

WORLDWIDE EMERGING ENVIRONMENTAL ISSUES AFFECTING THE U.S. MILITARY
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Note to Readers: Pages 1-12 comprise the summary and analysis of this report. Expanded details for some items are in the Appendix beginning on page 13.

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Item 1. Germany to Propose Adding Climate Change to UN Security Council Agenda

Germany will join the UN Security Council for two years beginning in January as one of ten non-permanent members. During this time it is expected to urge this UN body to begin addressing climate change as a global security threat. This view is shared by many other UN members, as evidence of the security implications of climate change mount, and environmental security is becoming part of the security agenda of states and international security organizations. The UN General Assembly December 15, 2010 session focused on improving the coordination of efforts in case of disasters, including those associated with natural hazards. [Related items: *UK Initiates UN Security Council Debate on Climate Change and Security* in April 2007, and *UN General Assembly Stressed Environment-related Issues* in September 2008 environmental security reports.]

Military Implications:

Military personnel involved in UN peacekeeping and military-to-military planning and training should anticipate increased requirements for future missions related to adaptation to climate change, from increasing weather disasters to human resettlements and food shortages.

Sources:

Security Council must tackle climate change: Germany

<http://www.france24.com/en/20101213-security-council-must-tackle-climate-change-germany>

Surge in Demand for Humanitarian Assistance in High-Risk Environments Informs General Assembly Debate on Strengthening UN Disaster Relief Assistance

<http://www.un.org/News/Press/docs//2010/ga11038.doc.htm>

Item 2. Cancún UN Climate Change Conference Consolidates Progress

The UN Climate Change Conference held in Cancún, Mexico, November 29-December 10, 2010, included the 16th session of the Conference of the Parties to the UN Framework Convention on Climate Change and the 6th session of Conference of the Parties to the Kyoto Protocol. Although no legally-binding outcomes emerged, the “Cancún Agreements” helped to reverse the pessimism from the stalled negotiations during the Copenhagen conference on climate change. The Cancún Agreements include: 1) long-term cooperative action for reducing greenhouse gas emissions and eventually keeping global warming under 2°C by the end of the century; 2) improved monitoring and reporting of national commitments by developed and developing countries; 3) enhanced action for adaptation, including establishing the Cancun Adaptation Framework, an Adaptation Committee, and a work program on loss and damages; 4) creation of the Green Climate Fund with a pledge of \$100 billion a year by 2020 to help developing countries reduce emissions and adapt to climate change; 5) acceleration of technology transfer; 6) strengthening of REDD+ (reduce emissions from deforestation and forest degradation) for lowering (or not raising) rates of deforestation (including fair treatment of indigenous people); and 7) capacity building. There were also around 20 other decisions covering administrative, financial, and institutional matters. The next Conference of the Parties to the UNFCCC is scheduled to be held in Durban, South Africa, November 28-December 9, 2011.

Military Implications:

The Cancún Agreements set conditions for increased accountability concerning emission reductions and adaptation actions. Relevant military personnel should review the “Cancún Agreements” to identify opportunities for implementing the Army Strategy for the Environment, military-to-military activities to build adaptation capacities, and to ensure that units and contractors respect host countries’ climate policies.

Sources:

The outcome documents of the COP16:

http://unfccc.int/conference_documents/items/5776.php

Back from the brink

<http://www.economist.com/node/17730564>

An Ethical Analysis of the Cancun Climate Negotiations Outcome.

<http://rockblogs.psu.edu/climate/2010/12/an-ethical-analysis-of-the-cancun-climate-negotiations-outcome.html>

Item 3. The EU Strengthens Legislation to Counter Cybercrime

The European Commission is developing legislation for criminalizing cyber attacks. A proposed Directive addressing cyber crimes is supplemented by a proposal for strengthening the European Network and Information Security Agency. The strategy also includes setting up a 24-hour alert system in each member state, where citizens and companies can announce attacks. The EU’s anti-terrorism coordinator Gilles de Kerckhove said that “state-driven or state-sponsored attacks” are identified as the highest risk to cyber security. He also warned that while having an international “code of conduct” regulating the use of cyberspace would be helpful, an international legally binding treaty could also legitimize state controls over content. Cybercrime is also identified in the EU Internal Security Strategy action plan as one of the five main areas needing more coordinated strategy to help member countries counter rapidly developing security threats—along with organized crime, international terrorism, borders’ management, and response to natural and man-made crises and disasters. It is likely that the international discussions over coordinated action to counter cybercrime will accelerate and lead to some binding legal frameworks. [Related item: *International Legal Frameworks Needed for Cybersecurity* in April 2010 environmental security report.]

Military Implications:

Military personnel with cyber security expertise should be asked for their suggestions on creation of a global cybersecurity strategy, agreements, and enforcement measures. Such suggestions could be shared with military counterparts to begin the formulation of international military cybersecurity positions that could be used for future treaty negotiations.

Sources:

Commissioner concerned about cyber-attacks on WikiLeaks

<http://euobserver.com/9/31409/?rk=1>

Commission to boost Europe's defences against cyber-attacks

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/10/1239&format=HTML&aged=1&language=EN&guiLanguage=en>

For a more secure Europe

http://ec.europa.eu/news/external_relations/101122_en.htm

Item 4. The ICC to Establish an Independent Oversight Mechanism

The 9th session of the Assembly of States Parties to the Rome Statute of the International Criminal Court, held December 6–10, 2010, was attended by representatives of the 114 ICC States Party and over 150 NGOs. The decisions adopted include a resolution on creating an Independent Oversight Mechanism and its operational mandate, to enhance the Court's efficiency. The IOM's working procedures will be set out in a manual over the coming year, to be adopted at the next Assembly of States Parties, in December 2011. An omnibus resolution, "Strengthening the International Criminal Court and the Assembly of States Parties," covers a wide range of policy and practical issues relating to the ICC and international criminal justice. [Related item: *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* in July 2010 environmental security report.]

Military Implications:

Although the U.S. is not a State Party to the ICC, relevant military personnel should review the documents adopted by the 9th ASP, especially the ones specified above, which aim to strengthen the ICC and international criminal justice. They should be prepared to cooperate or comply, as required by status of forces agreements, in those countries that are States Party.

Sources:

9th Assembly of States Parties to the Rome Statute of the ICC, Official documents

<http://www.icc-cpi.int/nr/exeres/f16c9b3e-55a6-4989-8987-f57125a0d306.htm>

Assembly of States Parties concludes its ninth session

<http://www.icc-cpi.int/Menus/ASP/Press+Releases/Press+Releases+2010/Assembly+of+States+Parties+concludes+its+ninth+session.htm>

Item 5. Technological Advances with Environmental Security Implications

5.1 Improved Plastic Recycling

Warwick Ventures at the University of Warwick, Coventry, England, has announced a new technology, using pyrolysis and fluidized beds that they claim will allow the recycling of 100% of household plastics instead of only 11% processed today (as measured in the U.K.).

Military Implications:

If the process proves to be cost-effective with acceptable environmental impacts, then it could represent a substantial contribution to recycling in military installations and operations.

Source:

Researchers: New tech could recycle all household plastics

<http://www.smartplanet.com/people/blog/pure-genius/new-tech-could-recycle-100-percent-of-household-plastics-even-holiday-wrap/5195/>

5.2 New Detection and Cleanup Techniques

5.2.1 Electrified Nanotube-Fabric Filter Offers Cheap, Fast Water Purification

The abstract of a research paper by Prof. Yi Cui of the Dept. of Materials Science and Engineering at Stanford University and colleagues states that an inexpensive, fast acting electrical water purification system has been developed using silver nanowires and carbon nanotubes on a cotton base. This operates at 100,000 L/(h × m²) and can deactivate >98% of bacteria within several seconds. The deactivation is achieved by large electric field concentrations near the silver nanowire tips.

Military Implications:

This water purification technology should be tested for field applications.

Sources:

High-speed filter uses electrified nanostructures to purify water at low cost

<http://www.rdmag.com/News/2010/08/Materials-Nanotechnology-High-speed-filter-uses-electrified-nanostructures-to-purify-water-at-low-cost/>

High Speed Water Sterilization Using One-Dimensional Nanostructures (Abstract)

<http://pubs.acs.org/doi/abs/10.1021/nl101944e>

5.2.2 Russian Enterprise to Mass Produce Low Cost Detectors for More than 40 Substances

The Russian firm Neutron Technologies has received funding for a project that will mass produce detectors of explosives and narcotics, using labeled neutron technology. The detectors are designed to operate in any kind of surroundings, can identify more than 40 different kinds of explosives, narcotics, and highly toxic substances, and are claimed to be significantly less expensive and more effective by numerous measures than other countries' offerings.

Military Implications:

This product should be evaluated against current options for environmental sensors.

Source:

RUSNANO Funds Project for Detectors of Explosives and Narcotics

<http://www.nanowerk.com/news/newsid=19545.php>

5.2.3 Marine Bacteria Which Can Metabolize Steel Discovered

A new species of bacteria was discovered corroding the Titanic. The newly identified species, while potentially dangerous to vital underwater installations such as offshore oil and gas pipelines, could also offer a new way to recycle iron from old ships and marine structures, according to the researchers from Dalhousie University in Halifax NS, Canada, and Seville University in Spain. Evidence for this species of marine bacteria originated with investigation into strange formations, referred to as "rusticles", found on the underwater wreckage of the Titanic, hence the name designation of *Halomonas titanicae*. In the context of marine bioremediation and recovery of recyclable metals, this discovery provides yet another avenue of investigation into these types of metabolic processes, and the potential organisms (naturally occurring and genetically engineered) utilizing them.

Military Implications:

Relevant military personnel should investigate to determine if this biological solution for iron conversion could help address underwater ship and unexploded ordnance cleanup.

Source:

Steel-munching bacteria are devouring the Titanic, say scientists

<http://www.guardian.co.uk/science/2010/dec/06/titanic-steel-bacteria-rusticles-pipelines>

5.2.4 Improved Method to Remove Pollutants from Gas and Liquids

University of Illinois researchers led by Prof. Mark Rood have created a continuous process for the creation of tailorable carbon/iron-based catalysts. The technology uses ultrasonic spray pyrolysis, also developed at the University, to produce porous carbon spheres with iron nanoparticles dispersed throughout, differentiating it from previous processes which typically provided only one ingredient or the other. The group will now work on developing catalysts to remove three bioaccumulating pollutants from gas streams simultaneously; where now such pollutants are addressed individually.

Military Implications:

The military should evaluate this technique for environmental cleanup of contaminated water or improvements in emissions from combustion sources.

Source:

New method for making tiny catalysts holds promise for air quality

http://www.news.illinois.edu/news/10/1215carbon_spheres_rood.html

Item 6. Updates on Previously Identified Issues**6.1 UNEP Study on Inter-Linkages of Climate Change, POPs, and Human Health**

The UNEP study *Climate Change and POPs Inter-Linkages* is the first systematic review of the link between climate change and the release of persistent organic pollutants (POPs), and the impact on human health and the environment. The study reveals that melting glaciers and ice sheets are releasing POPs trapped years ago, while severe and more frequent flooding triggered by climate change could lead to the secondary emissions of POPs through inundation of agricultural lands and POP storage sites. The study underlines the major impact on human health due to bio-magnification through the food chain. The full study will be presented to the 5th meeting of the Conference of the Parties to the Stockholm Convention, to be held in Geneva, Switzerland, in April 2011. [Related items: *New Chemicals Considered for Toxic Lists* in January 2009 environmental security report.]

Military Implications:

The impact of climate change on releasing potentially toxic chemicals might trigger new international discussions on disclosure and accelerating the cleanup of POP sites, including military bases and/or abandoned weapons. [See *CCW Protocol V on Explosive Remnants of War Entered into Force* in November 2006 environmental security report.]

Sources:

Climate change increases vulnerability of planet to Persistent Organic Pollutants

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=653&ArticleID=6862&l=en>

Climate Change Increases Planet's Vulnerability to Persistent Organic Pollutants

<http://chm.pops.int/Convention/Media/Pressreleases/UNFCCCOP16ClimateChangeCancun7Dec2010/tabid/1269/language/en-US/Default.aspx>

6.2 International Atomic Fuel Banks to Reduce Nuclear Proliferation

Following the March 2010 agreement with the IAEA, the Russian government opened the world's first reserve of low enriched uranium (LEU) at the International Uranium Enrichment Center in Angarsk, Siberia. The plant is holding 120 metric tons of LEU enriched between 2.00% and 4.95%, a safe level compared with the 90% enrichment required for weapons grade uranium. The LEU reserve is intended for IAEA member states, and is part of the global effort to control nuclear proliferation. Separately, on December 3, 2010, the IAEA Board of Governors decided to establish an IAEA LEU bank that will be owned and managed by the IAEA; the location has yet to be identified. [Related items: *Advancements on Non-proliferation and Nuclear Disarmament* in May 2009, and *Advancements on Denuclearization* in April 2010 environmental security reports.]

Military Implications:

The military should explore the use of the enriched uranium reserves along with other initiatives as part of the continual assistance to countries for advancing nuclear disarmament and facilitate NPT negotiations and improve global nuclear safety.

Sources:

IAEA approves global nuclear fuel bank

http://www.world-nuclear-news.org/ENF-IAEA_approves_global_nuclear_fuel_bank-0612105.html

The first in the world guaranteed reserve of nuclear fuel has been set up in the Russian Federation

<http://www.rosatom.ru/wps/wcm/connect/rosatom/rosatomsite.eng/presscentre/news/6a376f8044e2e26db0bdfa6fd126209c>

Russia Inaugurates World's First Low Enriched Uranium Reserve

<http://www.iaea.org/newscenter/news/2010/leureserve.html>

6.3 Shipping Efficiency Database to Reduce Emissions from Maritime Transportation

Shippingefficiency.org is a database developed by the Carbon War Room, aiming to reduce greenhouse gas emissions from maritime shipping. The database contains energy efficiency ratings for over 60,000 international vessels based on the IMO's Energy Efficiency Design Index. While global shipping is responsible for about 3% of total man-made CO₂ emissions, 15% of the global fleet is responsible for 50% of all emissions. The new database will be helpful for monitoring and enforcing the Ship Energy Efficiency Management Plan and the expected revised regulations for mitigation of emissions from maritime transport. [Related item: *IMO MEPC Revises MARPOL, Addresses Emissions from Ships* in October 2010 environmental security report.]

Military Implications:

The military should consider the shippingefficiency.org database for selecting contractors as part of reducing the environmental footprint of the Army in general and from shipping specifically.

Sources:

Shippingefficiency.org website

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

Cleaning up shipping. New database to rate energy efficiency of ocean-going vessels

<http://thechronicleherald.ca/Business/1218898.html>

6.4 Indigenous People Demanding Regulations for Addressing Climate Change and Mining

The Forum of Indigenous Peoples Mining, Climate Change and Well Being, held in Lima, November 18-20, 2010, has issued the Lima Declaration demanding measures to address implications of climate change and mining on indigenous land. The Declaration calls on governments to enact measures limiting (or revoking) transnational companies' rights to mine on indigenous land without consultation with the indigenous people, and the adoption of laws to determine zones prohibited for mining on indigenous territories. It calls upon the UN to declare indigenous peoples "the rightful owners since the ancient times of the soil, subsoil and natural resources" of their territories. They also declare being "committed to instrumentalize the International Court of Justice Climate" and the "construction of a national and regional agenda for climate justice." [Related item: *Indigenous Peoples Demand More Involvement in Environmental Policies* in May 2008 environmental security report.]

Military Implications:

Those involved in military-to-military operations on lands of indigenous peoples should review the Lima Declaration for implications for future operations.

Sources:

Indigenous Peoples in Latin America Unite Against Mining

<http://www.galdu.org/web/index.php?odas=4967&giella1=eng>

Lima Declaration - Forum of Indigenous Peoples Mining, Climate Change And Well Being

<http://www.culturalsurvival.org/news/peru/lima-declaration-forum-indigenous-peoples-mining-climate-change-and-well-being>

6.5 Regional Cooperation in Africa to Counter Wildlife Trafficking

Africa's only wildlife law enforcement NGO, Last Great Ape Organization (Laga), has coordinated successful transinstitutional 'sting' operations against wildlife crime in Cameroon, Gabon, CAR and DR Congo. For the first time, Gabon has jailed ivory dealers. The Laga founder noted, "African governments have started realizing international trafficking has to be fought internationally. These arrests in four neighboring countries are a warning... – no longer can you hide on the other side of a border." [Related item: *International Consortium Created to Curb Environmental Crime* in November 2010 environmental security report.]

Military Implications:

AFRICOM should explore how to assist such regional collaboration and build capacity to help enforcement of the Convention on International Trade in Endangered Species and the Convention against Transnational Organized Crime.

Sources:

Central Africa: four-nation 'sting' operation busts wildlife smuggling ring

<http://www.guardian.co.uk/environment/2010/dec/12/africa-wildlife-ivory-smuggling>

6.6 Bioethics Commission Calls for Enhanced Federal Oversight of Synthetic Biology

The Presidential Commission for the Study of Bioethical Issues has released its first report, *New Directions. The Ethics of Synthetic Biology and Emerging Technologies* – a comprehensive review of the emerging field of synthetic biology, including 18 recommendations, covering such topics as the risks likely to be encountered and approaches to regulation. With respect to seven of those 18, the Commission recommends "ongoing review by the government, in consultation with

the relevant scientific, academic, international, and public communities, with initial action completed within 18 months and made public.”

Military Implications:

Military personnel with research responsibilities that could be affected by synthetic biology should be given this document to study. Those with direct responsibilities for synthetic biology should give special consideration to the report’s recommendations, especially the seven cited above (1, 3, 5, 9, 11, 12, and 17).

Sources:

Presidential Commission on Bioethics calls for enhanced federal oversight of synthetic biology
<http://www.nanowerk.com/news/newsid=19449.php>
New Directions -The Ethics of Synthetic Biology and Emerging Technologies
<http://www.bioethics.gov/documents/synthetic-biology/PCSBI-Synthetic-Biology-Report-12-16-10.pdf>

6.7 China to Expand Weather Control Program

Reportedly, the Director of the China Meteorological Administration has said that chronic water shortages in parts of the country will worsen over the coming decades, and therefore the need for using weather-control technologies will increase. China already began last year to allocate a special budget for weather control activities, and spending grew 19% in the first ten months of 2010, to \$114 million. [Related item: *Chinese Use of Weather Modification Technologies Might Cause Disputes* in July 2004 environmental security report.]

Military Implications:

These activities will provide additional data on the consequences of such measures, and should be monitored, especially if they are a precursor to larger-scale geoengineering proposals and prove safe to apply to drought-prone areas that otherwise might force migrations that could lead to conflict.

Source:

China to step up efforts to control Mother Nature
<http://www.physorg.com/news/2010-12-china-efforts-mother-nature.html>

6.8 Climate Change

6.8.1 Scientific Evidence and Natural Disasters

Since 1970, each decade has been warmer than the preceding one, and 2000-2010 has been the warmest one on record, conclude preeminent meteorological organizations, despite some uncertainties and differences of measurement methodologies. Based on preliminary data from NASA and NOAA, 2010 might be the warmest year on record.

The *Climate Vulnerability Monitor 2010* estimates that the number of countries with most acute vulnerability will increase from 17 in 2010 to 48 in 2030. Using color-coded graphics, the report shows the worldwide vulnerability to climate change, comparing today’s situation with forecasts to 2030 as to health impacts, weather disasters, habitat loss, and economic stress. For example, annual deaths due to changing climate conditions could rise from 350,000 now, to 1 million by 2030, unless adaptation policies are implemented in vulnerable countries. Floods will cause most of the deaths from extreme weather.

Climate Risk Index 2011 by Germanwatch shows that in the period 1990-2009, developing countries are among the ten most affected by extreme weather and noted the importance of comprehensive risk management which includes new regional and international insurance approaches in accordance with the 'polluter pays' principle.

6.8.2 Food and Water Security

The World Bank's new initiative "Roadmap for Action: Agriculture, Food Security and Climate Change" stresses the role agriculture can play in climate and finance, such as: enhanced resilience and carbon sequestration.

The World Bank notes considerable increase in acquisition of farmlands since 2008. Over the first 11 months of 2009, there were signed deals covering at least 110 million acres, compared to an average 10 million acres per year before 2008.

Food security, farming, and climate change to 2050 by the International Food Policy Research Institute (IFPRI) has 15 scenarios that examine potential population and income growth. While warning that climate change could push staple food prices up 130%, it suggests that improved agricultural productivity, broad economic growth, and robust international trade could mitigate the adverse impacts of climate change on food security.

The Abu Dhabi Water Declaration adopted by the 31st Gulf Cooperation Council Summit stresses the connection between water security and diversification of energy and food security as important priorities. The GCC states are expected to create legislation to increase water efficiency, including the pricing system, review of the agricultural sector, and the efficiency of water desalination plants.

The Managing Blue Gold: New Perspectives to Water Security in the Levantine Middle East study by the Finnish Institute of International Affairs depicts future challenges of water security in this part of the Middle East and focuses on the ability of governments to secure a sustainable water supply for their populations.

6.8.3 Melting glaciers and sea ice

Recent research shows that the waters off the Western Antarctic Peninsula are warming exponentially, accelerating the melting ice shelf.

6.8.4 Migration

Following November's Brasilia Declaration, Mexico has recently passed a unique Law on Refugees and Complementary Protection, becoming the first country in the region to grant "complementary protection" for those not considered refugees but at risk of other threats.

Within Africa's Sahel, a region of approximately 60 million inhabitants, extreme drought and unpredictable weather patterns continue to worsen food and water security, and interregional migration. Additionally, insecurity triggered by spending money from natural resources (such as the oil money in Chad) on soldiers and military weaponry, exacerbates human migration.

The IOM reports that, worldwide, there are an estimated 740 million internal migrants and 214 million international migrants, with approximately 60% of all migration occurring within countries in the same category of development.

6.8.5 Adaptation

The UNEP *Latin America and the Caribbean: Atlas of our Changing Environment* is highlighting environmental challenges in the region due to climate change, loss of biodiversity, deforestation, the impacts of mining and natural disasters, changes in land use, and degradation of coastal areas.

According to the ECLAC report *Economics of Climate Change in Latin America and the Caribbean*, in the region's temperate countries, losses from climate change may amount to around 1% of annual GDP by 2100 in the scenario of highest emissions (A2 of the IPCC).

Military Implications:

[Same as previous on this issue] 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 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](#))

How Will We Know if 2010 Was the Warmest Year on Record?

<http://www.climatecentral.org/news/tracking-the-temperature-of-a-warming-planet/>

Climate Vulnerability Monitor 2010 report

<http://daraint.org/climate-vulnerability-monitor/climate-vulnerability-monitor-2010/>

Global Climate Risk Index 2011

<http://www.germanwatch.org/klima/cri.htm>

World leaders announce roadmap for action on agriculture, food security and climate change

<http://www.agricultureday.org/blog/index.php/?p=423>

African Farmers Displaced as Investors Move In

<http://www.nytimes.com/2010/12/22/world/africa/22mali.html?nl=todaysheadlines&emc=a22>

Food security, farming, and climate change to 2050

<http://www.ifpri.org/publication/food-security-farming-and-climate-change-2050>

UAE-GCC SUMMIT: Abu Dhabi Water Declaration calls for adoption of modern farming technologies

http://ipsnotizie.it/wam_en/news.php?idnews=7963

Managing Blue Gold: New Perspectives on Water Security in the Levantine Middle East

http://www.upi-fiia.fi/en/publication/154/managing_blue_gold/

Water as a Strategic Resource in the Middle East

<http://csis.org/publication/clear-gold>

Antarctic Melting as Deep Ocean Heat Rises

<http://news.discovery.com/earth/antarctica-melting-warming-penguins-101214.html>

UN High Commissioner Guterres welcomes breakthrough Mexico legislation on international protection

<http://www.unhcr.org/4d025bb66.html>

On the move in a warming world: The rise of climate refugees

<http://www.theglobeandmail.com/news/world/africa-mideast/on-the-move-in-a-warming-world-t-he-rise-of-climate-refugees/article1843024/page1/>

World Migration Report 2010

http://publications.iom.int/bookstore/free/WMR_2010_ENGLISH.pdf

Latin America and the Caribbean: Atlas of our Changing Environment

http://www.cathalac.org/lac_atlas/

Economics of Climate Change in Latin America and the Caribbean

<http://www.eclac.cl/cgi-bin/getProd.asp?xml=/publicaciones/xml/9/41909/P41909.xml&xsl=/dmaah/tpl-i/p9f.xsl&base=/dmaah/tpl/top-bottom.xsl>

6.9 Nanotechnology Safety Issues

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

- EC’s SCENIHR concludes that size should be the basis for the definition of ‘nanomaterial’ ([more](#))
- ETC Group report *The Big Downturn? Nanogeopolitic* presents comprehensive nanotech geopolitical landscape including regulation ([more](#))
- California asks manufacturers for nano analytical test measures ([more](#))
- Management of nanomaterials safety in research environment currently being implemented in more than 100 research labs ([more](#))
- Use of TiO₂ nanoparticles in city pavement raises risk questions ([more](#))
- OECD new documents on manufactured nanomaterials safety, including a compilation of guidelines related to exposure to nanomaterials in laboratories ([more](#))
- NIOSH Calls For Comments on Draft Nanotechnology Recommendations ([more](#))
- Austrian Nanotrust documents now available in English ([more](#))
- Proceedings of the International Conference on Safe production and use of nanomaterials, Nanosafe 2010, are now available on-line ([more](#))

Item 7. Reports and Information Suggested for Review

7.1 Global Energy Market Shifts to Asia Over Next Ten Years

More for Asia: Rebalancing World Oil and Gas, a paper published by Chatham House (The Royal Institute of International Affairs) offers forecasts through 2030 on the world’s oil and gas industries. Important highlights include anticipated increased politicization of access as industries governed by the state play a larger role in supply and distribution.

Military Implications:

Military planners responsible for energy policy, procurement and strategy for installations and commands, especially in non-U.S. regions where supply may be sourced locally, should become familiar with this report.

Source:

More for Asia: Rebalancing World Oil and Gas

<http://www.chathamhouse.org.uk/publications/papers/view/-/id/981/>

7.2 U.S. Senate Foreign Relations Committee Hearing on Latin America

The U.S. Senate Foreign Relations Committee held a hearing titled *Latin America in 2010: Opportunities, Challenges, and the Future of U.S. Policy in the Hemisphere* on December 1, 2010, which included emphasis on various aspects of the environment and energy. Collaboration within the Americas on preservation of the Amazon (as well as general environmental protection

aligned with economic development), initiation of a new U.S.-Brazil energy partnership elevated to international stature, sustainable agriculture and development approaches targeted to small farmers, and focusing of attention on the civil and economic causes of migration were proposed by senators as issues important to U.S. foreign policy.

Military Implications:

SOUTHCOM leadership should review the text of this hearing for future Latin American development, energy and environment policies.

Sources:

Latin America in 2010: Opportunities, Challenges, and the Future of U.S. Policy in the Hemisphere

<http://foreign.senate.gov/hearings/hearing/?id=28bfd63d-5056-a032-522a-f15cc4df8ef0>

Senators Listen to Ideas for Improving Relations with Latin America

<http://www.infozine.com/news/stories/op/storiesView/sid/45119/>

APPENDIX

Reference Details

This Appendix contains expanded background information on some items.

Item 6. Updates on Previously Identified Issues

6.8 Climate Change

6.8.1 Scientific Evidence and Natural Disasters

Sources: (a more expanded list)

6.8.1 Scientific Evidence and Natural Disasters

Near record temperatures in 2010 to be followed by cooler 2011

<http://www.metoffice.gov.uk/corporate/pressoffice/2010/pr20101202b.html>

2010 sets new temperature records

<http://www.bbc.co.uk/news/science-environment-11903397>

How Will We Know if 2010 Was the Warmest Year on Record?

<http://www.climatecentral.org/news/tracking-the-temperature-of-a-warming-planet/>

Warmest November on Record, NASA Data Shows

<http://www.climatecentral.org/blog/warmest-november-on-record-nasa-data-shows/>

Climate Vulnerability Monitor 2010 report

<http://daraint.org/climate-vulnerability-monitor/climate-vulnerability-monitor-2010/>

Climate change effects vary widely between rich and poor countries

http://www.contracostatimes.com/environment/ci_16947877?nclick_check=1

Global Climate Risk Index 2011

<http://www.germanwatch.org/klima/cri.htm>

6.8.2 Food and Water Security

Agriculture Must Play Key Role In Climate Solutions

<http://go.worldbank.org/3SYJZL2PN0>

World leaders announce roadmap for action on agriculture, food security and climate change

<http://www.agricultureday.org/blog/index.php/?p=423>

African Farmers Displaced as Investors Move In

<http://www.nytimes.com/2010/12/22/world/africa/22mali.html?nl=todaysheadlines&emc=a22>

Africa mulls biofuels as land grab fears grow

<http://www.reuters.com/article/idUSTRE6AT3ZE20101130>

Food security, farming, and climate change to 2050

<http://www.ifpri.org/publication/food-security-farming-and-climate-change-2050>

UAE-GCC SUMMIT: Abu Dhabi Water Declaration calls for adoption of modern farming technologies

http://ipsnotizie.it/wam_en/news.php?idnews=7963

UAE leads water security agenda

<http://www.thenational.ae/news/uae-news/environment/uae-leads-water-security-agenda>

Abu Dhabi Water Declaration calls for adoption of modern farming technologies

http://www.uaeinteract.com/docs/Abu_Dhabi_Water_Declaration_calls_for_adoption_of_modern_farming_technologies/43642.htm

Managing Blue Gold: New Perspectives on Water Security in the Levantine Middle East

http://www.upi-fiia.fi/en/publication/154/managing_blue_gold/

Managing Blue Gold: New Perspectives on Water Security in the Levantine Middle East--
Launching event highlight

<http://www.upi-fiia.fi/en/event/317/>

Water as a Strategic Resource in the Middle East

<http://csis.org/publication/clear-gold>

6.8.3 Melting glaciers and sea ice

Antarctic Melting as Deep Ocean Heat Rises

<http://news.discovery.com/earth/antarctica-melting-warming-penguins-101214.html>

6.8.4 Migration

UN High Commissioner Guterres welcomes breakthrough Mexico legislation on international protection

<http://www.unhcr.org/4d025bb66.html>

On the move in a warming world: The rise of climate refugees

<http://www.theglobeandmail.com/news/world/africa-mideast/on-the-move-in-a-warming-world-the-rise-of-climate-refugees/article1843024/page1/>

World Migration Report 2010

http://publications.iom.int/bookstore/free/WMR_2010_ENGLISH.pdf

6.8.5 Adaptation

Latin America and the Caribbean: Atlas of our Changing Environment

http://www.cathalac.org/lac_atlas/

New atlas maps future of the environment in Latin America and Caribbean

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=653&ArticleID=6867&l=en&t=long>

Economics of Climate Change in Latin America and the Caribbean

<http://www.eclac.cl/cgi-bin/getProd.asp?xml=/publicaciones/xml/9/41909/P41909.xml&xsl=/dmaah/tpl-i/p9f.xsl&base=/dmaah/tpl/top-bottom.xsl>

Climate Change Is Expected to Cost Latin American Countries at Least 1% of Annual GDP

<http://www.eclac.org/cgi-bin/getProd.asp?xml=/prensa/noticias/comunicados/7/41947/P41947.xml&xsl=/prensa/tpl-i/p6f.xsl&base=/tpl-i/top-bottom.xsl>

Climate change to trim Latin America growth: UN

http://news.yahoo.com/s/afp/20101208/sc_afp/unclimateglobaltam

6.9 Nanotechnology Safety Issues

More detailed descriptions of the nanotechnology issues

6.9.1 EC Committee Presents Scientific Basis for the Definition of "nanomaterial"

According to nanowerk.com, the EC's Scientific Committee for Emerging and Newly Identified Health Risks (SCENIHR) has published a 46-page paper – *Scientific Basis for the Definition of the Term "nanomaterial"*, in which it basically concludes that size should be the basis for this definition. The Executive Summary from the paper briefly lays out the multitude of considerations and qualifications related to this complex question.

Military Implications:

This definition is a difficult but key point that lies at the foundation of much nanotech regulatory activity. ES personnel concerned with this area should review the paper.

Sources:

EU scientific committee publishes opinion on definition of nanomaterials

<http://www.nanowerk.com/news/newsid=19377.php>

Scientific Basis for the Definition of the Term "nanomaterial"

http://ec.europa.eu/health/scientific_committees/emerging/docs/scenihr_o_032.pdf

6.9.2 The Geopolitics of Nanotech

ETC Group, a Canadian NGO, has released a 68-page report, *The Big Downturn? Nanogeopolitics*, which “revisits nano’s geopolitical landscape, providing a current snapshot of global investment, markets, governance and control, including intellectual property.” The report devotes 24 pages to questions of nanotech regulation and public communication, pointing out that “industry is increasingly nervous about its health and environmental exposure.”

Military Implications:

The report might be a good source of information on the present worldwide state of affairs of nanotechnology.

Source:

The Big Downturn? Nanogeopolitics

<http://www.etcgroup.org/en/node/5245>

6.9.3 California Asks Manufacturers for Nano Analytical Test Measures

The California Department of Toxic Substances Control (CDTSC) has issued a call to manufacturers for information regarding analytical test methods for nanosilver, nano zero valent iron, nano titanium dioxide, nano zinc oxide, nano cerium oxide, and quantum dots, citing the almost total lack of such information.

Military Implications:

The call is accompanied by a 102-page bibliography of chemical information on the nanomaterials of concern, which should be a very useful reference work for risk assessment.

Source:

CDTSC issues DCI for Nano Metals, Nano Metal Oxides, and Quantum Dots

<http://nanotech.lawbc.com/2010/12/articles/united-states/state/cdtsc-issues-dci-for-nano-metals-nano-metal-oxides-and-quantum-dots/>

Bibliography

http://www.dtsc.ca.gov/TechnologyDevelopment/Nanotechnology/upload/Round_Two_Biblio.pdf

6.9.4 Management of Nanomaterials Safety in Research Environment

According to Meridian *Nanotechnology and Development News*, "This article ... presents a practical, 'user-friendly' procedure for university-level safety management of nanomaterials. ... The procedure ... involves classifying laboratories into risk classes, with a list of risk mitigation measures given for each hazard level." It is currently being implemented at the Ecole Polytechnique de Lausanne, Switzerland, in more than 100 research labs.

Military Implications:

The article should offer insights into this institution's experience with this technique for risk management.

Source:

Management of Nanomaterials Safety in Research Environment

<http://sites.merid.org/nanodev/more.php?articleID=3034>

6.9.5 Use of TiO₂ Nanoparticles in City Pavement Raises Risk Questions

The TiO₂ nanoparticles used for air purification in city pavement in Antwerp allegedly agglomerate to a larger molecule with a size of 1.5 μm, and so escape suspicion of possibly producing "nanoparticle pollution", but questions have been raised about their long-term fate – whether weathering over the decades may result in their release in their original form or in a form that may be degraded after inhalation., creating an environmental problem. Dr. Anil Kumar Suresh of the Biological and Nanoscale Systems Group, Oak Ridge National Laboratory, warns, "There's not much known about the fate, transport and transformation of these particles in the environment. The area is not so explored and we cannot tell what will happen if the concentration of nanoparticles increases in the atmosphere. We have to be very careful", a reasonable warning considering the widespread use of TiO₂-containing materials.

Military Implications:

The use of TiO₂ nanoparticles should be viewed with extreme caution until their environmental risk is much better understood.

Source:

TiO₂ nanoparticles-containing materials in our cities: Impacts are difficult to predict

<http://www.physorg.com/news/2010-11-tio2-nanoparticles-containing-materials-cities-impacts.html>

6.9.6 OECD Publishes Documents on Manufactured Nanomaterials Safety

OECD has published two new documents in its *Series on the Safety of Manufactured Nanomaterials*:

No. 27: List of Manufactured Nanomaterials and List of Endpoints for Phase One of the Sponsorship Programme for the Testing of Manufactured Nanomaterials: Revision

A list of representative manufactured nanomaterial selected by the OECD Working Party on Manufactured Nanomaterials (WPMN) for use in its work.

[http://www.oecd.org/officialdocuments/displaydocumentpdf?cote=env/jm/mono\(2010\)46&doclanguage=en](http://www.oecd.org/officialdocuments/displaydocumentpdf?cote=env/jm/mono(2010)46&doclanguage=en)

No. 28: Compilation and Comparison of Guidelines Related to Exposure to Nanomaterials in Laboratories

An overview of recently published guidelines regarding the usage of nanomaterials in a laboratory scale.

[http://www.oecd.org/officialdocuments/displaydocumentpdf?cote=env/jm/mono\(2010\)47&doclanguage=en](http://www.oecd.org/officialdocuments/displaydocumentpdf?cote=env/jm/mono(2010)47&doclanguage=en)

Military Implications:

Relevant military personnel should consider the reports for information on the current state of nanotech risk assessment.

6.9.7 NIOSH Calls For Comments on Draft Nanotechnology Recommendations

The National Institute for Occupational Safety and Health (NIOSH) has invited public comment on a draft document, *Current Intelligence Bulletin: Occupational Exposure to Carbon Nanotubes and Nanofibers*, that "summarizes the adverse respiratory health effects that have been observed in laboratory animal studies with single-walled carbon nanotubes, multi-walled carbon nanotubes and CNF and provides recommendations for the safe handling of these materials." According to Nanowerk News, it also suggests areas where further research is vital. The draft document is available at www.cdc.gov/niosh/docket/review/docket161A/ for written public comment until February 18, 2011, and NIOSH will hold a public meeting to discuss and obtain comments on February 3, 2011, in Cincinnati, Ohio.

Military Implications:

ES personnel with appropriate knowledge should review the draft and consider submitting comments or attending the public meeting.

Source:

Occupational Exposure to Carbon Nanotubes and Nanofibers

<http://www.cdc.gov/niosh/docket/review/docket161A/>

NIOSH seeks comments on draft nanotechnology recommendations

<http://www.nanowerk.com/news/newsid=19308.php>

6.9.8 Austrian Nanotrust Documents Now Available in English

The NanoTrust project of the Institute of Technology Assessment of the Austrian Academy of Sciences has released some of its dossiers in English: *Nanoparticles and the Human Body*, *Nanosilver*, *What is Accompanying Research on Nanotechnology?*, *Can nanoparticles end up in the brain?*, *Nano-Textiles*, *Voluntary approaches by industry in the field of nanomaterials*, *EU Regulation*. The dossiers are a brief summary of the most important information about possible health and environmental risks and on societal aspects of nanotechnologies. Additional items will be added gradually.

Military Implications:

These dossiers could be a good source of information on nanotech-related research and regulations status.

Sources:

NanoTrust documents now available in English

<http://www.nanowerk.com/news/newsid=19338.php>

Can nanoparticles end up in the brain?

<http://www.nanowerk.com/spotlight/spotid=19339.php>

NanoTrust-Dossiers

<http://epub.oew.ac.at/ita/nanotrust-dossiers/>

6.9.9 NanoSafe 2010 Proceedings Now Available

Proceedings of the International Conference on Safe production and use of nanomaterials, Nanosafe 2010, November 16-18, 2010 in Grenoble, France, are now available on-line. Topics at the event included: Exposure assessment, Characterization, Detection and Monitoring, Nanomaterials life cycle, Toxicology, Environmental impact, Nanoparticle release from consumer products, Personal protection equipment, Secure industrial production, Safety parameters evaluation, Standardization, and Regulations.

Military Implications:

The proceedings could be a good source of information on nanotech-related safety research.

Sources:

NanoSafe 2010 presentations now available online

<http://www.nanowerk.com/news/newsid=19267.php>

Poster presentations at Nanosafe 2010

<http://www.nanosafe.org/scripts/home/publigen/content/templates/show.asp?P=119&L=EN&SYNC=Y>

Oral presentations at Nanosafe 2010

<http://www.nanosafe.org/scripts/home/publigen/content/templates/show.asp?P=118&L=EN&SYNC=Y>