

WORLDWIDE EMERGING ENVIRONMENTAL ISSUES AFFECTING THE U.S. MILITARY
Subcontract No: 1048, LMI Task No: MAN0B.04, for the U.S. Army Environmental Policy Institute

JULY 2010 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. China is Now the Largest Energy Consumer in the World

The International Energy Agency has announced that China's energy consumption is now the highest in the world; its energy consumption has doubled since 2000. IEA notes that China's per capita consumption is one-third of the OECD countries' average, and credits China's government for its efforts in reducing energy intensity and becoming a global leader in renewable energy technologies. Meantime, the Netherlands Environmental Assessment Agency report *No growth in total global CO₂ emissions in 2009* notes that OECD countries reduced their greenhouse gas emission by 7% during 2009. This reduction has been offset by increases from China and India. CO₂ emissions per capita in China increased from 2.2 tons in 1990, to 6.1 tons in 2009, while, in the same time period, the 15 EU nations decreased from 9.1 tons to 7.9 tons and the U.S. decreased from 19.5 tons to 17.2 tons. Considering the rising Chinese public discontent over pollution and an estimated \$25 trillion cost to clean up environmental damage associated with the country's rapid industrialization, China's government is increasingly concerned by the interdependence between economic and security issues. Therefore, in its 2011-2015 state plan, 39% of the performance indicators for government officials focus on "green" issues, up from 3% in the previous plan.

Military Implications:

This milestone in China's energy consumption is a warning to relevant military personal to explore a full range of military-to-military options with China for improved environmental security.

Sources:

China overtakes the United States to become world's largest energy consumer

http://www.iea.org/index_info.asp?id=1479

Global carbon emissions steady for first time since 1992

<http://www.guardian.co.uk/environment/2010/jul/01/emissions-recession>

No growth in total global CO₂ emissions in 2009

[http://www.pbl.nl/en/publications/2010/No-growth-in-total-global-CO₂-emissions-in-2009.html](http://www.pbl.nl/en/publications/2010/No-growth-in-total-global-CO2-emissions-in-2009.html)

Climate change biggest restriction on China's development –economist

http://www.alertnet.org/db/an_art/60714/2010/06/9-162342-1.htm

Item 2. China Applies for Seabed Mining Permit in Search for New Mineral Resources

China has filed the first application with the International Seabed Authority for deep seabed mining in international waters to search for valuable metals such as copper, nickel, cobalt, gold and silver. This application for mining of sulfides in the southwest Indian Ocean at depths of more than 5,000 feet below the surface is expected to be heard April 2011. If successful, many more applications are expected to follow from China and other countries. Environmental experts are already expressing concerns about the potentially major consequences that deep-sea mining could have on the marine ecosystem. [Related item: *The Race for Natural Resources a Potential Impediment for Peace* in June 2010 environmental security report.] [New estimates show large resources may be possible in Afghanistan.]

Apart from these relatively common metals, the world could experience shortages of rare earth minerals needed for renewable energy and information technologies as soon as 2012. China produced more than 97% of the world's rare earth oxides in 2009, and controls about 50% of the

globe's known reserves. Recently it announced a 72% cut in its exports of rare earths for the second half of 2010. In order to decreasing its dependence on foreign minerals, the U.S. is considering reviving the domestic rare earths mining industry, most probably beginning with the Mountain Pass CA mine that plans to increase mining and processing to 20,000 tons of rare earths by 2012, from the current 2,000 tons a year.

Military Implications:

New regulations for these minerals and their exploitation are likely. Increased attention should be given to R&D for substitutions for these rare earths to reduce future likelihood for tensions over their access.

Sources:

Rush On for 'Rare Earths' as U.S. Firms Seek to Counter Chinese Monopoly

<http://www.nytimes.com/gwire/2010/07/23/23greenwire-rush-on-for-rare-earth-as-us-firms-see-k-to-co-58814.html>

Deep-sea mining adds to fears of marine pollution

<http://www.independent.co.uk/environment/nature/deepsea-mining-adds-to-fears-of-marine-pollution-2016292.html>

Item 3. EU Parliament Adopts Restrictions on Nanoproducts

The European Parliament reached agreement that “nano-sized ingredients and food from nanotech processes should be subject to novel foods regulations,” and called for a moratorium until specifically-designed risk assessments verify their safety. The action was welcomed by the European Environmental Bureau, Europe's largest federation of environmental citizens' organizations. [Related item: *EU Restrictions on Nanofoods Expected to Pass in July*, in June 2010 environmental security report.]

Military Implications:

Military operations in the EU area should be prepared to adjust procurement plans accordingly, to comply with the new decision. The EU decision could lead other countries to implement similar policies until health and environmental safety is assured.

Sources:

MEPs call for ban on food from cloned animals

http://www.europarl.europa.eu/news/expert/infopress_page/067-77912-186-07-28-911-20100706IPR77911-05-07-2010-2010-false/default_en.htm

European Environmental Bureau welcomes European Parliament's vote on nanofoods

http://www.nanowerk.com/news/newsid=17069.php?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+nanowerk%2FagWB+%28Nanowerk+Nanotechnology+News%29

Item 4. The Protocol on Strategic Environmental Assessment to the UNECE Espoo Convention Entered into Force on July 11, 2010

The Protocol on Strategic Environmental Assessment to the UNECE Espoo Convention sets the legal framework for better integration of environmental and health assessments, as well as public participation in decisionmaking at the earliest stage of projects and programs. It ensures that environmental protection and health concerns are an integral part of sustainable development.

The SEA Protocol entered into force on July 11, 2010. [Related item: *Protocol on Strategic Environmental Assessment (SEA)* in May 2003 environmental security report]

Military Implications:

Relevant military personnel stationed in Europe should review the new SEA Protocol requirements for specific implications for planning new activities and projects.

Source:

Protocol on Strategic Environmental Assessment (Kyiv, 2003)
http://www.unece.org/env/eia/sea_protocol.htm

Item 5. UN Official Calls to “Securitize the Ground” as part of Human Security

At the Third Annual Caux Forum for Human Security, held July 9-16, 2010, in Caux, Switzerland, Luc Gnacadja, the Executive Secretary of the UN Convention to Combat Desertification (UNCCD), underlining the links between climate change and conflict, called for a “decisive policy change in the way we perceive the drylands and address the issues of its people in order to avoid environmentally induced conflicts.” To this end, he suggested the “securitize the ground” concept, in order to create a wider global political awareness of the social, environmental, and economic consequences of desertification, land degradation, and drought. Securitizing the ground is defined in the reference.

Military Implications:

Relevant military personnel should explore how the concept of “securitizing the ground” would affect policy as a factor in conflict prevention and resolution.

Source:

The Third Annual Caux Forum for Human Security. 9-16 July 2010, Caux Switzerland
Grounding security (Soil security a prerequisite for human security). Luc Gnacadja speech
<http://www.unccd.int/publicinfo/docs/lghumansecurity.pdf>

Item 6. Ecuador to Join the UN Convention on the Law of the Sea

President Rafael Correa of Ecuador announced the accession to the UN Law of the Sea, pending endorsement by the National Assembly. Ecuador is one of the 16 countries that neither signed nor ratified the Law of the Sea Convention, although it claimed a 200 nautical mile sovereignty zone even before the concept of the Exclusive Economic Zone was created by the Convention. By joining the UNCLOS, Ecuador’s claim to the 200-mile zone and the air space above will become official, and also opens the opportunity for eventual claims of extension.

Military Implications:

It is likely that Peru, another non-signatory of UNCLOS, will follow Ecuador regarding accession to the Convention, leaving only Venezuela in the Americas as a non-signatory, and making almost the entire Pacific coast Party to the Convention, with the exception of Colombia, El Salvador, and the U.S. Therefore, military organizations operating in this part of the Pacific should be prepared to comply with the UNCLOS requirements along the relevant coasts.

Source:

Ecuador anuncia adhesión a la Convemar (text in Spanish; unofficial translation in the [Appendix](#)) <http://andes.info.ec/politica/ecuador-anuncia-adhesion-a-la-convemar-23938.html> (Spanish language)

Item 7. Coal-fired Power Plants under Fire

The U.S. Environmental Protection Agency is contemplating introducing rules to reduce environmental effects of coal-fired power plants as part of its steps on regulating greenhouse gas emissions. Additionally, a new rule for reducing the emissions of mercury from coal-fired power plants is to be issued November 2011 with enforcement three years later. It is estimated that this will force about 20% of U.S. coal-fired electric generation capacity to retire by 2015. Similarly, in Australia, the Greens are advocating 100% replacement of coal with renewable energy sources such as sun, wind, and wave.

Military Implications:

Military bases dependent on coal-fired plants should review their energy requirements in light of these policy changes that could close coal plants earlier than expected and raise costs.

Sources:

Analysis: Toxic Fish Could Help Obama Hit 2020 Climate Goals

<http://planetark.org/wen/58929> (This site may require a subscription.)

Senator Milne said this could be achieved by 2030 with the right preparation and infrastructure. Greens say coal must go

<http://www.smh.com.au/federal-election/climate/greens-say-coal-must-go-20100724-10pmh.html>

Item 8. Technological Advances with Environmental Security Implications**8.1 New Optical Link Facilitates Exploration of the Underwater Environment**

Engineers at Woods Hole Oceanographic Institution have developed an optical modem system which allows data and command communication with an autonomous undersea research vehicle without the need for tethering with bulky cables. The system demonstrated error-free transmissions at 1 megabit per second at a range of more than 100 meters.

Military Implications:

The military should keep in touch with this development for gathering environmental data on the underwater environment, such as scanning for unexploded ordnance or other hazardous materials.

Source:

Revolutionary Communications System Promises New Generation of Untethered, Undersea Vehicles

<http://www.physorg.com/news197133272.html>

8.2 New Metal-Organic Frameworks (MOFs) Give Greatly Improved CO₂ Storage

Researchers from UCLA and Seoul's Soongsil University report development of several new MOF materials with greatly improved capability for CO₂ capture and storage.

Military Implications:

DARPA should explore this capacity – if not already doing so – for carbon capture and storage to reduce the military carbon footprint.

Sources:

World records by UCLA chemists, Korean colleagues enhance ability to capture CO₂

<http://newsroom.ucla.edu/portal/ucla/world-records-by-ucla-chemists-163439.aspx>

Ultra-High Porosity in Metal-Organic Frameworks

<http://www.sciencemag.org/cgi/content/abstract/science.1192160v1>

8.3 New Detection and Cleanup Techniques

8.3.1 Graphene-based Composite Removes Arsenic from Drinking Water

Researchers at Pohang University of Science and Technology in Pohang, Republic of Korea, claim creation of a new magnetite composite, based on reduced graphene oxide (RGO), which absorbs arsenic when dispersed in water, and can then be removed with a magnet. Compared to present methods, the highly efficient new material can be used in continuous-flow systems for longer periods.

Military Implications:

The new material should be evaluated for its applicability in systems for purifying arsenic-contaminated water sources.

Sources:

Graphene soaks up arsenic

<http://physicsworld.com/cws/article/news/43162>

Water-Dispersible Magnetite-Reduced Graphene Oxide Composites for Arsenic Removal

<http://pubs.acs.org/doi/abs/10.1021/nn1008897>

8.3.2 New Catalyst Enables Water Decontamination by Visible Light

Scientists at the Shenyang National Laboratory for Materials Science in Shenyang, China, have announced a catalytic water purification technique using visible light rather than UV. The catalyst is made from a grid of titanium oxide fibers impregnated with nitrogen, augmented with palladium nanoparticles. The bactericidal action continues for up to 24 hours after light is removed. Professor Shang has stated that this new technique is both more energy-efficient and more effective than previous UV photocatalysts and will also kill some of the toughest microbes such as spores.

Military Implications:

This new technique should be further evaluated for its bactericidal effectiveness (e.g. *E. coli* needs to be reduced to zero) and economic feasibility (palladium is expensive).

Sources:

Nanoparticles and light can purify water

<http://www.scidev.net/en/news/nanoparticles-and-light-can-purify-water.html>

Memory antibacterial effect from photoelectron transfer between nanoparticles and visible light photocatalyst

<http://www.rsc.org/publishing/journals/JM/article.asp?doi=b917239d>

8.3.3 Adding Flocculation Agents to Runoff Filter Socks Improves Performance

Scientists from the Agricultural Research Service's Animal and Natural Resources Institute in Beltsville MD, and researchers from Filtrexx International, say they improved on the performance of filter socks used to partially remove contaminants from storm water runoff from construction sites and other disturbed earth sites. Adding flocculation agents to the compost inside the socks improved reduction percentages of contaminants by up to one-third, including reducing *E. coli* and motor oil by 99%.

Military Implications:

This modification should be evaluated for possible use in reducing environmental damage on installations and at construction projects.

Source:

'Super socks' help stem pollution runoff

<http://www.physorg.com/news199099635.html>

8.4 Increasing Energy Efficiency Technologies

8.4.1 Adding Graphene to Lithium-Ion Batteries Dramatically Reduces Recharge Time

DOE's Pacific Northwest National Laboratory, Vorbeck Materials Corp. of Jessup MD, and Professor Ilhan Aksay of Princeton University collaborated in developing a new technology incorporating graphene into lithium-ion batteries, thereby reducing their recharge times by factors from 10 to 30.

Military Implications:

This technology could greatly improve the operational performance of portable/mobile environmental sensing systems, hybrid and electric vehicles, and other energy storage applications and should be monitored as it proceeds to commercial availability.

Source:

Battery research could lead to shorter recharge time for cell phones

<http://www.physorg.com/news198309365.html>

8.4.2 New Solar-Powered Process Converts Atmospheric CO₂ to Solid Carbon

Professor Stuart Licht of the Department of Chemistry and Solar Institute at George Washington University and collaborators report the STEP (Solar Thermal Electrochemical Photo) process, which uses solar radiation both to heat a molten lithium carbonate electrolyte that splits the CO₂ into free oxygen and solid carbon that is formed at the cathode, and to provide energy for the electrolysis.

Military Implications:

This development, if successfully scaled up, could be a significant addition to the set of CO₂-mitigation tools.

Sources:

New solar-powered process removes CO₂ from the air and stores it as solid carbon

<http://www.nanowerk.com/spotlight/spotid=17198.php>

A New Solar Carbon Capture Process: Solar Thermal Electrochemical Photo (STEP) Carbon Capture

<http://pubs.acs.org/doi/abs/10.1021/jz100829s>

Item 9. Updates on Previously Identified Issues

9.1 Updates of the Rome Statute Include Amendments on the Crime of Aggression and Expansion of Criminalizing the Use of Certain Weapons in Non-international Conflicts

The first Review Conference on the Rome Statute of the International Criminal Court (ICC) took place in Kampala, Uganda, May 31-June 11, 2010. The Conference reached agreement on the definition of the crime of aggression and the framework for the Court's jurisdiction over this type of crime. In principle, a crime of aggression is committed by a leader who plans or executes an "act of aggression" that constitutes "by its character, gravity and scale" a "manifest violation of the Charter of the United Nations," while an "act of aggression" is the use of armed force in a manner inconsistent with the U.N. Charter, including any of the acts stipulated in UN General Assembly Resolution 3314, which are listed in new Article 8 *bis*. The activation of the Court's jurisdiction is pending agreement of two-thirds of States Parties, which cannot be taken before January 1, 2017 and one year after the ratification or acceptance of the amendments by 30 states parties, whichever is later.

The criminalization of the use of certain weapons in non-international conflicts is added under Article 8, paragraph 2, e) and includes: poison, poisoned weapons, asphyxiating, poisonous or other gases and all analogous liquids, materials or devices, as well as the use of bullets that expand or flatten in the body. The amendment will enter into force for each State Party one year after depositing the instruments of ratification or acceptance of the amendment. [Related item: *Changes to War Crimes Proposed for the International Criminal Court* in November 2009 environmental security report.]

The Conference also adopted the Kampala Declaration, reaffirming states' commitment to the Rome Statute and its full implementation, as well as its universality and integrity.

Military Implications:

Although the U.S. is not a State Party to the ICC, relevant military personnel should review these new amendments to be prepared to cooperate or comply, as required by status of forces agreements, in those countries that are States Party.

Sources:

Review Conference of the Rome Statute

<http://www.coalitionfortheicc.org/?mod=review>

States Parties Approve New Crimes for International Criminal Court. ASIL Volume 14, Issue 16

<http://www.asil.org/files/insight100622pdf.pdf>

9.2 Progress on International Environmental Governance

The First Meeting of the Consultative Group of Ministers or High-Level Representatives on Broader International Environmental Governance Reform was held from July 7-9, 2010 in Nairobi, Kenya. The Consultative Group is formed of delegates from 59 countries. Using the original 24 points proposed by UNEP, the group identified nine options for further consideration. While there is general agreement that there are gaps in the current environmental governance system, views differ about potential solutions. Some countries favor creating a global policy organization with universal membership to manage the global environmental agenda, while others advocate a new specialized UN agency on the environment, or argue for an umbrella organization on sustainability. However, there is general support for other broad reforms, such as

an encompassing global information network, establishing a tracking system on environmental finance, and enhancing UNEP presence within existing country offices. The Group agreed to a roadmap for its work through the 2011 Governing Council. The second meeting is tentatively scheduled for late November 2010 in Helsinki, Finland. [Related item: *UNEP Conference Furthers Environmental Governance* in February 2009 environmental security report.]

Military Implications:

Military personnel with international environmental responsibilities should seek collaboration with the Consultative Group to ensure that security concerns are included in the most effective way in the new international environmental governance reform proposals.

Sources:

First Meeting of the Consultative Group, Nairobi 7-9 July 2010

<http://www.unep.org/environmentalgovernance/Introduction/GCfeb2010/tabid/4556/language/en-US/Default.aspx>

The Co-Chairs' Summary and Roadmap

<http://www.unep.org/environmentalgovernance/Introduction/GCfeb2010/tabid/4556/language/en-US/Default.aspx>

9.3 High cancer rates in Fallujah, Iraq; New Study Raises Questions on Environmental Damage from Bombardments

A paper by visiting professor Dr Chris Busby at the University of Ulster and colleagues reports a four-fold increase in all cancers and a 12-fold increase in childhood cancer in under-14s from a survey in Fallujah, Iraq which was heavily bombarded in 2004. The study showed that infant mortality in the city is more than four times higher than in Jordan and eight times higher than in Kuwait. There is a 38-fold increase in leukemia, and a ten-fold increase in female breast cancer. The changes cannot be ascribed to any specific cause, but the authors raise the possibility of uranium-tainted weapons being involved. [Related item: *New Legal Proceeding over Allegations of Use of Illegal Weapons in Iraq* in May 2010 environmental security report.]

Military Implications:

The results of this study will probably be added to similar preceding ones requiring further investigations on the potential implications of the use of certain weapons in urban environments. If the allegations prove justified, and depleted uranium is found to be the key cause, then it is fair to speculate that pressure from civil society will increase for restricted use of these weapons; hence, increased research for substitutes would be wise. The same might be hypothesized for conventional munitions propellants and combustion residues.

Sources:

Toxic legacy of US assault on Fallujah 'worse than Hiroshima'

<http://www.independent.co.uk/news/world/middle-east/toxic-legacy-of-us-assault-on-fallujah-worse-than-hiroshima-2034065.html>

Cancer, Infant Mortality and Birth Sex-Ratio in Fallujah, Iraq 2005–2009

<http://www.scribd.com/doc/34158205/Cancer-Infant-Mortality-and-Birth-Sex-Ratio-in-Fallujah-Iraq-2005–2009>

9.4 Artillery Training Charges Pose Environmental Asbestos Threat

The Australian Department of Defence has launched an investigation into the possible exposure of troops to white chrysotile asbestos from a broken dummy charge bag used in a kit for 105mm howitzer training, imported from the U.S.

Military Implications:

The military should investigate the potential use of such hazardous material in installations and increase safety measures. It is not clear at this point what the results of the investigation will be, but there might be some recommendations for standards' improvements and enforcements, as well as replacement of potentially hazardous materials in such items.

Source:

Artillery drills spark asbestos fears

<http://www.abc.net.au/news/stories/2010/06/29/2939489.htm?section=justin>

9.5 “Public Interest” Environmental Suits Increasing

Reportedly, in the past twenty years, tens of thousands of public interest lawsuits have been filed against the Indian government and corporations on grounds, among others, that large development projects threaten livelihoods, land, or the environment. These suits have led to landmark rulings on education, the environment, and human rights (PILs can relate to any public issue, not just the environment), but their volume has burdened the judicial system. Therefore, in an effort to reduce the caseload, the Indian government has introduced new directives, requiring higher standards of proof and sanctioning the petitioner if a project was delayed by a public interest litigation that is later dismissed. Note: similar public interest legal provisions as those in India are also included in jurisprudence in South Africa, Pakistan, Nepal, and Bangladesh. [Related item: *Environmental Courts and Tribunals Are Rapidly Increasing Around the World* in April 2010 environmental security report, as well as Item 4 on European SEA in this report.].]

Military Implications:

This is further evidence that military installation and training planners should increasingly consider public opinion on environmental issues before considering new projects, installations, training, etc.

Source:

Activists in India cry foul over new rules regarding public interest litigation

<http://www.washingtonpost.com/wp-dyn/content/article/2010/07/25/AR2010072502773.html>

9.6 Study Indicts Swimming Pool Disinfectants for Toxic Effects from Byproducts

According to Science Daily, research by Professor Michael Plewa of the University of Illinois at Urbana-Champaign and colleagues has linked the application of disinfectants in recreational pools to previously published adverse health outcomes such as asthma, bladder cancer, and DNA damage: “negative outcomes can occur when disinfection byproducts form reactions with organic matter [e.g., sweat, hair, sunscreen] in pool water”. The scientists recommend that disinfectants containing bromine be avoided.

Military Implications:

These results suggest a thorough reexamination by preventive health agencies of disinfection procedures for recreational facilities in installation environments.

Source:

Recreational Pool Disinfectants Linked to Health Problems

<http://www.sciencedaily.com/releases/2010/07/100721133213.htm>

Genotoxicity of Water Concentrates from Recreational Pools after Various Disinfection Methods

<http://pubs.acs.org/doi/abs/10.1021/es903593w>

9.7 Climate Change

9.7.1 Scientific Evidence and Natural Disasters

Mass bleaching of coral reefs has been reported throughout Southeast Asia, the Indian Ocean, and the Pacific. The damage so far has been the worst since 1997/1998 when high ocean temperatures killed an estimated 16% of the world's reefs, but with ocean temperatures reaching record levels and combined with the end of an El Niño episode, scientists warn that even more damage could come. While reefs can often recover from bleaching, it could take corals between 10 and 70 years to recover from bleaching events of such magnitude. Also, a recent study showed that rising temperatures slow the speed of coral growth. In the Red Sea, coral growth declined by a third over the past 12 years, and scientists warned that coral there would cease growing entirely by 2070 if warming continues.

Meantime, worldwide phytoplankton levels decreased 40% since the 1950s, reveal Canadian and U.S. scientists in a study published in the journal *Nature*. They say that the likely cause is global warming, which increases difficulty for plant plankton to get vital nutrients. The most dramatic changes are noted in the Arctic, southern, and equatorial Atlantic and equatorial Pacific oceans, while the Indian Ocean is not showing a decline.

9.7.2 Food and Water Security

Water Issues between Nepal, India & Bangladesh, a paper by the Institute of Peace and Conflict Studies, notes that the largely agrarian characteristics of the countries in the region and their volatile relations make the region highly prone to water related crises. The paper concludes that water issues are essentially a product of the political relations in the region and points to the benefits of developing joint water management schemes, such as information sharing mechanisms, disaster preparation, and maintenance of a specific quality of water, which, in addition to resolving water issues, would also enhance regional stability. Meantime, tensions between India and Pakistan are growing, with Pakistan filing a case with the international arbitration court to stop the construction of a hydroelectric dam in India in May.

The UN calls upon the international community to help the more than 10 million hungry people across Africa's drought-stricken Sahel region. The hardest hit is Niger, where more than 7 million people — almost 50% of the population — is suffering from lack of food.

9.7.3 Migration

Advocating for Safe Movement as a Climate Change Adaptation Strategy for Pastoralists in the Horn and East Africa, a new report by the Security Mobility Initiative, finds increasing levels of migration and conflict over often scarce resources. According to the report, vulnerability, a lack of preparedness, and appropriate, timely and relevant responses to natural disasters left millions in need of humanitarian assistance. The report recommends urgent actions to help pastoralists cope with the growing impacts of climate change, for example, to facilitate safe passage across borders in the Horn and East Africa region. In June, the European Commission

adopted a €20 million humanitarian financial package to support 12 million people affected by drought in the Greater Horn of Africa in developing resilience to drought and adapting to climate change.

The International Food Policy Research Institute (IFPRI) assesses the extent to which Northern Nigerian households migrate in response to weather-related variability and shocks. Its discussion paper, *Migratory responses to agricultural risk in Northern Nigeria*, finds that households use migration as a risk management strategy. The author underscores the importance of understanding how climate affects migration decisions in order to better target resources to cope with climate change.

9.7.4 Adaptation

The World Bank Institute has published a series of multimedia learning modules on Climate Adaptation for Water, Agriculture, and Natural Resource Management. The modules address issues including rehabilitating degraded watersheds; innovative cultivation strategies; legal aspects of water use; and public-private partnerships in irrigation management. The modules are available at: <http://vle.worldbank.org/moodle/course/view.php?id=402>

9.7.5 Computer Modeling and Scenarios

Forum for the Future (FF) with support from the British Department of International Development (DFID) has developed four scenarios exploring how climate change would transform low-income countries over the next 20 years. The study warns that unless strong and urgent action is taken, climate change would reverse years of work reducing poverty in the developing world. In addition, shortages of food and natural resources and climate change impacts could lead many nations to question the Western model of economic development and democracy. The study stresses that the impacts of climate change must be factored into development decisions to ensure they continue to yield benefits in the long-term.

The Chalmers Climate Calculator is a simple climate model for online use, developed by Chalmers University of Technology. The model shows potential impacts on global temperature rise under different CO₂ emissions scenarios shaped by reductions' timeframes and scales, climate sensitivity, and the net aerosol forcing in year 2005. The model also allows visualizing the different impacts of emission cuts by Annex I and Non-Annex I countries, as well as the role of deforestation. The global model is accessible at: www.chalmers.se/ee/ccc, while the model considering Annex I grouping and deforestation is available at www.chalmers.se/ee/ccc2.

Similarly, an interactive climate map from Google shows potential future impacts of a 4°C global temperature rise, illustrating rising water levels and reduced crop yields in different parts of the world. The map is continuously updated as new data become available. It is available at: <http://www.fco.gov.uk/google-earth-4degrees.kml> (requires Google Earth installed.)

9.7.6 Post-Copenhagen Negotiations

The World Investment Report 2010 by UNCTAD notes that current national and international policy frameworks do not target private sector and transnational corporation contributions sufficiently and effectively, and underlines the importance of integrating international investment policies into the negotiations and design of the new post-2012 regime. The report proposes a global partnership to synergize investment and climate change mitigation

for promoting sustainable development. One of the components of the proposal is setting up an international low-carbon technical assistance center (L-TAC).

Environmental and economic effects of the Copenhagen pledges and more ambitious emission reduction targets, a report by Germany's Federal Environment Agency (UBA), notes that the emission reduction targets of the world's major CO₂ emitters under the Copenhagen Accord are not yet sufficient to limit global warming to 2°C. Meantime, it shows that economic costs in terms of reduced GDP compared to baseline GDP in 2020 are no higher than 0.25%, assuming that emission allowances are traded globally. For the EU, the impact on GDP between 30% CO₂ reduction (instead of 20%) by 2020 compared to 1990 levels would be marginal.

Climate Stabilization Targets: Emissions, Concentrations, and Impacts Over Decades to Millennia by the National Research Council today assesses the levels of CO₂ reduction that would be necessary to stabilize climate at less than 2°C average global warming. It notes that efforts are needed imminently for a rapid decline to less than 80% of current emissions by mid-century.

Military Implications:

[Same as previous on this issue] The military should identify all 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 perform a gap analysis in anticipation of future requests. International discourse over climate change is increasing the development of international policies and strategies to mitigate and adapt to climate change.

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

Coral reefs suffer mass bleaching

<http://www.telegraph.co.uk/earth/earthnews/7896403/Coral-reefs-suffer-mass-bleaching.html>

Plankton, base of ocean food web, in big decline

http://news.yahoo.com/s/ap/20100728/ap_on_sc/us_sci_declining_plankton

Water Issues between Nepal, India & Bangladesh. IPCS paper

http://www.ipcs.org/pdf_file/issue/SR95.pdf

UN humanitarian chief: 10 million in Africa's drought-stricken Sahel hungry, need help

http://www.google.com/hostednews/canadianpress/article/ALeqM5jeg5Eoxjn-ivdeZ-vjPDaLa_RTNA

Security in Mobility Launch: Key Note Address: Mr. Mark Bowden, HC for Somalia

<http://ochaonline.un.org/OchaLinkClick.aspx?link=ocha&docId=1165384>

Greater Horn of Africa: EU Commission allocates € 20 million to support 12 million victims of recurrent droughts

http://europa-eu-un.org/articles/en/article_9879_en.htm

Migratory Responses to Agricultural Risk in Northern Nigeria. IFPRI Discussion Paper 01007

<http://www.ifpri.org/sites/default/files/publications/ifpridp01007.pdf>

World Investment Report 2010

<http://www.unctad.org/Templates/WebFlyer.asp?intItemID=5535&lang=1>

The Future Climate for Development

<http://www.forumforthefuture.org/projects/the-future-climate-for-development>

Low carbon, high hopes

<http://blogs.dfid.gov.uk/2010/07/low-carbon-high-hopes/>

World Investment Report 2010

<http://www.unctad.org/Templates/WebFlyer.asp?intItemID=5535&lang=1>

Environmental and economic effects of the Copenhagen pledges and more ambitious emission reduction targets

<http://www.uba.de/uba-info-medien/3998.html>

Study Warns that Decisions Made Today About Carbon Emissions Will Have Consequences "In the Coming Centuries and Millennia"

<http://www.wfblogs.org/climate/content/nrc-climatereport-16july2010>

9.8 Nanotechnology Safety Issues

More detailed descriptions of the following nanotechnology issues are in the [Appendix](#)

- EC publishes report on definition of nanomaterials for regulatory purposes ([more](#))
- Study raises doubts on PEN Nano Consumer Products Inventory (CPI) ([more](#))
- GAO tells EPA it should expand nanomaterials info and regulatory efforts ([more](#))
- New EU NanoSustain project aims for sustainable solutions for nanotechnology ([more](#))
- New model predicts nanoparticle cellular toxicity ([more](#))
- The German Paint Association issues nanomaterials workplace guidance ([more](#))
- Scientific review on using nanomaterials in construction materials ([more](#))
- Multicriteria Mapping study analyzes stakeholder preferences in regulating nanotechnology ([more](#))
- *What Can Nanotechnology Learn from Biotechnology?* a collection of papers comparing the nanotech and biotechnology controversies ([more](#))
- Nanotechnology Today 2010 Webinars on nanotech regulations ([more](#))
- Nano Korea 2010 Symposium, 'Nanotechnology for Green World' conference to be held in Korea in August ([more](#))

Item 10. Reports and Information Suggested for Review

10.1 New Website Addresses Conflict-sensitive Conservation

While most of the discourse is around environmental protection in case of conflict, a new website is addressing conflict-sensitive conservation (CSC) in order to prevent conservation activities from exacerbating conflict or impeding peacebuilding. Since many of the world's biodiversity hotspots are located in socially and/or politically unstable zones, conservation organizations have to "adopt conflict-sensitivity". IISD, one of the project's founding organizations, notes that conservation activities could exacerbate conflict situations by restricting populations' access to key livelihood resources; introducing new or additional economic burdens or risks; and/or causing unequal distribution of benefits. The CSC website offers a portal for understanding the links between conservation and conflict in order to reduce their potential negative backlash, while also suggesting best practices and ideas for improving situations.

Military Implications:

Military personnel with environmental and land use planning responsibilities should explore this website for applications in planning.

Sources:

Conflict-Sensitive Conservation. MEA Bulletin Issue No. 97, Thursday, 29 July 2010

<http://www.iisd.ca/mea-l/meabulletin97.pdf>

Conflict-Sensitive Conservation website

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

10.2 Measuring Progress in Conflict Environments: A Metrics Framework

Measuring Progress in Conflict Environments (MPICE): A Metrics Framework is “a hierarchical metrics system of outcome-based goals, indicators, and measures, useful to indications of trends toward the achievement of stabilization goals over time”. The approach shows a different way to measure conflict, based on outcomes in terms of success or failure results of strategies and projects aimed to strengthen stability and build a self-sustaining peace, instead of assessing traditional output such as the number of schools built, miles of roads paved, or numbers of police trained. MPICE provides a “system of metrics that can assist in formulating policy and implementing strategic and operational plans to transform conflict and bring stability to war-torn societies” by establishing “realistic goals, bringing adequate resources and authorities to bear”. The framework is aimed at analyzing the peace progress during stabilization and reconstruction in order to measure the drivers of violent conflict that prevent indigenous institutions from exiting the conflict peacefully. The MPICE system was tested in Afghanistan and Sudan, and it is currently being applied to crisis cases and will be applied to future ones, in order to improve the approach. It was developed by a consortium of organizations working in development, security, and policy.

Military Implications:

The MPICE framework is a good resource for improving security activity in the field.

Source:

Measuring Progress in Conflict Environments

<http://www.usip.org/resources/measuring-progress-in-conflict-environments-mpice-0>

10.3 Repository of Multilateral Environmental Agreements

Multilateral Environmental Agreements: State of Affairs and Developments 2010, edited by Philip Drost, Senior Legal Counsel at the Directorate International Affairs, Netherlands Ministry of Housing, Spatial Planning and the Environment, is a repository of the texts of the most important global Multilateral Environmental Agreements, “including the most recent texts of Rules of Procedure, Financial Rules and Compliance Procedures.” The chapter “Year Ahead” outlines the key negotiating issues for the forthcoming year.

Military Implications:

The book provides a comprehensive tool for legal practitioners and all those who are using MEAs in their work.

Sources:

Multilateral Environmental Agreements. State of Affairs and Developments 2010

<http://www.isbs.com/partnumber.asp?cid=28591&pnid=326458>

10.4 New Reports on Sustainability and Climate Change

The MIT Sloan School of Management has produced its Special Report, *The Business of Sustainability -Findings and Insights from the First Annual Business of Sustainability Survey and the Global Thought Leader's Research Project*, assessing how leading organizations are responding to sustainability-related business forces.

Informing an Effective Response to Climate Change, a new report by the National Research Council, “examines the types of information systems and communication tools needed to ensure that national, state, and local decision makers and the public base climate change policies and personal choices for responding on the best available science.” Among other conclusions, it calls for a systematic framework to effectively address challenges posed by climate change and for improved decision-taking and evaluation. The report is part of the America's Climate Choices suite of studies.

Military Implications:

Military personnel with sustainability and climate change responsibilities should review these reports for potential applications.

Sources:

The Business of Sustainability

<http://sloanreview.mit.edu/special-report/the-business-of-sustainability/>

TheBusiness of Sustainability -Findings from the first annual survey and interview project

<http://www.mitsmr-ezine.com./busofsustainability/2009#pg1>

Informing an Effective Response to Climate Change

http://www.nap.edu/catalog.php?record_id=12784

APPENDIX

Reference Details

This Appendix contains expanded background information on some items.

Item 6. Ecuador to Join the UN Convention on the Law of the Sea

Ecuador anuncia adhesión a la Convemar (original text in Spanish)

<http://andes.info.ec/politica/ecuador-anuncia-adhesion-a-la-convemar-23938.html>

Unofficial (automated) translation (original text follows below):

Ecuador announces membership of UNCLOS

by ANDES / AR "1:06 p.m. - July 25, 2010 In:

<http://andes.info.ec/politica/ecuador-anuncia-adhesion-a-la-convemar-23938.html>

GUAYAQUIL .- The President of Ecuador, Rafael Correa, announced on Sunday his country's accession to the United Nations Convention on the Law of the Sea (UNCLOS).

The president made the announcement as part of a military ceremony on the anniversary of the naval battle of Jambelí in the port city of Guayaquil.

“Very soon we expect the use of the rights stipulated by UNCLOS. It is the political decision of the Government to adhere to the UNCLOS,” Correa said, while adding that he expects the full endorsement by the National Assembly for the ratification of the country’s accession to the body.

"We have much to gain and virtually nothing to lose. The new legal framework is likely to expand our area of maritime sovereignty with great economic benefit to the country, "said Correa. / ARC

Source Article:

Ecuador anuncia adhesión a la Convemar

por ANDES/AR » 13:06 - 25 Jul 2010 En:

<http://andes.info.ec/politica/ecuador-anuncia-adhesion-a-la-convemar-23938.html>

GUAYAQUIL.- El presidente de Ecuador, Rafael Correa, anunció este domingo que la adhesión de su país a la Convención de las Naciones Unidas sobre los Derechos del Mar (Convemar).

El mandatario hizo el anuncio en el marco de una ceremonia castrense por el aniversario de la batalla naval de Jambelí, en la ciudad portuaria de Guayaquil.

“Muy pronto esperamos la vigencia de los derechos estipulados por la Convemar. Es decisión política del Gobierno ingresar a la Convemar”, dijo Correa, al tiempo de agregar que espera todo el respaldo de la Asamblea Nacional para que ratifique el ingreso del país a dicha instancia.

“Tenemos muchísimo que ganar y prácticamente nada que perder. El nuevo marco jurídico que probablemente ampliará nuestro ámbito de soberanía marítima con gran beneficio económico para el país”, dijo Correa. /ARC

source: <<http://andes.info.ec/politica/ecuador-anuncia-adhesion-a-la-convemar-23938.html>>

Item 9. Updates on Previously Identified Issues

9.7 Climate Change

Sources: (an expanded list)

9.7.1 Scientific Evidence and Natural Disasters

Coral reefs suffer mass bleaching

<http://www.telegraph.co.uk/earth/earthnews/7896403/Coral-reefs-suffer-mass-bleaching.html>

Ocean Warming Slows Coral Growth in the Central Red Sea

<http://www.sciencemag.org/cgi/content/abstract/sci.329/5989/322?maxtoshow=&hits=10&RESULTFORMAT=&fulltext=Red+Sea+coral&searchid=1&FIRSTINDEX=0&resourcetype=HWCIT>

Plankton, base of ocean food web, in big decline

http://news.yahoo.com/s/ap/20100728/ap_on_sc/us_sci_declining_plankton

9.7.2 Food and Water Security

Water Issues between Nepal, India & Bangladesh. IPCS paper

http://www.ipcs.org/pdf_file/issue/SR95.pdf

Water Dispute Increases India-Pakistan Tension

<http://www.nytimes.com/2010/07/21/world/asia/21kashmir.html>

India-Pakistan water treaty poised to burst

<http://www.theglobeandmail.com/news/world/asia-pacific/india-pakistan-water-treaty-poised-to-burst/article1652763/>

UN humanitarian chief: 10 million in Africa's drought-stricken Sahel hungry, need help

http://www.google.com/hostednews/canadianpress/article/ALeqM5jeg5Eoxjn-ivdeZ-vjPDaLa_RTNA

9.7.3 Migration

Urgent Action Needed for Pastoralists to Cope with Climate Change

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=628&ArticleID=6634&l=en&t=long>

Security in Mobility Launch: Key Note Address: Mr. Mark Bowden, HC for Somalia

<http://ochaonline.un.org/OchaLinkClick.aspx?link=ocha&docId=1165384> (Ms Word format; if experiencing problems, try item “29 June 2010; Security in Mobility Launch: Key Note Address...”
<http://ochaonline.un.org/kenya/Advocacy/SecurityinMobility/tabid/6735/language/en-US/Default.aspx>)

Greater Horn of Africa: EU Commission allocates € 20 million to support 12 million victims of recurrent droughts

http://europa-eu-un.org/articles/en/article_9879_en.htm

Migratory Responses to Agricultural Risk in Northern Nigeria. IFPRI Discussion Paper 01007

<http://www.ifpri.org/sites/default/files/publications/ifpridp01007.pdf>

9.7.4 Adaptation

World Investment Report 2010

<http://www.unctad.org/Templates/WebFlyer.asp?intItemID=5535&lang=1>

9.7.5 Computer Modeling and Scenarios

The Future Climate for Development

<http://www.forumforthefuture.org/projects/the-future-climate-for-development>

Low carbon, high hopes

<http://blogs.dfid.gov.uk/2010/07/low-carbon-high-hopes/>

9.7.6 Post-Copenhagen Negotiations

World Investment Report 2010

<http://www.unctad.org/Templates/WebFlyer.asp?intItemID=5535&lang=1>

Environmental and economic effects of the Copenhagen pledges and more ambitious emission reduction targets

<http://www.uba.de/uba-info-medien/3998.html>

Study Warns that Decisions Made Today About Carbon Emissions Will Have Consequences "In the Coming Centuries and Millennia"

<http://www.wfwblogs.org/climate/content/nrc-climatereport-16july2010>

9.8 Nanotechnology Safety Issues

More detailed descriptions of the nanotechnology issues

9.8.1 EC Publishes Report on Definition of Nanomaterials For Regulatory Purposes

Responding to a request of the European Parliament, the EC Joint Research Centre (JRC) published a reference report, Considerations on a definition of nanomaterial for regulatory purposes. According to Nanowerk News, "The report discusses possible elements of a definition aiming at reducing ambiguity and confusion for regulators, industry, and the general public. It recommends that the specific term 'particulate nanomaterial' should be employed in legislation to avoid inconsistencies with other definitions and that size should be used as the only defining property." Meantime, the European Commission has requested that the Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR) provide advice on the essential elements of a science-based working definition of "nanomaterials." Part of this process is a public consultation on the preliminary version, in which stakeholders are invited to submit comments and proposals.

Military Implications:

Military personnel concerned with nanotech regulation should follow the evolution of the European discourse on the definitional questions and eventually provide input. This process might set a precedent to be emulated worldwide, and trigger new regulations accordingly.

Sources:

Considerations on a definition of nanomaterial for regulatory purposes

<http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/14270/1/jrc-refreport-definition-nanomaterial-eur24403en.pdf>

European Commission publishes reference report on definition of nanomaterials for regulatory purposes

<http://www.nanowerk.com/news/newsid=17008.php>

Document: Scientific Basis for the Definition of the Term ‘Nanomaterial

http://ec.europa.eu/health/scientific_committees/emerging/docs/scenih_r_o_030.pdf

Public consultation on scientific basis for a definition of the term 'nanomaterial'

<http://www.nanowerk.com/news/newsid=17175.php>

9.8.2 Study Raises Doubts on PEN Nano Consumer Products Inventory (CPI)

A recent study, published in *Nanotechnology Law & Business*, of the Consumer Products Inventory (CPI) prepared by the Wilson Center/Pew Trusts' Project on Emerging Nanotechnologies came to the conclusion that the CPI has substantive deficiencies that call the validity of claims associated with the CPI into question. It also recommends a commitment of resources at the governmental level to produce and maintain a consumer product inventory.

Military Implications:

Military personnel concerned with nanotech risk evaluation should examine the allegations in the article, and their stated justifications, including the authors' professional qualifications, and determine if any additional caution is needed in using data from the CPI. They should also consider the merits of the recommendation for a government-prepared inventory.

Source:

Project on Emerging Nanotechnologies – Consumer Product Inventory Evaluated
Nanotechnology Law & Business (Volume 7, Issue 2)

<http://www.nanolabweb.com/index.cfm/action/main.default.viewArticle/articleID/330/CFID/4996510/CFTOKEN/43195139/index.html> (abstract; subscription or purchase required for full text)

9.8.3 GAO Tells EPA It Should Expand Nanomaterials Info and Regulatory Efforts

A new GAO report, *Nanotechnology: Nanomaterials Are Widely Used in Commerce, but EPA Faces Challenges in Regulating Risk*, says EPA should proceed with previously announced plans to increase the information the agency has on nanomaterials and expand its oversight of them. The EPA has said it agrees, and concurred with the GAO recommendations.

Military Implications:

The military should be prepared for potential additional regulations on the use of nanomaterials.

Sources:

Nanotechnology: Nanomaterials Are Widely Used in Commerce, but EPA Faces Challenges in Regulating Risk

<http://www.gao.gov/products/GAO-10-549>

EPA Should Expand Efforts to Get Data On, Regulate Nanomaterials, GAO Says in Report

<http://www.merid.org/nanodev/more.php?articleID=2708>

9.8.4 New EU NanoSustain Project Aims for Sustainable Solutions for Nanotechnology

The NanoSustain is a consortium comprising 12 partners from 8 different countries. The objective of the NanoSustain project is to develop innovative solutions for the sustainable design, use, recycling and final treatment of nanotechnology-based products, based on hazard characterization and life-cycle assessment (LCA). “This will be achieved by comprehensive data gathering and generation of relevant missing data, as well as their evaluation and validation for specific nano-products or product groups in relation to their human health and environmental hazards and possible impacts that may occur during after-production stages.”

Military Implications:

This project should make substantial contributions to the field of nanotech risk assessment, and should be closely followed by all personnel concerned with those issues.

Sources:

New EU-funded project to develop sustainable solutions for nanotechnology-based products based on hazard characterization

<http://www.nanowerk.com/news/newsid=17326.php>

NanoSustain Project

<http://www.nanosustain.eu/>

9.8.5 New Model Predicts Nanoparticle Cellular Toxicity

Enrico Burello and Andrew Worth of the EC's Joint Research Centre in Ispra, Italy have developed a new theoretical model that predicts which materials will make nanoparticles that could damage living cells. The model matches available electronic energy levels in the nanoparticle structure with the oxidation potentials of reactions that would either remove antioxidants from cells or generate reactive oxygen species (ROS) like hydrogen peroxide or superoxide ions. The researchers are trying to add factors besides oxidative stress.

Military Implications:

According to Meridian Nanotechnology and Development News, "The model could help regulators streamline and prioritize nanotoxicology testing, especially since nanoparticle use is growing faster than toxicology can keep up." It could also be a tool for military R&D agencies and preventive health organizations.

Source:

Predicting Nanoparticle Toxicity

<http://www.rsc.org/chemistryworld/News/2010/July/26071001.asp>

9.8.6 German Paint Association Issues Nanomaterials Workplace Guidance

The German Paint and Printing Ink Association published a guideline document to inform its members on the responsible handling of nanoscale materials at the workplace.

Military Implications:

Although this is a highly specialized industrial application area, the guidelines document could offer useful insight into self-regulation in Europe of potentially hazardous nanomaterials workplace environments.

Sources:

German Paint and Printing Ink Association publishes guidance for workplace handling nanomaterials

<http://www.nanowerk.com/news/newsid=17345.php>

Guidance for the handling of nano-objects at the workplace

http://www.lackindustrie.de/Default2.asp?cmd=get_dwnld&docnr=127627&file=Nanoleitfaden+englisch%2Epdf

9.8.7 Scientific Review on Using Nanomaterials in Construction Materials

Prof. Pedro J. Alvarez at Rice University and colleagues compiled a report listing current uses of nanomaterials in various construction applications and highlighting potential and promising future uses. They also outline benefits, exposure scenarios, and impact mitigation measures.

Military Implications:

This report provides useful guidance for anyone dealing with the use of manufactured nanomaterials in construction.

Sources:

Nanomaterials in the construction industry and resulting health and safety issues

<http://www.nanowerk.com/spotlight/spotid=17138.php>

Nanomaterials in the Construction Industry: A Review of Their Applications and Environmental Health and Safety Considerations

<http://pubs.acs.org/doi/abs/10.1021/nn100866w>

9.8.8 Study Analyzes Stakeholder Preferences in Regulating Nanotechnology

According to Meridian Nanotechnology and Development News, a recent analysis conducted by Steffen Foss Hansen, a postdoctorate student at the Technical Univ. of Denmark, used Multicriteria Mapping (MCM) to study why some nanotechnology regulatory options, such as bans, moratoriums, and voluntary measures, are deemed to be either acceptable or unacceptable to various stakeholders in the United States. His findings are quoted as saying, "[A]dopting an incremental approach and implementing a new regulatory framework have been evaluated as the best options whereas a complete ban and no additional regulation of nanotechnology were the least favorable."

Military Implications:

The results of this study should be taken into account in planning regulatory measures, and, in particular, in presenting them, and their justifications, to the stakeholders.

Sources:

Stakeholder Preferences in Regulating Nanotechnology

<http://www.nanowerk.com/spotlight/spotid=17337.php>

Multicriteria mapping of stakeholder preferences in regulating nanotechnology

<http://www.springerlink.com/content/x82lt46t86514361/>

9.8.9 What Can Nanotechnology Learn from Biotechnology? book

What Can Nanotechnology Learn from Biotechnology? is a collection of papers by experts--proponents and opponents--reviewing the social, environmental, ethical, and regulatory

issues of nanotechnology by comparison to biotechnology controversies, mainly in agricultural and food-related applications.

Military Implications:

Military personnel concerned with the relationship between nanotechnology and society, and setting policy and communicating with the public on such issues, should consider reviewing the paper and the book.

Sources:

In the footsteps of biotech

<http://www.nature.com/nnano/journal/v5/n7/full/nnano.2010.136.html> (Subscription or purchase required)

What Can Nanotechnology Learn From Biotechnology?

http://www.elsevier.com/wps/find/bookdescription.cws_home/713890/description#description

9.8.10 Webinars on Nanotech Regulation Offered

The Keller Heckman law firm is offering a webinar series Nanotechnology Today 2010, focusing on state regulation of nanotechnology in the absence of national regulation, the impact of nanomaterial regulation in Europe and North America, environmental applications of nanotechnology, and benefits and risk communication for nanomaterials. The series will comprises four sessions, in July, September, October, and November, and can be purchased for either live on-line viewing or three post-session on-demand viewings of each event.

Military Implications:

Relevant military personnel should consider subscribing to this offering.

Source:

Nanotechnology Today 2010 webinar

<http://www.khlaw.com/showevent.aspx?Show=3789>

9.8.11 Nanotechnology Conference to Be Held in Korea in August

The Nano Korea 2010 Symposium, "Nanotechnology for Green World", will be held in Seoul 17-20 August, concurrently with the 10th IEEE International Conference on Nanotechnology. More than 10,000 visitors from about 40 countries are expected to attend.

Military Implications:

Relevant military personnel concerned with nanotech environmental health and safety or environmental applications should consider attending the symposium or read the proceedings, to learn of new developments in these areas.

Source:

Nano Korea 2010

<http://www.nanokorea.or.kr/Eng/>