



January 2010

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INTRODUCTION

We are pleased to present you with *Sustainability at the National Academies*, a monthly update highlighting activities related to sustainable development from throughout the National Academies. Please visit our website for additional information on these and other activities at <http://sustainability.nationalacademies.org>.

The [Roundtable on Science and Technology for Sustainability](#) provides a unique forum for sharing views, information, and analyses related to sustainability. The goal for the Roundtable is to mobilize, encourage, and use scientific knowledge and technology to help achieve sustainability goals and to support the implementation of sustainability practices. Through its activities, the Roundtable identifies new ways in which science and technology can contribute to sustainability. What follows is a brief summary of sustainability-related activities being conducted throughout the National Academies.

You are receiving this update based on your participation in ongoing or past activities of the Roundtable. If you would prefer not to receive future monthly updates or would like to be added to the recipient list, please contact Emi Kameyama at 202-334-2694 or Sustainability@nas.edu or visit our website.

NEWS

New Video: Sustaining Global Surveillance and Response to Emerging Zoonotic Diseases

Recent disease outbreaks like pandemic H1N1 (so-called “swine flu”) are examples of how zoonotic diseases -- those transmissible between humans and animals -- can threaten health and economies around the world. The Division on Earth and Life Studies and the Institute of Medicine have a new video explaining why monitoring and responding to these diseases is important and the steps they recommend to protect human health and the global economy. <http://www.youtube.com/watch?v=akMQKFApBRO>

NEW REPORTS

Expanding Biofuel Production: Sustainability and the Transition to Advanced Biofuels: Summary of a Workshop

While energy prices, energy security, and climate change are front and center in the national media, these issues are often framed to the exclusion of the broader issue of sustainability--ensuring that the production and use of biofuels do not compromise the needs of future generations by recognizing the need to protect life-support systems, promote economic growth, and improve societal welfare. Thus, it is important to understand the effects of biofuel production and use on water quality and quantity, soils, wildlife habitat and biodiversity, greenhouse gas emissions, air quality, public health, and the economic viability of rural communities.

http://www.nap.edu/catalog.php?record_id=12806

Letter Report Assessing the USGS National Water Quality Assessment Program's Science Framework

The U.S. Geological Survey requested that the National Research Council review and provide guidance on the direction and priorities of the National Water Quality Assessment (NAWQA) Program. This initial letter report concerns the scientific priorities of the NAWQA program as expressed in its NAWQA Science Framework, assessing whether the framework sets forth adequately the priorities for the future which will be addressed in the third cycle of the NAWQA program. This letter report includes guidance on the nature and priorities of current and future water quality issues that will confront the Nation over the next 10-15 years.

http://www.nap.edu/catalog.php?record_id=12843

The Domestic and International Impacts of the 2009-H1N1 Influenza A Pandemic: Global Challenges, Global Solutions: Workshop Summary

On September 15-16, 2009, the IOM's Forum on Microbial Threats held a public workshop to discuss the domestic and international impacts of the 2009 H1N1 influenza A pandemic. Participants explored the origins, evolution, and epidemiology of the 2009 H1N1 influenza A virus as well as prospects for development and distribution of vaccines and other mitigation measures. In addition, participants discussed the value of disease detection and surveillance in understanding the epidemiology of the virus and in evaluating the success of various interventions to reduce the virus's spread. This report summarizes the workshop's discussions.

http://books.nap.edu/catalog.php?record_id=12799

Environment 2009

Transportation Research Board (TRB)'s Transportation Research Record: Journal of the Transportation Research Board, No. 2123 includes 19 papers that explore linking transportation planning and the National Environmental Policy Act processes, emissions inventories for construction vehicles, energy and environmental impacts of high-speed roundabouts, a macroscopic emission model for China, and environmental impacts of high-emitting vehicles.

http://www.trb.org/Main/Blurbs/Environment_2009_162820.aspx

New Approaches to Ecological Surveys

TRB's National Cooperative Highway Research Program (NCHRP) Synthesis 400: New Approaches to Ecological Surveys explores ecological survey needs related to transportation activities and examines technologies, techniques, and innovative methods to fulfill those needs.

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_400.pdf

Winter Issue of The Bridge on Frontiers of Engineering

The fifteenth U.S. Frontiers of Engineering (US FOE) Symposium was held September 10-12, 2009, at the National Academies Beckman Center in Irvine, California. The meeting was organized into independent sessions with the following themes: engineering tools for scientific discovery; nano/micro photonics and new applications; engineering the health care delivery system; and resilient and sustainable infrastructures. Five papers based on this year's presentations are included in this issue of The Bridge. Carla Gomes, whose paper is included in this issue (p. 5), described a new interdisciplinary field, computational sustainability, that uses computational and mathematical models, methods, and tools to manage and balance environmental, economic, and societal needs. She provided examples of applications in biodiversity and species conservation, natural resource management, and energy efficiency.

<http://nae.edu/Publications/TheBridge/17281.aspx>

NEW PROJECTS

A Research Strategy for Environmental, Health, and Safety Aspects of Engineered Nanomaterials

The National Research Council will develop and will monitor the implementation of an integrated research strategy to address the environmental, health, and safety aspects of engineered nanomaterials. This study will create a conceptual framework for environmental, health, and safety-related research; develop a research plan with short- and long-term research priorities; estimate resources necessary to implement this research plan; and subsequently evaluate research progress over a three year period.

<http://www8.nationalacademies.org/cp/projectview.aspx?key=49173>

Sustainable Water and Environmental Management in the California Bay-Delta

At the request of Congress and the Departments of the Interior and Commerce, a committee of independent experts will be formed to review the scientific basis of actions that have been and could be taken to simultaneously achieve both an environmentally sustainable Bay-Delta and a reliable water supply. In order to balance the need to inform near-term decisions with the need for an integrated view of water and environmental management challenges over the longer-term, the committee will undertake two main projects over a term of two years resulting in two reports.

<http://www8.nationalacademies.org/cp/projectview.aspx?key=49175>

Socioeconomic Scenarios for Climate Change Impact and Response Assessments

An ad hoc panel will organize an international workshop in early 2010 to consider the current state of the science and approaches for developing socioeconomic scenarios and story lines as context for analyzing global and regional climate change vulnerability, impacts, and adaptation (VIA) responses.

<http://www8.nationalacademies.org/cp/projectview.aspx?key=49177>

A Workshop on Global Change and Extreme Hydrologic Events: Testing Conventional Wisdom

A two-day workshop on *Global Change and Extreme Hydrology: Testing Conventional Wisdom* will be planned and conducted by a small ad hoc planning committee under the auspices of the standing Committee on Hydrologic Sciences (COHS). The workshop will foster discussions among the science and applications community about the hydrologic and climatologic perspective on extreme hydrologic events.

<http://www8.nationalacademies.org/cp/projectview.aspx?key=49179>

UPCOMING MEETINGS

January

Sustainable Water and Environmental Management in the California Bay-Delta,
January 24-28, 2010, Davis, CA

<http://www8.nationalacademies.org/cp/meetingview.aspx?MeetingId=4100>

February

Examination of Front-of-Package Nutrition Rating Systems and Symbols (Phase I),
February 2-3, 2010, Washington, DC

<http://www8.nationalacademies.org/cp/meetingview.aspx?MeetingId=4112>

An Ocean Infrastructure Strategy for U.S. Ocean Research in 2030, February 2-4, 2010,
Washington, DC

<http://www8.nationalacademies.org/cp/meetingview.aspx?MeetingId=3964>

A Research Strategy for Environmental, Health, and Safety Aspects of Engineered Nanomaterials, February 3-4, 2010, Washington, DC

<http://www8.nationalacademies.org/cp/meetingview.aspx?MeetingId=4142>

Envisioning a Strategy to Prepare for the Long-term Burden of HIVAIDS: African Needs and US Interests, February 3-4, 2010, Washington, DC

<http://www8.nationalacademies.org/cp/meetingview.aspx?MeetingId=4107>

Ranking FDA Product Categories Based on Health Consequences, Phase II,
February 3-4, 2010, Washington, DC

<http://www8.nationalacademies.org/cp/meetingview.aspx?MeetingId=4146>

Assessment of Intraseasonal to Interannual Climate Prediction and Predictability,
February 9-10, 2010, Washington, DC

<http://www8.nationalacademies.org/cp/meetingview.aspx?MeetingId=4137>

A Framework and Guidance for Health Impact Assessment, February 11-12, 2010,
Washington, DC

<http://www8.nationalacademies.org/cp/meetingview.aspx?MeetingId=4170>

Public Policy in Nutrition: Where does Science Fit In?, February 16, 2010, Irvine, CA
http://www.nasonline.org/site/PageServer?pagename=Beckman_DV_Spring2010

Climate Change and Ships: Increasing Energy Efficiency Symposium, February 16-17,
2010, Linthicum Heights, MD

<http://www.sname.org/SNAME/climatechange/Home/Default.aspx>

Sensors: From Sea to Space Innovations and Implications for the Future, February 22-23, 2010, Washington, DC

<http://sites.nationalacademies.org/pga/guirr/index.htm>

Independent Scientific Review of Everglades Restoration Progress, February 25-26, 2010, Washington, DC

<http://www8.nationalacademies.org/cp/meetingview.aspx?MeetingId=3986>

PROJECTS IN DEVELOPMENT

A Sustainability Challenge: Food Security for All

The National Academies' Roundtable on Science and Technology for Sustainability proposes to convene two public workshops in 2010 to help establish the dimensions of the food security challenge and explore how to sustainably meet growing food demands during the coming decades. The first workshop, *Measuring Food Insecurity and Assessing the Sustainability of Global Food Systems*, will examine the empirical basis for past trends, the current situation and projections for the future. The second workshop, *Exploring Sustainable Solutions for Increasing Global Food Supplies*, will examine a set of issues fundamental to assuring that food supplies can be increased to meet the needs of the world's growing population—now expected to grow to 9 billion by the year 2050.

http://sustainability.nationalacademies.org/proj_dev.shtml

Regional Approaches to Urban Sustainability: Challenges and Opportunities

The National Academies proposes to organize a series of workshops beginning in Spring 2010 to foster discussion of regional approaches to making U.S. metropolitan areas more sustainable, with an emphasis on building the evidence base upon which policies and programs might be developed. Making our communities more sustainable often requires context-specific, place-based approaches – a “cookie-cutter” approach to development will not work, given our diverse regional economies, ecosystems, and communities. Key participants in these workshops will include local and state decision-makers (mayors, city/country administrators, planning directors), academic researchers, regional NGOs, and federal agency representatives. Funding is currently being sought for this project.

http://sustainability.nationalacademies.org/proj_dev.shtml

Trends, Challenges, and Pathways to Urban Sustainability, an International Symposium

Today's world is highly interconnected through information technologies and global commerce – cities, however, still often rely on 19th century technologies and early 20th century infrastructure. This highlights the reality that urbanizing regions are not always amenable to a quick technological fix, but a century of experience in developing metropolitan regions, combined with new tools to decipher and disseminate information, will allow us to transform the way 21st century cities develop. The National Academies and international partners propose to organize a symposium in 2010 on the challenges and opportunities of finding ways to meet the needs of an increasingly urbanized world while sustaining critical resources and natural systems for future generations. The symposium will bring together city managers and planners, urban researchers from government and academia, and leaders from the donor and finance communities. Participants will share lessons learned and discuss how to mobilize their collective knowledge on what works and why, so that this century's urban areas will become substantially more sustainable than existing cities are today, and so that urban impacts on global sustainability are recognized and minimized. This symposium will build on existing initiatives, such as the World Urban Forum V scheduled for March 2010, with an eye towards connecting and learning from

these isolated activities, and catalyzing additional resources and partners to engage in this critically important issue. Cities are complex systems, and fostering sustainable urban areas requires an integrated, cross-sectoral, and multi-disciplinary approach; the proposed effort would be a promising step along that path.

http://sustainability.nationalacademies.org/proj_dev.shtml

ONGOING ACTIVITIES

PNAS Sustainability Science, Special Features: “Tipping Elements in Earth Systems”

The Earth System (ES) is defined as the conglomerate formed by human civilization and its planetary matrix (i.e., all parts of the Earth that interact with the members and manifestations of our species) (1, 2). Thus, eminently complex systems like the global economy or the human brain are just components of the ES, contributing to its overall evolution. The climate machinery is another formidable subsystem that comprises vast domains of the atmosphere, hydrosphere, biosphere, and pedosphere, involves innumerable intertwined processes, and generates fairly robust dynamical patterns like the Hadley cell. This machinery still operates in the “Holocene mode,” which emerged \approx 10 ka ago and is characterized by a distinctive distribution of ice sheets, wind regimes, ocean currents, biomes, and deserts, something that can be perceived as the environmental face of the Earth.

http://www.pnas.org/cgi/collection/tipping_elements

From the January 2010 Issue:

Housing Growth in and Near United States Protected Areas Limits Their Conservation Value

<http://www.pnas.org/content/107/2/940.full>

From the December 2009 Issue:

High Resilience in the Yamal-Nenets Social–Ecological System, West Siberian Arctic, Russia

<http://www.pnas.org/content/106/52/22041.full>

Global Sea Level Linked to Global Temperature

<http://www.pnas.org/content/106/51/21527.full>

To learn more about sustainability activities, both in the STS program and throughout the other boards and committees of the National Academies, please visit our webpage at:

<http://sustainability.nationalacademies.org/ongoing.shtml>

Preparation of this update was supported by the National Academies’ George and Cynthia Mitchell Endowment for Sustainability Science.