaap de Hoop Scheffer noted, “It should be a military presence that is not overdone, and there is a need for political cooperation and economic cooperation.” The U.S. Arctic policy was published January 9, 2009. [See also *EU Arctic Policy Guidelines* in November 2008, *Arctic Needs New International Regulations* in September 2008 and other related items in previous environmental security reports.]

Military Implications:

[Similar to previous on the same issue] Negotiations for clear international regulations concerning the Arctic region are necessary. The potential for new military roles in the region increases for both national security and protection of the ecosystems. Relevant military personnel should cooperate with their counterparts in other countries and international organizations for developing adequate strategies, regulations, and enforcement procedures.

Sources:

NATO chief wants military in Arctic as it thaws

<http://www.msnbc.msn.com/id/28907448/>

Defence warns of climate conflict

<http://www.smh.com.au/news/environment/global-warming/defence-warns-of-climate-conflict/2009/01/06/1231004021036.html>

National Security Presidential Directive and Homeland Security Presidential Directive

NSPD-66/HSPD-25, January 9, 2009

<http://www.fas.org/irp/offdocs/nspd/nspd-66.htm>

New policy emphasizes U.S. interests in Northwest Passage

<http://www.thestar.com/news/canada/article/569679>

Who Owns Rights to Melting Arctic?

http://www.businessweek.com/bwdaily/dnflash/content/jan2009/db20090127_954391.htm

7.5 Greenhouse Gas Observing Satellite Could Help Enforcing Environmental Regulations

Japanese Greenhouse Gases Observing Satellite "IBUKI" (meaning “breath”) is the world’s first satellite dedicated to monitoring greenhouse gas emissions. It circles the earth every 100 minutes and monitors the levels of CO₂ and methane at 56,000 observation points. The data should help the global effort to understand and combat global warming. [See also *Increased Use of Space Technology for Monitoring Environmental Events* in September 2008 and other related items in previous environmental security reports.]

Military Implications:

[Same as previous on similar issues] Further developing an integrating environmental monitoring capability to provide informed data to the public, and policy- and decision-makers, would considerably improve the assessment of potential environmental impacts of different actions, facilitate enforcement of international treaties worldwide, and mitigate environmental and social consequences.

Source:

Greenhouse gases Observing SATellite "IBUKI" (GOSAT)

http://www.jaxa.jp/projects/sat/gosat/index_e.html

7.6 India to Enact Regulation Curbing Plastic Bags Use

India's regulation to curb plastic bags gets increased enforcement by the decision of the city of Delhi to outlaw the, "use, storage and sale", of all polyethylene bags, and apply severe penalties for non-compliance. The law is effective immediately, and applies to customers and retailers alike, but the first target is manufacturers, to restrict availability. India thus joins other countries that have introduced similar regulations. [See also *Restrictions on Plastic Bags Expanding* in January 2008 and other related items in previous environmental security reports.]

Military Implications:

[Same as previous on this theme] The military should review its usage of plastic bags (especially the thinnest varieties) and plan for their eventual replacement. This would apply primarily to commissaries and PXs, but could extend to convenience uses for other functions.

Sources:

Heavy baggage. India's urban environment

http://www.economist.com/world/asia/displaystory.cfm?story_id=13041382

In India, plastic bag use is a capital offence

<http://www.theage.com.au/world/in-india-plastic-bag-use-is-a-capital-offence-20090117-7jl4.html>

7.7 Climate Change

7.7.1 Scientific Evidence and Natural Disasters

According to the Center for Research on Epidemiology of Disasters, in 2008 there were 321 disasters, below the 398 annual average for 2000–2007. Nevertheless, the 235,816 people killed, and the \$181 billion in economic losses were considerably higher than the yearly average for the same period. About 211 million people were affected, with the highest number of deaths in Asia, mainly due to Cyclone Nargis and the Sichuan earthquake. The largest numbers of disasters were recorded in China—26, the Philippines—20, U.S.—19, Indonesia—16, and Vietnam and India—10 each.

A NASA study based on five years of data shows that for every 1°C (1.8°F) increase in average ocean surface temperature, there is a 45% increase in the frequency of the very high clouds associated with severe storms and rainfall. Senior Research Scientist Hartmut Aumann notes that at the present rate of global warming of 0.13°C (0.23 °F) per decade, the frequency of severe storms could increase by 6% per decade.

7.7.2 Food and Water Security

Half the world's population might face food crises by 2100, warns a team of scientists from Stanford University's Program on Food Security and the Environment. The main cause is a combination of climate change and water shortage, reducing crop yields in the tropical and subtropical regions (between about 35° north latitude and 35° south latitude) where the world's fastest-growing and poorest populations are. They suggest rethinking the whole agricultural system in view of the new environmental and demographic trends.

The number of hungry people increased by 40 million in 2008, said FAO, but \$30 billion a year investment in infrastructure and agricultural production could eliminate the root causes of hunger by 2025. This represents only 8% of the support to agriculture by OECD countries. In sub-Saharan Africa only 4% of the arable land is irrigated (compared to 38% in Asia), and only 3% of renewable water reserves are used.

Before the high level meeting, "Food Security for All," held in Madrid, January 26-27, the ETC Group released a *Communiqué* on global governance of food and agriculture. It suggests that the four main agencies (FAO, CGIAR, IFAD, WFP) should coordinate and work together along with smaller more specialized organizations from the developing countries.

The UK created a new Food and Environment Research Agency (FERA) by merging several Defra agencies and thus better integrating food and environmental security research and policy.

Indonesia's rice production was very good in 2008, but inefficient implementation of land reforms and improvement of economic conditions of farmers led to numerous conflicts.

Two-thirds of the Tibetan plateau glaciers might be gone by 2050 if the current temperatures rise continues, note scientists. Water shortages would affect 2 billion people in China, India, Pakistan, Bangladesh, and Bhutan.

In Africa, by 2020, water shortages might affect 250 million people, and agricultural productivity could decline 50%. These points were stated at the two-day meeting organized by the UN Office for the Coordination of Humanitarian Affairs (OCHA) and the African Union (AU), aimed at developing a continent-wide policy framework to protect pastoralists in Africa.

7.7.3 Migration

The Australian Defense Force report *Climate Change, The Environment, Resources And Conflict*, warns of possible conflict in the South Pacific triggered by increased illegal immigration and fishing and potential failed states, as a consequence of climate change and rising sea levels.

In an address to the UN Security Council, UN High Commissioner for Refugees António Guterres warned of new forms of displacement, with natural disasters on the rise due to climate change. He explained the interrelationship between climate change, extreme deprivation, and conflict, and how they can exacerbate each other as causes of displacement.

7.7.4 Melting Glaciers and Sea Ice

The University of Zurich's World Glacier Monitoring Service published the latest data showing that alpine glaciers from the Andes to Alaska and across the Alps shrank twice as fast as a decade ago, losing on average 0.7 meters of thickness in 2007—the most recent data available. The experts warn that most glaciers will disappear by mid-century.

Synthesis and Assessment Product 1.2: Past Climate Variability and Change in the Arctic and at High Latitudes is a comprehensive synthesis of science literature about the Arctic, integrating research on the past 65 million years of climate change, with contributions from 37

scientists from several countries. The conclusions show that faster warming at the Arctic than other places in the Northern Hemisphere is expected to continue, with all its consequences—sea-ice retreat, rising sea levels, increased erosion, etc. Additionally, human activity might induce changes that would exceed documented natural variability and trigger serious transformations.

Despite earlier beliefs, all of Antarctica seems to be warming, reported climatologists in the article “Warming of the Antarctic ice-sheet surface since the 1957 International Geophysical Year” published in the journal *Nature*. The conclusions resulted from combining satellite observations over the entire continent with data from land weather stations for the past 50 years. Warming of the continent’s western side has been twice as rapid as the East Antarctica.

7.7.5 Rising Sea Levels

Research published by European scientists in *Climate Dynamics* shows that the next century might be 3°C warmer, and the ocean level could rise between 0.9 and 1.3 meters. Similarly, models by the U.S. National Oceanic and Atmospheric Administration Earth Systems Research Laboratory show that sea levels would be 1.3 to 3.2 feet higher from thermal expansion of ocean water alone, if CO₂ increase would cap at 600 parts per million, but twice as much if CO₂ peaks at 1,000 parts per million. The models also showed that even if warming stopped, climate change effects might last until 3000.

According to a report by the State Oceanic Administration, the sea level along China’s coastal areas has risen about 2.6 millimeter per year in the past 30 years, 0.8 millimeter higher than the world’s average, and might rise 0.13 meter in the next three decades.

Tens of thousands of people were displaced in the Pacific islands as a consequence of climate change effects. Coastal residents of Fiji were instructed to move to higher ground to avoid storms and flooding.

7.7.6 Post-Kyoto Negotiations

The EU proposes that richer countries cut greenhouse gas emissions by 30% by 2020, and that developing countries (except the poorest) cut emissions to 15%-30% below “business as usual” levels. The proposal suggests setting up a carbon market for richer countries by 2015 and that poorer countries be included five years later. The proposal will be submitted for member states’ approval at a summit in March. An important shortfall is the lack of budget.

The McKinsey report *Pathways to a low carbon economy* addresses the feasibility and conditions to keep global warming within the 2°C limit. The report finds that it is possible to reduce GHG emissions “to stay on track until 2030” but immediate action and a strong policy framework are needed. Any delay might result in missing the 2°C limit.

At the World Economic Forum, BP Chief Executive Tony Hayward said that the world should establish a price for carbon emissions.

Delegates attending the Ministerial Conference on Transport held January 14-16, 2009, in Tokyo, called on the International Maritime Organization and International Civil Aviation Organization to prepare by the end of the year “a package of appropriate mechanisms for reducing emissions,” from the aviation and shipping sectors.

Military Implications:

[Same as previous on similar issues] The military should identify all its resources and programs for reducing GHGs and responding to effects of climate change, update information

continuously, forecast how it might be called upon for both mitigation and adaptation, and to perform a gap analysis in anticipation of future requests. International discourse over climate change increases the rate of emergence of international policies trying to tackle the causes and develop strategies to mitigate climate change effects.

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

CRED Disaster Figures. Deaths and economic losses jump in 2008

<http://www.unisdr.org/eng/media-room/press-release/2009/pr-2009-01-disaster-figures-2008.pdf>

NASA Study Links Severe Storm Increases, Global Warming

<http://www.jpl.nasa.gov/news/news.cfm?release=2008-242>

Global crisis talks move to Davos

<http://news.bbc.co.uk/2/hi/business/davos/7830633.stm>

H(a)LF a Loaf: Finally, in Madrid, a High-Level Forum considers Governance

http://www.etcgroup.org/en/materials/publications.html?pub_id=715

Half of world's population could face climate-induced food crisis by 2100

<http://uwnews.org/article.asp?articleID=46272>

UK creates Food and Environment Research Agency

<http://www.defra.gov.uk/news/2009/090114a.htm>

AFRICA: Pastoralists grapple with climate change

<http://www.irinnews.org/Report.aspx?ReportId=82614>

Defence warns of climate conflict

<http://www.smh.com.au/news/environment/global-warming/defence-warns-of-climate-conflict/2009/01/06/1231004021036.html>

University of Zurich's World Glacier Monitoring Service

<http://www.geo.unizh.ch/wgms/index.html>

Many glaciers will disappear by middle of century and add to rising sea levels, expert warns

<http://www.guardian.co.uk/environment/2009/jan/19/glacier-rising-sea-levels>

All Antarctica seems to be warming, report says

<http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2009/01/22/MN8015E0U9.DTL>

Sea level rise of 1 meter within 100 years

<http://www.physorg.com/news150645386.html>

Tens of thousands abandon flooded Pacific villages

<http://www.alertnet.org/thenews/newsdesk/SYD379288.htm>

Climate change: Commission sets out proposals for global pact on climate change at Copenhagen

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/09/141&format=HTML&aged=0&language=EN&guiLanguage=en>

BP's Hayward Says World Needs A Carbon Price

<http://planetark.org/wen/51403>

Ministerial Conference on Transport Calls on IMO and ICAO to Pursue Work on Reducing GHG Emissions

http://www.mlit.go.jp/kokusai/MEET/index_en.html

7.8 Nanotechnology Safety Issues

Detailed descriptions of the following nanotechnology issues are in the Appendix

- companies under pressure to make public the presence of nanomaterials in their products, and their policies for dealing with these possibly hazardous substances. ([more](#))

- high aspect ratio (much longer than wide) nanoparticles (HARN), such as nanowires and carbon nanotubes, may pose the same health risks as asbestos fibers. ([more](#))
- quantum dots (QDs) may be toxic to cells under acidic or alkaline conditions ([more](#))
- Nanotech Conference & Expo 2009 May 3-7, 2009 at the George R. Brown Convention Center, in Houston, Texas ([more](#))
- Nanotech Europe 2009 will take place 28-30 September 2009, in Berlin ([more](#))
- nano tech 2009 International Nanotechnology Exhibition & Conference in Tokyo 18-20 February 2009 ([more](#))
- observatoryNANO consortium will hold a dissemination event in London at the BERR conference center in London on 19 March 2009. ([more](#))
- report on Ethical Evaluations of Nanotechnology ([more](#))
- nano Magazine issue 10 features energy and environment ([more](#))

Military Implications:

[Same as previous on this issue] 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:

Increase Expected in Shareholder Resolutions Urging Disclosure of Nanomaterials, Policies -- The Bureau of National Affairs' Daily Environment Report (1/15/2009)

http://news.bna.com/deln/DELNWB/split_display.adp?fedfid=11312763&vname=dennotallissues&fn=11312763&jd=A0B7U4H4J7&split=0 (subscription required; full text in [Appendix](#))

An outline scoping study to determine whether high aspect ratio nanoparticles (HARN) should raise the same concerns as do asbestos fibres

http://randd.defra.gov.uk/Document.aspx?Document=CB0406_7760_FRP.pdf

Quantum dots may be toxic to cells, environment under certain conditions

<http://www.nanowerk.com/news/newsid=9059.php>

Nanotech Conference & Expo 2009: <http://www.nanotechexpo.jp/en/index.html>

observatoryNANO consortium <http://www.nano.org.uk/events/ionevents.htm>

Ethical Evaluations of Nanotechnology

http://www.nanotechproject.org/news/archive/ethical_evaluations_nanotechnology/

Item 8. Reports Suggested for Review

8.1 State of the World 2009

State of the World 2009: Into a Warming World by Worldwatch Institute is a comprehensive analysis of potential evolution of climate change by the end of the century and of the urgent actions and policies that need to be taken now. It is “intended to inject new inspiration and energy into national and international climate negotiations.” It examines the technologies that would be the most efficient for reducing greenhouse gas emissions; policies and strategies to address climate change; ideas for saving biodiversity; and security implications of climate change. It also includes a climate change reference guide and glossary.

Military Implications:

The report is a source of information on the implications of climate change, including security and adaptation, and thus aids planning improvement, resource prioritization, and preparedness.

Source:

State of the World 2009: Into a Warming World

<http://www.worldwatch.org/node/5658>

8.2 New 2009 Terminology on Disaster Risk Reduction

United Nations International Strategy for Disaster Reduction (UNISDR) released an extensively upgraded terminology to help international common understanding and application of disaster risk reduction concepts. It also includes new concepts that are not in widespread use but are of growing professional relevance.

Military Implications:

Given the increasingly international nature of relief efforts, using a common “language” is important. The “guide” should be widely distributed to relevant military personnel.

Source:

UNISDR Terminology on Disaster Risk Reduction (2009)

<http://www.unisdr.org/eng/library/lib-terminology-eng.htm>

APPENDIX

Reference Details

This Appendix contains expanded background information on some items.

Item 1. U.S. Policy Shift May Improve International Environmental Security

Some bold actions considered by the new U.S. administration in its first week in office, include:

- implement the Energy Independence and Security Act that requires increasing car fuel efficiency standards starting with model year 2011 for reaching at least 35 miles per gallon by 2020 for cars and light trucks
- instruct the Environmental Protection Agency to allow California and other States willing to adopt stricter emissions standards for new motor vehicles (California's law requires reducing vehicles' emissions by 30% by 2016; so far, 13 other states and the District of Columbia want to follow California's standards, representing about 40% of the U.S. car market)
- double capacity for alternative sources of energy like wind, solar, and biofuels over the next 3 years
- build a smart electricity super-grid to transport renewable energy from the West to the rest of the country
- allocate funds for weatherizing public and private buildings, and appoint a special envoy for climate change. There are also signals for tougher environmental standards, the adoption of a cap-and-trade system for CO₂ emissions, and America's participation in the international efforts to negotiate a post-Kyoto Protocol on climate change
- appoint a climate change special envoy (Todd Stern) for international negotiation of actions and accords to address climate change causes and effects

Sources: (a more comprehensive list)

SUBJECT: The Energy Independence and Security Act of 2007

http://www.whitehouse.gov/the_press_office/Presidential_Memorandum_fuel_economy/

SUBJECT: State of California Request for Waiver Under 42 U.S.C. 7543(b), the Clean Air Act

http://www.whitehouse.gov/the_press_office/Presidential_Memorandum_EPA_Waiver/

As Europe Fiddles, U.S. May Take Lead on Climate Change

http://www.alternet.org/environment/119300/as_europe_fiddles%2C_u.s._may_take_lead_on_climate_change/

California's green light

http://www.economist.com/research/articlesBySubject/displayStory.cfm?story_id=13031009&subjectID=348924&fsrc=nwl

Clinton Climate Change Envoy Vows "Dramatic Diplomacy"

<http://planetark.org/wen/51349>

'Climate hope' in economic plans

<http://news.bbc.co.uk/2/hi/science/nature/7851227.stm>

Stepping on the gas

http://www.economist.com/daily/news/displaystory.cfm?story_id=13009620&fsrc=nwl

Barack Obama promises to lead world on climate change

<http://www.telegraph.co.uk/news/worldnews/northamerica/usa/barackobama/4349132/Barack-Obama-promises-to-lead-world-on-climate-change.html>

Obama's Inaugural Address Shows Concern for the Planet

<http://www.ens-newswire.com/ens/jan2009/2009-01-20-01.asp>

Obama: Oil dependence, climate change endanger security

http://www.reuters.com/article/reutersComService_2_MOLT/idUSTRE50P4AN20090126

A Strong Signal on Global Warming

<http://roomfordebate.blogs.nytimes.com/2009/01/26/a-strong-signal-on-global-warming/?8dpc>

President Obama to lawmakers: 'Can't afford delays' on economic rescue plan

http://www.nydailynews.com/news/politics/2009/01/26/2009-01-26_president_obama_to_lawmakers_cant_afford.html

U.S. Should Adopt California Car Rules: Schwarzenegger

<http://planetark.org/wen/51371>

As Europe Fiddles, U.S. May Take Lead on Climate Change

http://www.alternet.org/environment/119300/as_europe_fiddles%2C_u.s._may_take_lead_on_climate_change/

'Climate hope' in economic plans

<http://news.bbc.co.uk/2/hi/science/nature/7851227.stm>

World Economic Forum 2009, Davos

www.reuters.com/davos

Item 7. Updates on Previously Identified Issues

7.1 New Chemicals Considered for Toxic Lists

Sources: (a more comprehensive list)

Backgrounder on Batch 4 of the Chemicals Management Plan

http://www.chemicalsubstanceschimiques.gc.ca/challenge-defi/batch-lot-4/background-information_e.html

Ottawa suggests adding chemical to toxic list

<http://www.theglobeandmail.com/servlet/story/RTGAM.20090124.wtoxic24/BNStory/National/>

Comments Sought On Formaldehyde in Wood Products

<http://members.sej.org/sej/tipsheet.php?rssID=2417&view=tipsheet>

Formaldehyde Emissions from Pressed Wood Products

<http://www.epa.gov/opptintr/chemtest/formaldehyde/index.htm>

Formaldehyde. Hazard Recognition

<http://www.osha.gov/SLTC/formaldehyde/recognition.html>

Toxicological Risks of Selected Flame-Retardant Chemicals

http://www.nap.edu/catalog.php?record_id=9841

Ailing Boca Raton firefighters blame chemical in pants

http://www.palmbeachpost.com/localnews/content/local_news/epaper/2009/01/10/a1a_boca_pants_0111.html

Antimony & compounds fact sheet (Australia)

<http://www.npi.gov.au/database/substance-info/profiles/10.html>

EU Assembly Votes To Ban Toxic Pesticides

<http://planetark.org/wen/51205>

Toxic pesticides banned in Europe

<http://euobserver.com/9/27399/?rk=1>

7.7 Climate Change

Sources: (a more expanded list)

CRED Disaster Figures. Deaths and economic losses jump in 2008

<http://www.unisdr.org/eng/media-room/press-release/2009/pr-2009-01-disaster-figures-2008.pdf>

2008 disasters in numbers

<http://www.unisdr.org/eng/media-room/facts-sheets/2008-disasters-in-numbers-ISDR-CRED.pdf>

Natural Disasters Cost China \$110 Billion In 2008

<http://planetark.org/wen/51334>

NASA Study Links Severe Storm Increases, Global Warming

<http://www.jpl.nasa.gov/news/news.cfm?release=2008-242>

NASA study links severe storm increases, global warming

http://www.pasadenastarnews.com/ci_11539060

Ban urges greater efforts to feed world's hungry amid ongoing recession

<http://www.un.org/apps/news/story.asp?NewsID=29681&Cr=food+crisis&Cr1=>

Global crisis talks move to Davos

<http://news.bbc.co.uk/2/hi/business/davos/7830633.stm>

UN Chief Warns More Could Go Hungry In Crisis Year

<http://planetark.org/wen/51374>

UN urges release of billions for world food crisis

<http://www.washingtonpost.com/wp-dyn/content/article/2009/01/26/AR2009012600602.html>

H(a)LF a Loaf: Finally, in Madrid, a High-Level Forum considers Governance

http://www.etcgroup.org/en/materials/publications.html?pub_id=715

Historical Warnings of Future Food Insecurity with Unprecedented Seasonal Heat

http://fsi.stanford.edu/publications/historical_warnings_of_future_food_insecurity_with_unprecedented_seasonal_heat/

http://iis-db.stanford.edu/pubs/22374/battisti_naylor_2009.pdf (the article)

Unprecedented heat will trigger global food crisis

<http://www.theglobeandmail.com/servlet/story/RTGAM.20090108.wclimate0108/BNStory/International/home>

Half of world's population could face climate-induced food crisis by 2100

<http://uwnews.org/article.asp?articleID=46272>

Half Of World's Population Could Face Climate-induced Food Crisis By 2100

<http://www.sciencedaily.com/releases/2009/01/090108144745.htm>

Billions face food shortages, study warns

<http://www.enn.com/agriculture/article/39038>

Record purchase enabled UN to feed hungry, boost southern African economies

<http://www.un.org/apps/news/story.asp?NewsID=29649&Cr=wfp&Cr1=>

UK creates Food and Environment Research Agency

<http://www.defra.gov.uk/news/2009/090114a.htm>

Food and Environmental Security moves one step nearer, says CLA

<http://www.farminguk.com/news/Food-and-Environmental-Security-moves-one-step-nearer,-says-CLA10212.asp>

Counting the cost of ozone pollution on crops

<http://www.environmental-expert.com/resultEachArticle.aspx?cid=8819&codi=43964&idproducttype=8&level=0§ion=5>

Rice production surplus, farmers linger in poverty

<http://old.thejakartapost.com/detailnational.asp?fileid=20090124.D05&irec=4>

AFRICA: Pastoralists grapple with climate change

<http://www.irinnews.org/Report.aspx?ReportId=82614>

Unusual rain, evidence of climate change – FG

http://www.dailytrust.com/index.php?option=com_content&task=view&id=3148&Itemid=19

Defence warns of climate conflict

<http://www.smh.com.au/news/environment/global-warming/defence-warns-of-climate-conflict/2009/01/06/1231004021036.html>

Climate change threatens Pacific, Arctic conflicts

<http://www.alertnet.org/thenews/newsdesk/SYD372018.htm>

UNHCR Warns of Climate-Induced Displacements

<http://www.un.org/apps/news/story.asp?NewsID=29494&Cr=unhcr&Cr1=>

World's Glaciers Shrink for 18th Year in Alps, Andes

<http://www.bloomberg.com/apps/news?pid=20601124&sid=ajCBthQzAiU4&refer=home>

University of Zurich's World Glacier Monitoring Service

<http://www.geo.unizh.ch/wgms/index.html>

Many glaciers will disappear by middle of century and add to rising sea levels, expert warns

<http://www.guardian.co.uk/environment/2009/jan/19/glacier-rising-sea-levels>

Arctic heats up more than other places

http://www.eurekalert.org/pub_releases/2009-01/usgs-ahu011609.php

Synthesis and Assessment Product 1.2: Past Climate Variability and Change in the Arctic and at High Latitudes

http://www.usgs.gov/newsroom/article.asp?ID=2109&from=rss_home

Rain speeds Antarctic Peninsula glacier melt

<http://uk.reuters.com/article/environmentNews/idUKTRE50F35D20090116?sp=true>

“Warming of the Antarctic ice-sheet surface since the 1957 International Geophysical Year”

<http://www.nature.com/nature/journal/v457/n7228/full/nature07669.html> (abstract; full article by subscription only)

All Antarctica seems to be warming, report says

<http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2009/01/22/MN8015E0U9.DTL>

Antarctica Is Warming, Not Cooling: Study

<http://planetark.org/wen/51310>

Sea level rise of 1 meter within 100 years

<http://www.physorg.com/news150645386.html>

Climate change has a firm grip

<http://www.latimes.com/news/printedition/front/la-sci-warming27-2009jan27,0,2633118.story>

Sea level along China's coast to rise 0.13 meter in 30 years

http://www.chinadaily.com.cn/china/2009-01/28/content_7430371.htm

Tens of thousands abandon flooded Pacific villages

<http://www.alertnet.org/thenews/newsdesk/SYD379288.htm>

African harbour cities at risk from rising sea-levels

<http://www.terraviva.com/2007/090114173929.wbba87en.html>

Climate change: Commission sets out proposals for global pact on climate change at Copenhagen

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/09/141&format=HTML&aged=0&language=EN&guiLanguage=en>

EU unveils proposals for global climate change deal

<http://euobserver.com/9/27490/?rk=1>

EU urges US climate commitment

<http://news.bbc.co.uk/2/hi/science/nature/7856120.stm>

BP's Hayward Says World Needs A Carbon Price

<http://planetark.org/wen/51403>

Ministerial Conference on Transport Calls on IMO and ICAO to Pursue Work on Reducing GHG Emissions http://www.mlit.go.jp/kokusai/MEET/index_en.html

Statement: http://www.mlit.go.jp/kokusai/MEET/documents/Ministerial_Declaration.pdf

Transport can help propel world to greener future

<http://www.reuters.com/article/environmentNews/idUSTRE50E3CW20090115>

World Economic Forum Annual Meeting 2009 "Shaping the Post-Crisis World", Davos-Klosters, Switzerland, 28 January - 1 February, 2009

<http://www.weforum.org/en/events/AnnualMeeting2009/index.htm>

7.8 Nanotechnology Safety Issues

7.8.1 Corporations under Stockholder Pressure for Nanotech Disclosure

According to a story in Meridian Nanotechnology and Development News, a number of companies are coming under pressure from stockholder resolutions to make public the presence of nanomaterials in their products, and their policies for dealing with these possibly hazardous substances.

Military Implications:

Military concerned with nano risk assessment of contractor materiel should be on the alert for instances of this popular movement, and be prepared to take advantage of any subsequent disclosures.

Sources:

Increase Expected in Shareholder Resolutions Urging Disclosure of Nanomaterials, Policies -- The Bureau of National Affairs' Daily Environment Report (1/15/2009)

http://news.bna.com/deln/DELNWB/split_display.adp?fedfid=11312763&vname=denotallissues&fn=11312763&jd=A0B7U4H4J7&split=0 (subscription required; full text [below](#))

7.8.2 High Aspect Ratio Nanoparticles May Pose Asbestos-like Risks

A consortium of UK scientists, led by the Institute of Occupational Medicine, Edinburgh, has published a report discussing whether high aspect ratio (much longer than wide) nanoparticles (HARN), such as nanowires and carbon nanotubes, may pose the same health risks as asbestos fibers. The report concluded that there is enough evidence to suggest that HARN, which have the same physical characteristics as asbestos, are likely to induce similar pathology. The report presents a set of prioritized recommendations for future research.

Similar concerns have caused France's High Council of Public Health (HCSP) to recommend that workers in contact with carbon nanotubes receive the greatest protection under French law. Further, a new paper from Chinese researchers systematically reviews most of the experimental results on the variety of factors affecting carbon nanotubes' cytotoxicity.

Military Implications:

Military personnel concerned with nano risk assessment should follow this and subsequent research, and take its results into consideration in their evaluations of nanomaterials.

Sources:

UK report: http://randd.defra.gov.uk/Document.aspx?Document=CB0406_7760_FRP.pdf

News story on Chinese report:

http://www.eurekalert.org/pub_releases/2008-12/sicp-soc122208.php

Chinese paper:

<http://www.springerlink.com/content/fk685595n1583u88/?p=2fa06998388d4e45bda7cd2febc9272f&pi=0>

News story on UK report: <http://www.nanowerk.com/news/newsid=8996.php>

CL Tran, SM Hankin, B Ross, RJ Aitken, AD Jones, K Donaldson, V Stone, R Tantra, 2008, "An outline scoping study to determine whether high aspect ratio nanoparticles (HARN) should raise the same concerns as do asbestos fibres" (pdf, 1.67MB), Report on DEFRA project CB0406 is free to download.

French action:

<http://translate.google.com/translate?hl=en&sl=fr&u=http://fr.news.yahoo.com/2/20090121/thl-nanotubes-de-carbone-le-haut-conseil-96993ab.html&sa=X&oi=translate&resnum=1&ct=result&prev=/search%3Fq%3Dhttp://fr.news.yahoo.com/2/20090121/thl-nanotubes-de-carbone-le-haut-conseil-96993ab.html%26hl%3Den%26safe%3Doff%26client%3Dfirefox-a%26rls%3Dorg.mozilla:en-US:official%26hs%3Dukj>

7.8.3 Possible Environmental Hazard from Quantum Dots

According to an item in Nanowerk, "New research is showing that quantum dots (QDs) may be toxic to cells under acidic or alkaline conditions." It appears that the metallic shells of these semiconductor nanocrystals, increasingly used in electronic systems, may decompose under non-neutral pH conditions, (e.g. during weathering) releasing toxic zinc or cadmium.

Military Implications:

Health and environmental risk assessment personnel should review military and contractor use of these components to evaluate possible hazards.

Sources:

Quantum Dot Weathering Results in Microbial Toxicity

<http://pubs.acs.org/doi/abs/10.1021/es8023385>

Quantum dots may be toxic to cells, environment under certain conditions

<http://www.nanowerk.com/news/newsid=9059.php>

7.8.4 Nanotech Conferences to Be Held in Houston, May 2009, and Berlin, September 2009

The Nano Science and Technology Institute (NSTI) will hold the Nanotech Conference & Expo 2009 May 3-7, 2009 at the George R. Brown Convention Center, in Houston, Texas, with more than 5000 attendees and more than 1000 presentations, including policy issues. The meeting will be co-located with the Clean Technology Conference & Expo 2009. Nanotech Europe 2009 will take place 28-30 September 2009.

Sources:

NSTI Announcement: <http://www.nanowerk.com/news/newsid=8815.php>

Houston Nanotech Conference: www.nsti.org/Nanotech2009/expo

Clean Technology Conference: www.csievents.org/Cleantech2009

Berlin Nanotech Conference: <http://www.nanotech.net/content/home>

7.8.5 Nanotechnology Conference to Be Held in Tokyo 18-20 February 2009

The nano tech 2009 International Nanotechnology Exhibition & Conference will be held in Tokyo 18-20 February 2009. It will include several presentations on nanotech and the environment.

Source:

Conf. site: <http://www.nanotechexpo.jp/en/index.html>

7.8.6 UK Dissemination Event for the observatoryNANO Project in London, March 2009

The observatoryNANO consortium will hold a dissemination event in London at the BERR conference center in London on 19 March 2009. According to the announcement, it, "...will provide an overview of the work performed within the first year of the project and ... a better insight into how nanotechnology is evolving,...[including] the potential environment, health and safety issues. It also provides a platform for individuals to become involved in future engagement processes and have their opinions included in reports and analyses presented to EU policy makers."

Military Implications:

Appropriate military personnel should consider attending this event to gather information on nanotech developments and policies in the European theater.

Sources:

'Shaping European Nanotechnology – the role of observatoryNANO'

<http://www.nano.org.uk/events/ionevents.htm> 19 March 2009: BERR Conference Centre, London, UK

7.8.7 New Report on Ethical Evaluations of Nanotechnology

The Wilson International Center's/Pew Trust's Project on Emerging Nanotechnologies has issued a new report on Ethical Evaluations of Nanotechnology that strives to, "...address social and ethical issues ... [and] both the substantial potential risks of nanotechnology and its possible significant contributions to our well-being and environmental sustainability," and, "emphasizes

ways in which such topics intersect with governmental functions and responsibilities, including science and technology policy, as well as research funding, regulation and work on public engagement”, according to a Project announcement.

Source:

Report: http://www.nanotechproject.org/news/archive/ethical_evaluations_nanotechnology/

7.8.8 *nano* Magazine to Feature Energy and Environment

Issue 10 of *nano*, with the theme Energy and Environment, will be available for download from 1 February 2009. It will also provide comment and features on nanotechnology for: environmental benefit and nanotech for clean water, land remediation, and construction, <http://www.nanomagazine.co.uk>

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7.8.1 Corporations under Stockholder Pressure for Nanotech Disclosure

http://news.bna.com/deln/DELNWB/split_display.adp?fedfid=11312763&vname=denotallissues&fn=11312763&jd=A0B7U4H4J7&split=0

(Subscription required)

According to the article, companies that use nanomaterials will increasingly be asked by shareholders to disclose the presence of nanomaterials in their personal care and food products and to describe their policies for dealing with nanomaterials. Socially responsible investment firms and advocacy organizations are targeting such companies, and resolutions have been filed for the 2009 annual meetings of Avon Products, Kellogg Company, Kraft Foods, and McDonald's Corporation. The resolutions generally request that the company publish a report detailing its use of nanomaterials in its products and its overall policy on nanomaterials. Rich Liroff, executive director of the Investor Environmental Health Network, explained: "[I]t's really important that companies think long and hard about if and how they're going to be involved with nanomaterials, especially since the health and environmental impacts of nanomaterials have scarcely been explored. Some of the studies that have been done have raised critical concerns, and if they're not careful, companies will harm themselves and their shareholders."