

EDUCATION FOR A SUSTAINABLE AND SECURE FUTURE

DRAFT OF BREAKOUT SESSION RECOMMENDATIONS

Overarching Themes

- Fighting poverty, protecting the environment, and protecting people's rights are the path to human security and the foundation, in the long-term, for global security.
- Education is essential for human and global security.
- Education for sustainability needs to be infused across the educational enterprise for life-long learning.
- Support is necessary for the continuum of professional development, from educators to practitioners in sustainability and environmental education.
- Inclusiveness and diversity are essential in all aspects of education, including content, participation, disciplines and approaches.
- Experiential, inquiry-based, team-building, problem-solving, systems approaches and critical thinking are essential attributes of education
- People need to understand geospatial and temporal frames of reference.
- Curricula need to be developed, including content, materials and tools such as case examples and identification of best practices.
- Sustainability concepts need to be incorporated into existing accreditation systems.
- Baseline information is largely absent in all aspects of sustainability education and practice.
- Education should help students to identify values, assumptions and ethical systems in order to help students to make their own decisions.
- Messages need to be developed that connect sustainability to personal core values. Public communication and media campaigns are needed to present these messages.
- Institutions (schools, businesses, agencies and other organizations) must become leaders in "practicing what we teach" through adopting sustainable practices (activities, culture, personal relationships and community involvement) and creating sustainable facilities, for example, making every school a solar school.
- Criteria to measure success must be developed and implemented.
- Funding and other incentives are necessary for any of the above to happen.

Summary of Primary Recommendations

- Core competencies in environmental and sustainability education should be identified through synthesis of previous efforts and workshops to reach common agreement.
- Guidelines and resources are needed to assist educators and public communicators to understand and teach about the linkages between sustainability and security.
- All children should be educated regarding the value of diversity within American society and among societies across the globe.

- Business leadership for sustainability should be fostered by linking sustainability and stakeholder values and presenting case examples in training, education, and development.
- A baseline inventory of government and other programs and funding for environmental and sustainability education should be conducted and repeated at periodic intervals.
- Clearinghouses are needed to identify mentors, practices, and curricula.
- Schools and other institutions should conduct baseline assessments of their practices with respect to sustainability and systematically monitor their progress.
- Standards should be developed that incorporate sustainability principles into learning.
- State departments of education should encourage experiential, science-based and analytical/synthetic learning.
- Research on how people learn about the environment needs to be conducted and incorporated into educational practices.
- A group is needed to define a framework and process to create a clear and inspiring message on sustainability, including an effective marketing strategy that connects to personal core values.
- Tenure and promotional criteria need to foster interdisciplinary education and research.
- Sabbaticals and opportunities should be created for education of mid-career professionals.
- Communities should create multi-disciplinary service centers (utilizing resources such as libraries and universities) so that community members can access information and individuals with expertise to help them meet their own goals for sustainability.
- Graduate courses and programs to help people understand the relationships between population and the environment.
- The “seven-generation test” is essential in any education/communication strategy for sustainability.

Detailed Recommendations, by Breakout Session

Business Education

Transforming Education at Business Schools

Chair: Rick Bunch, Gib Hedstrom

Recommendations (top recommendations marked with ***):

1. Learn from past attempts to alter curriculum – an RFP that seeks proposals to develop an analysis of a past attempts to inculcate change, especially for sustainability, into curriculum and analyze the factors that led to success or failure – NAS funding? Examples of past attempts might focus on quality, international business, women’s studies – also how sustainability has been infused into subjects other than business.
2. ***School accreditation – the addition of a standard that would require or infuse sustainability into AACSB or other accreditation standards.
3. Focus and articulate employment demand for managers who understand sustainable business. Many businesses talk about sustainability but relatively few hire people who understand it.
4. ***Mentoring and persuading academics with expert speakers (respected academics, program chairs and deans, representatives from industry) and credible groups to make the case/legitimize.
5. Use business associations as proxy voice for sustainability (groups like Businesses for Social Responsibility, Global Environmental Management Initiative, Business Roundtable, The Conference Board).
6. Advisory roles of companies – company representatives who sit on business school advisory boards should be more assertive advocates for sustainability. Implement through business associations mentioned above.

7. Improve curriculum resources through support and recognition for teaching cases, infusion to textbooks
 - Funding for case study development
 - Funding to support presentation of sustainability case studies at academic conferences
 - Special editions of peer reviewed case study journals
 - Develop full range of sustainability annexes to leading disciplinary textbooks
 - Identify “zero content tradeoff” options for infusing sustainability into main body of leading textbooks.

Community Education

When the Community is the Classroom

Chair: Elaine Andrews

Recommendations:

1. Create place-based, multidisciplinary service centers utilizing public library and university resources so community members and groups can access individuals with expertise in social marketing, fundraising, conflict resolution, facilitation, etc. in their quest for sustainability (funded by public and private sources).
2. Universities need to see community education as integral to their mission, training researchers in methodologies of participatory action research, and encouraging researchers to communicate research to diverse groups (the public, NGOs, etc.).
3. Universities and agencies should seek out successful projects and models, develop case studies to disseminate broadly, and fund teaching mentors.
4. Develop culturally sensitive approaches to community education, making sure that community members are involved in recommendations and implementation.
5. Provide education programs which engage citizens who are not already engaged in sustainability, identifying and providing incentives and strategies for them to implement sustainable practices in their daily lives.
6. Encourage k-12 education institutions to address sustainability by implementing standards, encouraging development of links to the community (including multigenerational activities), and finding and filling gaps in sustainability education materials.
7. Develop a set of indicators to determine success or failure of sustainability implementation at the local level.
8. Make action-oriented outcomes a priority in community education, in part by making the principles of social marketing widely available to community education groups.
9. Create partnerships with businesses within the community to increase buy-in with local and regional projects and to help develop programs that build the communities’ perspectives for including environmental values and costs in economic decisions.

Diversity

Human Diversity in Education for a Sustainable and Secure Future

Chairs: Dan Durett, Jeff Cook

Recommendations:

1. Infuse diversity throughout all future conferences 2004 onward (no break-out sessions on Human Diversity; integrate (it) into the mainstream i.e., panels, plenary sessions).
2. NCSE should utilize the strengths of our diverse human universe, supporting culturally relevant environmental education, to achieve solutions to our environmental problems.

3. “Show Us The Money!” increase level\$ of funding for K-Grey environmental education in general and for minority serving institutions, including long-term commitment of federal, state and local grant support. An annual increase of federal funding to address issues of workforce diversity must be made an integral part of the federal budget process.
4. Develop a national public education media campaign on global perspectives of diversity.
5. Increase human diversity in science education, policy, research, and decisionmaking.

Diversity: A Basic Concept of Science

6. Educational institutions should increase human diversity in environmental fields and in leadership positions of professional organizations and associations. Recognize and promote human diversity and leadership from human diversity as a basic concept of science on a global perspective, and seek to define its strengths and advantages in pursue common goals (i.e., a sustainable future).
7. Diversity needs to be more strongly promoted and sustained in higher education programs nationally and internationally. Higher education institutions should direct substantive funding for diversity initiatives, esp. scholarships, fellowships, eligibility to be inclusive of foreign students on the campuses.
8. All children should receive instruction in the value of diversity within American society. Develop and implement a national environmental curriculum (K-12) that recognizes the human diversity of students, faculty, and communities.
9. NSCE, its stakeholder organizations, corporate support and other science and education organizations need to define and publicize its diversity policies.
10. Use human diversity as a basis for a balanced approach to the eradication of poverty by establishing simple diversity and eco-friendly educational goals that can be commonly followed globally and asking: Does it sustain/improve water quality? Does it sustain/improve air quality? Does it sustain/improve soil quality?
11. Higher educational institutions should promote practical environmental programs that can be related to theories learned in classes.
12. Develop international partnerships with countries such as Nigeria, South Africa, and other emerging nations developing solutions to issues of human diversity in education for a sustainable and secure future.

Educational Research

Developing a Research Agenda for Education for a Sustainable and Secure Future Diversity

Chair: Rosalyn McKeowan

Recommendations:

1. Research should reflect that education for sustainable development (ESD) ought to be locally relevant and culturally appropriate for all stakeholders.
2. The purpose of ESD is to help individuals, communities, provinces, and nations reach their sustainability goals. One of the major research objectives is to ask if this is happening and to help guide educational program, practice, and policy so that it does.
3. Educational research should delve into sustainability issues of the community (e.g., is the campus maintained within principles of environmental sustainability and hiring policies should support gender equity).
4. ESD research should look at the well-being of the students, not simply academic performance.
5. Research needs to reflect local citizenship in that we expect our citizens to have critical thinking skills, to have the ability to act, and to have the ability to articulate different points of view (not a “knowledge based” curriculum only). ESD research can include measuring a broad range of outcomes including thinking, action, and affect.
6. ESD research should involve all three realms of sustainability—environment, society, and economy.

7. Baseline information of status of ESD should be established early so that comparisons in the future can be made to the baseline information. Baseline information will help establish whether or not programmatic changes have been effective.
8. Research at the national, provincial/state, and local levels should be cataloged and published in easily available and inexpensive format so that program and curriculum developers can learn and profit from the research.
9. Practitioners, researchers, and other stakeholders ought work together to create a research agenda.
10. Research agenda needs to include components of free choice (nonformal and informal education) learning and media. Such research covers life-span – ESE through senior and community-based programming.

Environmental Majors

Curricular Needs for Environmental Sciences and Environmental Studies Degree Programs

Chair: Molly Anderson

The Council of Environmental Deans and Directors (CEDD) Taskforce on Curriculum has developed a draft "Core Competencies for Undergraduates in Environmental Programs" document identifying the basic assumptions, core competencies, and some area-specific competencies of undergraduate environmental education. The goal of the document and the process that creates it will be to improve the strength and credibility of academic environmental programs. The Taskforce hosted this session to gather input on the draft from the academic environmental community, as well as thoughts on what next steps should be taken in the definition and implementation of a framework document stating what makes environmental programs unique in teaching skills, knowledge and perspectives not found in traditional disciplinary programs.

Key questions:

- *What skills, knowledge and perspectives make environmental programs unique? (E.g. What skills, knowledge and perspectives does a graduate from an environmental program have compared with a graduate from a traditional disciplinary program?)*
- *What are the commonalities amongst various environmental programs? (E.g. What does a graduate from an environmental chemistry program share in common with a graduate from an environmental policy program?)*
- *Is there a core canon of environmental education, and is it useful to identify?*

Recommendations:

1. Host intensive writing workshop (size and participants to be determined by CEDD Taskforce on Curriculum) to draft a document to circulate for comment to academic community.
2. Incorporate comments to create a living document that can be presented to academic administrations, prospective students and employers to emphasize the strengths and potential of environmental programs.
3. Reference and build previous competencies work.
4. Focus on adoption and implementation by leaders of academic environmental programs, in order to strengthen undergraduate environmental education.

Environmental Security

Chairs: Kheryn Klubnikin, Douglas Causey

Recommendations:

Environmental Security is the maintenance, restoration, and protection of ecosystem services, such as soil productivity, availability of water, pollination, and others. These services are essential to the maintenance of all living systems of which human social, political, and economic systems are part. Education across all sectors is important to achieve the required paradigm change. To this end:

1. Funding agencies like the National Science Foundation should support multidisciplinary research on the complex social, political, economic, and cultural relationships inherent in environmental security issues.
2. Federal resource management agencies and educational institutions should promote transboundary, collaborative, multidisciplinary cooperation on the science and management of ecosystem services.
3. Federal resource management agencies and educational institutions jointly should develop concrete strategies and tools aimed at critical analysis, understanding, and interpretation of complex ecosystem interactions and dynamic relationships, such as dynamic simulation modeling.
4. National decision makers need to include ecosystem science and scientists in national security policies and activities where they relate to the environment.
5. Educational programs should be developed to build intellectual capacity, awareness, and emergency preparedness to deal with chronic and acute ecological degradation and its consequences.
6. Private foundations and NGOs in environmental education should support and encourage curriculum design in primary and secondary school programs on the subject of ecological sustainability and the vulnerability of ecosystem services.
7. The public media should be encouraged and assisted to convey the understanding derived from research in environmental security.

Fostering Corporate Leadership

Sustainability, Education and Economic Opportunities

Chairs: Sara Ethier, Kim Lamphier

Recommendations:

1. Literacy - Corporations should foster ecological literacy at all levels of learning (top item).
2. Leadership - Foster business leadership for sustainability through training, education and developmental opportunities (second item).
3. Authenticity – assure authenticity of corporate commitment by assessing and disseminating to the public the sustainability footprint of the corporation.
4. Shareholder Case Studies - Provide business case studies to corporate leadership that link sustainability and shareholder value over the short and long term.
5. Transparency - Encourage corporate transparency on sustainability through development of mechanisms such as 3rd party verification and communication of results to the public.
6. Experiential Learning - Provide experiential learning opportunities in sustainability for employees and sponsor opportunities for projects with community, university and K through 12 partners.
7. Mentoring - Encourage sustainable business practices by communicating best practices through education, mentoring and networking opportunities.
8. Research - Foster sustainability research and innovation through government agencies, NGOs, professional and business associations and educational institutions.
9. Examine the historical relationship between businesses and sustainability/environmental issues (the two have not always been at odds).

Geographic Learning

Designing National Programs for Local and Global Impacts

Chair: Greg Crosby

Geographic analysis is an essential component in moving societies toward sustainability. In evaluating whether any process or product is sustainable it is essential to examine how materials consumption and resource use stretches across scales and over time. To ensure a secure and sustainable future, all citizens

need to understand sustainability and behave in a sustainable fashion. To facilitate the education about sustainability we have these recommendations.

Recommendations (Three top recommendations are marked with ***):

1. Programs should be designed so participants collect and use real data to address local issues.
2. Programs should include a range of spatial and temporal scales in their analysis.
3. ***National programs should promote the incorporation of geographic learning into sustainability education because geographic learning is a place-based, real-world, local and global, and is a linking and integrative framework that encourages critical spatial thinking and that can be an effective means of linking goals of sustainability education to actually creating a more sustainable future.
 - Programs should build multi-sector learning communities.
 - Programs should be able to support a wide range of people.
 - Sustainable education should be integrated among other topics of public discourse. Ways to interject sustainability into on-going national issues.
4. ***Need national effort for teacher professional development programs to assist teachers in learning how to teach sustainability using geographic analysis tools. Enable teachers to meet professional development on how to teach about it.
5. Need professional development programs to assist teachers in learning how to teach sustainability using geographic analysis tools.
6. Geographic learning fostered in informal teaching about sustainability and learning broadly and link to popular culture and mass media. Develop partner with cognitive scientists and learner center-ed design to develop geographic analysis tools customized for teachers in the classroom and access to..
7. ***Integrate physical, social and economic geography as part of the core curriculum. Geographic has to component of problem solving that addresses sustainability. Need more focus on integrated approaches to learning such as science with geography.
8. US students need and deserve more integrated geography that includes the social, environmental, and economic as an entire subject-matter as part of a core curriculum. Geography as core subject-matter. Every student by the end of high school should take a geography course.
9. Encourage the direction that NSF is taking toward integrative sciences. Include a focus on environmental sustainability in every RFP.
10. University rewards system should promote interests and efforts to increase an interdisciplinary focus on sustainability.
11. Sustainability education should stress the importance and consequence of individual action and the interrelations of individuals, communities and global systems.
 - Develop a national clearing house so people can find mentors, practices, mentors, curriculum etc.
 - Encourage participants to consider all aspects of sustainability (environment and economics and social) simultaneously to work towards viable solution that will be adopted by society.
12. ***US Students need and deserve to learn how to use state-of-the art technology and software to solve problems, think critically make decisions, and visualize solutions to address issues of sustainability.

Green Campuses

Creating Green Campuses: Practicing What We Teach

Chairs: Jack Crowley, David Orr

Recommendations:

1. Make the case to society at large of the need for value of sustainability. Give the agents of change the resources to make the links between actions & consequences (links to security, equity, human health).
2. Facilitate institution sustainability assessment.
3. Promote education of decisionmakers.
4. Promote the teaching of whole system design (Life cycle analysis).

5. Initiate a clearinghouse for information (physical/plant & community).
6. Promote the development of a sustainability committee/office.
7. Financial/Economic map – payback should be longer.
8. Promote student to student interactions.
9. Resource teams (evaluation, inspiration).
10. Remove barriers to cross-disciplinary & cross-sectors collaborations.

International Challenges

After the World Summit on Sustainable Development and Toward the UN Decade of Education for Sustainability

Chairs: Rick Clugston, Wynn Calder

Recommendations:

1. In light of the fact that the U.S. has recently rejoined UNESCO, NCSE should organize a coalition of relevant international partners (e.g., UNESCO, UNF, ULSF, etc.) to develop a *process* and *strategy* for implementing the Decade of Education for Sustainable Development (which begins in 2005). The *process* leading up to 2005 should include an awareness campaign for U.S. educators on (a) sustainable development, and (b) the Decade. The *strategy* should incorporate measurable outcomes to help define and ensure success of the Decade.
2. U.S. Higher education institutions should provide specific incentives and funding for interdisciplinary research and teaching.
3. A major U.S. foundation should create an endowment for prestigious awards to individuals and institutions that demonstrate leadership in higher education for sustainable development.
4. U.S. higher education institutions should build partnerships with institutions in developing countries with a focus on sustainability in teaching, research, outreach and operations.
5. Encourage all colleges and universities (undergraduate, FAS graduates, professional schools) to develop a required course on global challenges and sustainable development.
6. Initiate programs to address the ethical dimensions of sustainability, and recommend the Earth Charter as a basis for this.
7. Enhance the development of international exchange programs and opportunities for graduate, undergraduate and mid-career students with an explicit focus on the study of sustainable development (and on experiential learning in this area).

K-12 Content

Identification of Essential Learnings at the K-12 Level

Chair: Jaimie Cloud

Recommendations:

General area of emphasis:

- *Teacher Education, Pre-service and Inservice*
- *Standards and Assessments*
- *Community Education, School Partnerships and Real-world Knowledge*
- *Curriculum development and distribution*
- *Funding*

More Specific Recommendations:

1. Connect kids to their natural world
2. Get EFS into their textbooks
3. Free up teachers to care
4. Develop EFS concepts & process in a way to be teachable

5. Involve all of those interested in: DM, curriculum development in sustainability
6. ID the turning points that will make a noticeable change
7. More k-12 teacher in process
8. Preservice and inservice involvement
9. Build communities of teacher-practioners. Peer to peer
10. Find more ways to integrate EFS into the teachers load
11. Establish research agencies that study impacts
12. More integration & mapping into STDS. Prep teachers to see connection. Provide needed resources
13. Package EFS to answer the teacher problems
14. Integrate sustainability more in early writing and reading
15. Formulate more OSE informal education programs
16. Create more external demand sustainable knowledge/ Skills
17. Institutionalize EFS into AP courses & STDS.

K-12 Implementation

Integrating Environment and Sustainability across the K-12 Educational Enterprise

Chair: Mary Smith

Recommendations:

Environmental and sustainability education is an essential element of K-12 curriculum that should be infused and integrated across all disciplines.

Policy

1. K-12 policy must include education in environmental sustainability as a core priority. Resources must be allocated for research and implementation in sustainable practices and ideas. State and Federal government should include standards for and appropriate assessment of sustainability criteria and environmental comprehension.

Learning Outcomes/Strategies

2. Sustainability education should foster the development of problem-solving skills, higher order thinking, and inquiry, using experiential methods that focus on the local environment and community, and link to global issues.
3. Schools should model sustainability through their facilities, school culture, personal relationships, and community involvement.
4. Schools should integrate subjects across disciplines and facilitate student understanding and application of systems thinking (the interactions between human and natural systems).
5. Schools should provide opportunities for students to explore and develop their own values about these issues.

Professional Development

6. Pre-service and in-service teacher training should emphasize inquiry-based learning and integrated systems-based thinking, leading to problem-solving in teaching and learning.
7. Career teachers need frequent opportunities to continue their education through participation in high quality professional development with colleagues across disciplines and grade levels.
8. Teachers need time and support to collaborate with their colleagues to develop interdisciplinary projects addressing sustainability.

Partnerships

9. Schools should form strategic partnerships with non-formal education organizations, such as nature-centers, zoos, museums, and parks.
10. Partnerships should connect students with their environment and their community, promote community service in environmental stewardship, and engage students in long-term environmental projects.

Large Scale Conservation
Integration of Education and Large Scale Conservation
Chair: Judy Braus

Recommendations:

1. **Capacity Building (19):** Agencies, universities, NGOs, and others responsible for training of professionals in large-scale conservation should ensure that: (1) training programs for educators equip those educators to work collaboratively with specialists in other disciplines, (2) specialists in non-educational disciplines appreciate the power of learning and, therefore, value the potential contribution of educators in adding value to their work.
2. **Research Funding (17):** NSF, universities, foundations, and other government and state agencies should commission research into: (1) *learning across geopolitical, social, and institutional boundaries* to build capacity for large-scale conservation (2) how to achieve and evaluate this learning.
3. **Economics (14):** Agencies, educational institutions, and NGOs should educate constituents, students, and members about the tensions between economic growth and ecological, economic, and social sustainability. **Learning from Others (14—combined two):** Organizations, agencies, universities, and funders working in large-scale conservation should promote cross-jurisdictional and interdisciplinary staff training and capacity building. Two-way learning/exchange of professionals from U.S. and other countries helps build/share local knowledge.
4. **Lessons Learned (7—combined two):** A consortium (universities, NGOs, agencies) should capture, catalogue, and make available the conservation education success stories in a national archive (i.e., at NCTC). Look at examples of where federal agencies are collaborating/sharing resources.
5. **Increase Access (7):** Conservation education professionals should ensure that materials and training are appropriate and accessible for target audiences by using a participatory development process that reflects diverse cultures, interests, and backgrounds.
6. **Policy (7):** Issue an executive order that establishes a national conservation education training policy for all conservation professionals. This policy will develop the competencies necessary for natural resource managers to effectively integrate education into large-scale conservation.

Natural History
The Revitalization of Natural History Education
Chair: Mitch Thomashow

Recommendations:

1. The National Council for Science and the Environment should emphasize that natural history education is the foundation for all ecological learning and sustainability education. As such, it should be an overriding educational priority.
2. Develop a White Paper to outline the rationale, purpose, and virtues of natural history education.
3. Organize a society of natural history educators, including members from government, schools, academia, nature centers, parks, zoos, museums, and land trusts, in order to reestablish the prominence of natural history for citizenship, community participation, and ecological literacy.
4. Increase opportunities for public involvement, interaction, and education in natural history through family and community organizations, worship communities, and media outlets.
5. Cultivate a national network of accessible, convenient, visible, and local natural history observation sites in schoolyards, shopping centers, and playgrounds (“bird banding on Main Street”).
6. Organize web based efforts to collect, distribute, and evaluate grassroots natural history data, supported by scientists, employing citizen groups, schools, and amateur naturalists.
7. A national program of field based natural history training, sponsored by nature centers, teacher organizations, and environmental studies programs to support and enhance the natural history skills

and observation techniques of K-12 teachers, and provide instruction for place-based, schoolyard programs.

8. Initiate a comprehensive research program to investigate cognitive natural history—how people learn to observe nature at different stages of lifecycle development.
9. Increase the opportunities for natural history education by providing sites that offer security and freedom to explore habitats, without concerns for personal safety.

Planetary Health

Integrating Human Health and Environmental Education

Chair: Andrew Brown

Recommendations:

1. The health of existing and future humans is being compromised by environmental degradation. We recommend that the sustainability of interdependent human and environmental health become the primary focus of all educational, political and economic decision-making.
2. We recommend the transformation of learning communities to reflect the interdependence of human and environmental health, focusing specifically on:
 - Integrated thinking;
 - Systemic interconnections;
 - Understanding of natural limits;
 - Processes that empower self-directed community action; and
 - Common principles applicable at global, national, local, and individual scales.
3. At grade school levels K-12, we recommend the introduction of a basic curriculum on the social and environmental determinants of health, including nutrition, physical education, food production, and community self-sufficiency.
4. At post-secondary education levels, we recommend the expansion of the principles of interdependent human and environmental health into all disciplines and professional education programs, including law, business, engineering and architecture schools.
5. In educational programs for all health professionals, we recommend the introduction of a mandatory core curriculum on the principles of sustainable human and environmental health, and training in diagnostic procedures that reflects those principles.
6. In specific programs for public Health professionals, we request that the Association of Health Centers (AHC) immediately formally requests that the Council for Accreditation of Schools of Public Health establish mandatory criteria reflecting the principles of sustainable human and environmental health.
7. In scientific research programs focused on health and medicine, we recommend a shift in focus and funding support from a search for reactive cures to causation research, prevention and health promotion.
8. In industry, we recommend initiatives that remove known or possible direct and indirect threats to interdependent human and environmental health.
9. In the political arena, we recommend, as a priority, ongoing dissemination of information establishing interdependent human and environmental health.
10. In the media, we recommend highly visible public awareness campaigns promoting interdependent human and environmental health, and advocating individual and community responsibility and action.
11. In urban and community development, we recommend the consistent application of the principles of sustainable interdependent human and environmental health.

Population-Environment

Population-Environment Linkages: Science-based Education

Chairs: Peter Saundry, V. Jeffery Evans, Vivien Joy Ponniah

Recommendations:

1. Establish graduate programs in population and environmental linkages to create the next generation of population and environment scientists.
2. Create an on-line clearinghouse for distribution of population and environment information, expertise, linkages, resources, and educational activities.
3. Educate policy-makers through science-based decision making tools and decision support systems.
4. Create an educational network to bring scholars together to bring scholars together.
5. Bring about a broader public understanding of basic population and the environment facts by creating partnerships between universities and NGOs to translate science into understandable and actionable information.
6. Extend population and environment information to K-12.
7. Create P&E media fellowships.
8. Create P&E congressional fellowships.
9. NICHD should target a major research and training initiative on Population and environment interactions focused on water (to help achieve the millennium development goal of halving the proportion of people without access to safe drinking water by 2015 and the added world summit on sustainable development goal to halve the proportion of people without access to sanitation by 2015).

Public Communication

Strategy for a National Public Communications Campaign on Sustainable Development

Chairs: Bill Godfrey, Isabel Castillo, Warren Flint

Keystone Recommendation:

- 1) Develop a group that will work on defining a framework and process to create a clear, inspiring notion of Sustainable Development.
 - Putting a marketing plan into place.
 - Getting participation from the right organizations to provide the expertise and buy-in.
 - Using existing multi-media outlets (avenues) to get the message out.
 - Designating creative venues for communicating the message.
 - Creating events at the local level that will introduce people to Sustainable Development and practices.
 - Ensuring that work created is endorsed in and beyond the U.S.

Other Recommendations:

- 2) Encourage and support the design and implementation of a national movement for sustainable development with local actions encompassing the ten groups of WSSD: national government; local authority; labor, farmers; women; youth; indigenous peoples; NGOs; Science, Education, and Technology; workers and trade; and business. Process to consider the full diversity of stakeholders.
- 3) The Marketing Strategy should include:
 - Implementing a marketing campaign in the short-term which communicates 5 things people can do to be sustainable on an individual basis and five current public policies people can support that address Sustainable Development (e.g. AIDS in Africa).
 - Creating a positive message that corporations will not want to turn down and will not turn off the public listener.
 - Encouraging the messengers of sustainability to employ similar marketing strategies as are used by the business world (“fight fire with fire”).

- Linking Sustainable Development needs to economic stability.
 - Using Celebrities as spokespeople for Sustainable Development.
- 4) The specific message of sustainability to the public should possess certain characteristics that are determined by or include the following. (What the message looks like?)
- Conduct audience research on how to develop the message. For example, will making it a moral issue, make it into a political issue?
 - Keep the how and why tied together. When you give people action give them the “why” it should be done.
 - The message has to connect to people’s deeply held ethical values.
 - Pay as much attention to the “public way of knowing” as the “expert way of knowing.”
 - Apply the message locally.
 - Make it personal.
 - Sustainable Development needs to be directly linked to economic stability and security.
 - The message should be dynamic, not dull and be positive.
 - Identify specific case studies of Sustainable Development that demonstrate the fallacy of myths and benefits of sustainability.
- 5) Tailor the primary message to multiple audiences.
- Youth – Focus groups of young people who make it “cool.”
 - To create an American Coalition for Sustainability (that will help to define who “WE” are.)
 - Develop a market for:
 - a) those who want to practice sustainability and don’t know how;
 - b) those who do not have the desire.
 - Develop messages that resonate with baby boomers such as economic stability.
 - Develop messages that resonate with business.
- 6) Create a mid-career educational program for communicating Sustainable Development and create abroad programs where youth collaborate on Sustainable Development programs.
- 7) In communication to the public, need to make clear that US is perceived as a threat to world sustainability because of consumption and lifestyles that goes beyond just a few national values. Have to take into account the perceptions of other peoples and create Universal language.

Sustainability-Security Curricula

Developing Curricula to Integrate Sustainability and Security
Chairs: Geoff Dabelko, Bill Godfrey

Sustainability and security are two sides of the same coin. Subsequently, we will refer to Sustainability/Security education as Sustainability Education.

Recommendations:

1. NCSE should develop its existing library as a national resource for sustainability education, focusing on case studies of what works. The NCSE library would serve as a “K to Gray” resource.
2. NCSE should consider developing guidelines for teachers of sustainability/security education.
3. State departments of education should develop Sustainability education that is experiential in early grades, science-based beginning in middle school and concentrate on development of analytic and synthesis skills beginning in high schools.
4. Colleges and universities should include sustainability education as an integral part of their general education requirements. Sustainability education should be seen as a value-added course of study, complimentary to the pursuit of traditional degrees. (This would hopefully help avoid encountering administrative and departmental barriers present in college level education.)

5. Sustainability education at the high school level and beyond should include an understanding of environmental, social and economic systems. (The study of environmental systems should be science based.)
6. Sustainability education at the college level should include coursework, case studies and experiential (project) involvement and be designed to meet the needs of employers and markets.

Sustainable Practices

Moving from Communities of Learning to Communities of Practice

Chair: Keith Wheeler

Recommendations:

1. Leaders at all levels need to communicate that what we do not know is as important as what we do know – i.e., value the Precautionary Principle.
2. Develop higher education programs that stress interdisciplinary content and thinking.
3. The education system and the media need to refocus, and not solely emphasize profit-driven motives.
4. Research and examine sustainable societies' best practices.
5. Develop and fund longitudinal studies of sustainable practices in order to design replicable transformative experiences.
6. All sectors need to widen stakeholders' perspectives and focus on developing a common language.
7. Standards for construction of new facilities and renovation of old should incorporate the principles of ecological design.
8. The Sustainable Development Education Network needs to work with communities to develop success stories and sustainability icons.
9. Teachers at all levels need to translate personal commitment to diverse action, including corporate action.
10. The Sustainable Development Education Network needs to develop a sustainable sister cities program pairing urban and rural cities in sustainability initiatives.

Teacher Professional Development

The Link to Success (and Change) in Education: Transforming Professional Development with Teachers

Chair: Chris Chopyak-Minor

There are various stakeholders required to support the preparation and ongoing development of educators throughout the United States. Higher education, non-governmental organizations, community partners, government at all levels, corporations, students and teachers are all critical entities in achieving a secure and sustainable world.

Recommendations:

To advance education in this country, the White House should specifically provide support for a seamless continuum of professional development from aspiring educators to master practitioners in sustainable and environmental education through the following:

1. Revisit and revamp the preparation of new educators entering the workforce in content and professional performance;
2. Provide multiple opportunities for ongoing and sustained professional development that results in no teacher left behind;
3. Support, at all levels, for the materials, experiences, tools, skills and other resources needed to create safe learning environments that improve the performance and behavior of students.

Undergraduate Education

Transforming Undergraduate Education for Environmental Sustainability

Chair: Elaine Hoagland

Recommendations:

1. Learning

- Understanding the four dimensions of sustainability – health, social, economic and ecological dimensions.
- University modeling sustainability as a fully integrated community – connecting learning to research, operations, facilities, purchasing and collaboration with local and regional communities.
- Sustainability, environmental, social and science literacy, social change skills and values an integral part of all disciplines and majors.
- Systems thinking for all majors.
- Make environmental, economic and social footprint of students and the college/university visible to all students and also help them understand how to reduce any negative impact.
- Interdisciplinary learning should be as strong a part of learning as disciplinary learning – have the same lateral rigor across the disciplines as well as vertical rigor within the disciplines.
- Means to help connect different scholarly disciplines and to deal with conflicts among disciplines.
- Make visible to students the assumptions of all learning disciplines so students will understand the history of the learning and whether the assumptions are still appropriate.
- Understanding that humans are an integral part of nature and the larger social community and the interdependence of all human and natural system well-being.
- An integral part of the learning experience for all students should be experiential, collaborative learning on campus, local communities and other parts of the world to promote connection to community and citizenship as well as the environment.
- The above is part a good liberal arts education as well as professional education.
- *Recommended to Accreditation organizations, professional societies, university presidents/administrators, higher education organizations, future employers, trustees, alumni and funders of education and research.*

2. Faculty Development & Rewards

- Help professional development for faculty to make sustainability an integral part of their research and education, for example, faculty development programs
- Change tenure and promotion criteria to foster interdisciplinary teaching and research, involvement in public policy and public education.
- *Recommended to college/university administration, accreditation organizations, professional societies, trustees and funders of education and research*

3. Educational Resources

- Ask Authors and publishers to make sustainability issues a part of mainstream textbooks & educational resources
- *Recommend to NSF, Dept. of Education and foundations research on and assessment of the impact/effectiveness of sustainability education, research and operations in higher education*

4. Institutional Change

- Bring together external stakeholders - future employers, education & research funders, alumni, professional associations, accreditation organizations and college/university leaders to discuss ways to make sustainability a foundation of learning & practice. It is critical that these external stakeholders create incentives (“demand creation”) for higher education to make sustainability a priority.
- Make sustainability a part of the mission statement of higher education institutions

- Establish a university wide committee across the college to promote sustainability
 - *Recommended to future employers, education & research funders, alumni, professional associations, accreditation organizations and college/university leaders.*
5. Employment Opportunities
- Make visible to students the employment opportunities of sustainability learning & practice.
 - Change employment classifications in professional associations and higher education to include employment/professional activities related to sustainability
 - *Recommended to professional societies, higher education administrators, future employers.*