

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

JUNE 2009 REPORT

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

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Item 1. International Guidance on the Treatment of Individuals in War May Eventually Guild International Standards on the Treatment of the Environment in War

Making distinctions between civilians and combatants, as well as making distinctions between military targets and civilian areas, is becoming increasingly difficult and may become even more difficult in the future. As a result, the International Committee of the Red Cross has issued an “Interpretive Guidance” concerning “the distinction between legitimate military targets and persons protected against direct attacks.” The Guidance is not intended to replace existing rules, but clarify criteria in answering key questions. “Who is considered a civilian for the purposes of the principle of distinction? What conduct amounts to direct participation in hostilities? What modalities govern the loss of protection against direct attack?” With the increasing attention to environmental security, these kinds of questions may eventually be applied to the environment. Although the guidance applies only to IHL affecting human factors, considering the reference that triggered the guidelines, “transformation and modernization of warfare”, as well as previous discussions relative to including environmental factors under IHL, it is fair to speculate that the scope and spectrum might be expanded to also cover environmental aspects; e.g., when is the use of environment considered a weapon and when should it be off limits?

Military Implications:

Long-range military planning might be wise to assume that such guidance will eventually be extended to the environment. Those involved in implementing the Army Strategy for the Environment might meet with relevant personnel at the International Committee of the Red Cross to explore collaboration about future guidance on the environment.

Sources:

Interpretive Guidance on the Notion of Direct Participation in Hostilities under International Humanitarian Law (International Committee of the Red Cross, June 2009)

[http://www.icrc.org/Web/eng/siteeng0.nsf/htmlall/direct-participation-ihl-article-020609/\\$File/direct-participation-guidance-2009-ICRC.pdf](http://www.icrc.org/Web/eng/siteeng0.nsf/htmlall/direct-participation-ihl-article-020609/$File/direct-participation-guidance-2009-ICRC.pdf)

International Law in Brief, June 26. Resolutions, Declarations, and Other Documents

<http://www.asil.org/ilib090626.cfm#r1>

Item 2. Proposal for a UN Environmental Mediation Program

Former and present Executive Directors of UNEP and NGO leaders met June 28-July 2, 2009 in Glion, Switzerland to make recommendations to improve international environmental governance. A UN Environmental Mediation Program (UNEMP) was proposed by U.S. Ambassador John McDonald, Executive Director of the Institute for Multi-Track Diplomacy. The proposed UNEP unit would provide mediation services as requested by governments to help resolve environmental issues between nations and within nations, including training of environmental mediators, establishing national environmental mediation centers, assisting national research programs, and creating an international panel of environmental mediators to be on call to help resolve transboundary disputes. The idea will be considered by UNEP later in 2009. [For an earlier version of the proposal see: "Environmental Security: United Nations Doctrine for Managing Environmental Issues in Military Actions; Appendix C: United Nations Environmental Mediation Program (UNEMP)" at <http://www.millennium-project.org/millennium/es-un-app3.html>]

Military Implications:

Those involved in implementing the Army Strategy for the Environment and other relevant military personnel might contact Ambassador McDonald to explore how the military might collaborate with the development and deployment of the proposed units.

Sources:

GEG Forum: Reflecting on the Past, Moving into the Future

<http://environmentalgovernance.org/event/2009/06/geg-forum>

For further information, contact: U.S. Ambassador John McDonald, Executive Director of the Institute for Multi-Track Diplomacy, email: <Jmcdonald@imtd.org>

Environmental Security: United Nations Doctrine for Managing Environmental Issues in Military Actions; Appendix C: United Nations Environmental Mediation Program (UNEMP)

<http://www.millennium-project.org/millennium/es-un-app3.html>

Item 3. Canada, Mexico, and the USA Met to Strengthen Regional Environmental Regulations

Environment ministers of Canada, Mexico, and the United States met as the Council of the Commission for Environmental Cooperation (CEC) and consulted with the Joint Public Advisory Committee in Denver this month to improve public participation and partnerships, enhance accountability and transparency, and set clear performance goals concerning environmental regulations across the continent. The environmental trilateral 2010–2015 Strategic Plan will consider strategies for reducing CO₂ emissions (including a potential continental cap-and-trade system), climate change mitigation and adaptation issues, and enhancing protection of ecosystems. The participants from the public group asked specifically that reducing the North American ecological footprint also be included. Earlier this month, U.S. Secretary of State Hillary Clinton and Canada's Minister of Foreign Affairs Lawrence Cannon met and announced their intention to modernize the 37-year-old Great Lakes Water Quality Agreement to reflect the new environmental threats and technologies to address them.

Military Implications:

Military personnel with environmental responsibilities that relate to the border areas should keep track of the CEC's work as it affects collaboration among government agencies, which might affect some military operations and collaboration among military counterparts.

Sources:

Commission for Environmental Cooperation (CEC) Ministerial Statement

<http://www.cec.org/news/details/index.cfm?varlan=english&ID=2828>

Input from Millennium Project staff attending the CEC meeting (for further information contact <millennium-project@igc.org>)

USA, Canada to Modernize Great Lakes Water Quality Pact

<http://www.ens-newswire.com/ens/jun2009/2009-06-15-01.asp>

Item 4. European Union to Consider Regulations for Curbing Biowaste

The European Commission is conducting an assessment of the potential need for and impact of legislation for reducing biowaste and its environmental impacts. The new regulation should

reinforce the EU Landfill Directive, including a large spectrum of measures, from prevention, handling, and treatment, to product labeling. However, important aspects will need to be elucidated, from definitions related to biowaste, to countries infrastructure differences. Biowaste in the EU is estimated to rise to 139 million tonnes yearly, representing an important source of greenhouse gas emissions and other pollution when deposited in landfills. The Commission should present the impact assessment of different policy options by the end of 2009, and the legislative proposal is expected to be adopted in 2010.

Military Implications:

The military stationed in the EU region should increase its biowaste management practices and be prepared to comply with eventual new regulations.

Sources:

Council Conclusions. Green Paper on the management of bio-waste in the European Union

http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/envir/108751.pdf

EU biowaste directive moves a step closer

<http://www.euractiv.com/en/sustainability/eu-biowaste-directive-moves-step-closer/article-183575>

Item 5. EU-US Joint Energy-Efficiency Standards for Office Equipment

The European Commission and the U.S. Environmental Protection Agency agreed to implement the joint Energy Star Programme by introducing higher energy-efficiency standards for office equipment such as computers, copiers and printers.

Military Implications:

Military acquisition departments, contractors, and manufacturers should make sure that office equipment complies with the Energy Star program's stipulations.

Sources:

EU and US Reinforce Energy Efficiency Standards for Office Equipment

http://www.eurunion.org/eu/index.php?option=com_content&task=view&id=3417&Itemid=58

EU-US Energy Star Program

<http://www.eu-energystar.org/en/index.html>

Item 6. Technological Advances with Environmental Security Implications

6.1 Faster and Cheaper Virus Detector Uses Indium Nanowires, Synthetic Antibodies

A more rapid and cheaper type of SARS virus-detector is being developed by a team from the University of Southern California. The active elements are indium oxide nanowires carrying bioengineered synthetic antibodies, reportedly resulting in a system which is lower in cost and produces results in minutes rather than hours, compared to existing devices.

Military Implications:

The military should investigate this development for its potential application in fast detection and reaction to viral contamination.

Source:

Label-Free, Electrical Detection of the SARS Virus N-Protein with Nanowire Biosensors Utilizing Antibody Mimics as Capture Probes

<http://pubs.acs.org/doi/abs/10.1021/nm900086c>

A quicker, cheaper SARS virus detector benefits from advances in nanodesign

<http://www.nanowerk.com/news/newsid=10908.php>

6.2 Increasing Energy Efficiency Technologies

6.2.1 Environmental Advantages in New Methanol Production Process

Scott Barnett at Northwestern Univ., Evanston IL, and colleagues have demonstrated a new environmentally friendly technology that uses a solid oxide electrolysis cell to turn CO₂, hydrogen, and water into syngas (H + CO), which can then be converted into methanol, a competitor to hydrogen for energy storage and production. A “methanol economy” has the advantage over hydrogen of using the existing liquid-fuel-oriented storage and distribution infrastructure. The current syngas production processes are based on fossil fuels, and have negative environmental impacts.

Military Implications:

The military should keep in touch with this development as it proceeds toward commercial availability.

Source:

Methanol challenges hydrogen to be fuel of the future

<http://www.newscientist.com/article/dn17240-methanol-challenges-hydrogen-to-be-fuel-of-the-future.html>

6.2.2 New Fuel Cell Membrane May Solve Dry Surroundings Problem

Researcher Cy Fujimoto of the Sandia National Laboratories is developing a new type of polymer electrolyte membrane for fuel cells. The new material aims to solve the problem of dehydration and consequent diminished functioning of fuel cells in dry desert environments.

Military Implications:

The military should follow this development as it is scaled up and cost-reduced, for possible application in power supplies for use in hot, dry environments.

Source:

New type of membrane developed at Sandia may help make hydrogen hybrid cars a reality

<http://www.sandia.gov/news/resources/releases/2009/PEM.html>

Item 7. Updates on Previously Identified Issues

7.1 Improving Marine Environmental Protection

7.1.1 Growing Marine Litter Increasingly Threatens Marine Ecosystems

Plastic debris, along with rubbish and other waste, are littering the marine environment worldwide, revealed *Marine Litter: A Global Challenge*, a report launched on World Oceans Day by UNEP and Ocean Conservancy, analyzing 12 major regional marine ecosystems around the world. Studies indicate that plastic content rose considerably in ocean animals from North Sea fulmars, to Northeast Atlantic plankton. UNEP suggests several strategies to curb marine

litter, including improved waste management, shipping and port regulations on waste discharge, a modified system of fines for ocean dumping, improved ship dismantling, and a ban on thin film plastic bags. Out of the 12 regional seas included in the report—Baltic Sea, Black Sea, Caspian Sea, East Asian seas, East African seas, Mediterranean, Northeast Atlantic, Northwest Pacific, Red Sea and Gulf of Aden, South Asian seas, South Pacific, and Wider Caribbean—the East Asian Seas seem to be in the worst situation. [Items on similar issues in previous environmental security reports: *Microplastics Recognized as Environmental Threat to Oceans* in November 2008, and *International Conference and Assessments Find Rising Ocean Pollution* in October 2006.]

Military Implications:

In addition to improving its own environmental performance, the military should consider offering assistance in regions where pollution control is inadequate.

Sources:

Marine Litter: A Global Challenge

http://www.unep.org/regionalseas/marinelitter/publications/docs/Marine_Litter_A_Global_Challenge.pdf

Report Brings to the Surface the Growing Global Problem of Marine Litter

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=589&ArticleID=6214&l=en&t=long>

7.1.2 World Database on Marine Protected Areas

The World Database on Marine Protected Areas is a new online system designed to provide up-to-date information on marine protected areas and marine and coastal ecosystems. It is a tool that would help decision-makers, conservation organizations, and communities around the world to enforce marine protected areas conservation and management. Note: marine protected areas represent less than 1% of earth's surface, while terrestrial protected areas are about 12%. [Items on similar issues in previous environmental security reports: *"Roving" Marine Protected Areas as Climate Change Affects Migration* in March 2008.]

Military Implications:

The World Database on Marine Protected Areas is a useful tool for the Navy to help compliance with protected areas regulations.

Sources:

World Database on Marine Protected Areas: <http://www.wdpa-marine.org>

UNEP launches new online system to view and study the world's marine protected areas

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=589&ArticleID=6212&l=en&t=long>

7.2 New Substances Identified as Harmful to Human Health and the Environment

California has identified 30 new chemicals with detrimental effects to human health, ranging from gasoline additives, to industrial solvents, chemicals used to manufacture plastics, adhesives and other materials, and byproducts of water disinfection using chlorine.

The Kenyan Parliament is considering a ban on Furadan, a highly toxic pesticide widely available in Kenya, but already banned in the U.S. and Europe.

A study of a weed-killer by scientists at the Institute of Biology of the University of Caen in France has added evidence to the finding that an "inert" ingredient in a product may have toxic effects outweighing any attributed to the principal ingredient(s) in the material. In their research, polyethoxylated tallowamine (POEA), a surfactant, was shown to be more lethal to certain

human cells than the product's active ingredient, glyphosate. [Previous items on similar issues: *Stockholm Convention Updated with Nine New Chemicals* in May 2009, *New Chemicals Considered for Toxic Lists* in January 2009 environmental security reports.]

Military Implications:

The military should review the use of products containing newly listed toxic compounds, as well as be alert to the possible dangers from “inert” components, and consider safer alternatives. In cases such as Kenya, it should assess potential security implications of eventual illegal trafficking of banned chemicals.

Sources:

30 'New' Toxic Chemicals to Avoid

<http://www.thedailygreen.com/environmental-news/latest/toxic-chemicals-47061601>

Kenya Considers a Ban on Pesticide Used to Kill Lions and Wildlife

<http://e360.yale.edu/content/digest.msp?id=1910>

P Glyphosate Formulations Induce Apoptosis and Necrosis in Human Umbilical, Embryonic, and Placental Cells

<http://pubs.acs.org/doi/abs/10.1021/tx800218n>

Weed killer kills human cells. Study intensifies debate over 'inert' ingredients

<http://www.environmentalhealthnews.org/ehs/news/roundup-weed-killer-is-toxic-to-human-cells.-study-intensifies-debate-over-inert-ingredients>

7.3 Greenland Moving Towards Independence

In what might be an example of political and sovereignty implications of climate change, Greenland took another step towards full independence from Denmark. It was granted self-rule status, recognizing Greenlanders as a distinct people with Greenlandic as the territory's official language and with the right to self-determination, including control over its natural reserves — gas, gold and diamonds. The warming climate could open access to the untapped wealth and pave the road towards economic independence. A referendum held in November 2008, showed more than 75% support of the residents for taking charge of the police, justice, and security responsibilities. [Previous related item: *The Debate over Strategic Control of the Arctic is Heating Up* in July-August 2008 environmental security report.]

Military Implications:

The likelihood of potential new roles of coalition forces in the region increases, for both national security and protection of the ecosystems. Relevant military personnel should cooperate with their counterparts in other countries and international organizations in developing timely, adequate national and international regulations and enforcement procedures.

Sources:

Greenland takes step toward independence from Denmark

<http://www.telegraph.co.uk/news/worldnews/europe/greenland/5594140/Greenland-takes-step-toward-independence-from-Denmark.html>

Divorce up north?

http://www.economist.com/daily/news/displaystory.cfm?story_id=12696845

Greenland Takes a Step Towards Autonomy

<http://www.spiegel.de/international/europe/0,1518,592880,00.html>

7.4 Global Influenza Pandemic Declared

The World Health Organization raised the level of influenza A(H1N1) alert to Phase 6, which indicates that a global pandemic is underway and further spread of the virus is ‘inevitable.’ According to the latest figures from the WHO, there have been 263 deaths and nearly 60,000 cases in some 100 countries and territories. [See also: *International Response to Contain Influenza A(H1N1) Outbreak* in April 2009 environmental security report.]

Military Implications:

[Same as previous on this issue] In addition to monitoring the situation and protecting the health of military personnel and contractors, the military should follow this development to identify “lessons learned” for addressing future pandemics, help catalyze global efforts to strengthen implementation and compliance with IHR 2005, and improve contingency plans and training for possible future bioterrorist attacks.

Sources:

Global Influenza Pandemic Declared

<http://www.ens-newswire.com/ens/jun2009/2009-06-11-02.asp>

US passes million swine flu cases

<http://news.bbc.co.uk/2/hi/americas/8122262.stm>

7.5 Health Threats from Open Waste Pits in Conflict Zones Trigger Regulation

Over 400 Iraq and Afghanistan veterans complain of health problems after being exposed in conflict areas to burning toxic waste in open pits. A bill introduced to Congress, ‘Military Personnel War Zone Toxic Exposure Prevention Act,’ requires health assessment of those who were exposed, as well as further prohibition of use of open pits to burn toxic waste. Meantime, several lawsuits have been filed against KBR Inc., a former subsidiary of Halliburton, for liability over soldiers’ toxic exposure.

Military Implications:

This case could trigger international attention and potential liability issues and even prompt some international regulations. Military and their civilian contractors should review their practices to ensure that waste disposal is being carried out in ways that are safe for personnel and the environment.

Source:

Vets protest open-pit fires in war zones

<http://thehill.com/business--lobby/vets-protest-open-pit-fires-in-war-zones-2009-06-11.html>

7.6 Health Hazards from “Environment-friendly” Reusable Bags

A new study warns of possible health hazards from reusable plastic bags, revealing high levels of mold, bacteria, and yeast in samples. [Previous related items: *New Material Makes Biodegradable Plastic Bags* in January 2009, *India to Enact Regulation Curbing Plastic Bags Use* in January 2009, and *Restrictions on Plastic Bags Expanding* in January 2008.]

Military Implications:

Military organizations attempting to help the environment through the use of reusable bags should ensure that proper sanitary procedures are being followed.

Sources:

“A Microbiological Study of Plastic Reusable Bags and ‘First or single-use’ Plastic Bags”

http://www.cpia.ca/files/files/A_Microbiological_Study_of_Reuseable_Plastic_Grocery_Bags.pdf

Study Labels Reusable Bags as Possible Health Risk

<http://earth911.com/blog/2009/06/01/study-labels-reusable-bags-as-possible-health-risk/>

7.7 Climate Change**7.7.1 Scientific Evidence and Natural Disasters**

A new IPCC report, summarizing over 1,400 studies that were presented at the climate conference of March 2009 in Copenhagen, warns that changes in ocean temperatures and sea levels, extreme climate conditions, and the retreat of the Arctic sea ice are happening more rapidly than experts predicted two years ago, and concludes that “The world faces a growing risk of abrupt and irreversible climatic shifts.”

World Disasters Report 2009 states that the 326 natural disasters that occurred worldwide in 2008 had a 235,736 death toll and the developing world suffered 76% of the disasters and 99% of the deaths. The *Human Impact Report: Climate Change—The Anatomy of a Silent Crisis* report claims that climate change affects 325 million people a year, at a total economic cost of \$125 billion, and predicts that, by 2030, more than 660 million people would be affected, with potentially 500,000 deaths, and an economic loss rising to \$340 billion

The Korea Meteorological Administration 10-years analysis shows that the Korean Peninsula is closer to a subtropical climate, due to climate change. For the 1999–2008 period, the average temperature was 0.6°C (1°F) higher than the 30-year average of the 1971–2000 period, while precipitation increased by an average 9.1%.

7.7.2 Food and Water Security

FAO announced that the number of world hungry is projected to reach a historic high of 1,020 million people in 2009. The most recent increase is not the consequence of poor global harvests but is caused by the world economic crisis which resulted in lower incomes and increased unemployment undermining access to food. The majority of those most affected live in areas with already high environmental and conflict vulnerability. The final version of *State of Food Insecurity in the World* will be released in October.

By mid-century, climate change may have outrun the ability of Africa's farmers to adapt to rising temperatures, threatening the continent's precarious food security. Growing seasons throughout nearly all of Africa in 2050 will likely be hotter than any year in historical experience, and even the hardiest varieties of the continent's three main crops – maize, millet and sorghum – would probably not tolerate the conditions. The six most affected nations will probably be Senegal, Chad, Mali, Burkina Faso, Niger, and Sierra Leone. However, the situation might get worse, as the study, published in the *Global Environmental Change* journal, is based on IPCC's mid-range projection, which is considered an underestimate.

The OECD and FAO released an advance summary of the *Agricultural Outlook 2009-2018* that addresses, among other issues, the interdependence between food and energy markets and the possible impacts of expanding demand for biofuels on agricultural commodity prices. It highlights that oil prices above US\$90 per barrel would imply significantly higher food prices.

During the past 50 years, freshwater flow dropped up to 14% for some of the major rivers feeding the Pacific and Indian Oceans, mainly due to changing precipitation patterns linked to climate change, according to research by the National Center for Atmospheric Research.

The *Rising Temperatures, Rising Tensions; Climate change and the risk of violent conflict in the Middle East* report [see above item ‘7.2 Threats and Strategies for Addressing Climate Change in the Middle-East’] specifically warns about potential increasing armed conflict in the Middle East over control of water resources. The report refers to expert opinions that even under the present condition of moderate global warming, by 2100, the Euphrates (which runs through Turkey, Syria and Iraq) might shrink by 30%, the Jordan River by 80%, while the Dead Sea is shrinking by 1 meter per year due to overuse of its tributaries, and climate change. The study notes that Israel’s National Communication warned that water supply may fall by 60% of 2000 levels by the end of the century.

7.7.3 Migration

More than 200 million people could be displaced due to climate change by 2050, underlines the report *In Search of Shelter: Mapping the Effects of Climate Change on Human Migration and Displacement* by a consortium of several international organizations. The report presents several maps of climate change impacts and population distribution patterns, and suggests that a better understanding of the dynamics of climate-related migration and displacement is needed in order to incorporate human mobility into international and national adaptation plans. Meantime, Christian Aid estimates that climate-induced displacement could be closer to one billion by 2050. Nevertheless, the debate over a framework to deal with this increasing segment of the population continues. Developed countries tend to oppose the term ‘refugee,’ that might imply application of the 1951 UN convention on refugees, and favor other terms, like ‘environmentally induced migration.’

The Global Governance Project launched the Policy Forum on Climate Refugees, a Web-based clearinghouse with up-to-date information on climate-related migration. The Forum proposes the term ‘climate refugees’, defined as: “people who have to leave their habitats, immediately or in the near future, because of sudden or gradual alterations in their natural environment related to at least one of three impacts of climate change: sea-level rise, extreme weather events, and drought and water scarcity. The Forum’s website is: <http://www.glogov.org/?pageid=80>.

“We’ve never before had to deal with disappearing states. Who’s going to take responsibility for people who are losing their country?” asks Dr Charles Erhart, of CARE International, referring to disappearing island-states.

7.7.4 Melting Glaciers and Sea Ice

While it’s still too early to say whether the 2009 melt will exceed the record 2007 melt, since the annual low-point is reached in September, the trend line for 2009 shows a lower sea ice coverage, according to the latest data from the National Snow and Ice Data Center.

Uganda’s National Environmental Management Authority said that at the present rate, Mount Speke ice cap, the main water source to the neighboring communities, might be melted away by 2023, threatening the livelihoods of the people of Bundibugyo, who rely on agriculture to survive. It will also impact the Nile basin and Lake George and Lake Albert.

7.7.5 Rising Sea Levels

Computer models show that sea levels could rise faster along the U.S. East Coast than in other densely populated parts of the world, due to changes of pressure from ice caps melting, and ocean current modifications. In addition to sea level rises and erosion, the region from New York to North Carolina is falling about six inches per century.

The Maldives decided to adopt a “safe islands” program that includes 25% of its 196 low-lying islands and is considering abandoning the rest, according to one of the authors of a new study on the impacts of global warming.

7.7.6 Health

Climate change is the biggest global health threat of the 21st century, warns Professor Anthony Costello, co-author of the article “Managing the health effects of climate change” published in *The Lancet*. The article outlines the global health implications of a range of climate change projections from the optimistic average global temperature rise of 2°C to the catastrophic 6°C, considering a wide range of pathways through which climate change could impact human health. Professor Costello proposes three action points emerging from this report: add health experts to the mitigation debate; address the massive inequality in health systems around the world; and develop win–win situations so that mitigation and adaptation to climate change strategies also improve human health and well-being.

7.7.7 Adaptation

The second session of the Global Platform for Disaster Risk Reduction, held June 16-19, 2009 in Geneva, Switzerland, concluded with a call to halve disaster-related deaths by 2015. Other specific targets identified include: by 2010, the establishment of clear national and international financial commitments to disaster risk reduction (DRR), for example to allocate a minimum of 10% of all humanitarian and reconstruction funding, at least 1% of development funding, and at least 30% of climate change adaptation funding to DRR; and by 2015, all major cities in disaster-prone areas to include and enforce DRR measures.

The Scientific and Technical Advisory Panel of the Global Environment Facility recommended that all mitigation projects and also, as appropriate, GEF strategies should incorporate climate adaptation measures and promote mitigation-adaptation synergies. It also advised that the GEF should consider the whole landscape approach regarding natural resource and chemicals life cycle management, and that it critically apply risk assessment to its proposed actions in order to maximize resilience to climate change while investing in mitigation.

The Zambezi River Basin Initiative (ZRBI) launched by The International Federation of Red Cross and Red Crescent Societies is an adaptation project focusing on disaster preparedness rather than post-emergency relief operations. About 80% of the region’s 32 million people depend on agriculture and fishing. It is a joint program among seven southern African countries: Angola, Botswana, Malawi, Mozambique, Namibia, Zambia, and Zimbabwe, combining risk reduction efforts with food security, health, HIV prevention, and capacity building activities.

Gordon Brown says that developed nations should create a \$100 billion per year fund to help developing nations cope with the effects of global warming. This is less than the 1% of developed countries’ GDP that the G77 group has suggested. Brown’s suggestion still needs to be endorsed by the EU-bloc before it could be put forward at the Copenhagen negotiations.

7.7.8 Post-Kyoto Negotiations

The second round of preliminary negotiations for a UN climate treaty revealed that developed countries are unlikely to cut emissions between 25% and 40% from 1990 levels by 2020, Japan, U.S., and Canada being among the ones that are hindering negotiations, due to tough resistance from industry at home. Hence, a 15% target seems more realistic. However, the Association of Small Island States is pushing for a 45% reduction in greenhouse gas emissions by 2020. The African Ministerial Conference on the Environment adopted the Nairobi Declaration on climate at a week-long special session, to be put forward at the Copenhagen negotiations. Some argue that the “G2” of China and America determines the global post-Kyoto agenda.

Meantime, the U.S. Congress passed the American Clean Energy and Security Act of 2009, which gives stronger power to the U.S. at the Copenhagen negotiations. The bill sets a framework for reducing greenhouse gases in the U.S. by 17% below 2005 levels by 2020, and 83% by 2050. The bill sets a CO₂ cap-and-trade system—scheduled to begin in 2012, requires at least 20% renewable electricity production by 2020, and allocates billions of dollars to new energy-efficient and low-carbon projects.

During the climate change preparation conference in Bonn emissions trading and emissions credits systems were also discussed. Nevertheless, experts and environmental groups are increasingly opposing the carbon credits market, as a source of pollution in developing countries.

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

Climate Change Picks Pace New IPCC Report Warns

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=589&ArticleID=6225&l=en&t=long>

Press Conference by International Federation of Red Cross and Red Crescent Societies to Launch ‘World Disasters Report 2009’

http://www.un.org/News/briefings/docs/2009/090616_ICRC.doc.htm

Korea moving toward a subtropical climate

http://www.koreaherald.co.kr/NEWKHSITE/data/html_dir/2009/06/15/200906150007.asp

FAO press release

<http://www.fao.org/news/story/en/item/20568/icode/>

Warming may outstrip Africa's ability to feed itself: study:

<http://www.google.com/hostednews/afp/article/ALeqM5imolPwNU5DuvGHV01-85nlm4XH5g>

Advance Summary: <http://www.agri-outlook.org/dataoecd/5/27/43037451.pdf>

New report: Climate Change is detectable driver of migration

<http://www.care-international.org/New-report-Climate-Change-is-detectable-driver-of-migration>

Arctic Sea Ice Extent Trending Below Record 2007 Melt

<http://www.thedailygreen.com/environmental-news/latest/arctic-sea-ice-47061201>

Lifestyle melts away with Uganda peak snow cap

<http://www.google.com/hostednews/afp/article/ALeqM5juO8oIXAPsiP4pVfkU4nHsI0TNGg>

East Coast May Feel Rise in Sea Levels the Most

<http://www.washingtonpost.com/wp-dyn/content/article/2009/06/05/AR2009060501342.html>

Climate change causing 'environmental migrants'

<http://www.irishtimes.com/newspaper/world/2009/0611/1224248612413.html>

Climate change: The biggest global-health threat of the 21st century

<http://www.ucl.ac.uk/news/news-articles/0905/09051501/>

Second session of the Global Platform for Disaster Risk Reduction

<http://www.preventionweb.net/globalplatform/2009/>

Zambezi River Basin Initiative

http://www.ifrc.org/Docs/pubs/disasters/160400-Zambezi_River_Project_LR3.pdf

Gordon Brown puts \$100bn price tag on climate adaptation

<http://www.guardian.co.uk/environment/2009/jun/26/gordon-brown-climate-adaptation-cost>

Heating up or cooling down?

http://www.economist.com/world/asia/displaystory.cfm?story_id=13832227

Friends of the Earth slams "fundamentally flawed" offsetting model

<http://www.businessgreen.com/business-green/news/2243304/friends-earth-slams>

American Clean Energy and Security Act of 2009

<http://thehill.com/images/stories/news/2009/june/getdoc.cgi.pdf>

7.8 Nanotechnology Safety Issues

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

- The European Agency for Safety and Health at Work released "Literature Review - Workplace exposure to nanoparticles." ([more](#))
- Wide use of nano-silver raises health and environmental issues ([more](#))
- Appropriate Risk Governance Strategies for Nanotechnology Applications in Food and Cosmetics recommendations document by the International Risk Governance Council ([more](#))
- Study of Scientists' and Public's Views of Nanotechnology ([more](#))
- Comprehensive Overview of Nanomaterial Properties and Biological Interactions ([more](#))
- ObservatoryNANO Annual Report ([more](#))

Item 8. Reports and Information Suggested for Review

8.1 Convention on Cluster Munitions is Effective

The report *Banning Cluster Munitions: Government Policy and Practice* assesses the cluster munitions-related situation in 150 countries, including progress on the implementation of the Convention on Cluster Munitions requirements in the signatory or party states. It documents that many countries already started to destroy their stockpiles of the weapon before the treaty formally came into force, and are expected to complete the destruction earlier than the eight-year deadline stipulated by the convention. Spain is the first country that completed the destruction of its cluster munitions stockpiles. Other countries that began the process include: Austria,

Belgium, Canada, Colombia, France, Germany, Netherlands, Norway, Switzerland, and the United Kingdom.

Military Implications:

The report provides a comprehensive overview of the countries affected as well as stockpilers of cluster munitions.

Sources:

"Banning Cluster Munitions: Government Policy and Practice" Report Released

<http://www.icbl.org/index.php/icbl/Library/News-Articles/Work/Banning-Cluster-Munitions>

Launch of New Report - Banning Cluster Munitions

<http://www.stopclustermunitions.org/news/?id=1534>

8.2 Threats and Strategies for Addressing Climate Change in the Middle-East

Rising Temperatures, Rising Tensions; Climate change and the risk of violent conflict in the Middle East, by the International Institute for Sustainable Development, is an analysis of the security issues in the Levant region over the period to 2050, in view of the implications of climate change. Acknowledging that the legacy of 60 years of conflict undermines adaptation efforts, it identifies and details six climate change-related potential threats which are likely to become obstacles to peacebuilding: 1) increasing competition over scarce water resources; 2) intensifying food insecurity; 3) worsening poverty and social instability; 4) forced migration; 5) “militarization of strategic natural resources;” and 6) the danger of inaction on climate change, which might lead to “growing resentment and distrust of the West (and Israel) by Arab nations.” The study also suggests four strategies that could turn climate change into a peacebuilding tool: promote conservation and efficiency; develop joint adaptation projects, including water management; advance solidarity and green energy policies; and be actively involved in developing regional and international adaptation strategies. [Previous related items: *Security Risk due to Climate Change* in December 2007, *Security Implication of Climate Change to the EU* in March 2008, and *Food and Water Security* in October 2008 environmental security reports.]

Military Implications:

Relevant military personnel should consider reviewing the study for its potential input for peacebuilding in the Levant region.

Source:

Rising Temperatures, Rising Tensions; Climate change and the risk of violent conflict in the Middle East

http://www.iisd.org/pdf/2009/rising_temps_middle_east.pdf

Report warns of environment wars

http://www.gulf-times.com/site/topics/article.asp?cu_no=2&item_no=294712&version=1&template_id=37&parent_id=17

160 Syrian villages deserted 'due to climate change'

<http://www.google.com/hostednews/afp/article/ALeqM5jXbS8a3ggiMm4ekludBbmWQMb-HQ>

8.3 New Report Summarizes Pacific Environmental Threats and Solutions

The *Pacific Ocean Synthesis* report, from the Center for Ocean Solutions, presented at the World Ocean Conference in Manado, Indonesia, in May 2009, discusses environmental threats and potential solutions in seven regions of the Pacific. It represents the results of a review of more

than 3,400 publications from 50 countries in the Pacific basin, and both synthesizes information from research and points out gaps in the studies.

Military Implications:

Military components responsible for oceanic environmental issues should review this 150-page report for potentially useful information.

Sources:

Pacific Ocean Synthesis. Scientific Literature Review of Coastal and Ocean Threats, Impacts, and Solutions
<http://www.centerforoceansolutions.org/PacificSynthesis.pdf>

Research reveals Pacific Ocean threats and solutions
http://www.enn.com/top_stories/article/39989

8.4 Geo-engineering Promises/Threatens Major Consequences

Discourse over the use of geo-engineering in the strategies for reducing greenhouse gas emissions increases. While some projects appear to offer major environmental benefits at a fraction of the cost of currently proposed remedial measures for climate change, many also raise the specter of potential catastrophic and perhaps unforeseen consequences. The National Academy of Sciences recently held a workshop to discuss this topic. Some of the papers are available online and the proceedings are expected to be posted soon.

Military Implications:

The military should be aware of geo-engineering proposals, and be prepared to participate in discussions of policies concerning them.

Sources:

Re-Engineering the Earth

<http://www.theatlantic.com/doc/200907/climate-engineering>

Scientists Debate Shading Earth As Climate Fix

<http://www.npr.org/templates/story/story.php?storyId=105483423>

Geoengineering Options to Respond to Climate Change: Input to the Workshop and Suggested Reading
http://americasclimatechoices.org/Geoengineering_Input/GeoInputHome.html

8.5 The Center for a New American Security Launched National Security Program

The Center for a New American Security launched the National Security Program, based on its work on the national security and foreign policy implications of energy and climate change.

Military Implications:

In the collaboration with the National Security Program, the military should review the diverse aspects of natural security, consider how it may be called upon to act to protect the natural resources in the future and develop appropriate scenarios.

Sources:

CNAS on Natural Security

<http://www.cnas.org/naturalsecurity>

Natural Security, A Working Paper, Sharon Burke, CNAS, June 2009

http://www.cnas.org/files/documents/publications/CNAS_Working%20Paper_Natural%20Security_SBurke_June2009_Web_1.pdf

APPENDIX

Reference Details

This Appendix contains expanded background information on some items.

7.7 Climate Change

Sources (a more expanded list)

7.7.1 Scientific Evidences and Natural Disasters

Climate Change Picks Pace New IPCC Report Warns

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=589&ArticleID=6225&l=en&t=long>

Press Conference by International Federation of Red Cross and Red Crescent Societies to Launch ‘World Disasters Report 2009’

http://www.un.org/News/briefings/docs/2009/090616_ICRC.doc.htm

Deadly heat

http://www.salon.com/env/feature/2009/05/30/climate_change_crisis/#

Climate change study counts high human toll

http://www.ft.com/cms/s/0/4f408284-4c79-11de-a6c5-00144feabdc0.html?nclick_check=1

Climate change study counts high human toll

http://www.ft.com/cms/s/0/4f408284-4c79-11de-a6c5-00144feabdc0.html?nclick_check=1

Korea moving toward a subtropical climate

http://www.koreaherald.co.kr/NEWKHSITE/data/html_dir/2009/06/15/200906150007.asp

7.7.2 Food and Water Security

FAO press release

<http://www.fao.org/news/story/en/item/20568/icode/>

Warming may outstrip Africa's ability to feed itself: study:

<http://www.google.com/hostednews/afp/article/ALeqM5imolPwNU5DuvGHV01-85nlm4XH5g>

AFRICA: What will we eat in the future?:

<http://www.irinnews.org/Report.aspx?ReportId=84892>

Shifts in African crop climates by 2050, and the implications for crop improvement and genetic resources conservation (subscription required):

http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6VFV-4WFGANC-1&_user=10&_rdoc=1&_fmt=&_orig=search&_sort=d&_docanchor=&_view=c&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=2b4d92336f74bb5b44d3d4270ce85654

FAO Press Release: <http://www.fao.org/news/story/en/item/20770/icode/>

Advance Summary: <http://www.agri-outlook.org/dataoecd/5/27/43037451.pdf>

Never the same river twice. Freshwater flows change as global climate shifts.

<http://pubs.acs.org/action/showStoryContent?doi=10.1021/on.2009.05.26.380568>

Rising Temperatures, Rising Tensions; Climate change and the risk of violent conflict in the Middle East

http://www.iisd.org/pdf/2009/rising_temps_middle_east.pdf

160 Syrian villages deserted 'due to climate change'

<http://www.google.com/hostednews/afp/article/ALeqM5jXbS8a3ggiMm4ekludBbmWQMb-HQ>

7.7.3 Migration

New report: Climate Change is detectable driver of migration

<http://www.care-international.org/New-report-Climate-Change-is-detectable-driver-of-migration>

Climate change could displace 25 million by 2010

<http://www.hindu.com/thehindu/holnus/008200906101451.htm>

Climate change causing 'environmental migrants'

<http://www.irishtimes.com/newspaper/world/2009/0611/1224248612413.html>

Making the Case for Climate as a Migration Driver

<http://www.nytimes.com/2009/06/15/business/energy-environment/15iht-green15.html>

Climate change causing 'environmental migrants'

<http://www.irishtimes.com/newspaper/world/2009/0611/1224248612413.html>

7.7.4 Melting Glaciers and Sea Ice

Arctic Sea Ice Extent Trending Below Record 2007 Melt

<http://www.thedailygreen.com/environmental-news/latest/arctic-sea-ice-47061201>

Lifestyle melts away with Uganda peak snow cap

<http://www.google.com/hostednews/afp/article/ALeqM5juO8oIXAPsiP4pVfkU4nHsI0TNGg>

7.7.5 Rising Sea Levels

East Coast May Feel Rise in Sea Levels the Most

<http://www.washingtonpost.com/wp-dyn/content/article/2009/06/05/AR2009060501342.html>

Climate change causing 'environmental migrants'

<http://www.irishtimes.com/newspaper/world/2009/0611/1224248612413.html>

7.7.6 Health

Running a Temperature

http://www.foreignpolicy.com/articles/2009/06/24/running_a_temperature_0

Managing the Health effects of Climate Change

<http://www.thelancet.com/climate-change>

Climate change: The biggest global-health threat of the 21st century

<http://www.ucl.ac.uk/news/news-articles/0905/09051501/>

Climate 'biggest health threat'

<http://news.bbc.co.uk/1/hi/sci/tech/8049061.stm>

7.7.7 Adaptation

UNISDR release: <http://www.unisdr.org/>

Chair's summary:

<http://www.preventionweb.net/globalplatform/2009/background/documents/GP09-Chair%27s-Summary.pdf>

GEF STAP Recommendations:

[http://www.gefweb.org/uploadedFiles/Documents/Council_Documents_\(PDF_DOC\)/GEF35/C.35.13_STAP.pdf](http://www.gefweb.org/uploadedFiles/Documents/Council_Documents_(PDF_DOC)/GEF35/C.35.13_STAP.pdf)

SOUTHERN AFRICA: Climate proofing the Zambezi

<http://www.irinnews.org/Report.aspx?ReportId=85013>

Zambezi River Basin Initiative

http://www.ifrc.org/Docs/pubs/disasters/160400-Zambezi_River_Project_LR3.pdf

Gordon Brown puts \$100bn price tag on climate adaptation

<http://www.guardian.co.uk/environment/2009/jun/26/gordon-brown-climate-adaptation-cost>

7.7.8 Post-Kyoto Negotiations

Heating up or cooling down?

http://www.economist.com/world/asia/displaystory.cfm?story_id=13832227

Climate pact: What kind of deal can emerge in Copenhagen?

<http://www.terradaily.com/2007/090614011736.b0erysqv.html>

700,000 addresses face being washed off map

<http://www.smh.com.au/environment/global-warming/700000-addresses-face-being-washed-off-map-20090612-c64c.html>

Nations may form global CO2 market without U.N. deal

<http://www.reuters.com/article/GCA-GreenBusiness/idUSTRE55B67V20090612>

The great carbon credit con: Why are we paying the Third World to poison its environment?

<http://www.dailymail.co.uk/home/moslive/article-1188937/The-great-carbon-credit-eco-companies-causing-pollution.html>

Friends of the Earth slams "fundamentally flawed" offsetting model

<http://www.businessgreen.com/business-green/news/2243304/friends-earth-slams>

INTERVIEW-Global warming is a security threat - Kofi Annan

<http://www.reuters.com/article/featuredCrisis/idUSLN472597>

'Climate change is already here'

<http://www.saipantribune.com/newsstory.aspx?newsID=91436&cat=1>

African Ministers Adopt the Nairobi Declaration on Climate

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=589&ArticleID=6199&l=en&t=long>

American Clean Energy and Security Act of 2009

<http://thehill.com/images/stories/news/2009/june/getdoc.cgi.pdf>

House Passes Bill to Address Threat of Climate Change

http://www.nytimes.com/2009/06/27/us/politics/27climate.html?_r=1&th&emc=th

7.8 Nanotechnology Safety Issues

More detailed descriptions

7.8.1 European Report on Workplace Exposure to Nanoparticles

The European Agency for Safety and Health at Work (OSHA) has released a 91-page "Literature Review - Workplace exposure to nanoparticles.", which, according to an item in Meridian

Nanotechnology and Development News, “reviews the most recent publications on nanoparticles and focuses on the possible adverse effects of workplace exposure while also presenting the regulatory background and activities being taken to manage this emerging risk.”

Source:

Literature Review - Workplace exposure to nanoparticles

http://osha.europa.eu/en/publications/literature_reviews/workplace_exposure_to_nanoparticles

7.8.2 Wide Use of Nano-Silver Raises Health and Environmental Issues

Friends of the Earth and Health Care Without Harm Europe have published a report describing the public health threat posed by the use of nano-silver particles as an anti-microbial element in consumer products. Use of this material may risk the development of bacterial resistance to it, and, as it is released into the environment, it may interfere with bacterial action in waste treatment processes.

Military Implications:

The military should carefully follow studies of this potentially hazardous substance and, if appropriate, consider taking measures to control its use in military materiel.

Source:

Nano & Biocidal Silver

http://www.foe.org/sites/default/files/Nano-silverReport_US.pdf

Nano-silver: Extreme Germ Killer Presents Growing Threat to Public Health

<http://www.foe.org/nano-silver-extreme-germ-killer-presents-growing-threat-public-health>

7.8.3 New Policy Brief: Appropriate Risk Governance Strategies for Nanotechnology Applications in Food and Cosmetics

The International Risk Governance Council has published a recommendations document, *Appropriate Risk Governance Strategies for Nanotechnology Applications in Food and Cosmetics*. This report presents the conclusions arrived at as the result of an April 2008 “multi-stakeholder expert workshop (with representatives from regulators, industry, academia and consumer groups) ... to discuss key issues and to develop risk governance policy guidelines for nanotechnology applications in food and cosmetics.”

Sources:

Appropriate risk governance strategies for nanotechnology applications in food and cosmetics

<http://www.irgc.org/Appropriate-risk-governance.html>

Appropriate Risk Governance Strategies for Nanotechnology Applications in Food and Cosmetics

http://www.irgc.org/IMG/pdf/IRGC_PBnanofood_WEB.pdf

7.8.4 Study of Scientists’ and Public’s Views of Nanotechnology

A new paper reports on “the heuristics that the leading U.S. nanoscientists use when they make policy decisions about regulating nanotechnology” and compares them with the corresponding process in the general public. Included in their work is data on which nanotech application areas the scientists feel are most in need of new regulations. The authors highlight that although there is no conclusive evidence on many environmental and health aspects of nanotechnology, policy and some legal framework should be established.

Sources:

Of risks and regulations: how leading U.S. nanoscientists form policy stances about nanotechnology

<http://www.springerlink.com/content/627323076677745q/fulltext.html>

Scientists and Public Differ on Views about Nanotechnology Regulation

<http://www.news.wisc.edu/releases/15361>

7.8.5 Comprehensive Overview of Nanomaterial Properties and Biological Interactions

Researchers at UCLA and the California NanoSystems Institute (CNSI), together with colleagues in academia and industry, have published a research review article that is described as “a comprehensive overview of current knowledge on the physical and chemical properties of nanomaterials that allow them to undergo interactions with biological molecules and bioprocesses”. The paper details several important research advancements and their implications for risk assessment.

Sources:

Research explores interactions between nanomaterials, biological systems

<http://newsroom.ucla.edu/portal/ucla/exploring-the-world-of-nanomaterial-94257.aspx>

Paper: <http://www.nature.com/nmat/journal/v8/n7/full/nmat2442.html> (by subscription only)

7.8.6 ObservatoryNANO Annual Report Published

The EC FP7 ObservatoryNANO project has published its Annual Report, summarizing developments in the field, including their effects, and concerns for human health and the environment.

ObservatoryNANO Annual Report

<http://www.observatorynano.eu/project/catalogue/9AR/>