FROM CLASSROOM TO COMMUNITY AND BEYOND: EDUCATING FOR A SUSTAINABLE FUTURE

Task Force Report

Report of the Public Linkage, Dialogue, and Education Task Force of the President's Council on Sustainable Development

February 1997

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Many of the federal officials who serve on the Council also serve as members of the Council's Task Forces and participate actively in developing Task Force recommendations, but those recommendations do not necessarily reflect administration policy.

A LETTER
FROM THE TASK FORCE CO-CHAIRS

It is not enough for us to merely say thank you to the individuals and organizations whose invaluable contributions enabled the Task Force to successfully meet the objectives set for it by President Clinton and the Council. Representing a wide variety of interests, thousands of people devoted countless hours and shared with us their creative ideas, heart-felt opinions, sage advice, and a wealth of valuable information. From our dialogue, we have seen visions about sustainability through others' eyes. We have heard bold ideas about how such visions can be realized, within a host of richly diverse community settings. We hope that this report effectively synthesizes the visions and key ideas, some of the remarkable examples, and the recommendations which flowed from our discussions. To each one of you who participated, champions all, we extend our deepest appreciation and gratitude. It is your extraordinary accomplishments, and the achievements of others like you across the land, which have already resulted in some real progress toward a sustainable future in many communities.

Citizens in the communities we visited advised us that government at all levels must foster and provide leadership to make sustainable development a reality, across the breadth of our own country and around the world. It is the expressed will of citizens that has evoked such a positive response and a commitment from our government to take action, and to help us realize our dreams, desires, and goals for a sustainable future. The findings of the Task Force have clearly reinforced the critical importance of building effective linkages between individuals and grassroots groups, and the institutions which comprise local, state, national, and international communities. Through such linkages we must maintain an open dialogue, form innovative public-private partnerships, and establish productive new strategic alliances. Continuing, open dialogue will feed our understanding of complex issues and enable each of us to benefit from the experiences of others. Linkages between diverse organizations will germinate research and create the knowledge needed to meet coming challenges. Educating for sustainability will enable the dynamic building of the intellectual capacity which will carry us toward the fulfillment of our highest aspirations.

For those leaders currently involved in Council or community activities, we ask that you continue the already impressive work that is being undertaken to integrate the tenets of sustainability into our education institutions, and our personal and community lives. For those of you who have been newly introduced to sustainable development, we urge you to learn as much as you can, and to take up the banner for yourselves, your families, and for the people and places where you live. The promise is a prosperous, socially equitable, and healthy life for us -- and a life-sustaining earth for our children and those yet to come.

Judith M. Espinosa Michele A. Perrault

PREFACE

This report of the Public Linkage, Dialogue, and Education Task Force (PLTF) is one of seven Task Force reports prepared for the President's Council on Sustainable Development. The Council was established by President Bill Clinton through Executive Order No. 12852 on June 29, 1993 and charged with the following missions:

- make recommendations to the President to advance sustainable development, including a national sustainable development action strategy;
- expand public awareness of the challenges inherent in moving toward sustainability, including the need to manage the nation's natural resources carefully;
- institute a Presidential Honors Program recognizing exemplary efforts that advance sustainable development.

President Clinton also appointed the individual members of the Council -- leaders drawn from business and industry; government at all levels; non-governmental organizations; education and research institutions; labor and civil rights groups, and communities.

Shared responsibility for success was a hallmark of the eight Task Forces, organized by the Council. Their purpose was to provide advice to the Council on major issues, spur dialogue, and involve the public. Individual Council members served on various Task Forces. At their discretion, Task Force chairpersons invited others to participate in various capacities. The expertise and resources of the Council members were expanded and enhanced with a cadre of volunteer leaders and experts, as well as citizens representing diverse domestic and international interests. Through local and regional conferences, workshops, roundtable discussions, demonstration projects, case studies, and other public meetings -- conducted around the country -- hundreds of other leaders and experts, and thousands of citizens were involved in the dialogues and deliberations of the Task Forces.

Each Task Force developed a work plan corresponding to the opportunities and challenges reflected in the subjects and issues to be addressed. The eight Task Forces were:

- Eco-Efficiency;
- Energy and Transportation;
- Natural Resources Management and Protection;
- Population and Consumption;
- Principles, Goals and Definitions (administrative function -- no report prepared;
- Public Linkage, Dialogue, and Education;
- Sustainable Agriculture, and
- Sustainable Communities.

The Task Force reports serve as a record of each group's dialogues and deliberations, and their respective contributions to the information needs and interests expressed by the Council. The work of the eight initial Task Forces culminated during the spring of 1996, subsequent to their transmittal of policy recommendations and suggested actions for consideration by the full Council. After review of each Task Force's work by the Council, recommendations were transmitted to the President for his further review and action. Thereafter, President Clinton requested that the Council continue its work, and he asked it to undertake aspects of implementation related to the Task Forces' recommendations.

In addition to seven Council members who served on the PLTF, there were six PCSD member's liaisons, and fifty-eight additional non-PCSD members who participated. Another forty-seven leaders and experts were invited to participate in special meetings. Extensive public participation was invited throughout the period of the PLTF's work.

This report is intended to summarize the observations, findings, and recommendations made by the PLTF to the Council and the President, and to provide additional ideas, information, and examples which may prove helpful to others interested in sustainable development matters. The PLTF hopes that the ideas, recommendations, and suggestions found within this report will be publicly discussed and debated, and further refined over time. Although its work was comprehensive, for practical reasons the Task Force did not seek to provide policy recommendations or suggest actions intended to address all of the significant issues associated with its mission. Rather, the report and recommendations are intended to be a call for action on strategic issues, and to stimulate further public dialogue and debate that will carry us to the next levels of public linkage, dialogue, and education for sustainability.

EXECUTIVE SUMMARY

"FROM CLASSROOM TO COMMUNITY AND BEYOND"

This report reflects the observations, findings, and recommendations made by the Public Linkage, Dialogue, and Education Task Force (PLTF) of the President's Council on Sustainable Development (PCSD). The mission of the PLTF was twofold:

- to foster a two-way dialogue between the public and the Council, ensuring that interested stakeholders were kept informed about the PCSD process and encouraging public comment on that process, and
- to formulate policies on how to integrate sustainable development into the nation's formal and non-formal education systems.

Comprised of experts representing diverse public- and private-sector organizations, the PLTF engaged in a two-year process to accomplish its mission. Internal deliberations as well as public dialogues were conducted. Included in the dialogues were grassroots leaders; business, community, and government representatives; educators and school administrators; education consumers, and others involved with formal and nonformal education and training -- at all levels -- ranging from pre-school to the university level, and beyond.

From those dialogues, the Task Force concluded that our citizens do want a sustainable future, and that many already have the fundamental, conceptual underpinnings and motivation to drive needed change. In some communities, there has already been significant progress made to effect change for sustainable development. However, when viewed from a state, regional, or national perspective, movement toward such change is still very nascent. Stephen Joel Trachtenberg, President of The George Washington University, put it this way: "Most of us do not lack a philosophical commitment for sustainability, we lack the knowledge necessary to make decisions for sustainable actions." Therein lie some of the challenges for our academic and research institutions and our education systems.

The PLTF report focuses on the important role that formal and nonformal education plays in equipping citizens with the knowledge, skills, and abilities necessary to move our nation -- indeed the world -- towards a sustainable future. Education for sustainability must be a lifelong endeavor that goes beyond classroom walls, enabling students, teachers, and entire communities to turn learnings into commonplace, everyday sustainable choices and actions.

To effectively drive and frame nationally needed change for sustainability education, new policies and actions were determined to be needed at all levels. From its dialogues, the PLTF developed three policy recommendations and a total of thirteen suggested action items. The full text of each recommended policy and suggested action items appears in a section of the report, beginning on page twenty, and they are individually discussed at length in the chapters indicated below. These recommendations and suggestions were included in the PCSD's report *Sustainable America: A New Consensus* (February 1996), which was transmitted to President Clinton for his review and action. During the spring of 1996, the President requested the Council to continue its work, and he asked it to begin aspects of the implementation process. Implementation at local, state, national, and international levels, should be a coordinated effort to make the best possible use of all available resources. The policy recommendations and an abbreviated version of each action item follow:

Policy Recommendation 1: Formal Education Reform.

Encourage changes in the formal education system to help all students (kindergarten through higher education), educators, and education administrators learn about the environment, the economy, and social equity as they relate to all academic disciplines and to their daily lives. [Chapter 3]

Action 1 ...identify the essential skills and knowledge that students should have at specified benchmark grades...

Action 2 ...support education reform; emphasize systems thinking and interdisciplinary approaches; pursue experiential, hands-on learning...

Action 3 ...incorporate education about sustainability into pre-service training and in-service professional development for educators...

Action 4 ...promote curriculum and community awareness and follow sustainable practices in school and on campus.

Policy Recommendation 2: Nonformal Education and Outreach.

Encourage nonformal access to information on, and opportunities to learn and make informed decisions about, sustainability as it relates to citizens' personal, work, and community lives. [Chapter 4]

Action 1 ...encourage lifelong learning about sustainability...

Action 2 ...develop an integrated approach for raising public awareness and support for sustainability goals, conveying information on indicators...encourage people to adopt sustainable decision making...

Action 3 ...a national extension network should be developed to provide needed information to enhance the capacity of individuals and communities...

Action 4 ...local and state governments should expand partnerships with community organizations and other levels of government to support community sustainability planning processes and assessments.

Action 5 ...employers, through partnerships, should develop training programs to equip the workforce with skills and abilities needed to adapt to changes brought on by national and global transition to sustainability.

Policy Recommendation 3: Strengthened Education for Sustainability

Institute policy changes at the federal, state, and local levels to encourage equitable education for sustainability; develop, use, and expand access to information technologies in all educational settings, and encourage understanding about how local issues fit into state, national, and international contexts. [Chapter 5]

Action 1 ...government at all levels should form partnerships to develop and implement coordinated strategies supporting education for sustainability.

Action 2 ...public and private sectors should support the development of, and access to, enhanced multimedia telecommunications technologies and improved clearinghouse capabilities that promote an understanding of sustainability.

Action 3 ...educators should help students understand the international factors that affect the nation's transition to a sustainable society.

Action 4 ...educators should ensure that education for sustainability invites and involves diverse viewpoints, and that everyone has opportunities to participate in all aspects of the learning process.

The report also provides many specific examples of diverse sustainability education projects and initiatives, currently underway, domestically and around the world. Additionally, an appendix contains a resource guide which lists the organizations and groups cited in the examples; it includes mailing addresses, telephone and fax numbers, and e-mail addresses -- when available at the time of publication.

Although the Public Linkage, Dialogue, and Education Task Force completed its mission during the spring of 1996, the members hope that the recommendations, examples, and resources cited in this report will encourage individuals and organizations to develop their own sustainability visions and commitments to action.

INTRODUCTION

An educated and informed public is our nation's most powerful resource for meeting the challenges created by increasing environmental, economic, and social equity demands. Recognizing the importance of education, the President's Council on Sustainable Development (PCSD) established the Public Linkage, Dialogue, and Education Task Force (PLTF).

PLTF's policy recommendations focus on education, access to information, outreach, and development of sustainable communities and a sustainable workforce; these are described in depth in the body of this report. The following summarizes how the Task Force achieved its first mandate - that of public outreach and dialogue. Through that process, which was consensus building in nature, the PLTF was able to accomplish its second mandate - the formulation of policy recommendations for consideration by the President.

As consumers and producers, individuals make choices that cumulatively have local-, national-, and even global-scale impacts on societies, economies, and environments. Without education and outreach among the public, the societal consensus needed to redirect our nation toward a sustainable path cannot be attained. Education and outreach thus are necessary for a sustainable future. PLTF aimed its outreach to the public at large, with specific reference to the following key constituencies:

- The **youth** of today are the nation's future. It is important that they acquire the substantive knowledge and skills needed to become responsible citizens who can help bring about sustainability in their homes, workplaces, and communities.

- **Business leaders and employees** can have a significant effect on consumer and product choices which will ultimately affect - positively or negatively - our nation's ability to become more sustainable.

- **Federal, state, local, and Native American tribal policy makers** and local community leaders are primary target audiences because their active leadership is essential.

- **Researchers and educators** help youth and adults acquire the knowledge, skills, and attitudes necessary for sustainability.

- **Civil rights, religious, environmental, and nonprofit organizations** are important links to community and grassroots constituencies.

The PLTF outreach effort encouraged fresh approaches to increase public dialogue; served as a catalyst for developing local, regional, national, and international sustainability agendas; facilitated the flow of information; and provided a central point for disseminating information on the Council's deliberations. To this end, PLTF:

- involved Council members in a variety of conferences,

- identified and promoted dialogue among states and local regions that had developed sustainability plans or were in the process of doing so,

- initiated demonstration projects that reached out directly to educate our nation's young people and teachers about sustainable development, and

- distributed written information from and about the Council via print and electronic media.

PLTF also hosted dialogues, roundtables, and fora around the country, thereby providing a valuable opportunity for the Council to hear about the lessons learned in local communities -- which are often considered the breeding grounds for innovative ideas on sustainability. Several landmark PLTF dialogues and fora are highlighted below:

- In March 1995, approximately 200 people from across New England attended a public PCSD forum -- Achieving a Sustainable New England -- at Tufts University's Fletcher School of Law and Diplomacy in Medford, Massachusetts. The purpose of the forum, which PLTF co-hosted, was to inform citizens about PCSD's work and to hear testimony on issues related to New England's sustainability efforts. Citizens were invited to voice their hopes and concerns about New England's future and their ideas for achieving sustainable development in the region. Testimony -- which has now been compiled into a report, *Achieving Sustainable Development in New England* -- was given on regional issues, such as fisheries and defense diversification, that are affecting or promoting community sustainability. A public comment period followed the testimony, allowing environmental representatives, health

officials, and citizen leaders from around New England to advise the Council.

- An international roundtable, which included a diverse group of citizens from the San Francisco Bay Area, was hosted by PLTF to focus on international issues. Many of the topics discussed became the basis for a chapter on international leadership in the Council's report,[1] and helped formulate the Task Force's action item on international education for sustainability. In particular, the participants noted that part of shifting to sustainability requires an examination of the root causes of the "global eco-crisis," including massive media, "techno-worship," and the lack of a geological time frame. Overcoming obstacles requires a global understanding of the effects that one country's actions and policies have on the health and well-being of another country, coupled with domestic solutions to unsustainable practices. The roundtable concluded that this was best achieved through a "think globally, act locally" credo -- a message to be explained and publicized through strong educational programs emphasizing individual, community, business, and national responsibilities to the global community.

- In April 1995, the PCSD held a meeting in San Francisco which focused on education for sustainability. Part of that focus was to incorporate youth into all facets of the dialogue. A youth-led roundtable was held with local area youths to discuss issues and problems that were barriers to sustainability. Concerns were raised about increasing societal ills such as drugs, violent crime, teen pregnancy, lack of access to education and jobs, and the environmental degradation of the earth. The youth were hopeful that by continuing to talk and work together to find common solutions, a more sustainable environment could be created for future generations. Two youth representatives to the Council, James Hung (a PLTF member) and Amy Weinberg (a member of PCSD's Sustainable Communities Task Force) communicated the results of the forum to the Council members during the PCSD meeting.

These -- and many more -- meetings, roundtables, dialogues, and other fora were central to shaping the Council's work and PLTF's policy deliberations: the goal was to make the Council's work as inclusive as possible. Thousands of people from multiple sectors responded to the Council's request for participation in the PCSD process. Participants drafted, reviewed, and commented on the work of the Council at each stage of development. They also shared project information, materials, and success stories -- all of which greatly enriched this process.

The Task Force members took all the information from dialogues and roundtables, coupled with their personal and professional expertise, and embarked upon an ambitious process to develop policy recommendations. Their goal was to identify the potential policy areas that needed to be addressed and highlighted in the national sustainable development action strategy being developed by the PCSD. This process was unique in that it brought together the different components of education -- formal (K-12 and postsecondary); nonformal (media, museums, extension, and continuing education); workforce and vocational training, and outreach. Within each education component, a variety of education stakeholders were represented -- teachers, the private sector, NGOs and environmental organizations. This approach enabled a variety of innovative ideas to be represented and it fostered a sense of ownership of the product -- the recommendations for policies and associated action items.

- The January 1995 education-related meeting kicked off PLTF's policy process. The focus of that meeting was on nonformal education. PLTF members heard from a variety of formal and nonformal educators about the benefits of linking the community to education efforts. To further their education for sustainability efforts, the Task Force hosted a community forum in Chattanooga which was moderated by a local student.

- In February 1995, the Task Force led a forum sponsored by S.C. Johnson & Son, Inc., and hosted by the Global Rivers Environmental Education Network in Ann Arbor, Michigan. At the forum, a group of visionary leaders from academia, public relations firms, nonformal education programs, business, government, and non-governmental organizations gathered to formulate policy recommendations that looked beyond incremental educational reform to focus on lifelong learning emphasizing holistic relationships with the environment and communities.

- In February 1995, PLTF members teamed up with a diverse group of educators from around the globe to participate in a workshop to develop principles of sustainability in higher education. This PLTF forum was hosted in Essex, Massachusetts, by Second

Nature, a nonprofit organization that helps universities craft sustainability plans. The forum helped shape the Council's recommendations on higher education and sustainability and produced a booklet entitled *Workshop on the Principles of Sustainability in Higher Education*.

- In March 1995, S.C. Johnson & Son, Inc., hosted a forum held in Washington, D.C., chaired by Madeleine Kunin, Deputy Secretary of the U.S. Department of Education. Educators and administrators attended this roundtable, whose purpose was to review the policy recommendations formulated at the Ann Arbor meeting and determine whether the paradigm shift outlined in those recommendations was realistic. There was consensus among the participants that the policies were on the right track for directing the nation's efforts at educating for sustainability.

This report is a compilation of the consensus findings, including policy recommendations and suggested action items, arrived at through the efforts of the PLTF outreach and dialogue process. It expands upon recommendations in the PCSD report, Sustainable America: A New Consensus, by highlighting more examples and success stories of sustainability in action. This report also provides a resource guide, found in "Appendix C," to assist individuals and organizations in making new linkages to advance sustainability initiatives and programs.

CHAPTER 1

Dialogue and Education: Keys to Sustainability

STEPS TOWARD SUSTAINABILITY

From individual consumers to international corporations, from youths to seniors, households to communities, this nation is taking its first tentative steps toward becoming a sustainable society. The consumer who selects a recycled paper product at the supermarket or who rejects a product because it is over-packaged is taking positive action. The corporation that redesigns its manufacturing process to save energy and raw materials has taken an equally positive step. The young person who devotes hours of after-school or weekend time to volunteer in his or her community is also participating -- and it is a process of change that is gathering force across the nation and around the world.

A 1995 survey noted that 61 percent of Americans favor the idea of sustainable development, and that four out of 10 say they would tolerate changes in the price of consumer goods, such as paying more for a gallon of gasoline if they were sure it would help the environment.[1] This willingness indicates that the public is developing attitudes and values that foster sustainable living. Further, a March 1996 survey asked respondents if the three goals of sustainable development -- economic growth, environmental protection and the health and happiness of people -- can be accomplished collectively without compromising any one of them, and 66% agree that it is possible to achieve all three simultaneously.[2]

Our society will not be unsustainable one day and sustainable the next. Sustainability is a process with a beginning and no end. The challenge will remain with us and our children and their children.

-- Stephen Viederman
President,
Jessie Smith Noyes Foundation

Another indicator of change is in the industrial sector. Manufacturers across the nation are adopting eco-efficient manufacturing processes, also known as 'industrial ecology." Eco-efficient firms design industrial processes that mimic natural ecosystems, following nature's model by recycling valuable energy and natural resources. The goal is a closed loop with little or no waste -- a system that makes good economic as well as environmental sense. Other evidence of change, drawn from the actions of individuals, businesses, and manufacturers, is mounting:

- Recent years have seen phenomenal success in converting a nation of "throwaway consumers" to conscientious recyclers. In 1990, Americans recycled 9.65 million tons of aluminum beverage cans, a recovery rate of 63 percent. The Berger family in Whitney Point, New York, has found ways to keep its trash to 3.0 pounds a year, rather than the 4.3 pounds of garbage produced every day by the average American. "It's integrated into our lives," explains Cindy Berger. "It's second nature, a habit."[3]

- Production of bicycles reached 110 million units worldwide in 1994; 12 million were bought in the United States alone. Mail carriers in St. Petersburg, Florida, use bicycles on their rounds. Some police officers in New York City and Washington, D.C., patrol on bicycles, as do some Secret Service agents at the White House. While bicycles' overall impact on reducing energy use and air pollution may be small, it is growing.[4]

- Nationwide, various high-profile retail chains have introduced environmentally friendly practices. McDonalds, for example, through a partnership with the Environmental Defense Fund, pays for independent evaluations of manufacturer' claims of "biodegradable," "recyclable," and "saves energy." The company shares that information with consumers, enabling them to make informed purchasing decisions.[5]

- Home Depot and Scientific Certification Systems pioneered the first U.S. private sector program to partner retailers, manufacturers, and third-party environmental certification to promote continuous environmental improvement in consumer products. Collins Pine, a sustainable forest products company, became the first to join the program by introducing Collins' wood, a certified sustainable product, at select Home Depot stores.[6]

- Interface Flooring has started to implement a licensing program for carpeting. Interface manufactures the carpet (a petroleum-intensive product), ships and installs it, maintains it, and continues to own the carpet throughout its life. Because the carpet is made of free-laying carpet tiles, Interface's maintenance program includes periodic selective replacement of individual tiles that show wear and tear. Replaced carpet tiles are returned to a closed loop recycling center where individual components are recycled into new carpet tiles. Interface is also implementing The Natural Step, a program that combines science-based principles of sustainable development with total quality management to introduce sound environmental practices to the factory floor. [7]

- Young people also are finding innovative ways to practice principles of sustainability. For the past three years, fifth grade students at Kimbark Elementary School in San Bernardino, California, have lowered their school's energy bill by $5,000 a year. One of the student ideas was to hang signs reading, "Oops, you left your lights on," in empty classrooms. Students record each day's energy consumption, discuss possible causes when high readings occur, and carry out strategies for lowering energy use.[8]

The individuals and organizations cited above may not call what they are doing "living sustainably," but they are making behavioral changes by conserving resources, saving money, and making collective and collaborative contributions to their community. Collectively, these actions -- and others like them -- will lead us to a sustainable tomorrow.

Brookside Fifth Graders: Students for Sustainability

For the past four years, students of Brookside School in San Anselmo, California, have worked with their teachers, Ruth Hicks and Laurette Rogers, to help save a local endangered species, the California freshwater shrimp (Syncaris pacifica). They adopted the shrimp through the California State Adopt-a-Species Program. First, the students learned all that they could about the shrimp. Then they acted to put their knowledge into practice. The students visited a native plant nursery to learn about methods that could be used for restoring creekside habitat. They also contacted Paul Martin, a local rancher whose property included one of the last 15 creeks harboring the shrimp. The class asked for -- and was given -- permission to restore habitat along the creek. Partnerships were formed among creek biologists, Americorps, and Future Farmers of America members who worked with the students to make the creek rehabilitation possible.

To build support for their project, the students formed a "Shrimp Club" and arranged for the club logo to be stamped on grocery bags; they also sold student-designed t-shirts to raise money. The class's public relations committee arranged for the project to be featured in magazines and newspapers, and on radio shows and local and national television. The shrimp project has received over $100,000 in awards and grants which will be used to build fences to keep the run-off from cattle manure out of the creek and to plant the banks with native plants.

One 10-year-old made a presentation to the University of California Board of Regents expressing his concern over what would happen to the shrimp if a proposed dam was built. Other students involved with the project have gone to Sacramento and Washington, D.C., to lobby for the shrimp. For example, at the Endangered Species Act congressional hearings, these students spoke about the importance of collaboration with private landowners and the need to keep funding strong.

Participation in the project makes students feel empowered and hopeful. Eleven-year-old Lucia says, "I learned a lot from the shrimp project, and one of the main things was that kids can really do a lot to save the earth. If every class in the world helped one species, the world would be a much better place. I learned so much about building dams, planting species of the same kind, and showing people how much we care . . . This project showed me how much kids can do."

The Need for Public Dialogue on Sustainability

Despite the encouraging trend toward sustainable living practices, an overarching, incontrovertible fact remains: many Americans do not understand the concept of, or concepts involved in, sustainable development.

For example, they have little if any understanding of such pervasive environmental issues as biodiversity and global warming. A 1992 national opinion survey by Peter D. Hart Research Associates indicated that only one percent of respondents consider endangered species to be a serious environmental problem, and only one in five respondents had heard of the loss of biological diversity. This response, according to E.O. Wilson in *The Diversity of Life*, stands in startling contrast to the fact that approximately 27,000 species a year -- 74 per day, or three species every hour -- are driven to extinction worldwide.

Additionally, many people confuse the issue of global warming with depletion of the ozone layer. A 1994 study by Carnegie-Mellon University revealed that even well-educated citizens wrongly believe climate change can cause increased cases of skin cancer and are convinced that their personal response should be to give up aerosol sprays.[9] Not only are these respondents confusing global warming and depletion of the ozone layer, they also seem to be unaware that ozone-depleting chemicals have been federally banned from aerosols for about 20 years.

If widely reported concepts such as global warming remain unfamiliar to so many Americans, it is not surprising that sustainability -- a complex and multidimensional concept,

which involves finding a balance between achieving environmental protection, economic progress, and sociopolitical equity -- is unknown to as many as four out of 10 citizens, as well as to many policy makers, business leaders, educators, and community leaders.[10]

Many approaches can be used to raise public awareness of sustainability. But education -- lifelong education, education within and outside the formal schooling system throughout our lives -- is the major, perhaps primary, tool for creating a common understanding of this concept. This education may occur in formal schooling or in such nonformal venues as the media, adult education programs, museum exhibits, conferences and workshops, and nature center programs. The goal of this educational experience is for citizens to become active participants in dialogues about sustainable development and in developing meaningful sustainable development strategies -- personally, locally, nationally, and globally.

Dialogues on sustainability must involve as many people and as many different viewpoints as possible. Multi-stakeholder dialogues compel people to work to discover common ground on which to build consensus and create change. Exploration of diverse views will result in wiser decisions leading to win-win solutions that provide benefits for all constituencies. Ultimately, this approach encourages "buy in" because participants feel they have a stake in the outcome. The result of a successful process in a cooperative atmosphere is that the stakeholders develop shared visions.

At the heart of a sustainable society is an integrated, supportive system that does not allow one component to dominate over another to the exclusion or extinction of another, but allows every component to flourish. The consensus needed to develop this system will be a gradual, cumulative process spreading outward from a few individuals, groups, and communities, and building over the years

Sustainability: A Moving Target

The fact that the term "sustainability" has not yet entered the mainstream of American consciousness may be due in part to confusion about its meaning. Over the years, literally hundreds of definitions have been suggested. One of the earliest was proposed in 1915 by Canada's Commission on Conservation: "Each generation is entitled to the interest on the natural capital, but the principal should be handed down unimpaired."[11] The actual term "sustainable development" was first introduced in the late 1970s and popularized in 1987 by the World Commission on Environment and Development, also known as the Bruntland Commission, which defines sustainability as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

In the final analysis, however, agreeing on a formal definition of the term is not as important as coming to agreement on a vision of a sustainable world. Citizens must work together to answer critical questions that emulate their view of the world. What would a sustainable lifestyle be like? How can sustainability be achieved? What does a sustainable society mean? Clearly these visions will differ based on a variety of issues, as well as from community to community.

As changes occur in social, economic, political, and environmental conditions, and as new scientific discoveries and technological advances are introduced, society's vision of sustainability will be affected. In other words, since conditions vary from one community to another and across nations, what will be sustainable under one set of circumstances may not be the best solution under other conditions. Also, what might be considered a sustainable society a few years from now might very well be seen as unsustainable a few decades hence, as advances in technology enable visions of sustainability to grow and improve.

A vision of sustainability in each community or country must take into account a variety of different views and perspectives. Businesses, nonprofit organizations, communities, and countries must seek the common ground that supports their collective needs, values, and goals. Then, as changes occur, they must continually revisit and revise their vision to reflect current-day situations.

Overcoming Barriers through Dialogue and Education

Projections by the United Nations indicate that the world's human population will increase from 5.5 billion to 8.5 billion by the year 2025. In 1988, 1.25 billion people worldwide breathed air containing unhealthy concentrations of suspended particulate matter. The average annual rate of deforestation worldwide between 1980 and 1990 was approximately equivalent to an area the size of Georgia.[12] In the United States, citizens consume 25 percent of the Earth's resources although they constitute only five percent of the planet's population. The amount of energy used by a single person in the United States is equivalent to that used by three Japanese, six Mexicans, and eight Native Americans.[13] In the last 20 years, per capita consumption in the United States has increased by 45 percent. Because 35 percent of resources in America are consumed in households, it follows that lifestyle changes can make a direct impact on resource consumption.

Clearly, the time to chart and pursue a sustainable course is now. But lack of knowledge, indifference, and resistance must first be addressed.

If sustainability is to become a reality, educators, government at all levels, businesses, and non-governmental organizations must work together to foster an awareness of common needs, knowledge of the long-term impacts of decisions, and understanding of the benefits of achieving a sustainable society. The best way to allay any apprehensions about reductions in the standard of living and overcome anxiety and fear is to present positive visions and real-life examples of sustainability.[14] Countless examples testify to sustainability-oriented changes across the United States. This report highlights some of these models, discusses the obstacles and efforts behind their success, and relates them to Task Force policy recommendations. By highlighting these stories, our hope is that their successes will inspire other grassroots efforts to spread the idea and practice of sustainability into other communities across the nation and the globe.

Progress toward sustainability will be realized if we as a nation can:

- build upon what is already working,
- identify success stories and share them as models,
- form productive partnerships to work for the common good and address system constraints, and
- educate individuals and communities for sustainability.

Progress means seeking synergy with ongoing initiatives and exploring new vehicles, such as experiential learning in the workplace, which will lead to an understanding of sustainability. A process like the one used by the President's Council on Sustainable Development and its Public Linkage, Dialogue, and Education Task Force can be replicated to continue moving us forward in examining strategies for advancing education for sustainability. The task is admittedly a big one, but it can be accomplished by working together to find common solutions.

Gap Households for Sustainability

Many of the resources consumed in the United States are used in the home. The Global Action Plan for the Earth (GAP) is a grassroots effort providing individuals and communities with the motivation, support, and hands-on experience they need to live their lives more sustainably. GAP believes that the primary means for shifting America onto a sustainable path is for households to make changes in the way they live.

To date, approximately 7,500 households in 12 countries have participated on GAP's EcoTeams. GAP reports that, on average, these households sent 42 percent less garbage to landfills, used 25 percent less water, cut 16 percent of their carbon dioxide output, and used 16 percent less fuel for transportation. These lifestyle changes helped households save an average of $401 per year.

To further promote individual sustainability, PLTF teamed up with GAP to work with citizens in cities visited by the Council to help put sustainability ideas into practice. Says Sandy Kurtz of Chattanooga, Tennessee, "The PCSD and the Public Linkage Task Force enabled us to bring key community leaders to the table at the critical campaign launching time by underlining our credibility when we needed it most. In our first year, Global Action Plan-Chattanooga, with a small staff and many volunteers, has become a special project of the Chattanooga Chamber of Commerce Foundation, and receives financial assistance from Chattanooga Public Works Department and several businesses. The result: 11 household EcoTeams have been started!"

CHAPTER 2
Education for Sustainability: Definition and Goals

What Is Education for Sustainability?

The President's Council on Sustainable Development identified education as an integral part of its long-term strategy for rebuilding communities and the country for the 21st century. Together with its Public Linkage, Dialogue, and Education Task Force, the Council defined the following education goal:

Ensure that all Americans have equal access to education and lifelong learning opportunities that will prepare them for meaningful work, a high quality of life, and an understanding of the concepts involved in sustainable development.

Education for sustainability is the continual refinement of the knowledge and skills that lead to an informed citizenry that is committed to responsible individual and collaborative actions that will result in an ecologically sound, economically prosperous, and equitable society for present and future generations. The principles underlying education for sustainability include, but are not limited to, strong core academics, understanding the relationships between disciplines, systems thinking, lifelong learning, hands-on experiential learning, community-based learning, technology, partnerships, family involvement, and personal responsibility.

-- President's Council on Sustainable Development

It also identified the following indicators to measure achievement of the education goal.

- **Information access:** larger number of communities with infrastructure in place that allows easy access to government information, public and private research, and community right-to-know documents.
- **Curriculum development:** increased number of curricula, material, and training opportunities that teach the principles of sustainable development.
- **National standards:** larger number of school systems that have adopted K-12 voluntary standards for learning about sustainable development similar to the standards developed under the National Goals 2000 initiative.
- **Community participation:** larger number of school systems and communities with programs for lifelong learning through both formal and nonformal learning institutions.
- **National achievement:** improved skill performance of U.S. students as measured by standardized achievement tests.
- **Graduation rates:** increased high school graduation rates and number of students going on to college, vocational training, or other advanced training.

What Are Its Objectives?

Three objectives underlie the Council's education for sustainability goal.

Ensure that awareness, knowledge, and understanding of sustainability become part of the mainstream consciousness, both nationally and internationally.
Awareness and concern about environmental, economic, and equity issues must become firmly rooted in public consciousness. Also needed is an in-depth understanding of the short- and long-term implications of decisions and choices. To produce that understanding, students and adults need to know how natural systems work and appreciate natural cycles. But such knowledge is only the beginning. Also needed is an understanding of the interdependence of economic, social, political, and ecological conditions -- in rural and urban areas as well as locally, regionally, nationally, and internationally.

In addition to formal classroom education, this objective can be implemented through various kinds of nonformal education, such as a multifaceted public awareness campaign. Advances in computer technologies and other information and communication technologies will help in this effort by broadening awareness of sustainability and helping bridge cultures and continents in ways never before possible.

Engage key domestic constituencies in a dialogue about sustainability to produce consensus.
The recommendations offered in this document are directed toward fostering a dialogue on sustainability. Since the aim is

to work toward consensus, stakeholders must work together to articulate an action agenda that enjoys broad support to ensure implementation. The next step is widening the initial consensus by continually involving new partners.

Implementation of this objective requires engaging in all forms of dialogue. Potential mechanisms range from town or neighborhood meetings to roundtable discussions, conferences and workshops, task forces and commissions, and community and group "visioning" sessions. Other venues could include electronic mechanisms such as the Internet; radio and television talk shows; and feature articles, op-ed articles, and letters to the editor in newspapers, magazines, and newsletters.

Foster the skills, attitudes, motivation, and values that will redirect action to sustainable practices and produce the commitment to work individually and collectively toward a sustainable world.
Individuals must bring their actions into accord with a sustainable future. Practical citizenship skills must be applied to organize groups to act on issues related to sustainability. Conflict resolution techniques can be used to find ways to negotiate divergent interests. An understanding of the economic incentives that drive people's decisions and the other values that affect decision making can help develop a sense of how values interact and how they can change behavior.[1]

Implementation of this objective depends on formal education and various forms of nonformal public outreach. Mobilizing the level of action needed to bring about a sustainable world requires a paradigm shift regarding humanity's attitude toward the environment and an increased ability to integrate divergent disciplines so environmental, economic, and social conditions are treated as interconnected systems.

How Can Education for Sustainability Be Accomplished?

Education for sustainability can give people the tools, skills, and experience they need to understand, process, and use information about sustainable development. It will help them make individual and collective decisions that both benefit themselves and promote the development of sustainable communities. And it will provide a means for creating a more highly skilled and globally competitive workforce and developing a more informed, active, and responsible citizenry.

But how can it be accomplished? The following are key principles about education for sustainability that the Task Force identified.

Education for sustainability must involve everyone.
Education on any topic, but particularly on sustainability, should flow from school to community and back again. Educators at all levels should reach beyond school walls, as many successful programs already do, to involve parents, industry, communities, and government in the education process. Colleges and universities should work with other schools and communities -- to deliver information, identify questions for research, and provide direct services to help solve community problems. For their part, communities should take a stronger interest in educating their citizens for sustainability, recognizing that current and future generations will need to be well-educated on this topic in order to bring about a sustainable future.

Education for sustainability emphasizes relationships between formal and nonformal education.
It thrives in all types of classrooms, exposing students to local, state, national, and international issues through hands-on, experiential learning in alternative educational environments -- such as wading through streams to do water quality testing, volunteering in the community, or participating in school-to-work programs. Because sustainability is all-encompassing, learning about it cannot and should not be confined to formal settings such as schools, universities, colleges, and training institutions. Nonformal education settings, such as museums, zoos, extension programs, libraries, parks, and mass media, provide significant opportunities to complement and build on classroom learning. This means that formal and nonformal educators should work together to produce an educated citizenry.

Education for sustainability is about connections.
Educating for sustainability does not follow academic theories according to a single discipline but rather emphasizes connections among all subject areas, as well as geographic and cultural relationships. Rather than weaken the rigor of individual disciplines, education for sustainability offers an opportunity to strengthen them by demonstrating vital interrelationships. For example, Dartmouth College requires students to take an international leadership course stressing business and environmental components. Students must strive to achieve high standards within the core disciplines, even as they develop an understanding of the connections across these disciplines. Further, education for sustainability involves consideration of diverse perspectives, including those of ethnic groups, businesses, citizens, workers, government entities, and other countries.

Education for sustainability is practical.
While delving into many disciplines, education for

sustainability helps students apply what they learn to their daily lives. It engenders a sense of efficacy. Part of sustainability education is learning citizenship skills and understanding that citizens have the power to shape their lives and their communities in light of their vision of a healthy and prosperous future.

Education for sustainability is lifelong.
Continual efforts should be made to institute programs about sustainability in a variety of arenas, including the workplace and community centers and through the media. A citizenry knowledgeable about the benefits of sustainable living will have the capacity to create and maintain lasting change. Benefits to the individual include an understanding of and ability to participate in the social and economic changes that will affect their lives. For example, many communities have used planning processes that engage citizens in defining a desired future plan for their community. Using their plan, citizens work to achieve a sustainable future for themselves, their children, and their community.

Environmental Education and Education for Sustainability: The Debate Among Educators

At this point, many readers will be asking themselves how environmental education and education for sustainability differ. Many educators have been asking the same question. Among some educators there is a debate about the relationship between environmental education and education for sustainability. Some say that education for sustainability is a subset of environmental education; others say vice versa.

The field of environmental education dates back at least to the 1972 Stockholm conference on the environment. Two subsequent U.N. conferences defined the new field. A charter adopted at the Belgrade conference held in 1975 defined the goal of environmental education; "...to develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones."

Thus, environmental education departed from ecology or science education by calling for a strong social component. Not only would students acquire knowledge about the environment but also the skills, attitudes, motivations, and commitments to work on problems. A second U.N. conference held in Tbilisi in 1978 built on this charter and laid out five categories of objectives for environmental education: awareness, knowledge, attitudes, skills, and participation.

These objectives have provided the field's new framework for the past 18 years. The Tbilisi Declaration pushed environmental education past strictly environmental concerns to:

> *prepare the individual for life through understanding of the major problems of the contemporary world, and the provision of skills and attitudes needed to play a productive role towards improving life and protecting the environment with due regard to ethical values. By adopting a holistic approach, rooted in a broad interdisciplinary base, it recreates an overall perspective which acknowledges the fact that natural environment and man-made environment are profoundly interdependent. It helps reveal the enduring continuity which links the acts of today to the consequences for tomorrow.*

These words foreshadow the thinking that became known as the concept of sustainable development in the early 1990s.

In the 1990s, the Brundtland Commission report and the Earth Summit Conference popularized the concept of sustainable development, which bound concerns about economic prosperity and social equity with environmental protection. The field of environmental education largely embraced this concept. At the same time, a few other academic disciplines, attracted to the concept of sustainable development, began developing their own networks and curriculum.

Gus Medina, a past President of the North American Association for Environmental Education (NAAEE), the professional association of environmental educators, says that environmental education essentially is education for sustainability. He maintains that efforts should go into strengthening the network of environmental educators, rather than confusing the public with a new concept of education for sustainability. Environmental education, Medina says, "should increase its efforts and ensure that concepts of education for sustainability are incorporated and promoted."

"Sustainability education is an attempt to articulate and implement a specific vision of environmental education," Bora Simmons, current NAAEE President, and Ed McCrea, NAAEE Executive Director, note in a review of a report on education for sustainability. They ask "why a new field of education for sustainability is needed -- as opposed to putting a similar amount of energy and resources into enhancing and extending existing environmental education efforts." They suggest that sustainability educators "become integral partners

with a network of thousands of environmental educators who have the experience, materials, and dedication to help achieve shared goals."

On the other hand, the United Nations Educational, Scientific and Cultural Organization (UNESCO), in a recent report issued by the U.N. Secretariat, maintains that the forward-looking vision of Tbilisi was not fully implemented: ". . . efforts everywhere focused more on environmental concerns than on human or economics development." The report commits UNESCO to promoting development of the concept of education for sustainable development and anticipates that environmental educators will provide the base from which it can grow.

The report also recognized that it will also be important to seek out and engage professionals from related areas such as population education, economics, religion, and other social sciences, including human rights and values education. While each profession or discipline had been exploring its own singular contribution to sustainable development, it is now time to bring together lateral thinkers from these related fields to explore the potential synergy that could be unleashed by creative interdisciplinary thinking.

As this dialogue on educating for sustainability and environmental education continues, one thing is clear: these two areas need to work cooperatively rather than separately.

The Public Linkage, Dialogue, and Education Task Force has tried to do just that -- work cooperatively with representatives from all disciplines to come to a consensus on education policy for this nation. The PLTF frames their policies under the rubric of educating for sustainability. This is not to say that one side of the debate is right or that one side is wrong. Rather it is to acknowledge that a paradigm shift needs to take place in this country to emphasize the important role that education must play in advancing sustainability.

Task Force POLICY Recommendations and Actions

Although a number of individuals, businesses, government entities, and communities across the nation have taken the first steps toward sustainability, much more can be done to nurture a sustainable society. To foster awareness, dialogue, and action for sustainability, the Task Force proposes three policy recommendations. These recommendations address both formal and nonformal educational settings and acknowledge the lifelong nature of education. They also address an array of crosscutting issues that relate to formal and nonformal education alike -- such as technology, partnerships, cultural, and international contexts. Each recommendation is accompanied by specific actions that articulate the necessary partnerships and activities needed for implementation at local, state, national, and international levels. By exploring successful case studies in which challenges were faced and barriers overcome, strategies and initiatives for implementing action are offered. Together, these suggested recommendations and actions form a comprehensive educational strategy that promises to help lead the nation to a more sustainable future.

The Task Force's three policy recommendations and related actions are listed on the next three pages, concluding this Chapter. Then, in Chapters 3, 4 and 5, each policy recommendation is reviewed in further detail, with examples cited throughout the discussions.

POLICY RECOMMENDATION 1

Formal Education Reform
Encourage changes in the formal education system to help all students (kindergarten through higher education), educators, and education administrators learn about the environment, the economy, and social equity as they relate to all academic disciplines and to their daily lives.

Action 1. Parents and representatives from states, schools, educational organizations, community groups, businesses, and other education stakeholders should identify the essential skills and knowledge that all students should have at specified benchmark grades for a basic understanding of the interrelationships among environmental, economic, and social equity issues. This set of voluntary standards could serve as a model for states and communities to use in setting their own requirements for academic performance.

Action 2. State officials, school administrators, and other educators and stakeholders should continue to support education reform; emphasize systems thinking and interdisciplinary approaches; and pursue experiential, hands-on learning at all levels, from elementary and secondary schools to universities, colleges, community colleges, and technical schools.

Action 3. Colleges and universities should incorporate education about sustainability into pre-service training and in-service professional development for educators of all types, at all levels, and in all institutions.

Action 4. Schools, colleges, and universities should promote curriculum and community awareness about sustainable

development and should follow sustainable practices in school and on campus.

POLICY RECOMMENDATION 2

Nonformal Education and Outreach
Encourage nonformal access to information on, and opportunities to learn and make informed decisions about, sustainability as it relates to citizens' personal, work, and community lives.

Action 1. Nonformal educators should encourage lifelong learning about sustainability through adult education programs, community and civic organizations, and nonformal education programs -- such as those sponsored by museums, zoos, nature centers, and 4-H clubs -- so that individuals can make well-informed decisions.

Action 2. Media strategists and sustainable development experts should develop an integrated approach for raising public awareness of and support for sustainability goals, conveying information on indicators of sustainable development, and encouraging people to adopt sustainable decision making in their daily lives.

Action 3. A new or expanded national extension network should be developed to provide needed information to enhance the capacity of individuals and communities to exist sustainably.

Action 4. Local and state governments should continue to extend their partnerships with community organizations and other levels of government to support community sustainability planning processes and periodic assessments.

Action 5. Employers -- in partnership with all levels of government, community organizations, businesses, educational institutions, and others -- should develop training programs to create a workforce with the skills and abilities needed to adapt to changes brought on by the national and global transition to sustainability.

POLICY RECOMMENDATION 3

Strengthened Education for Sustainability
Institute policy changes at the federal, state, and local levels to encourage equitable education for sustainability; develop, use, and expand access to information technologies in all educational settings; and encourage understanding about how local issues fit into state, national, and international contexts.

Action 1. Federal, state, and local governments should form partnerships with private sector organizations, businesses, professional societies, educational institutions, and community groups to develop and implement coordinated strategies supporting education for sustainability.

Action 2. The public and private sectors should support the development of and equitable access to enhanced multimedia telecommunications technologies and improved clearinghouse capabilities that promote an understanding of sustainability.

Action 3. Educators in both formal and nonformal learning programs should help students understand the international factors that affect the nation's transition to a sustainable society.

Action 4. Formal and nonformal educators should ensure that education for sustainability invites and involves diverse viewpoints, and that everyone -- regardless of background and origin -- has opportunities to participate in all aspects of the learning process. This will ensure that education for sustainability is enriched by, and relevant to, all points of view.

CHAPTER 3

In the Classroom: Restructuring Formal Education

Formal classroom education plays a primary role in shaping the minds of our nation's youth -- the next generation of leaders, activists, managers, parents, and government officials. As America participates in an increasingly interdependent and resource-demanding world, educators must find ways to prepare students to meet the challenges created by rapidly changing global situations and conditions.

In particular, education for sustainability must counteract the long tradition of splintering knowledge into smaller and smaller pieces. Education for sustainability is not an add-on curriculum -- that is, it is not a new core subject like math or science. Instead, it involves an understanding of how each subject relates to environmental, economic, and social issues. Further, educating for sustainability promotes both high standards of achievement in all academic disciplines as well as an understanding of how these disciplines relate to each other and to the concepts of environmental quality, economic prosperity, and social equity.

Young people make up 20 percent of the population, but 100 percent of the future.

-- Richard Riley, Secretary U.S. Department of Education

Confronting the challenges of a new century will require a purposeful refocusing of the nation's education system into a more hands-on, interdisciplinary learning experience. Principles of sustainability can be used as a catalyst for innovation and restructuring of educational institutions, curricula, and teacher training efforts.

POLICY RECOMMENDATION 1

Formal Education Reform

Encourage changes in the formal education system to help all students (kindergarten through higher education), educators, and education administrators learn about the environment, the economy, and social equity as they relate to all academic disciplines and to their daily lives.

- defining the essential learnings and skills needed for understanding sustainability,
- emphasizing interdisciplinary learning and systems-oriented thinking,
- expanding pre-service and in-service professional training for teachers, and *
- having educational institutions serve as models for sustainability in their communities.

Defining Essential Learnings

Action 1. Parents and representatives from states, schools, educational organizations, community groups, businesses, and other education stakeholders should identify the essential skills and knowledge that all students should have at specified benchmark grades for a basic understanding of the interrelationships among environmental, economic, and social equity issues. This could serve as a model for states and communities to use in setting their own requirements for academic performance.

Education is not the filling of a bucket but the lighting of a fire.

-- William Butler Yeats

A Nation at Risk, a 1983 report commissioned by the U.S. Department of Education and authored by the National Commission on Excellence in Education, galvanized the country with its findings on the inadequacy of public schools in preparing the nation's youth. The report led many state and local leaders to make school reform a top priority; it also spurred bipartisan support to enact Goals 2000: Educate America Act (P.L. 103-227).

This 1994 law aimed at improving the quality of learning and teaching in the classroom and workplace. Its principles include high expectations for all students; full participation by parents, educators, and communities; quality teaching; increased graduation rates; effective use of technology in learning; adult literacy and lifelong learning; safe and drug-free schools; and hands-on, experiential learning.

These principles are compatible with educating for sustainability. Educating students for high standards in basic

skills across the curriculum will enable them to participate productively as members of the community and the workforce. Continuing educational opportunities throughout people's lives, both in formal and nonformal learning situations, will enable them to adapt to changing economic conditions and respond to the need for environmental protection. Building knowledge of the interdependence among economic prosperity, environmental protection, and social equity will help citizens understand, communicate, and participate in the decisions that affect their lives.

This reorientation to an integrated, interdisciplinary approach will succeed only if standards are established to ensure that sustainability education achieves high levels of quality and performance. Standards have been set for disciplines such as math, science, and geography. Additionally, educators have long recognized the need for a set of standards for environmental education. Organizations and businesses that fund environmental education projects also have called for a set of widely accepted materials standards that could be used in curriculum selection. To date, 19 states have adopted legislation mandating environmental education and 33 have enacted formal guidelines. Without a peer-reviewed framework of essential standards, however, implementation and evaluation of programs will be difficult. Education for sustainability requires connections to be made across all the standards and that environmental, equity, and economic issues be a part of each discipline.

Various organizations have focused on developing a set of consensus standards for environmental education.

- **Environmental Education Standards.** In 1990, the National Science Teachers Association adopted a set of general "criteria for excellence in environmental education." More recently, the North American Association for Environmental Education has been collaborating with the World Resources Institute and members of the Public Linkage, Dialogue, and Education Task Force (PLTF) to develop a set of learning standards for environmental education that can be used at the state level, by school districts, or by individual schools as guidelines for curriculum benchmarks at various grade levels. These standards cover such areas as the importance of ecological and sociopolitical knowledge, appreciation of the interdependence of all life forms, concern for human impacts, problem-solving skills, knowledge of citizen action strategies, and respect for different perspectives and values. The standards development process involves opportunities for review, application to the National Education Goals Panel for certification, and dissemination to curriculum teams that are drafting statewide learning standards.

Educators -- working in partnership with communities, businesses, and other stakeholders -- can make education for sustainability a reality. Specifically, for various levels of formal education, they can define the skills and knowledge students will need in order to understand how various human actions affect the environment, economy, and equity.

Students who meet performance standards on the principles of sustainability will be better prepared for emerging job opportunities in a global and dynamic economy. They also will be better prepared to become responsible citizens. Defining standards for a core of basic knowledge about sustainability will accelerate the infusion of these concepts throughout the nation's educational system. The standards also can serve as a resource for media strategies and other venues for nonformal education about sustainability.

Many states have already begun to address the changes needed to ensure that an informed citizenry has the awareness, understanding, behavior and skills necessary for a sustainable future.

- **New Jersey Environmental Education Plan of Action.** In New Jersey, legislation was passed in 1996 to create a permanent Environmental Education Commission to implement a Plan of Action which addresses the basic principles of sustainability. All citizens of New Jersey are responsible for gaining the knowledge, attitudes and values, skills and behaviors that ensure sustainability for future generations. New Jersey hopes to accomplish this through many venues and -- in particular -- by establishing a New Jersey Environmental Education Network, a New Jersey Global Forum, and an annual Environmental Education/Earth Week celebration. This Plan of Action has been acclaimed by leaders in the field of environmental education as a template for living in the Western Hemisphere.

Friends of the Future

Sixth through 12th grade students from the St. Francis of Assisi School in Louisville, Kentucky, have created a voice for themselves and other youth in the state by forming Friends of the Future (FoF). With their teacher, Sheila Yule -- who, according to one student, "pulls everything together and is the core of the group" -- Friends of the Future members have set an ambitious local, state, and international agenda.

- Locally, they are examining what they can do as individuals and as a group to protect and enhance the environment and their community. Students regularly conduct environmental testing and have alerted the city council to a variety of water quality problems in their community; in fact, they have helped prompt legislative changes to address the situation.
- Across the state, FoF members are working in partnership with a consortium of schools and universities, state agencies, and students from other environmental groups to develop strategies to better organize and incorporate environmental and sustainable development education into the Kentucky school curriculum.
- FoF's international mission is to raise awareness of the United Nations' Agenda 21 and of the role youth need to play in the discussion on sustainable development. With the sponsorship and support of the U.N. Environment Programme, FoF published the book We Got the Whole World in Our Hands: A Youth Interpretation of Agenda 21, which documents the proceedings of the 1992 U.N. Conference on Environment and Development.[1] The book puts Agenda 21 into simple language -- easy for younger readers to understand. The students presented their version at the National Earth Summit in Louisville in May 1993.

Emphasizing Interdisciplinary Learning

Action 2. State officials, school administrators, and other educators and stakeholders should continue to support education reform; emphasize systems thinking and interdisciplinary approaches; and pursue experiential, hands-on learning at all levels, from elementary and secondary schools to universities, colleges, community colleges, and technical schools.

Equipping today's students for tomorrow's decisions means that educators must promote long-term thinking and planning in conjunction with interdisciplinary, systemic learning. This shift will require new methods of teaching as well as new curriculum content. It will require that educators work with communities, businesses, and organizations to develop materials that expose students to local, national, and global issues. It means ensuring that issues and ideas from a variety of cultures and disciplines are represented in the classroom. Building knowledge of the interdependence among economic prosperity, environmental protection, and social equity will help students become responsible citizens and understand, communicate, and participate in the decisions that affect their lives.

Education for sustainability will . . . connect disciplines as well as disparate parts of the personality: intellect, hands, and heart.

-- David Orr, Chair
Environmental Studies
Oberlin College

The time is ripe for making education for sustainability -- and its requisite interdisciplinary approach -- a focal point of reinvention efforts in educational institutions. There are already groups, locally and abroad, that are leading the way:

- Through Goals 2000, the U.S. Department of Education is supporting state and local restructuring efforts.

- Countries around the world, including Canada and the United Kingdom, are using sustainability concepts to help guide their educational programs.

If the nation's elementary, secondary, and higher education schools are to infuse sustainability concepts into their curricula and offer separate courses in issues related to sustainability, universities and colleges will need to take the lead in reorienting education's approach from compartmentalization to integration.

More courses that support interdisciplinary approaches need to be offered and existing courses need to be refocused to include sustainability topics.

- **Sustainability in the Curriculum.** The Kellogg School at Northwestern University sponsors an elective course that involves a spring-break trip to Costa Rica to research such initiatives as the ecotourism industry and paper production from the waste products of banana processing. The Crouse School of Management at Syracuse University has a mandatory course focusing on what business students need to know about the environment and sustainability; it also offers courses on land development law and environmental law as part of the business school curriculum.

Widener University offers a Sustainability and the Law course which has three themes: the role of law in achieving sustainability, sustainability as a basis for evaluating laws, and the potential effectiveness of different types of legal instruments in achieving sustainability. The course materials, which include an interdisciplinary bibliography, focus on topics including fisheries; business and manufacturing; biodiversity and climate; international, national, and local communities; and consumption and population.

Additionally, a wide variety of university programs focusing on sustainability and interdisciplinary study opportunities are emerging across the nation.

- **Columbian International Center.** This graduate studies program of the American Institute for Urban and Regional Affairs in Washington, D.C., is accredited to offer the first master's and scholar-practitioner doctorate degrees in sustainable development. Both degrees are in accordance with requirements established by the World Council on Sustainable Development. These programs (1) are interdisciplinary; (2) incorporate a global awareness of social, economic, technological, and environmental change and the resulting impacts on society; (3) foster integration of theory, research, and professional practice; and (4) require effective teamwork, cooperation, management, and leadership. The degree programs are an international, off-campus curriculum for practicing professionals.

- **Center for Sustainable Technology.** The Georgia Institute of Technology's Center for Sustainable Technology was created in collaboration with the World Engineering Partnership for Sustainable Development. This partnership was itself established in 1992 to unify the global engineering community to implement sustainable development initiatives. Recently, the center was awarded a $925,000 grant by the General Electric Foundation; it will use the grant to develop an educational program in sustainable development and technology that cuts across all engineering disciplines.

- **The Randolph G. Pack Environmental Institute.** In 1996, The SUNY College of Environmental Science and Forestry launched the Randolph G. Pack Environmental Institute to promote the philosophy of sustainable development. The Institute focuses on such topics as democratic processes, environmental decision making, public participation, environmental equity, and sustainable development. Interest in these areas will be promoted through research and service activity in community, state, national, and international venues.

- **The University of Louisville Institute for the Environment and Sustainable Development (IESD).** IESD was established to promote multidisciplinary analysis and research on the needs, causes, and consequences of development. It seeks to expand knowledge on the environment and economic development while providing an effective interface between scientific inquiry and the policy-making process. Conferences, such as a series held in 1995

on promoting sustainable communities, are part of IESD efforts to educate and engage the public in a dialogue on sustainability.

- **Institute for a Sustainable Environment.** In 1994, the University of Oregon chartered its Institute for a Sustainable Environment, which is particularly interested in encouraging cross-disciplinary environmental research, education, and public service. The institute is also focused on working with the community on sustainability projects. Recent collaborations include Oregon Benchmarks, *Quality of Life Indicators for Coos County*, and a sustainable forestry plan for 64,000 acres of forest land of the Caquelle Native American Tribe.

- **Center for Sustainable Communities.** This is one of three centers at the University of Washington's Cascadia Community and Environment Institute. The institute's emphasis is on interdisciplinary activity to address regional priorities while providing students with practical education and training experiences. The center seeks to transfer knowledge, experience, and services between the academic setting and communities through training, research, and direct involvement with students. The center is a source of information for many areas of sustainability from environmental design to sustainable building practices to community planning.

- **Tahoe Center for a Sustainable Future.** This center is working in collaboration with a variety of partners including the University of California at Davis and the Sierra Nevada College, as well as teachers and business, environmental and community leaders to develop a sustainable development curriculum for the Tahoe-Truckee Region. The effort's overall mission is to develop a model process for environmental education teachers and K-12 students that will focus on promoting a healthy environment and developing an adequate standard of living for all community members.

To ensure that the momentum to develop programs on sustainability continues, universities need to work with federal, state, and local agencies to shift funding priorities toward interdisciplinary research. At present, fewer than two percent of federal funding to universities supports research related to environmental subjects, including the human causes of environmental change.[2] Too often, interdisciplinary research is regarded as "soft science" which does not advance a faculty member's professional standing, fulfill publication requirements, or earn tenure. Consequently, the educational system is not responding as quickly to the need for information and research on sustainability.

"Countries could establish national or regional centers of excellence in interdisciplinary research and education… Such centers could be universities"

-- excerpted from
Agenda 21
UNCED 1990
Rio de Janeiro

Elementary and secondary schools also need to work with other schools and communities to develop curriculum, deliver information, identify questions for research, and provide direct services to help solve community problems. Many elementary and secondary schools are already making progress in this area. For example, the Community High School Environmental Research and Field Studies Academy in Jupiter, Florida, incorporates sustainability concepts into classroom subjects, school activities, community service projects, and enterprise partnerships. This gives students an opportunity to share in decisions related to their school and community to define a more sustainable, equitable, and productive future.

Although some educators believe that schools should impart only knowledge and skills, not foster changes in attitudes or actions, other educators contend that participation in real-world activities is an integral component of education.[3] Courses in citizenship, for example, sometimes involve the development of action plans to resolve real-world environmental problems and the opportunity to implement those plans if students desire. The Global Rivers Environmental Education Network (GREEN) initiative is an educational program with a strong focus on real-world problems and community service. This program is helping empower students to take community action by providing the tools necessary to learn about the environmental, economic,

and social conditions in their communities, as well as the global community.

Community service can be a powerful educational tool. Taking young people out of the classroom has a long, successful tradition in environmental education.

- **Student Volunteers.** Since 1957, the Student Conservation Association has encouraged more than 30,000 student volunteers to perform conservation work in national parks, national forests, national wildlife refuges, and other public lands.

- **Learning Through Service.** In 1990, students at Oglala Lakota College on the Pine Ridge Native American Reservation in South Dakota surveyed their community for willingness to recycle. Based on the overwhelmingly positive response, the students pushed the district council to build a recycling center.[4]

Finally, the success of reform efforts will depend heavily on access to pre- and in-service training for educators and the development of new materials. Classroom learning can be greatly enhanced by knowledgeable educators who are supported by recent and accurate materials. Learning institutions can work collaboratively with organizations and businesses to develop materials for teaching and learning about sustainability. In fact, many organizations are already leading the way.

- **World Resources Institute (WRI).** WRI's Environmental Education Project has completed a series of teachers' guides with comprehensive course work focusing on the global environment. Separate units include sustainable development; watershed pollution; oceans and coasts; energy, atmosphere, and climate; biodiversity; natural resource economics; population, poverty, and land degradation; and citizen action[5].

Saleem Ali

To remain competitive in the global marketplace, our nation needs a workforce knowledgeable about the interdependence among environmental, economic, and social issues as well as the skills necessary to apply this knowledge to their everyday lives. It follows that an educated workforce needs to have access to programs, training, and curriculum that provide for interdisciplinary learning opportunities. Many schools are starting to recognize the benefits of interdisciplinary studies, and are working collaboratively with students to create their own programs of study.

Saleem Ali worked with advisors at Tufts and Yale to pioneer his own interdisciplinary path of study. After completing a bachelor of science degree in chemistry and environmental studies at Tufts University, Saleem was accepted to a master's program at the Yale School of Forestry and Environmental Studies. To buttress his environmental degrees and his interest in sustainable development, Saleem took a variety of courses including Industrial Ecology, Environmental Economics, Quantitative Methods in Decision Analysis, and Philosophy and Public Policy.

But he knew that coursework alone was not enough: He needed to couple his academics with hands-on, experiential learning in order to gain a broader understanding of the interdependence of environmental, economic, and social issues in a global society. Saleem set out to gain experience in the business, nonprofit, and government sectors to broaden his understanding of how each one operated. He worked for the General Electric Company on international environmental protocols and environmental auditing; interned for a year for the British Parliament (House of Commons) in London conducting research on material for environmental debates; and worked at the Center for Rainforest Studies in Australia where he interviewed farmers, conducted analysis on water and soil samples, and prepared a research report on reforestation in the Lake Tinaroo Catchment.

Sharing his knowledge with others is a top priority for Saleem. He has written about his interests and concerns in campus and local newspapers, including the Yale Herald and Tufts Daily. Plus, Saleem has lectured in Pakistani schools to promote awareness of environmental issues. In 1994, he was awarded the Marshall Hoshhauser Prize for "altruistic community service."

To Saleem Ali, these diverse activities and experiences just made sense. "In order to be an effective environmental professional, it is essential to cover a broad disciplinary spectrum because environmental issues tend to permeate all educational discourse from humanities to natural sciences. I am particularly interested in bringing my skills to work for the industrial sector because I feel a need to bridge the gap between the corporate sector and the environmental community. This partnership between the for-profit and nonprofit sectors, I believe, will be the most significant impetus to environmental reform in coming years."

Classroom Outside the Classroom

A group of windsurfers on the Huron River became concerned for their health when they emerged from the water with severe skin rashes. A few had also contracted Hepatitis A. The students turned to University of Michigan professors Dale Greiner and William Stapp for answers. The professors devised nine water quality tests and, over the next few months and in a variety of weather conditions, assisted the students in charting the quality of the water. What they found was that after a heavy rain, there was a dangerously high fecal coliform count -- at 1,200 parts per million it was not considered safe for drinking, swimming, or fishing -- caused by combined sewer overflow. The students told city officials of their findings and erected a sign to warn others of the potential dangers of entering the water after a storm.

In 1986, students from 16 high schools near the Rouge River heard about the Huron River findings and decided to do the same analysis. They were shocked to find that their river's fecal levels were even higher than in the Huron study, with counts ranging from 15,000 to 20,000 parts per million. The students contacted city officials, who were able to attract financial support from the federal and state governments to build retention basins that would eliminate the sanitary waste from overflowing storm pipes. There are now more than 100 schools involved in monitoring the Rouge River.

These events, and the concern for healthy water systems, launched the Global Rivers Environmental Education Network (GREEN), a nonprofit organization whose director, Keith Wheeler, also participates on the Public Linkage, Dialogue, and Education Task Force. Since 1989, GREEN has grown to include more than 140 nations.

GREEN's interdisciplinary approach to watershed analysis entails maintaining a log of scientific data and information, as well as looking at an area's history and cataloguing its culture and economic status. The GREEN program also emphasizes that watersheds do not recognize human boundaries; and encourages communities, states, and nations to work together to preserve water quality.

For example, high school students in Juarez, Mexico, conducted water quality tests at their school and discovered high levels of nitrate. Suspecting that the problem was caused by fertilizers seeping into community wells, the students made appeals to local authorities for action. Although their appeals were ignored, the students posted signs in the community. Public awareness of water quality issues increased -- as did sales of bottled water. This project, which came to be known as Project del Rio, now has 24 participating schools in Mexico and 36 in Texas and New Mexico. Student results are validated by local environmental businesses, and data are shared via a bilingual computer network.

GREEN participants learn the importance of ensuring a clean and safe water supply for themselves, their families, and their communities. The problem-solving skills, knowledge, and understanding they achieve advance them as responsible citizens.

Expanding Professional Development

Action 3. Colleges and universities should incorporate education about sustainability into pre-service training and in-service professional development for educators of all types, at all levels, and in all institutions.

Educators are the best means for infusing sustainability into formal learning -- but only if these educators have had relevant high-quality professional development before and during their tenure in the classroom. Professional development can bridge the gap between what educators know now and what they will need to know to prepare the nation's youth for changes resulting from the global transition to sustainability. Educators continually need to learn new methods and

techniques for transferring knowledge both inside and outside the classroom. The challenge is how to best deliver this training so it is widespread and promotes hands-on, interdisciplinary learning.

Anecdotal evidence suggests that teachers do not feel adequately prepared to incorporate environmental education, multicultural perspectives, vocational relevance, and other educational demands that comprise elements of a sustainability curriculum -- including stimulating, higher order creative skills -- into their teaching. Difficulty in accessing different teaching materials are barriers.

- **Providing Materials and Access.** Surveys in 1992 by the National Consortium for Environmental Education and Training revealed that teachers have difficulty finding what will help students. In response, the consortium produced a teachers' manual, *Getting Started*; a toolbox of information on workshops across the country for preparing teachers for environmental education; and EE-Link, a major source of K-12 teaching materials on the environment and sustainable development that can be accessed through sites on the Internet.

Professional training for sustainability poses a number of challenges. For one thing, teachers in all subject areas will have to acquire some knowledge and understanding of the principles of sustainability. Adequate pre-service training will depend on institutions of higher education adding appropriate courses; in-service professional development presents the formidable challenge of retraining the 2.8 million teachers in the nation's public and private K-12 schools.[6] Meeting these challenges is an important step in our nation's movement toward sustainability since educators impart the knowledge that the next generation of citizens, parents, and workers will use in their daily lives.

Because it is a relatively new concept for teachers as well as students, education for sustainability needs to be incorporated into teacher pre-service and in-service education programs. Adequate funding through legislation or grants is essential for expanding pre-service and in-service training in sustainability. To ensure adequate financial support, partnerships among state departments of education, institutions of higher education, professional societies, and school districts are critical. Funding for developing, demonstrating, and disseminating exemplary programs, especially for professors who educate pre-service teachers, could strongly influence the future of sustainability in the United States. Where state or federal funding is unavailable, the private sector can help meet the challenge.

- **Federal Support.** Two federal agencies, the U.S. Department of Education and the U.S. Environmental Protection Agency (EPA), have established programs that support professional development for teachers. The Department of Education, through its Dwight D. Eisenhower Professional Development Program, provides grant assistance to state and local education agencies, institutions of higher education, and nonprofit organizations to ensure that teachers and other staff and administrators have access to high-quality professional development. EPA, in addition to providing support to encourage students to pursue careers in mathematics, science, engineering, and other fields essential to environmental improvement, helps fund training for educators on how to increase environmental literacy. Through the 1990 Environmental Education Act, EPA created a three-year partnership endeavor, the Environmental Education and Training Project, to fund educators who (1) need additional training, (2) provide education to underserved populations, and (3) work with adult learners.

Teachers will need plenty of guidance at the outset, especially in measuring success. Educators, with the help of academics, non-governmental organizations, professional societies, and businesses, can take the lead in developing new materials on sustainability. Professional development, adequate teaching materials, and evaluations of success are all necessary prerequisites if educators are to meet the challenge of preparing students for a new era.

Successful work in this area includes the following:

- **Requiring Environmental Education.** Of the states that mandate environmental education, only two -- Maryland and Wisconsin -- also require pre-service training to prepare teachers for implementing that mandate. Besides including environmental education objectives in its pre-service teacher certification programs, Wisconsin also has a large in-service program in environmental education. Both of these Wisconsin-based programs have elicited strong support from students, teachers, and school administrators.[7]

- **Environmental Literacy.** The Tufts University Environmental Literacy Institute provides

environmental literacy training to secondary school teachers and university faculty, helping them weave environmental themes into their courses. The institute exposes participants to current educational theory, teaching strategies, assessment techniques, and information retrieval methods. Its nine-day participatory learning course covers such topics as life-cycle assessment, design for environment, cost-benefit analysis, market-driven technological innovations, and responsible industry practices. The institute's Global Partners Program promotes interdisciplinary research, information exchange, and international partnerships. By 1992, 70 faculty members from schools around the country, in fields ranging from medicine to the arts, had attended institute workshops. Today, these teachers and professors -- whether they teach English or engineering -- are incorporating environmental principles into their courses.[8]

- **Middle Schools.** An EPA grant is supporting a two-week summer training institute for middle school teachers by the Columbia Education Center in Portland, Oregon. The center also will expand its program to establish environmental education demonstration sites at public and private schools in five states.

- **Biodiversity Training.** The Science Improvement Through Environmental Studies Program uses an investigative and problem-solving approach to study the ecological and social principles of biodiversity. Following summer training, qualified teachers are certified as state-level volunteer peer leaders to provide in-service programs for their colleagues.

Teaching Teachers and Students About the Environment

Despite the popular teaching slogan "think globally and act locally," few high school students graduate with the ability to analyze and assess global environmental problems. A 1995 study sponsored by the Pew Charitable Trusts found that global topics such as population change, ocean pollution, temperate ecology, and land use – some of the most pressing problems facing society -- were among the least common subjects addressed in environmental education classes and teacher training programs.

Although many teachers would like to include global environmental studies in their courses, they are discouraged by a variety of barriers including the need for new information, the need for new ways to integrate information and materials into learning situations, and determining how to make global issues relevant to students. In addition, teachers worry about overwhelming students -- either with the somber nature of the topics or as an addition to an already overcrowded school year.

Most teacher training courses and curriculum materials offer little help. Training courses tend to focus on local and regional issues. Most materials are appropriate for elementary and middle schools, but not sufficiently challenging for high school use.

Overcoming these obstacles is the goal of a recent partnership formed between the World Resources Institute (WRI) and the Global Network of Environmental Education Centers. By combining their respective strengths -- teacher training and the production of top-quality curriculum materials -- they hope to bolster the professional development of environmental educators nationwide and stimulate the infusion of global environmental studies into U.S. secondary schools. The plan is to develop model teacher training courses using WRI's curriculum materials that link global environment and sustainable development issues with similar concerns.

Serving as Models of Sustainability

Action 4. Schools, colleges, and universities should promote curriculum and community awareness about sustainable development and should follow sustainable practices in school and on campus.

The university has all too often geared its research, teaching, and service to communities in ways that have little relationship to sustainability. We must change much of our thinking about how to walk softly upon the planet. To do this will require us to make fundamental changes in the corporate culture of the university.

--Bunyan Bryant,
Professor
University of
Michigan

Educational institutions -- from K-12 schools through colleges and universities -- can and should serve as models for sustainability. As such, schools at all levels can be potent forces in educating the communities they serve while reducing their own operating costs and increasing their efficiency. For students, participating in a school's conservation efforts is a form of hands-on, experiential learning. Various forms of community service that get students out of the classroom, literally or figuratively, can also serve as powerful educational tools.

In February 1995, a workshop on the Principles of Sustainability in Higher Education was held in Essex, Massachusetts, under PLTF auspices. The workshop was sponsored by Second Nature, a nonprofit organization dedicated to education for sustainability, and the Secretariat of University Leaders for a Sustainable Future. One of the workshop's major conclusions was that the operations of universities and colleges should be restructured so that they serve as models for sustainability:

- The university is a microcosm of the larger community, and the manner in which it carries out its daily activities is an important demonstration of ways to achieve environmentally responsible living. By focusing on itself, the university can engage students in understanding the "institutional metabolism" of materials and activities. Students can be made aware of their "ecological address" and the impact of their attending school on the natural environment and the community, and they can be actively engaged in the practice of sustainable living. By using the campus as a laboratory, students learn to analyze complex multidisciplinary problems, develop real solutions and focus on their institution's and their own behavior -- skills that are critical for the realities of the 21st century. By "practicing what it preaches," engaging in environmentally just and sustainable practices in its operations, purchasing and investments, higher education helps reinforce desired values and behaviors in all members of the academic community. Moreover, the annual buying and investment power of the nation's institutions of higher learning -- $120 billion in purchasing; $75 billion in endowment -- makes them important players in creating market demand for environmentally just and sustainable goods and services and in supporting the local communities in which these institutions are located.[9]

Not only can institutions develop curricula that integrate sustainability concepts, they can also incorporate these concepts into a wide range of activities, including research projects, career counseling, administrative procedures, procurement practices, academic curricula, and other university services.

The results of practical research or model greening projects conducted at universities and colleges can be shared with the community and other school systems. For example:

- **Yale University.** In response to recommendations made at the Campus Earth Summit, Yale switched from incandescent to fluorescent lighting, with projected savings of $3.5 million over the next 10 years.
- **University of Arizona.** By modifying laboratory procedures in an introductory chemistry course to eliminate 3,600 gallons of hazardous waste, savings of more than $12,000 in disposal costs were realized.
- **State University of New York.** The Stony Brook branch of the University system instituted conservation measures for its heating and air

conditioning systems that saved 1.53 million gallons of fuel oil, worth over $1 million.

- **Benedict College.** Energy-saving practices at Benedict College of Columbia, South Carolina, initially cost $28,900 but saved more than $91,400 during the first year.

- **University of California.** The University of California at San Francisco uses co-generation to heat its medical center with recovered steam heat; the initial cost of $247,000 will be amortized quickly through annual savings of $87,000.[10]

- **Brown and Tufts Universities.** Brown University installed energy-efficient improvements through its Brown Is Green program; Tufts University did the same through its Tufts Clean! effort.[11]

Primary and secondary schools can follow suit; in fact, some of the nation's 80,000 primary and secondary schools have already made great strides.

Higher education institutions bear a profound moral responsibility to increase the awareness, knowledge, skills and values to create a just and sustainable future.

--Tony Cortese, CEO
Second Nature

- **Chicago Public School System.** In an era of tight funding the Chicago Public School System, in partnership with the Center for Neighborhood Technology, is planning a novel approach to use energy efficiency to generate savings and revenue. The city is in the process of developing a comprehensive energy and environmental evaluation of public school facilities and transportation systems. The results will be translated into better resource management, new investment strategies, and improved education opportunities for students. The plan is being developed under U.S. EPA's Project XLC ("eXcellence and Leadership for Communities"). Project XLC assists communities in the use of creative approaches to attain greater environmental benefits. In this case, a provision of the Clean Air Act can provide "pollution credits" to schools, for reducing emissions through investments in energy efficiency. The schools can then sell some of the credits -- currently worth $12,000 to $15,000 per ton reduced -- to firms that are having difficulty meeting emissions standards. Students and faculty can be engaged in the effort by incorporating information about energy reduction into the curriculum and by helping develop new and innovative ways to reduce energy use and costs, system-wide. This effort builds on the 1991 American Association of School Administrators "Schoolhouse in the Red" study, which projected that energy management programs could cut utility bills 25 percent in the nation's schools -- or approximately $14 million a year for Chicago. The city schools there hope to serve as a model which can be replicated by other schools throughout the country.

- **New York Healthy Schools Network.** This network was created to bring together the perspectives of over 30 health, environment, education, and parent groups. The coalition motivated the State Board of Regents and Education Department to create an "environmental bill of rights" for schools. The bill encourages schools to serve as role models of environmental awareness and states that every child and school employee should have the right to have a safe school that uses its resources effectively.

- **Guidance Materials.** Brochures, videos, and books like *Blueprint for a Green School* (by the Center for Environmental Education) are helping school administrators, teachers, maintenance staff, students, parents, and community leaders create environmentally safe and healthy school buildings. *Blueprint for a Green School* is a guide on how to tackle environmental safety issues and make practical, responsible decisions about the operation of school buildings and classrooms.

Becoming a model of sustainability is consistent with higher education's traditional mission of teaching, research, and service. Increasing awareness, knowledge, and technologies to create a sustainable future is a key responsibility of schools. Schools educate the leaders, managers, and visionaries of tomorrow. They train the teachers who educate children from kindergarten through high school, vocational schools, colleges, and universities. The school's responsibility is to provide a quality education and a safe and healthy learning environment. Institutions of higher education can exert a strong influence on society by turning out literate citizens who have witnessed first-hand the benefits of sustainability.

Universities and schools nationwide should develop 10- and 20-year plans to make sustainability a central focus of their

operations. Through their own experiences in becoming more sustainable, universities and schools can serve as catalysts for encouraging local communities to move toward a sustainable future. Following are some examples of successful sustainability efforts and experiments in academia.

- **Second Nature.** Second Nature, a nonprofit organization dedicated to education for sustainability, targets its efforts at colleges, universities, and professional schools as the institutions responsible for educating future teachers, policy makers, and managers. Second Nature fosters partnerships such as the 17-member Environmental Technology Consortium of the Historically Black Colleges and Universities/Minority Institutions. Another partnership is the 11-member Brazilian Consortium for Environmental Education and Research, composed of representatives from universities, government, industry, and non-governmental organizations. Finally, the Montana Consortium is a four-member group that includes three Native American tribal colleges and one four-year university. Second Nature provides guidance on how these groups can work together to incorporate sustainability into their day-to-day operations, curriculum, and research priorities; it works with these organizations to make them models of sustainability in their communities.

- **The High School for Environmental Studies.** State-of-the-art facilities that include a recycling center, roof garden, greenhouse, composting center, weather station, computerized research library, and million-dollar media center are a few of the innovations at the High School for Environmental Studies, a public school in New York City formed to foster environmental education in an urban setting. The school was established in 1991 by a partnership between the Surdna Foundation and the New York Board of Education. A highlight of the school's curricula is its voluntary internship program that places students in an environmentally oriented organization for a full academic year.

- **University Leaders for a Sustainable Future.** In 1990, the presidents, rectors, and vice chancellors of more than 200 member institutions in 40 nations formed a Secretariat of University Leaders for a Sustainable Future to promote university leadership for global environmental management and sustainable development. The secretariat supports universal environmental literacy, faculty development, socially and ecologically responsive research, ecologically sound institutional practices that minimize environmental impact, and expanded outreach through partnerships.

- **Eastern Kentucky University.** Paper recycling is a common project on campuses, but Eastern Kentucky University has involved a new constituency: cattle. In a program developed by the agricultural department and the physical plant, paper destined for the recycling bin is collected and reused as bedding for the school's cattle. When the bedding has been sufficiently soiled, it is reused as compost in the fields. According to the university's Sierra Club advisor, Doug Hindman, more than 30 tons of paper have been "recycled" by the cattle, reducing the amount of waste exported from the campus by two dump-truck loads.

Oberlin College

"Colleges and universities are, for the most part, still educating the young for an industrial world. But in the much more crowded world of the 21st century those now in school must have the know how and know why to sharply reduce the amount of land, fossil energy, materials, and water thought necessary for human life."

-- David W. Orr, Professor and Chair, Department of Environmental Studies, Oberlin College

To answer the challenge of educating students for sustainability, Oberlin College is involving students and faculty, as well as outside consultants and stakeholders, in developing a 10,000 square foot, zero emissions Environmental Center. The facility will require the efficient use of recycled materials, ecological wastewater systems, solar energy, and ecological landscaping. "We intend for the building to be a crossroads for interdisciplinary education, research, and action on the complex array of problems and opportunities facing humankind in the 21st century," says Orr.

In conjunction with the Environmental Center project, Oberlin College offers an Ecological Design class. Students in the class meet with leading practitioners, energy experts, and designers to share and develop ideas contributing to the building process. In the future, students will use the building as a living laboratory for discovery and learning.

Schools as Models of Sustainability

Some 450 faculty, staff, and student delegates from all 50 states and six continents convened February 18-20, 1994, at the Campus Earth Summit at Yale University. The delegates agreed that schools must promote sustainable development; they gathered their suggestions, input, and recommendations into the Blueprint for a Green Campus: The Campus Earth Summit Initiatives for Higher Education.[12] The document describes ways to make sustainability a central focus of education programs and to provide community and regional fora to discuss sustainability. It is based on the principle that students, as multi-billion-dollar consumers of higher education's services, have the power to demand more environmentally responsible campuses and curricula.

The Blueprint's 10 recommendations are as follows:

- Integrate environmental knowledge into all relevant disciplines.
- Improve undergraduate environmental studies course offerings.
- Provide opportunities for students to study campus and local environmental issues.
- Conduct a campus environmental audit.
- Institute environmentally responsible purchasing policies.
- Reduce campus waste.
- Maximize energy efficiency.
- Make environmental sustainability a top priority in campus land use, transportation, and building planning.
- Establish a student environmental center.
- Support students who seek environmentally responsible careers.

National Wildlife Federation Campus Ecology Program

On Earth Day 1990, the National Wildlife Federation (NWF) launched the Campus Ecology program to help college and university students, staff, and faculty promote environmental education throughout their campuses and make campuses more sustainable. The program has involved over one-third of the institutes of higher learning in the United States.

Campus Ecology's mission is to establish environmentally sound practices on college campuses by promoting leadership and action within the campus community. Realizing the importance of diversity, Campus Ecology strives to include all peoples in working toward environmental solutions, and encourages joint campus and community projects. Campus Ecology recognizes the efforts of people who work on outstanding projects by documenting and publishing their accomplishments.

The program has three main components which have led to its success. Action is the most essential component. It is necessary to act now for environmental challenges to be met. Coalition building is also necessary; this promotes leadership, and should be representative of the country's diverse cultural heritage. Finally, continuity is crucial. Programs should be designed with a long-range goal in mind and be in existence long after students have graduated.

Campus Ecology participants have access to many different resources and services. These include Ecodemia, a book highlighting how universities around the country have started to "green" their campuses and the benefits associated with this greening; project resource packets which provide an overview of issues and strategies on tackling these issues; one-on-one consultation; site visits; workshops; NWF campus environmental yearbook; newsletters; job bank; speaker's bureau; case study clearinghouse; and a World Wide Web site.

George Washington University: Becoming a Model for Sustainability

In 1994, the U.S. EPA and The George Washington University (GW) signed a partnership agreement to work collaboratively to foster and enhance leadership and stewardship for environmental management and sustainability. GW is striving to become a model among institutions of higher learning by embodying a principled ethic for the environment and sustainability. This effort includes its education and training programs; research; healthcare, and other services; management of its built and natural campus environments, and other functions. This holistic approach implies that GW is in a "...perpetual state of becoming sustainable."

GW has developed a "living" strategic plan which serves as its dynamic roadmap to a sustainable future. The planning process involved the participation of internal stakeholders, including students, faculty, staff, and administrators. External stakeholders also participated -- including representatives of the neighborhoods around its campuses, vendors and contractors, local, state, and federal government agencies, and other parties. University President Stephen Joel Trachtenberg signed and committed the plan to action on Earth Day 1995. The comprehensive plan is available to other interested schools via the National Environmental Information Resources Center at http://www.gwu.edu/~greenu/.

As an outcome of initial planning efforts, and to institutionalize what began as a volunteer-driven initiative, President Trachtenberg also chartered, funded, and staffed an "Institute for the Environment." With a University-provided base operating budget of about $150K/year (FY95), the Institute's mission is to facilitate and coordinate sustainability initiatives across all operating units of the University. Volunteerism continues to be a vital force in achieving the objectives of GW's plan. Rosemary Sokas, M.D., directs the Institute and its paid staff and volunteers, on a part-time basis. She brings a unique perspective to the job -- as a faculty member who actively practices international occupational and environmental medicine. Says Dr. Sokas: "GW has already made healthy returns on its investments." Trachtenberg's response:"...investing for sustainability is just plain good business."

Enrolling a diverse population of students from all 50 states and more than 120 countries, GW is the largest institution of higher learning in the nation's capital. At its main campus, the GW community of faculty, staff, students, and on-site contractors numbers more than 30,000. GW is the largest private sector employer in the District of Columbia, with a regional economic impact estimated at $1.6 billion annually. Its academic, research, and health care activities extend into over 100 countries. The scale and scope of these activities reflects a remarkable capability and an enormous capacity to drive widespread, positive change for sustainability. This ranges from the national and international influence of its more than 150,000 living alumni, to the leverage it exerts in the marketplace when specifying and procuring environmentally preferable goods and services from the 26,000 vendors it uses each year.

GW is working with colleges and universities; business and industry; federal, state, and local government agencies; and other organizations to form strategic alliances, advance mutual objectives, and achieve common goals for a sustainable future. The alliances are operating at four levels of communities: local, regional, national, and international. Opportunities which build the intellectual capacity for a sustainable future, fuel the economy, create new jobs, advance social equity, and enhance public and environmental health and wellness are among the results.

CHAPTER 4
In the Community:
Encouraging Nonformal Learning

If sustainability is to become a reality, educational strategies must reach people of all ages -- as citizens of the world and of the United States, as residents of a community, as members of the nation's workforce, as individual consumers -- at all phases of their lives. Fostering such opportunities for lifelong learning means that the transition to sustainable development can begin today rather than with the next generation.

Museums, zoos, libraries, extension programs, the media, the workplace, and community organizations are just a few venues for providing lifelong learning opportunities. These nonformal educational settings can expand awareness and put sustainability concepts in a familiar context. To be most effective in doing so, nonformal educational institutions should expand their relationships with formal educators to identify those areas in which schools are inadequately preparing students and to help fill those gaps and develop appropriate materials.

Until sustainability becomes a public philosophy, conscious or unconscious, it will not become a reality in our country.

-- Olin M. Ivey
Executive Director
Georgia Environmental Organization, Inc.

Several sources of nonformal education deserve special consideration:

- Because Americans obtain most of their news and information from the **print and broadcast media**, a key strategy in nonformal education is to foster public awareness of sustainability via television, computers, newspapers, and magazines. Information on sustainability must be communicated through these media in appropriate and accessible formats.
- **Work-based learning** is another avenue for equipping adults with the knowledge and skills they need in a fast-changing world. School-to-work opportunities and retraining programs for dislocated workers will become increasingly important as the economy shifts to more efficient enterprises and sustainable practices.
- Also in light of these shifts and changes, **communities** will be instrumental in coordinating sustainability concepts and including them as part of community outreach and participation plans.

POLICY RECOMMENDATION 2

Nonformal Education and Outreach
Encourage nonformal access to information on, and opportunities to learn and make informed decisions about, sustainability as it relates to citizens' personal, work, and community lives.

Five actions are suggested for implementing this recommendation:

- encourage lifelong learning.
- raise public awareness,
- provide outreach,
- expand community "visioning," and
- foster workforce training.

"We will find neither national purpose nor personal satisfaction in a mere continuation of economic progress, in an endless amassing of worldly goods. We cannot measure national spirit by the Dow Jones Average, nor national achievement by the gross national product. For the gross national product includes air pollution and advertising for cigarettes, and ambulances to clear our highway carnage. It counts special locks for our doors, and jails for the people who break them. The gross national product includes the destruction of the redwoods, and the death of Lake Superior. It grows with the production of napalm and missiles and nuclear warheads . . . It includes Whitman's rifle and Speck's knife, and the broadcasting of television programs which glorify violence to sell goods to our country."

"And if the gross national product includes all this, there is much that it does not comprehend. It does not allow for the health of our families, the quality of their education or the joy of their play. It is indifferent to the decency of our factories and the safety of our streets alike. It does not include the beauty of our poetry or the strength of our marriages, the intelligence of our public debate or the integrity of public officials . . . the gross national product measures neither our wit nor our courage, neither our wisdom nor our learning, neither our compassion nor our devotion to our country. It measures everything, in short, except that which makes life worthwhile; and it can tell us everything about America -- except whether we are proud to be Americans."

-- from a speech given by Robert F. Kennedy
1968 Presidential campaign
University of Kansas

Encouraging Lifelong Learning

Action 1: Nonformal educators should encourage lifelong learning about sustainability through adult education programs, community and civic organizations, and nonformal education programs -- such as those sponsored by museums, zoos, nature centers, and 4-H clubs -- so that individual can make well-informed decisions.

Studies show that in early childhood -- from birth to age six -- the home is the primary educational influence. Between ages seven and 12, the role of the home diminishes while that of the school and -- to a lesser extent -- the community, church, and media increases. The influence of the home continues to lessen, and that of the school grows, during the teen years. In the individual's next decade, however, the school's impact drops dramatically, and that of the community increases proportionately. The greatest influences during the adult years are the community, church, and home, in that order. Interest groups remain relatively constant as an influence throughout one's life, beginning at about age seven.[1]

There is no easy dividing line between formal and nonformal education. We are all committed to a continuum of lifelong learning.

--Tom Keehn,
Senior Consultant
American Forum
for Global
Education

Most adults received limited information directly related to sustainability during their formal schooling. Through the U.S. educational system, many students do not develop an understanding of the interconnections among economic, environmental, and equity issues. More than three-fourths of U.S. citizens do not obtain a college degree, and even those who do graduate from college lack an understanding of sustainability.[2] In other words, for the vast majority of Americans, knowledge of sustainability will have to be obtained during their adult years. Continuing education programs in local communities and educational opportunities offered by the media, civic organizations, clubs such as the 4-H, nonprofit organizations such as the YWCA and YMCA, and informal venues such as museums and churches are needed to fill the gap and equip adults with the knowledge and skills required for committed and effective action.

The challenge for nonformal education is to find ways to reach a voluntary, "noncaptive," adult audience. Motivations of adult learners range from the opportunity to socialize to mental stimulation, personal growth, and professional advancement. The challenge is to harness some or all of these incentives to

stimulate interest in educational experiences related to sustainability.

For some aspects of environmental education, the challenge of attracting adult learners is not a difficult one. Outings offered by environmental organizations such as the Sierra Club, The Nature Conservancy, and the Audubon Society often contain instruction in natural history and attract intensely interested learners. Interpretive programs offered in national parks are drawing participants at a faster rate than park visitation overall.[3] Interest in this area is also indicated by the explosive growth of ecotourist excursions led by naturalists.

Although these programs are growing in popularity, a new challenge is emerging -- how can these programs help adult learners link environmental education experiences to their everyday lives? Extension offices and conservation districts offer one avenue for widening participation. In recent years, the U.S. Department of Agriculture's Cooperative Extension Service has boosted its efforts to create an environmentally literate citizenry, targeting a broader audience than their traditional farm clientele.

Other avenues are continuing education classes offered by community colleges and school districts. The nation's 1,200 accredited community colleges represent the fastest growing type of educational institutions in the United States. Since they are well-connected to local businesses, community colleges are ideally suited to serve as catalysts for sustainability.

Nonformal educational organizations should work closely with educators to identify areas in which schools traditionally have not prepared students adequately. Once these opportunities are identified, nonformal educators can develop materials and work with formal educators to determine possibilities for partnership. In this way, nonformal education can complement classroom teaching.

Examples of successful nonformal sustainability education efforts follow.

- **EARTHWATCH: A Model for Lifelong Education for Sustainability.** Founded in 1972, EARTHWATCH has become a model for global education for sustainable development. To date, 40,000 citizen volunteers have served in EARTHWATCH's EarthCorps program, which has funded 2,000 expeditions to 120 countries. The majority of these volunteers are business and professional members of EARTHWATCH; and the remaining 25 percent are teachers and students preparing for careers in the arts and sciences. The program is intergenerational and interdisciplinary in design, and involves citizens from 30 countries each year, who share costs and contribute skills to protect heritage, biodiversity, public health, and treasured habitats worldwide. Partnerships with corporations, foundations, universities, and U.N. and government agencies produce on-line education for sustainability.

- **YWCA: Education for Global Responsibility.** Education for Global Responsibility is a program for educating YWCA members, volunteers, staff, and the community about the causes of global poverty and how it affects particularly women. With support from the U.S. Agency for International Development, the YWCA has held international conferences and workshops on women's sustainable economic development. Participants have included local and national leaders from the United States, Africa, Asia, Latin America, and the Caribbean. The purpose is to develop a cadre of consultants on women's sustainable economic development issues who will work to educate others in their communities and networks.

- **Course in Sustainability for Community Leaders.** A land-use course designed in 1994 by the Rome Teacher Resource Center in Rome, New York, was targeted at key community representatives and interested groups. "Open Space: Defining-Assessing-Deciding" stressed the profound impact of current decisions on community open space in the future. Participants included representatives from the community's education, business, industry, local government, and special-interest sectors. The course reached local community organizations not usually targeted by environmental education programs.

- **The Presidio Institute.** The Presidio Institute now being formed in the San Francisco Bay Area will help businesses, citizen organizations, and governments promote sustainable economic development that incorporates environmental protection and social equity. Located at a former military base, the institute will -- under National Park Service auspices -- be converted into a laboratory to explore policies, practices, and technologies to enhance sustainability worldwide. The institute will work in partnership with various area resources, including Stanford University, three University of California campuses, many national laboratories and private research facilities, and Silicon Valley organizations. It will

focus on both critically needed programs for today's leaders as well as on longer range research aimed at solutions for tomorrow. The institute's overall goal is to balance the demands of economic health, environmental quality, and social fairness in order to offer solutions to the problems of the present without depriving future generations of opportunities to meet their needs.

Community In The Classroom

To initiate local business ventures, create employment, market craft products, or staff a day care center, people need guidance, support, ideas -- and education. Thus, to promote the development of their local business ventures, Appalachian communities created the Community in the Classroom project. This program takes a community-based, participatory approach to educating citizens by integrating education into community development activities. Components of the program include a series of six workshops aimed at building knowledge, skills, and leadership abilities of staff and volunteers. A series of special projects have also been developed to focus on particular community needs. Finally, a process of program reflection and development, designed to integrate literacy education with other community empowerment activities, has been initiated.

Projects initiated by the participating communities include an effort by the Mountain Women's Exchange, which aims to bring GED graduates to volunteer in an adult education program. The Dungannon Development Commission is developing an adult education program for members who are rehabilitating housing and who want to develop reading and math skills related to their work. The Whitley County Communities for Children's staff is creating a curriculum for employment which targets unemployed mothers receiving government aid. The Big Creek People in Action are developing a literacy and adult education program in an area isolated from any nearby communities. Finally, the Lonsdale Improvement Organization is writing a housing survey and brochure about its community as a part of the group's neighborhood revitalization and development efforts.

Sustainability Education Center of the American Forum for Global Education

In order to prepare today's youth to be responsible citizens in an interdependent world, the American Forum for Global Education created the Sustainability Education Center to integrate environmental, economic, and social equity issues in the local community with those in the global community. The center's mission is to develop teacher education and professional development programs as well as programs at the local, national, and international levels that promote lifelong learning about sustainability. Some of the center's projects include the following:

- **Sustainability Education for Educators (SEE).** This project works with educators from diverse schools throughout New York City in the fields of science, math, government, U.S. history, business, social studies, and the humanities. Through a series of professional development seminars and project retreats, SEE educates teachers on sustainability concepts. Participants learn through debate, discussion, modeling, role playing, and problem solving -- all techniques that can be transferred to the classroom. After the pilot program in New York City is complete, the center hopes the SEE project will serve as a model for communities and schools all around the country.

- **Civil and Sustainable Society.** Another center project is a curriculum training module, which includes a facilitator's guide, a participant's guide, and an evaluation component, created for the YWCA to motivate participants to work toward a civil and sustainable society. The curriculum will be presented as a series of case studies of community sustainable development initiatives across the country.
- **School for a Change.** The School for a Change program will initiate a partnership among a sustainable community project, a pilot school within its community, and the American Forum for Global Education. The primary focus of the project is to develop leadership and organizational training for teachers and students to solve problems in the community and develop collaborative partnerships between schools and community.

By helping facilitate dialogues, projects, and activities between schools and communities, the Sustainability Education Center is promoting broader participation, understanding, and linkage between these entities regarding each other.

National 4-H Council

The mission of the National 4-H Council is to build partnerships for community youth development that value and involve youth in solving issues critical to their lives, their families and society. The Council is implementing a hands-on environmental stewardship program which encourages partnerships to be built between young people and trainers at local, county, or state levels.

The National 4-H Council is also involved in a program -- A Future for Me -- with six West Virginia University County Extension Offices and local school systems to encourage career education and preparation for local students. The program works with high school guidance counselors to help students explore different career opportunities and develop an understanding of the skills needed in today's workforce. Training is provided on a weekly basis during the school day. Students are educated on decision making, interview skills, resume writing, career options, personal interest assessments, self-exploration, prerequisite job skills and credentials, and goal planning. All counties involved in this training cited an increase in student planning for postsecondary education as a result of the effort.

The Council also supports a work study program in which a local store sponsors a student, providing him or her with employment and a scholarship to the college of his or her choice. Under this program, Williamina Keegan worked part time at the Saratoga Springs Shop and Save. She gained valuable experience in her future major, business management in the food industry, and later attended Cornell University. "This work study program has encouraged me to go on and pursue a career in business management. I realize that I am one of the first students to participate in this program, and I am encouraged by myself and my mentors to achieve my goals and to set an example for anyone else who might want to participate. I am extremely happy with the program, and I hope that anyone else who is interested does try."

Four Corners School

Imagine exploring pristine ruins, rafting through incredible geological formations, hiking magnificent plateaus, and mastering crafts with Native American artists. Located in Utah, Four Corners School offers this five-day "ed-venture" vacation as well as many other educational programs on environment, culture, and sustainability in the Southwest.

Since 1984, the school has been dedicated to educating people of all ages and backgrounds about the need to preserve the natural and cultural treasures primarily in the Southwest, and also around the world. The school provides scholarships to teachers so that environmental education may be presented throughout schools, and offers accredited courses that can be transferred for use in undergraduate and graduate educational institutions.

Currently, Four Corners School is involved in a three-year project aimed at creating a better understanding of Native American cultures. Part of the project involves a traveling fine arts exhibit developed by Navajo children that will be featured at the Denver Art Museum, in Denver public schools, and in the Navajo Nation. Many travelers who have visited reservations through Four Corners School reflect that, "the best part of the trip was meeting the Navajo and Hopi people . . . [there was] a feeling of harmony and oneness with nature that permeated every aspect of living."

In 1994, the Four Corners School was recognized by the Utah Society of Environmental Education with a program award for its preservation work on the Colorado Plateau. Four Corners developed a public-private partnership, the Colorado Plateau Research Group, to assess research and service needs to manage the Plateau. The school is also collaborating with the Southern Utah Wilderness Alliance to develop wilderness advocacy training in the wildlands of southern Utah.

By emphasizing that learning about sustainability is a lifelong as well as an intergenerational and cultural endeavor, the Four Corners School is providing opportunities for students of all ages to explore sustainability in action at a hands-on, grassroots level.

Raising Public Awareness

Action 2: Media strategists and sustainable development experts should develop an integrated approach for raising public awareness of and support for sustainability goals, conveying information on indicators of sustainable development, and encouraging people to adopt sustainable decision making in their daily lives.

Raising public awareness is central to any plan to move the nation toward sustainability. If citizens are to reverse such negative trends as urban sprawl, loss of biodiversity, and decreasing voter turnout, they must understand the issues and have accurate and accessible information. In general, people rely on the mass media for their news and information. A 1995 Roper poll found that 72 percent of survey respondents obtained most of their news and information from television, 38 percent from newspapers, 18 percent from radio, and eight percent from magazines.[4] The fact that Americans rely so heavily on print and broadcast media underscores the importance of supplying information on sustainability that is accurate, easily understood, and readily applied to everyday life.

Polls disagree on Americans' overall understanding of the concept of sustainability. On the one hand, a 1995 national survey of 1,036 adults conducted by pollster Paul H. Ray to determine Americans' attitudes toward sustainability revealed that a strong majority -- 61 percent -- favored sustainability. Further, a majority agreed that they would be willing to pay 10 percent more for consumer goods and 20 cents more per gallon for gasoline if they were sure it would help the environment.[5] Ray concluded that American citizens are aware of the concept of sustainability and agree with it. It should be noted, however, that a sizable minority (40 percent), were against sustainability or unsure about what it is and its benefits.

On the other hand, a pair of 1995 Roper surveys tested Americans' "green point average." These environmental quizzes revealed that the average adult and teenager could answer fewer than four out of 10 questions correctly. The average adult score was 33 out of a possible 100 points; teens scored 31 out of 100 points.[6] Moreover, the Roper surveys indicated that the majority of respondents believed that the only actions they can take to improve the environment are those related to litter and indoor air pollution. Sixty-one percent believed that large companies are responsible for causing the nation's environmental problems and should be the ones to implement solutions, failing to take into account pollution from individual sources such as automobiles and lawn mowers.[7]

The conclusion to be drawn from these findings is that a substantial minority of Americans need more information about sustainability -- what it is and what they can do to live more sustainably. Even those citizens who don't need to be convinced that long-term development problems exist do need information showing how their actions can affect sustainable development. They also need information and ideas, presented through the popular broadcast and print media, about practical things they can do that have a positive effect on sustainable development. For many people, the desire to change is not the issue; they are ready to change their behavior but need the guidance and mechanisms to do so.

A media campaign on nationally and regionally relevant issues should be used as a vehicle to raise awareness about sustainability. This campaign could feature and publicize easily understood benchmarks of sustainable development. People have become familiar with national numeric measures of the economy, such as the gross domestic product, inflation rate, and unemployment index, as well as such indicators of environmental quality as the air quality index. As indicators of sustainability are developed, the media should feature these "yardsticks" as part of their regular coverage.

Daily and weekly reports of trends and measures will help increase understanding of costs and benefits, and contribute to public awareness of areas where a change in course is needed. Like economic indicators, sustainable development indicators will provide policy makers and the public with a more accurate view of progress in achieving sustainability goals. These national benchmarks will make it easier for all sectors of society to reach consensus on tough issues related to sustainability.

Much is being done toward developing relevant indicators and benchmarks, as the following examples illustrate.

- **Federal Indicators.** A federal interagency effort, the Interagency Working Group on Sustainable Development Indicators, is aimed at creating indicators and yardsticks by which the American public can track and monitor progress in specific areas relating to environmental quality; sustainability; and the complex interconnections among social, economic, and environmental forces.

- **National Goals.** The President's Council on Sustainable Development, in its report Sustainable America: a New Consensus, released 10 national sustainability goals and a set of corresponding indicators.

- **Community-Level Indicators.** The Foundation for the Future of Youth, through its Rescue Mission Indicators Project, is working to create partnerships among groups of students around the world to create community-level indicators to measure progress toward meeting sustainable development goals. The foundation is developing youth-run state centers to coordinate this work locally.

- **Urban Indicators.** The U.S. Department of Housing and Urban Development (HUD) is working with the Rutgers University Center for Urban Policy Research to develop urban and shelter sector indicators at the national level based on research in 77 U.S. cities. This research has been compiled in a database and includes indicators in the following categories: employment and economic development; demographic factors; housing and land use; poverty and income distribution; fiscal conditions and the public sector; and environment, health, and other social indicators. HUD is also working with nonprofit organizations, professional journals, and Canadian housing groups to promote further public engagement and awareness of indicators and the role they play in identifying key problems and working toward their solution.

- **State Benchmarks.** Oregon has selected benchmarks to serve as indicators of the state's well-being. Oregon's 259 benchmarks are organized according to core and urgent indicators. Core indicators examine primary and long-term goals for the state: family stability, capacity, enhanced quality of life and the environment, and promotion of a strong and diverse economy. Urgent indicators examine critical issues facing the state, such as endangered wild salmon runs

and rising teen pregnancy rates. According to the Oregon Progress Board, which was created to maintain focus on its vision of the future and to assess trends affecting this vision, "Failure to reach urgent benchmarks in the near term threatens our ability to achieve other, more fundamental benchmark s years down the road."

Color Me Green

"People say, we're only children. People say, what can we do. Can't you see we are the future, and right now we're depending on you?" These are the words of songwriter Mike Nobel. They are powerful to read, but just imagine the impact when a group of students known as the Color Me Green singers put these words to music. Mike Nobel's songs and the Color Me Green singers are part of the Color Me Green campaign in Portland, Maine, to build awareness of environmental, community, and intergenerational issues.

Now in its third year, the award-winning campaign has been made possible by an enthusiastic partnership involving the local television station 6ALIVE, businesses, state regulatory agencies, environmental groups, educators, parents, and students. The campaign features four components: Nobel's songs, produced as music videos and aired as public service announcements; a series of "Ecotips," individual actions that people can carry out in the community; "Earth Notes' which describe current issues, such as what industries are doing to become more environmentally responsible; and a public education program that disseminates a Color Me Green school kit to schools throughout the state.

The Color Me Green campaign has been a huge success. The National Association of Broadcasters awarded it first place at the 1994 Service to Children Awards, and said that the campaign, "reflects the best of what America represents." And the fame of the Color Me Green singers is spreading. The group's recordings and videos have been circulated around the world to international acclaim. As one of their songs says, ""Cause everything we do today can change our tomorrow. And maybe when kids lead the way, the whole world will follow."

*Color Me Green© lyrics copyrighted by Mike Nobel, Gorham, Maine, 1993.

WQED Public Television Series on Sustainable Development

The Pittsburgh public broadcasting station, in conjunction with New Vision Communications and the Jefferson Energy Foundation, is producing a series of one-hour programs about the implementation of sustainable development practices in the United States and throughout the Americas. The goal of the series is to introduce viewers to the concepts of sustainable development using documentary profiles of compelling case studies. It will use many of the success stories featured in Sustainable America: A New Consensus, the final report of the President's Council on Sustainable Development, as well as examples based on research by the World Resources Institute.

Providing Outreach

Action 3: A new or expanded national extension network should be developed to provide needed information to enhance the capacity of individuals and communities to exist sustainably.

To complement a public information campaign on sustainability, a vehicle is needed to ensure that information is

accessible and accurate at the community level to initiate community action. This can be accomplished through information sharing on practical actions that individuals can undertake as consumers, members of the workforce, and community residents. The same vehicle also could facilitate coordination with state efforts to encourage education for sustainability, and help guide nonformal educational venues such as museums and nature centers in making the transition. Similarly, technical assistance will be needed to help introduce new sustainable technologies within the nation's industrial, transportation, and communications sectors. Clean environmental technologies will be needed to help industry augment current practices for controlling pollution and cleaning up wastes by adding sustainable practices such as prevention of pollution and efficient use of energy and resources.

A national extension service, which collects and disseminates information on particular topics of interest, could be used to meet the research, technology transfer, and community needs generated by those interested in charting a sustainable course. It could make information on sustainability widely available to the public, schools, media, communities, and businesses and could clarify and infuse sustainability issues into the nation's environmental, economic, and social agendas.

Extension services have a proven track record of providing outreach and integrating research and education at the community, county, and state levels. Various federal agencies and organizations have successfully coordinated and made available existing information through such services. Notable models for a Sustainable Development Extension Network include the U.S. Department of Agriculture's Cooperative Extension System, the National Oceanic and Atmospheric Administration's Sea Grant College Program, the National Aeronautics and Space Administration's Space Grant Program, the Department of the Interior's National Parks Outreach Program, and the Department of Commerce Manufacturing Extension Partnership. Also, the Office of Economic Conversion Information at the U.S. Department of Commerce has a clearinghouse offering information on economic development, defense adjustment, technology transfer, and community sustainability. And the Committee for the National Institute for the Environment is establishing a national library to link major collections of data and centers of scientific expertise for use by scientists and public users. A new or expanded national extension network on sustainability could work collaboratively to focus on interrelated issues such as communities, agriculture, forestry, manufacturing, coastal zone and marine environments, technology transfer, and education.

Information gives people the power to shape their own futures. The extension network can provide educational expertise, needed information on sustainability, technical assistance, and training for individuals and employees in organizations and businesses interested in applying sustainable development principles.

Establishing a Sustainable Development Extension Network could help ensure that local needs drive national policy. In addition, the network could help clarify research, education, and extension roles for government agencies and the private sector. It could help ensure that national policy and programs for sustainability are coordinated.

The success of the extension effort will be measured by the actions taken by local communities and the adoption of new technologies by industries. A major criterion for evaluation may be responsiveness to actual community needs. Extension activities will have to remain flexible and innovative so that they are targeted to changing conditions as society advances along the path to sustainability.

Some model extension services and networks are already being forged locally and nationally, as these examples describe.

- **Sustainable Communities Network.** Concern, Inc., on behalf of a national partnership, announced plans to create the Sustainable Communities Network, an interactive, on-line clearinghouse that will help communities improve their economic, social, and environmental well-being. The network will make information on tools, technologies, and innovative projects and programs readily available to citizens, planners, public officials, educators, and entrepreneurs. An ongoing, extensive evaluation will be conducted by participants in eight communities around the country to provide feedback on the effectiveness of the network's information. Supported by public and private funding, the network is being developed collaboratively by organizations from the Pacific Northwest to the Chesapeake Bay and in cooperation with the U.S. Environmental Protection Agency (EPA).

- **Education for Sustainable Development Clearinghouse.** Second Nature is developing an electronic Environmental Reference Center to provide sophisticated and sound information that will empower educators from all disciplines to become environmental and sustainability experts. The center

will also encourage educators to revise their courses to include education about the relationship between humans and the environment. It includes 1,500 references to the latest resources on sustainability including books, articles, videos, and electronic resources. In addition, the center will include a database of over 250 courses with environmental content to provide examples to professors in all disciplines and to demonstrate the realistic integration of sustainability concepts into courses.

- **Farm and Home-A-Syst.** The pollution potential of over 22,000 private land- and homeowners was assessed through a joint program, Farm and Home-A-Syst, administered by the Extension Service, Natural Resources Conservation Service, and EPA. First, a site-specific environmental risk assessment is conducted and then it is followed by an education program. The goal is to encourage farmers and homeowners to voluntarily fix potential or existing environmental problems brought on by petroleum and pesticide handling, decaying underground gasoline tanks; and household disposal of wastewater, cleaning fluids, and paint solvents. The Future Farmers of America has worked in partnership with the program to integrate the lessons into the school curriculum in both Spanish and English. By applying research-based, best management practices, the Farm and Home-A-Syst educational program costs $1 for every $3 to $9 realized in savings from pollution prevention efforts.

- **Fetzer Extension Partnership.** An educational partnership between the University of California Extension, Fetzer Winery, and the local school district was launched using the SERIES model. A 4-H program, SERIES (Science Experiences and Resources for Informal Educational Settings) is a multidimensional delivery system where scientists mentor teenagers, and teenagers mentor younger children. The goal is to teach about the entire food system, from the farmer and the field to the consumer and society, and to learn about sustainable agriculture techniques. Fetzer was an ideal site for this project, since two-thirds of the Fetzer vineyards are farmed under the organic gardening label.

- **Florida Sustainable Development.** Because of recurring water shortages in Sarasota County, Florida, a two-year moratorium on all building construction was proposed and defeated in 1991. Citizens decided, however, that if there is to be development in their community, it must be properly managed. The extension agents in Sarasota County initiated a discussion forum with public planners, private developers, licensed building contractors, landscape architects, and public and private commercial and residential property owners. The result of the forum was that a statewide educational program called Build Green and Profit was developed to educate about alternative practices that reduce the environmental impact of building construction.

- **Nonpoint Education for Municipal Officials (NEMO).** Local municipal officials on the Connecticut River watershed are being taught how to use geographically based resource information from remote-sensing satellites to make land development decisions. The University of Connecticut Cooperative Extension, in partnership with The Nature Conservancy and EPA, are combining technology with outreach and education to better understand and predict the effects of urban and suburban development on nonpoint source pollution. NEMO addresses storm water treatment through more effective zoning, and development planning and watershed management through coordinated uses of technology and education.

Expanding Community Visioning

Action 4: Local and state governments should continue to extend their partnerships with community organizations and other levels of government to support community sustainability planning processes and periodic assessments.

Flourishing communities are the foundation of a healthy society. At the community level, sustainable development means building partnerships among business, government, the nonprofit sector, and citizen groups to develop a shared vision for the future. It means working together to provide jobs for all citizens while simultaneously managing community resources responsibly. It also means providing all citizens the opportunity to live in a healthy, clean, and safe community.

Overcoming barriers to change is not an easy task. For this reason, people need to embrace their own vision of the advantages of living in a sustainable world before they will be inspired to act and make the necessary behavioral changes. Community residents need to create a collaborative vision of what their community needs to sustain itself into the next century. Across the country, people are meeting this challenge by participating in planning, implementation, and assessment exercises that measure their progress toward meeting their goals.

With proper education and jobs, citizens themselves can transform urban areas, renovating and creating affordable housing, cleaning streets and parks, ridding their neighborhoods of crime and drugs, planting trees and gardens, and even encouraging new smaller scale economic development.

--Francis H. Duehay,
City Councilor
Cambridge, MA

Chapter 28 of *Agenda 21* charges communities with formulating action plans to move toward a sustainable future.[8] The first step in each municipality's long-range planning for sustainability is to initiate a "visioning" process. How does visioning or community planning work and how will it promote community sustainability? This process involves bringing diverse members of the public together to discuss and define sustainability at the local level. From their collective vision emerges support for implementation plans and projects. These in turn are measured periodically by indicators gauging the community's success in meeting its goals.

Citizens who participate in community visioning exercises are asked to describe their idea of an ideal community. This vision usually comprises a safe and healthy community with parks; walking and bike paths; good schools supported by parents and community organizations; affordable and clean housing; recreational facilities, museums, and libraries; clean, energy-efficient transportation to replace traffic jams and road noise; and clean, safe, and friendly streets. Creating a vision of a desired future lets a community compare an ideal state with what will likely occur if present trends continue. By backcasting from the vision to the present, appropriate changes in policy and behavior can be identified. Participants in the visioning process clarify their values and become proactive change agents rather than victims of circumstance.[9]

Just as municipalities vary enormously, so will their visions. What is considered sustainable under certain conditions may not be sustainable under others. Each community will need an overall plan for becoming sustainable that addresses its unique local economic, environmental, social, or technological demands. In a community located in a desert, for example, sustainable use of water resources may differ greatly from sustainable use in a mountain community or a city situated on a major river or near a sizable underground aquifer. The natural environment and other factors will affect a community's needs and vision: This means that the plan developed must be regionally specific and must consider interconnections between the community and other locations near and far. There are many alternative paths to sustainability, and the task of visioning is to find a particular community's best road to a better future.

The reasons for initiating the visioning process are diverse. Some towns may embark on a visioning process in response to the closing of a military base, the devastation created by a natural disaster, economic doldrums, or environmental problems.

- **Natural Disaster.** After the Missouri town of Pattonsburg was literally washed away by the 1993 floods, the town used a consensus-based visioning process during its relocation to higher ground to

ensure that the new community would be energy-efficient and economically prosperous.

- **Economics.** The community of Silverton, Washington, is engaging in a collaborative planning process to deal with the effects of economic changes in the area's logging industry.

- **Resource Use.** In Jacksonville, Florida, a local businessman's concern over growth and consequent strain on resources led to a visioning process that uses indicators of progress and targets for the year 2000.

- **Long-Term Planning.** In Santa Monica, California, a process was initiated to address underlying, long-term issues related to resource conservation, solid waste, water and wastewater, energy, transportation, pollution prevention, public health protection, and community and economic development. The program will be re-evaluated in the year 2000.

- **Holistic Planning.** In Albuquerque, New Mexico, a book entitled *Albuquerque's Environmental Story: Toward a Sustainable Community* was created to provide a holistic, interdisciplinary approach to Albuquerque's natural, built, and human environments. Now in its third edition, this book gives students the knowledge needed to develop current and future policies, and to carry out hands-on experiments and actions within their community.

Education is crucial to this process. An active community outreach and education program must be in place to help people understand and adjust to changes in their community brought on by the transition to sustainability. Such formal and nonformal educational efforts as the information clearinghouse previously mentioned will contribute to the visioning process and follow-up assessments. In particular, the proposed Sustainable Development Extension Network could provide information to help facilitate visioning activities.

Community visioning exercises need support at all levels of government as well as from organizations, businesses, and citizens. At the federal level, the Sustainable Communities Task Force, one of the eight task forces of the President's Council on Sustainable Development, has developed an action strategy to move our nation's communities toward sustainability. The Task Force drew constructive guidance from actual community experiences to develop policy recommendations that, when implemented, will invigorate our communities to be more livable in the broadest sense -- environmentally, economically, and socially. Other efforts at the federal, state, and local levels are emerging as well, especially with assistance from national organizations such as the National League of Cities, the National Governors' Association, and the International City/County Management Association.

Some examples of visioning in action follow:

- **Seattle, Washington.** Sustainable Seattle, a voluntary network of citizens from many sectors of the community, began meeting in 1990 to promote sustainability. This citizen-led public forum has hosted many events and roundtable discussions concerning the future of the Puget Sound area. The primary focus has been to develop indicators of a sustainable community. These indicators allow the community to measure its current health in the broad areas of environment, population, education, and civic engagement. Sustainable Seattle's neighborhood network is currently recruiting volunteers to participate in the city's neighborhood planning process. Through these efforts and others, Sustainable Seattle is working to infuse the concept of sustainability in Seattle's development.

- **Noblesville, Indiana.** In a year-long series of facilitated meetings, the town of Noblesville, Indiana, developed goals and set benchmarks to guide the community's future in the areas of land use and social and economic assets (development). The process, coordinated by Indiana University, was modeled after an Oregon statewide initiative but included several aspects unique to Noblesville. These included consideration of (1) social issues through the involvement of a local group representing community social service providers and (2) information on interrelationships among community concerns, such as the measurement of formal and informal business, education, and community partnerships.

- **Plymouth, Wisconsin.** The Plymouth Institute, which evolved from a 15 year-old community called High Wind, is a nonprofit consortium of environmental designers/builders, educators, artists, scientists, farmers, futurists, and entrepreneurs whose purpose is to define, demonstrate, and communicate values and practices of sustainable living. The 292 acres includes an organic farm, aquaculture system, solar homes, and a 70-acre eco-village that is in the design phase. It also cooperatively administers a

comprehensive education and outreach program with several universities and school districts to local, national, and international communities. For example, Plymouth Institute/High Wind helped organize Sustainable Wisconsin, a statewide initiative to build a public agenda for sustainable development. Founder and resident of Plymouth Institute Belden Paulson believes that developing an environment ". . . where people live in honesty and harmony with one another and nature [allows them to] acknowledge and celebrate the divine interconnectedness of all life, and a commitment to holistic thinking and living."

- **Greenville County, South Carolina.** The United Way and Community Planning Council of Greenville County helps produce a community wide Needs Assessment Planning Study (NAPS) every three or four years. Using a community process that involves a broad range of citizens, NAPS identifies a set of issues related to the social problems faced in the county. In 1995, NAPS identified four such issues: early childhood development, dropout prevention, work and economic opportunity, and human services delivery and neighborhood development. The NAPS data provide the basis for focused action aimed at long-term improvement. Thus, in 1995, task forces representing broad areas of community life and collaborations of public and voluntary organizations were formed for each of the four issue areas. They are developing short- and long-range action plans, implementing them, and evaluating the results.

- **Santa Ana Pueblo, New Mexico.** The people of Santa Ana, whose tribal economy was traditionally based on agriculture, have lived near the convergence of the Rio Jemez and Rio Grande in New Mexico since 1700. During the 1970s, lack of access to credit discouraged family farming and led to off-reservation wage work. In 1980, tribal leaders formulated programs to establish greater economic independence while honoring traditional customs. These programs led to several integrated agriculture-based enterprises, including an organic tribal farm, a grain mill, a retail garden center, and a native plant and tree nursery. Today, tribal crops are sold in stores across the country and are the main food source for the Prairie Star, an upscale restaurant on the reservation serving the Albuquerque area. In addition, the tribal farm specializes in growing and processing blue corn products sold in cosmetics shops worldwide.

- **Owensboro, Kentucky.** Owensboro is western Kentucky's largest city. Until recently, many of its downtown sites were either unsightly or vacant. In a successful community wide effort to revitalize the downtown area, Owensboro residents raised $16 million to build Riverpark Complex, a civic and arts facility which includes a museum, theater, arts center, and administrative offices. Owensboro also convinced a paper company to locate a $500 million tissue products plant in the city, thereby creating 550 new manufacturing jobs. Through the vision of its citizens; creative financing; and the formation of solid partnerships among the public, private, and nonprofit sectors of the community, economic growth and revitalization in Owensboro are becoming a reality.

- **The U.S. Network for Habitat II.** The U.S. Network for Habitat II, a project of the Tides Center and a creation of the Citizens Network for Sustainable Development, is a national coalition of non-governmental and community-based organizations and interested individuals. These groups came together to advocate broad and diverse U.S. participation in the Second Conference on Human Settlements, June 3-14, 1996, in Istanbul, Turkey. Also known as Habitat II or "the City Summit," this conference focused on achieving universal housing and on building sustainable communities. To gear up for the conference, the U.S. Network for Habitat II conducted 12 town meetings to engage American citizens in a civic discussion about the future of its cities and towns. For most U.S. citizens participating in the town meetings and in the conference, the greatest benefit was linking the global issues of Habitat II to key needs of mainstream Americans.

Chattanooga: A Community for Sustainability

In 1969, a U.S. government study on air quality criteria for particulate matter declared Chattanooga, Tennessee, America's most polluted city. This pronouncement, coupled with economic recession, environmental degradation, governmental in-fighting, and general urban decline, pushed the city into a downward spiral. To effect a turnaround, Chattanooga in 1984 invited its citizens to come to the table and offer their hopes, ideas, and goals for the future. More than 1,700 residents participated in a series of community visioning meetings. Out of this process came a revitalized riverfront with fishing piers, restaurants, housing, a business park, and a city aquarium that generated $133 million in economic activity in its first year alone.

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Also as a result of this visioning, Chattanooga is now a living laboratory for the research, design, and manufacture of electric-powered public transit buses. The city's transit authority teamed with a private research center and a new company to provide continuous, free, electric-powered shuttles in the downtown area. Chattanooga today operates and maintains the world's largest electric-powered bus fleet.

Other outcomes include 4,166 units of new affordable housing, a family violence shelter, a restructured government that increases accountability and provides the opportunity for a broader and more diverse pool of candidates for local office, a plan for a county wide network of greenways along streams to enhance the integrity of the watershed, citywide recycling with sorting contracted through a rehabilitation center for mentally challenged adults, and training workshops in environmental education for teachers.

Chattanooga's story is not finished. Although the city has met most of its goals, it is now engaged in a process called Revision 2000 which will help the city adjust to its changing needs and prepare for a sustainable future.

All of these accomplishments have made Chattanooga a more desirable place to live and have elevated the public's commitment to Chattanooga. But one accomplishment in particular helped Chattanoogans breathe easier: In 1990, after more than two decades of trying, the city attained Clean Air status.

Center for Excellence

The U.S. Department of Energy (DOE) has launched a Center for Excellence for Sustainable Development -- a service to help communities get started on their own sustainable development activities. The center is an outgrowth of DOE's work in 1994 and 1995, when it helped two Midwest communities destroyed by flooding -- Pattonsburg, Missouri, and Valmeyer, Illinois -- plan new towns with sustainable development features. Since then, DOE has received a number of additional requests for help and will now make its materials available nationwide. The center will offer communities a tool kit of workbooks, guidebooks, and data. These include guidance on design and construction of "green" buildings and using computer programs to design neighborhoods that waste less energy, more than 70 case studies and more than 150 slides of successful community projects, model ordinances and codes communities are using to implement sustainable development, and a database of nearly 800 public and private programs that offer technical or financial help.

Fostering Workforce Training

Action 5: Employers -- in partnership with all levels of government, community organizations, businesses, educational institutions, and others -- should develop training programs to create a workforce with the skills and abilities needed to adapt to changes brought on by the national and global transition to sustainability.

We will need farmers, business persons, writers, bureaucrats, builders, foresters, and workers who are also ecologically literate and competent and who can build sustainable solutions from the bottom up.

-- David Orr, Oberlin College

Employers, employees, and the self-employed need education and training that lets them reexamine the nature of their work -- what is produced and how it is produced -- so that they will contribute to sustainability in their homes and communities as well as in their workplaces. Incentives such as increased wages, greater job security, and increased training opportunities should be offered to employees who find innovative ways for their companies to conserve resources, reduce production costs, and help the company prosper.

Educators are the key to readying the nation for the transition to sustainability. They can shape the workforce in part by focusing increased attention on career preparation, especially for those who do not attend college. A 1990 study concluded that the productivity of workers in jobs that do not require a college education will make or break the nation's economic future.[10] The report states that America invests comparatively little in these front-line workers, who are fast becoming unemployable at U.S. wage levels. A 1988 report agrees, "Our economy, national security, and social cohesion face a precarious future if our nation fails to develop now the comprehensive policies and programs needed to help all youth."[11]

Anecdotal support for this conclusion was voiced at a Chattanooga, Tennessee, roundtable convened by the Public Linkage, Dialogue, and Education Task Force to discuss jobs, labor, and sustainability. Participants noted that their biggest concern is preparing students to be community citizens who will have the knowledge and training needed to become part of the workforce. Despite this concern, representatives from the diverse industries and organizations in Chattanooga had never sat down to discuss impediments to reaching this goal. Their assessment was that schools are failing to connect curricula with real-life situations and, consequently, are failing to prepare students with the skills needed in the workforce.

But formal, in-school education will not answer to all the employment-related training needs raised by sustainability. Workers in all vocations -- from farmers and computer technicians to plant managers and shop owners -- will need to be trained to incorporate sustainability into their jobs. New industries employing sustainable practices will require a flexible and adaptable workforce that is prepared for a world in transition. At the same time, many resource-intensive industries may contract out for services, displacing workers who will need to be retrained for work in sustainable enterprises.

Worker training is essential, but if sustainability is to become a household word, advocates must respond to the job loss, insecurity, and falling wages facing America's workers.

-- Ruth Caplan,
Coordinator
Economics Working Group
Tides Foundation

Jobs in environmental industries contribute to sustainability and are presently high-growth areas. Demand for trained workers in environmentally related fields such as air quality management, sustainable energy production, hazardous waste management, and resource recovery is projected at a composite annual growth rate of six percent.[12] More jobs will be needed to design and build water treatment plants, increase the efficiency of power plants, insulate homes, build bike paths, and manage parks and wildlife. Workers will need to be trained for these jobs.

Business and organized labor can play constructive roles in educating workers for sustainability. Companies can help finance formal and nonformal educational programs and can support work-based training in sustainable practices. Labor can help focus attention on the need for this kind of training and the fact that in a sustainable economy all citizens can obtain secure, ongoing means of livelihood with full benefits at livable wages -- jobs that improve the quality of life while protecting the local and global environment.

Education must go beyond training workers. Educational outreach programs are needed to help community leaders and community-based economic development organizations become aware of the need for new strategies to develop a sustainable job base that promotes stability through diversification and locally owned, environmentally responsible enterprises. For example, in 1992, Boston announced plans to help create 10,000 new jobs in environmental services, including a $4 million recycling center.[13] Communities will need technical assistance to implement similar economic development strategies. Entrepreneurs will need access to financing so they can establish sustainable enterprises, and communities will need funds for programs to train workers in the new industries. Rapid consolidation in the banking industry is making it increasingly difficult for communities and entrepreneurs to obtain that financing, a situation that must be remedied.

Educating workers and employers for a sustainable world needs to become a national priority, and a national effort to provide workforce training should be launched. In particular, training efforts should target K-12 students, students receiving vocational training at the secondary and postsecondary school levels, new employees and employers, employees and employers who need on-the-job upgrading of skills and training in sustainable practices, and displaced workers who must be retrained so they can find work in new industries.

Work-based learning is critical in equipping adults with the knowledge and skills they will need in a fast-changing world. On-the-job training is important in every economic sector, including service industries. One service industry -- health care -- is developing a program for educating its workforce that could serve as a model for other sectors of the economy. The National Association of Physicians for the Environment was founded in 1992 to educate physicians, patients, and the public. The association convenes conferences on environmental health issues, works to "green" the nation's 180,000 physicians' offices, and encourages physicians and other health practitioners to inform patients about the connection between pollution prevention and disease prevention.

Training and retraining programs must proliferate as the economy shifts to more efficient practices. Some businesses already are taking a proactive approach to training in business schools and should extend that effort. For example, companies are partnering with business schools to create internships and courses in environmental management that will help produce graduates knowledgeable of the environment's implications for business, including market opportunities resulting from environmental regulations.

Business and engineering schools at the University of Michigan and Carnegie-Mellon University have received funding for these kinds of programs from IBM and Dow Chemical. Similar initiatives in vocational education at the secondary and postsecondary levels should be established so

that business will have the skilled workforce it will need to remain competitive in the global economy. Cooperative efforts by business and organized labor in this area would benefit both.

"School-to-work" opportunities offered through partnerships between industry and educators also should be encouraged. Promising models for career preparation range from career academies to "tech-prep" programs. The latter are often referred to as "2+2" programs, because they generally involve two years of high school and two years of postsecondary instruction. The idea is to administer a sequence of courses that prepares students for a variety of occupations within an industry. Tech-prep courses supported under the 1990 Perkins amendment to the federal vocational education law are coordinated through consultation with local businesses and unions. As of mid-1993, as many as 100,000 students in the United States were participating in tech-prep programs.

A recent study of 16 innovative school-to-work programs by Manpower Demonstration Research Corporation recommends that federal policy promote common themes and underlying principles rather than prescribe a specific program model. Localities should have the flexibility to customize their own school-to-work strategy, whether that means restructuring existing vocational programs or adopting another approach such as youth apprenticeships. Quality career preparation is desirable, achievable, and essential for attaining a sustainable society.

Some examples of ongoing innovative workforce training projects follow:

- **Career Academies.** While the modern American high school tends to isolate students from the adult world, career academies involve students in real-world careers early on. Career academies offer the opportunity to select an occupational theme, such as computers, finance, health, business, or tourism, and obtain actual experience through mentoring, summer work experiences, and internships. Typically structured as a "school within a school," a career academy generally consists of a group of students and teachers who get together for several hours each day. Businesses provide the academy participants with mentors, workshops, part-time jobs, and -- on graduation -- full-time employment with career potential. Career options range from jobs that require no postsecondary education to professions requiring advanced degrees. Curricula are formulated collaboratively through partnerships between schools and local employers.

- **Business Schools for Sustainability.** Created by the Management Institute for Environment and Business, the Business Environment Learning and Leadership program (BELL) is a consortium of 25 business schools committed to incorporating environmental issues into their curricula. BELL links universities, corporations, and communities to foster the "greening" of management education. Internships and permanent employment opportunities will offer MBA students the chance to integrate environmental concerns into management decision processes.

- **Crouse School of Management.** At present, only 100 out of 700 schools of business in the United States offer courses on business and the environment.[14] One of those schools is the Crouse School of Management at Syracuse University. First year business students are required to take a course called Managing in the Natural Environment. Incorporated into this course are issues such as environmental ethics and ecology; jobs, competitiveness, and environmental regulation; global problems; businesses and challenges of sustainable development; and strategies for a sustainable society. The business school curriculum is also buttressed with courses such as land development law and environmental law.

- **Zero Impact Program.** GNB Technologies, an Atlanta, Georgia, division of Pacific Dunlop, manufactures lead-acid batteries for all markets in the United States. Together with EARTHWATCH in Boston, GNB has designed a Zero Impact Program to introduce the principles of sustainable development to GNB's 6,000 employees. EARTHWATCH and GNB hope that this educational program will help employees to find new and creative ways to make their process zero impact, minimum emissions, and low toxic material through-puts over the long term.

Green Tech

In 1995, a south Boston High School recognized the growth of employment opportunities in the environmental field. The school saw this growth as an opportunity to prepare students to meet the challenges of today's changing workforce. The result was Green Tech, a program connecting the classroom to the workplace by preparing urban high school students for environmental careers.

Working in partnership with the U.S. Environmental Protection Agency and the Boston Private Industry Council, Green Tech is a model program for environmental education, career awareness, and career preparation. Green Tech prepares students for environmental careers through specialized academic instruction and a progressive series of internships, "shadowships," and after-school and summer jobs.

Green Tech began on a small scale by selecting 25 sophomores to intern in environmental businesses during their junior and senior years of high school. By 1998, Green Tech envisions that all 1,000 students then participating in the program will graduate with a four-year education in environmental studies and possess the skills required to pursue environmental careers successfully.

Employers are benefiting from the program by helping develop a pool of potential workers who will not need extensive training once they enter the workforce. Students benefit by being able to complement their academic instruction with on-site work experience.

Shore Trust: Conservation-Based Development in the Rainforests of Home

ShoreTrust has a strategy for a new economy based on environmental restoration and community development. Currently focused on coastal temperate rainforest communities in the Pacific Northwest, ShoreTrust's goal is to demonstrate that environmental restoration, economic development, and job creation can be mutually reinforcing goals. Created in the early 1990s, ShoreTrust grew out of a unique partnership between Shorebank Corporation of Chicago and Ecotrust, a Portland-based nonprofit conservation organization.

The demonstration site for ShoreTrust's work is the Willapa watershed in southwest Washington. Willapa's economy has traditionally been based on natural resource extraction, primarily timber, fish, and cranberries, with little processing or value-added production before export. Structural changes in these industries over the last two decades, accompanied by recessionary pressures, have led to declining business investment and rising unemployment and poverty rates. ShoreTrust developed a strategy to help spark local investment and support a transition in the regional economic base. The conservation-based development strategy aimed at encouraging the creation and expansion of environmentally restorative businesses in the Willapa watershed.

Market testing determined that strong regional and national demand exists for environmentally restorative goods and services and that, with appropriate assistance, responsible entrepreneurs could take advantage of these opportunities. These natural resource-based businesses could then become the cornerstone of broad-ranging environmental restoration throughout the coastal temperate rainforest region along the Pacific Coast from Northern California to the Alaskan Peninsula.

To help these new businesses establish themselves in the community, ShoreTrust Bank was established. Scheduled to be operational in 1997, ShoreTrust Bank will lend to businesses in targeted communities throughout the coastal rainforest region to enhance community development and ecosystem health. "ShoreTrust Bank should be a significant addition to the state's economic fabric," says John Bley, Washington State Banking Commissioner. "The integration of community development and environmental health is critical to the future of rural Washington."

EcoDeposits, FDIC-insured bank products, are now being raised by South Shore Bank in Chicago and will provide the foundation for ShoreTrust Bank. Over 350 environmentally minded individuals and institutions throughout the country have joined in ShoreTrust's work by opening EcoDeposit accounts.

ShoreTrust is demonstrating that business and conservation can work together to help restore ecosystem and community health and improve the quality of people's lives.

Jobs, Labor, and Sustainability Roundtables

"We have to get together and exchange ideas. Difference of opinion is what makes us think."

- Walter Johnson, Secretary General of the
- San Francisco Labor Council

The Public Linkage, Dialogue, and Education Task Force (PLTF) held three roundtable dialogues on jobs, labor, and sustainability. The purpose was to engage community members in thinking collectively about the state of employment in their community, and what could be done to enhance the current employment situation. Chattanooga, TN was the site of the first roundtable. It brought together people from the local technical colleges and universities, as well as labor representatives, high school students, government officials, and industry leaders. The dominant theme of this roundtable was that continual training -- for students and workers -- was necessary to provide the discipline of learning and the skills needed to lead to meaningful employment opportunities. Additionally, all agreed that successful training efforts would only be realized if the local unions and businesses, vocational and public schools, and the community continue the dialogue and work together to develop programs that reflect the needs of the community.

In Boston, MA the roundtable focused on economic diversification, and developing strategies to sustainably use available natural resources such as fish stocks. Over-fishing in Boston Harbor has caused a severe depletion of fish stocks -- severe enough to have federal and state governments stepping in to curtail fishing in the area. Participants at the roundtable recognized the need to engage the public in creating a sustainability plan for their region. Said Tim Costello of Call to Action, "All of this is about revitalizing democracy. We have to develop ways to involve people in thinking about alternatives to the path we are heading down . . . governments, communities, and businesses need to support and fund a vigorous grassroots revival to participate in a community process . . . we need to ensure an adequate social safety net so the transition to new and better ways of doing things can be made without devastating people."

At the third roundtable in San Francisco, the theme was how to provide young people with education and training opportunities that would make them better suited for quality jobs with benefits and livable wages. One participant stressed the importance of school-to-work programs that help create incentives for students to be self-sufficient, and an increase in community efforts to create and offer quality jobs that youth are motivated to pursue. Said one advocate for California reinvestment, "A major problem is disinvestment in the communities . . . the lack of an engaged citizenry, a stakeholders' society, poses the greatest threat currently to sustainability." Small business owners and managers were quick to agree and voiced an eagerness to serve their communities by creating new employment opportunities, but encouraged the community to work together to direct funding to these areas.

The roundtable sessions provided diverse community representatives with the opportunity to discuss the most pressing issues facing their communities. Some of the issues mentioned included portable pensions, support during workplace and workforce transitions, worker training, school-to-work programs, creative funding options, and provisions for livable wages. However, education, dialogue, and action were touted as the most important remedies to help curb future employment crisis. It was agreed that individuals with interdisciplinary thinking skills are what creates innovation and solutions in our dynamic, global economy.

As the Postal Service Goes, So Goes the Nation

The United States Postal Service is one of the oldest and most efficiently run businesses in the country. It is known for its delivery people who brave adverse weather conditions, long distances, and dogs to deliver the mail anywhere in the nation. What is not known by many citizens is the leadership role the Postal Service is taking to promote sustainability on the national level as well as within its own organization. "The vision of the Postal Service's environmental programs is to achieve compliance with government regulations and to serve as a leader for government, industry, and communities," explains Charlie Bravo, Manager of Environmental Management Policy. "As one of our guiding principles states, "we will foster the sustainable use of our natural resources by promoting pollution prevention, reducing waste, recycling, and reusing material."

The Postal Service has adopted environmental, social, and economic goals -- many of which are already being met. Environmentally, the Postal Service is a national leader in the use of recycled products including paper, retreaded tires, and re-refined oil; and has the nation's largest natural gas-powered delivery fleet -- more than 6,800 vehicles. Electric- and ethanol-powered vehicles are also being tested. On the community outreach side, the Postal Service has partnered with businesses such as Xerox, with whom it was involved in a return merchandise program for used copier toner cartridges. Economically, the Postal Service is increasing revenues through environmental compliance. For example, in 1995, more than one million tons of wastepaper, cardboard, and other material were recycled by the Postal Service resulting in $6.4 million in revenue. Locally, in Houston, for example, more than 500 tons of waste paper are recycled each month; this has generated more than $300,000 in revenue.

These accomplishments were made possible through aggressive employee training and public outreach programs. "Implementation of these types of initiatives requires awareness and cooperation throughout the organization," says Dawn Lebek, Environmental Compliance Coordinator for the Baltimore District. "In our organization, there is a continuous effort to educate and involve employees in pollution prevention, waste minimization, recycling, and affirmative procurement. Employees are encouraged to participate on committees and to make recommendations that incorporate environmental programs into everyday operations. Employee involvement is critical if we are to realize our vision."

Education does not stop at the Postal Service walls; rather, its awareness efforts are filtering into communities, businesses, and schools. For example, in 1994, the Postal Service partnered with the McDonalds Corporation to sponsor a contest for youth to design four commemorative "Kid's Care" environmental stamps as part of the 25th anniversary celebration of Earth Day. The winning stamps portray reforestation, cleaning the earth, cleaning the beaches, and solar energy. The Postal Service is also involved in developing public service announcements, videotapes, and "good environmental citizen" kits, as well as using the Internet to convey information about environmental stewardship. "With almost 40,000 facilities across the country, our environmental programs can really have a positive impact in every community from coast to coast," notes Bravo.

CHAPTER 5

And Beyond: Improving and Enhancing Sustainability Education

This chapter explores the following four areas that together form the foundation for education for sustainability.

- **Partnerships.** Local, state, and federal governments; parents, teachers, and schools; environmental organizations; and business associations should form partnerships to coordinate educational programs focusing on sustainable development. Such coordination should reduce duplication of efforts, increase availability of resources, and enhance stakeholders' knowledge and ability to make the decisions that will help their communities thrive.

- **Technology.** Sustainability requires that learners of all ages be prepared for today's ever-changing, increasingly technological society. Computer-based instruction and hands-on experience can foster achievement in technological disciplines and increase employment opportunities. The use of information technologies in and out of the classroom must be expanded and equitable access to technology must be ensured.

- **Global understanding.** Educating for sustainability requires that learners have an understanding and appreciation of the international forces that affect their lives. Environmental problems such as air pollution and pollution of the oceans are global in scale, since ecosystems and ecological processes do not adhere to human-made boundaries. At the same time, economic and social forces are becoming increasingly globalized. For these reasons, achieving sustainability will require cooperation on an international scale. If today's students are to be ready to make tomorrow's decisions, they must understand the links not only among various subject areas but especially between local and global conditions.

- **Multicultural awareness.** Individuals from diverse backgrounds must have equal access to education for sustainability. Equally as important, their voices must be heard and their input included in the educational process. As the demographics of America's schools and communities change, it is essential that students learn to function in a multicultural society by understanding issues from various perspectives, resolving conflict creatively, and synthesizing new ideas from diverse points of view.

The third policy recommendation of the Public Linkage, Dialogue, and Education Task Force relates to these crosscutting policy, infrastructure, and social needs.

POLICY RECOMMENDATION 3

Strengthened Education for Sustainability

Institute policy changes at the federal, state, and local levels to encourage equitable education for sustainability; develop, use, and expand access to information technologies in all educational settings; and encourage understanding about how local issues fit into state, national, and international contexts.

Four actions are suggested for implementing this recommendation:

- form federal, state, and local partnerships;

- establish and expand access to information and communication networks;

- foster an understanding of the global forces that affect the transition to a sustainable society, and

- integrate multicultural perspectives.

The need for each of these actions is explored in the remainder of this chapter through highlighted Task Force activities and models of successful programs.

Forming Partnerships

Action 1: Federal, state, and local governments should form partnerships with private sector organizations, businesses, professional societies, educational institutions, and community groups to develop and implement coordinated strategies supporting education for sustainability.

Partnerships among government; businesses; individuals; communities; and religious, labor, environmental, and other stakeholder groups can serve to create common ground among diverse views, reduce conflict and suspicion, and encourage collaborative and consensus-based decisions. Partnerships do this by expanding available resources and creating win-win solutions. Also, partnerships ensure that programs of excellence are developed and continued in communities throughout the country. Through partnerships, schools and communities can create high-performance learning environments, both in the classroom and outside, by incorporating information technologies and developing community-based communications programs on sustainable development. This is the context within which a learning system for both young and old can be created that helps people learn how to think, be empowered, fulfill an interest in learning, and initiate a lifelong motivation for learning.

Leveraging limited federal resources to spur private sector initiatives directed at educational and national needs should be a high priority. Another priority should be to encourage agencies to make partnership opportunities related to sustainability and education for sustainability central to their missions. This would coordinate resources and avoid overlap and duplication. A collaborative effort should also be initiated to develop models that could be used by states to strengthen their education for sustainability programs in a comprehensive way through legislation, statewide coordination, funding, curriculum guidelines, and professional development. Those states that have not yet formed advisory councils could be encouraged to do so; and the councils could participate with the working group in setting priorities and ensuring accurate communication, coordination, and accountability. Each state advisory council should link existing networks of public and private entities within the state to form a consortium that would integrate research, education, and extension functions.

Partnerships enable the public and private sectors to share ideas, build consensus, leverage scarce financial resources, engage a greater diversity of participants, and foster innovation. Education can be a link that draws people and organizations into partnerships, and education will benefit from the resulting exchange of experiences.

Successful sustainability partnerships are evident at the highest levels of government, as these examples show.

- **The Administration's Sustainability Agenda.** Throughout his presidency, Bill Clinton has emphasized a "sustainability agenda," stressing the need for education reform, job creation, workforce training, economic competitiveness, and environmental protection. With these issues as national priorities, the Clinton Administration has created a variety of initiatives that embody the spirit of partnership and stress the importance of a sustainable future. The President's Council on Sustainable Development is one example of diverse stakeholders coming together to develop a consensus on how best to meet national goals involving environmental protection, economic progress, and social harmony.

- **The National Science and Technology Council (NSTC).** President Clinton created this cabinet-level Council, under the umbrella of the Office of Science and Technology Policy, to coordinate science, space, and technology policies across the federal government. The NSTC also establishes clear national goals for federal science and technology investments. *Bridge to a Sustainable Future* (April 1995) was the NSTC's response to the mandate for a long term national strategy and goals for the advancement of environmental technologies. The President's charge: "... spur the development of a new generation of technologies that prevent pollution, promote the development and use of technologies to monitor the environment, clean up existing pollution, and encourage the application of environmental technologies throughout the world." The strategy emphasizes the importance of integrating information about sustainability and emerging technologies into interdisciplinary education and training. The strategy stresses the need to forge partnerships to establish links between curricula and the experiential and other knowledge students need in order to effectively participate in the workforce of the 21st century.

- **Meeting Manufacturing Challenges: Environmental Systems Engineering Education.** Coupling environmental considerations with systems engineering approaches offers a powerful mechanism for industry to develop sustainable manufacturing processes and to design environmentally preferable technologies and products. Within the manufacturing sector, there is a growing demand for a new generation of engineers who can apply environmental systems engineering, with a view toward total life-cycle, to their work. At the present time, there is a dearth of engineers who can meet this need. In response, the TI Group and one of its U.S. subsidiaries -- John Crane International, Inc. -- have been working closely with the U.S. EPA and GW University to champion the formation of a National Alliance for Environmental Systems Engineering Education. (The TI Group, recognized world leaders in specialized engineering and manufacturing, is a conglomerate of more than 125 companies with 350 plants and customer service facilities in 115 countries on five continents.) The Alliance's industry partners were linked in 1995 to an academic forum comprised of diverse community colleges and universities. At the core of the academic forum's current and planned activities is the development of new, interdisciplinary environmental systems engineering curricula for sustainability -- strengthened by partnerships for research, outreach, and innovative education and training activities. The Alliance also intends to advance essential pollution prevention knowledge, community-level sustainability action, and achievement in the development, commercialization, and transfer of advanced environmental technologies.

- **Other Federal Partnerships.** At the federal level, a variety of partnership opportunities to promote and enhance education for sustainability options are currently being explored. A Working Group on Education about Sustainability under the National Science and Technology Council was recently created. The group's mission is to coordinate federal policies and programs supporting education for sustainability. It will also facilitate partnerships with state efforts and those of governmental organizations, businesses, professional societies, educational institutions, and community organizations.

The Environmental Education and Training Partnership: Sustainability At Work

In 1995, the U.S. Environmental Protection Agency awarded a cooperative agreement to a consortium of institutions led by the North American Association for Environmental Education (NAAEE) to manage the first year of a three-year national training program. This Environmental Education and Training Partnership (EETAP) is comprised of 18 partners from various universities and nonprofit organizations. The partnership includes existing successful teacher training programs such as Project Learning Tree, Project WILD, and Project WET. These programs have proven nationwide delivery mechanisms already in place. Through these and other programs, EETAP provided training for approximately 35,000 teacher and other environmental education professionals in 1996 alone. Program partners include the Academy for Educational Development, Ohio State University, Northern Illinois University, National Project Water Education for Teachers, University of Michigan, University of Wisconsin-Stevens Point, and Western Regional Environmental Education Council.

Educational partnerships are more frequently forged at the state rather than the federal level. This is because the federal government tends to play a supporting role in U.S. education -- funding programs to promote excellence and access -- while state and local governments take primary responsibility for education by establishing curricula frameworks and standards for educational achievement. Collaborative efforts, initiated by state and local government, and including educators, academics, educational institutions, and professional associations, are essential to the success of educational reform efforts.

- **Environmental Education in the School System.** Many states are integrating environmental education programs and curricula into their school systems. By 1993, a total of 33 states had established formal guidelines for environmental education.[1] Today, 19 states have enacted legislation that mandates environmental education.[2] Five states -- Illinois, Iowa, Kentucky, Louisiana, and Hawaii -- are working with the National Environmental Education Advancement Project to develop comprehensive plans to strengthen their

environmental education programs. This project provides (1) matching grants from EPA to the five pilot states and (2) support services such as newsletters and workshops on successful efforts in other states. Organizations such as the National Wildlife Federation and the North American Association for Environmental Education have provided financial assistance for this effort. The project is an example of how educational institutions and nonprofit organizations are working together to assist state governments in developing statewide environmental education programs.

- **U.S. Global Change Research Program.** This public-private partnership and education initiative is designed to develop national literacy and teaching capability in sustainability education through improved science information concerning global change issues. The initiative involves formal and nonformal educators and community leaders through statewide, systemic approaches ultimately contributing to the development of knowledgeable constituencies. Results of research in science and social science are communicated through integration in statewide core curricula; professional and association meetings at regional and national levels; and programs conducted in museums, science centers, and community groups. Organized in state teams, professional educators partner with non-governmental organizations, state government officials, businesses, and educators to design and implement state action plans. The five-member state teams gathered at a national global change education conference in Washington, D.C., in 1994, at seven regional conferences throughout the country in 1995, and at state-level planning and organizing meetings in 1996.

The National Science Foundation offered planning grants to seven states in 1995 (Alaska, Arkansas, Florida, Iowa, Maine, Ohio, and Utah); and the National Aeronautics and Space Administration supported 19 states with implementation grants for statewide action plans (Colorado, Connecticut, Florida, Hawaii, Indiana, Iowa, Kentucky, Louisiana, Maine, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oregon, Rhode Island, South Carolina, Wisconsin, and Wyoming).

- **Influence of Agenda 21.** Spurred by the National Earth Summit, the governor of Kentucky invited representatives from all states to a conference, From Rio to the Capitols, in May 1993 to discuss how states can help the nation meet guidelines set by Agenda 21. Subsequently, many states, including Colorado, Delaware, Florida, Kentucky, Maine, Minnesota, Missouri, Montana, North Carolina, Virginia, and Wisconsin, began to develop statewide strategic plans for sustainable development.[3]

State efforts have spurred community projects, workshops, and councils on sustainability.

- **Local Partnerships.** Kentucky and Minnesota are just a few of the states in the country that have initiated partnership programs among state agencies, community and environmental groups, businesses, and the public to develop state sustainability plans. Both states noted that while top-down support is crucial, so too is widespread involvement from interest groups, the public, and other stakeholders in the process.[4]

Partnership for Protection

"There are so many brilliant ideas, but they're like shooting stars because people do not figure out ways to make them sustainable," says Steve Hulbert, owner of an Olympia, Washington, car dealership and a member of the Council's Public Linkage, Dialogue, and Education Task Force. *"A sustainable idea must have support and resources at all levels, otherwise the idea fizzles and fades."*

So when Steve Hulbert had a good environmental protection idea, he knew its success would depend on strong partnerships with stakeholders from all walks of life. Olympia's watersheds affect many concerns; over the years, however, their viability has been increasingly threatened by human encroachment and activities. Steve joined with community members to develop a program that involves youth, businesses, educators, resource professionals, nonprofit organizations, neighborhoods, and government in monitoring the condition of the area's watersheds. The program's goal is to take watersheds from assessment to problem identification to rehabilitation to sustainability.

As part of this program, students from the North Mason School District are working with officials of the State Department of Natural Resources to assess the effects of heavily used recreational trails in the Hood Canal/Tahuya State Forest Watershed. Other partners in the program include the Puget Sound Water Quality Authority, the Washington State Department of Ecology, the Interagency Committee for Outdoor Recreation, the Washington State Legislature, the Olympia Department of Natural Resources, and the U.S. Fish and Wildlife Service. These partners supply the resources and financial support while community organizations, businesses, and parents provide the volunteers. Together, they have also established an information network that allows resources, knowledge, and expertise to be shared.

Steve Hulbert's idea has turned into a full-scale program that uses national, state, and local resources not only to educate students about forest ecosystems, the connection between watersheds and the forest, and the effect that humans can have on both, but to empower the whole community to work together to take protective actions.

It is clear that the ability to achieve sustainable development depends on scientific knowledge of the Earth's natural systems and the ways in which human activities affect these systems. Accurate information built on basic scientific research is needed, and existing research needs to be organized and accessible. Information will help people understand and predict changes in the environment, manage and restore natural systems, prioritize the potential risks associated with environmental problems, and take advantage of opportunities offered by technological developments. Information will also help the private sector develop new technologies, production processes, and goods and services; it will help too in developing community-based sustainable development strategies.

Today, we have a dream for a different kind of superhighway that can save lives, create jobs, and give every American, young and old, the chance for the best education available to anyone, anywhere. I challenge you . . . to connect all of our classrooms, all of our libraries, . . . by the year 2000.

-- Vice President Al Gore

Information technologies are transforming society. Although it is argued whether this transformation is for better or worse, it is becoming clear that those who have access to and knowledge about computers are at an advantage compared to other students and workers.[5] As President Clinton noted in a February 13, 1996, address, "educational technology has actually helped to raise educational performance . . . it's allowing students around the country to do things they could never have done before, to examine gray whales, to study Hawaii's volcanoes, to explore the Galapagos, all without leaving the classroom."

Technologies such as the Internet, World Wide Web (WWW), and interactive CD-ROMs can advance education for sustainability by linking educators, policy makers, students, and parents nationally and internationally. Incorporating these technologies in educational contexts and improving computer-based instruction and the infrastructure for hands-on computer experience is becoming increasingly important. However, the U.S. Department of Education notes that application of information technologies in the classroom varies among locales. One explanation, cited in a recent Office of Technology Assessment report, is a lack of telephone lines in classrooms; this effectively bars student participation in electronic communications networks.[6] Another barrier is the speed at which technology is changing: Many schools simply cannot afford to keep upgrading their equipment every few years. Also, even if technology is available in a school, educators frequently are not properly trained in its use, and therefore do not know how to incorporate it into their teaching.

These caveats aside, the proliferation and use of information and communications technology are rapidly increasing:

- By 1994, nearly 65 percent of all schools, and 77 percent of all high schools, had modems and access to telephone lines.[7]
- Ten years ago, schools had one computer for every 125 children; that ratio is now one computer for every 12 children.[8]
- The Internet today reaches approximately 40 million people in about 168 countries; use is rapidly increasing. China went from two Internet sites in 1994 to 593 in 1995; Argentina increased from one to 1,415; and Japan rose from 38,267 to 99,034.[9]

Technology is rapidly becoming an invaluable tool for supplying equitable access to information about new programs, resources, and materials related to education for sustainability. In its final report, the President's Council on Sustainable Development called for the development of the National Information Infrastructure (NII) by the private sector to increase access to public information and improve access for all. NII, or "Information Superhighway," will be a seamless web of communications networks, computers, databases, and consumer electronics putting vast amounts of information at users' fingertips. Its continued development will ensure that the best schools, teachers, and courses will be available to all students, regardless of geography, resources, or limitations.

NII's infrastructure must include excellent organization of information. Existing clearinghouses, such as EE Link, the Educational Resources Information Clearinghouse (ERIC), and others relating to sustainable development, can collaborate to offer central gateway points of access on the World Wide Web (WWW). The EPA's Environmental Education and Training Partnership (EETAP), led by the North American Association for Environmental Education (NAAEE), is working to create a coordinated system for information networks. Educators at all levels need to access models of

successful education for sustainability programs that can be emulated or adapted for use in their classrooms. A WWW home page, a starting point for receiving information about a particular organization or topic, sponsored by the National Science and Technology Council's Joint Working Group on Education could supply information about models of sustainability in action, as well as about the activities of federal agencies, grant programs, and government-supported projects in the private sector.

Finally, educational programs should be encouraged to incorporate data from environmental monitoring tools such as geographic information systems. Teachers and students should be aware of databases maintained by international, national, and state governments as well as by private organizations. Courses should familiarize students with the availability of different types of databases, how they are accessed, and how they can be used to monitor environmental change and guide decisions about resource use and protection of the environment.

Following are some examples of how new technologies and clearinghouse capabilities are being applied today by government and the private sector in furthering sustainable development education.

- **CD-ROMs and Satellite Images.** The Island Institute in Rockland, Maine, supplies students in 150 classrooms with innovative environmental education software and satellite imagery of the students' school and town. One class, when studying satellite images of its town, discovered that a proposed site for a low-level nuclear waste dump from Maine's nuclear power plant was a wetlands habitat. After the students' results were confirmed by a hydrogeologist, the class presented its findings to the town planning board. The program material was made available under the direction of the Remote Sensing Facility at the Bigelow Laboratory for Ocean Sciences; sponsors include the National Aeronautics and Space Administration, Island Institute, and Apple Computer, Inc. It addresses classroom instruction in mathematics, physics, geology, ecology, oceanography, history, and geography.

- **Distance Learning.** Bell Atlantic Foundation is working with teachers to engage students in collaborative learning projects based on sustainable development issues in a new multimedia learning project co-sponsored by EARTHWATCH. Using electronic networks and the World Wide Web, EARTHWATCH on-line is able to support these teachers and their students throughout the school year. Apple Computers, Inc. provided laptops, digital cameras, and Newton personal data assistants for the project.

- **Computer-based Learning for Sustainability: EPA's Multimedia Development Laboratory.** Originally intended to address learning and training needs of the U.S. EPA's employees, the Multimedia Development Laboratory (MML) has since grown to provide computer-based learning products on diverse safety, health, environmental, and sustainability matters to over 2,600 organizations throughout the U.S. and abroad. Using state-of-the-art technologies, the MML produces and distributes learning, information, and performance support tools, including interactive CD-ROMs. These generic products enable individuals to have learning experiences and meet training objectives in a timely and cost-effective manner, without travel to off-site locations. EPA's return on its investment was about 50% during the first year of operation, and it is expected to return over 200% in the following six years; savings in excess of $2 million are currently estimated. The MML recently started work with the Urban Consortium's Environmental Task Force of Public Technology, Inc., to develop and deliver computer-based learning, information, and performance support products to local governments and communities to help them achieve their sustainability goals.

The growth of computer technology in the 20th century has been exponential. Every day, more and more people gain access to information via the Internet. A survey conducted by Nielsen Media Research concluded that about 37 million people in the United States and Canada have Internet access: 24 million of those surveyed had "signed on" to the Internet in the last 90 days. As access to computers increases, more and more people will be able to use the Internet as an educational tool, enabling people to expand their global perspectives and understanding of different cultures, religions, regions, languages, and ideas. Networks that provide information or services related to sustainability are also expanding. For example:

- **Global Action and Information Network (GAIN).** GAIN provides "information for action." GAIN-Online provides current legislative information on almost every environmental issue, as

well as background data and analyses, action alerts, organizational resources, and contact information for congressional members, cabinet officials, and federal agencies. It also is developing a computer program, Vision Into Action (VIA), that helps individuals, businesses, and communities determine the scope of their ecological impact. Once producers and consumers alike understand the impact of their actions, VIA assists them with adopting new practices by providing education and information about stainable lifestyles and communities. (http://www.igc.apc/gain)

- **Government Information Locator Service.** EPA has established a Government Information Locator Service for anyone who needs to locate, access, or acquire environmental information. The service lists more than 200 of the Agency's public information resources, describes the information in those resources, and provides assistance in obtaining the needed information. [http://www.epa.gov/gils]

- **EE-Link.** EE-Link is an on-line source of information about environmental education. It provides access to teaching resources on the Internet, including articles, databases, grant information, and instructional materials. EE-Link is administered through a partnership among EPA, the North American Association for Environmental Education, and the National Consortium for Environmental Education and Training. [http://www.nceet.snre.umich.edu/use.html]

- **GREENWIRE.** GREENWIRE, an on-line environmental news service, provides a daily briefing on environmental news. Editorial commentary comes from over 100 U.S. and international media sources. The GREENWIRE database provides 24-hour-a-day access to over 20,000 stories published in GREENWIRE since 1991. [http://www.apn.com]

- **Global Network of Environment and Technology (GNET).** GNET provides access to information on environmental products and services, marketing opportunities, contracts, U.S. government programs, policy and law, current industry news, and business assistance resources on the environment, technology, and commerce. It was designed to help the federal government track roundtables, agency initiatives, and other work products or dialogues initiated by the White House on environment, energy, and sustainability issues. [http://www.gxinet.com or http://www.gnet.org]

- **National Library for the Environment.** The Committee for the National Institute for the Environment has developed a National Library for the Environment. The library provides access to over 300 reports on various environmental issues, a user-friendly on-line encyclopedia of the environment, and detailed information at all technical levels on specific environmental subjects. Reports are reviewed, prepared, and checked for accuracy by the Congressional Research Service, a division of the Library of Congress. [http://www.cnie.org/nle]

- **Educational Resources Information Center.** ERIC is a national information system designed to provide users with ready access to an extensive body of literature on education and related issues. Established in 1966, ERIC is supported by the U.S. Department of Education. A number of subject-specific clearinghouses and services provide research summaries, bibliographies, reference and referral services, computer searches, and document reproduction. [http://www.aspen.sys.com/eric]

- **National Environmental Information Resources Center (NEIRC).** The NEIRC was designed to provide professionals, students, and the general public with "one-stop access" to diverse environmental, educational, and sustainability-related information maintained on the World Wide Web of the Internet. Established in 1995 as a public service by The George Washington University (GW) and the U.S. EPA, it provides direct linkages to more than 1,000 sites, globally. A number of the linked sites feature computer-based learning, information, and performance support modules; on-line tools for educators and researchers, and extensive search capabilities. NEIRC users can engage in discussions encompassing many different environmental and sustainability subjects through dedicated Usenet news groups. The NEIRC also serves as a repository of information developed by, and for, higher education and research institutions through GW's "Green University Initiative." [http://www.gwu.edu/~greenu/]

Computer technology is likely to change the course of our future. With the expansion of the Internet, societies all over the globe will one day be able to access the information they need to create sustainable living conditions. Educating via computer opens doors to information and teaches valuable skills.

Bridges Not Walls: Bringing the Internet to Public Housing

The National Urban Internet is an environmental justice initiative, sponsored by Naval District Washington, that has been designed to provide access and training on the Information Superhighway to low-income and minority communities in Southeast Washington, D.C. The program provides hardware, software, computer literacy training, Internet access and training, and occupational training. It also provides information on such subjects as health education, business development, and risk assessment in the interests of contributing to an enhanced quality of life. Final development and implementation of the initiative will be conducted through a public-private partnership consisting of leaders from government, industry, and community groups.

When fully implemented, the National Urban Internet will go far beyond providing computer equipment and connecting public housing residents to the Internet. "It is clear that access is only a partial solution," notes John Rosenthall, Director of National Urban Internet. "The partnership will ensure appropriate training and information such as grant-writing training and technical assistance for participants that will help with life skills applications." The ultimate purpose of the project is to help community residents gain environmental justice, community empowerment, and self-sufficiency through computer usage.

GLOBE: Hands-On Learning

Students, parents, teachers, and school administrators met on the grounds of Jamestown Elementary School in Arlington, Virginia, awaiting the arrival of Vice President Al Gore, who was visiting the school to launch another GLOBE (Global Learning and Observation to Benefit the Environment) site. GLOBE, started by the Vice President in 1994 and supported by several federal agency partners -- the National Science Foundation, the National Oceanic and Atmospheric Administration, the U.S. Environmental Protection Agency, the U.S. Department of Education, and the National Aeronautics and Space Administration (NASA) -- is designed to link teachers, students, and scientists around the world in a study of the environment. Says Jamestown principal Nicki Smith, "GLOBE is going to revolutionize education."

So how does GLOBE work? Basically, it is a hands-on scientific experiment. Teachers are trained to help students test soil, gauge water temperature, study plant species and clouds, and measure the height and diameter of trees. These data are then reported on the Internet via the World Wide Web for use by students, scientists, and NASA. "It's exciting, electrifying," says Joseph Squeo, a fifth grade teacher at Royle Elementary School in Darien, Connecticut, who is one of 12 teachers in that state being trained to run GLOBE programs at their own schools. "This program is unique because it makes students and teachers a part of a scientific experiment. We have ownership. We can get involved and be a part of the scientific study of the Earth. We're going to be doers and participants, and that is what is going to appeal to kids today."

To date, more than 2,500 schools in the United States and 35 partner countries have signed up as GLOBE sites. Scientists are already benefiting from the information collected by the students. "We don't have the time or the capability or the research funding to do the work these students are doing," William Lawrence, a research scientist at the University of Maryland, remarks. Says Neal Pettingill, an 11-year-old Jamestown student involved with the program, "You're not just doing it to learn stuff, but you're actually helping scientists figure out what they need to do to help the Earth."

Fostering Global Understanding

Action 3: Educators in both formal and nonformal learning programs should help students understand the international factors that affect the nation's transition to a sustainable society.

Sustainable development cannot be achieved without global cooperation that stresses the need for common solutions to long-term challenges and a greater understanding of the inextricable link among all nations. Overcoming obstacles to sustainability requires a global understanding of the effects that one country's actions and policies have on the health and well-being of another country. This "think globally, act locally" credo is best set forth through strong educational programs that emphasize individual, community, business, and national responsibilities to the global community.

> The concept of sustainable development is still vague in the minds of many people . . . around the world. If this issue is going to succeed in the international community, it is going to be through very strong promotion by the United States government.
>
> -- William Mansfield (former) Deputy Director, U.N. Environment Programme

Educating for sustainability requires that learners have an understanding and appreciation of the international forces that affect their lives. Environmental problems such as air pollution and pollution of the oceans are global in scale since ecosystems and ecological processes do not adhere to human-made boundaries. At the same time, economic and social forces are becoming increasingly globalized. For these reasons, achieving sustainability will require cooperation on an international scale. If today's students are to be ready to make tomorrow's decisions, they must be able to understand the links not only among various subject areas but especially between local and global conditions.

Achieving sustainability on a global scale will take decades or perhaps centuries. Solutions to global problems will require long-term dialogue and education at regional and international levels. Meaningful discussions will bear fruit, however, only if they lead to appropriate actions and behavioral changes.

> ***What is urgently needed is an international strategic alliance of citizens, including United Nations agencies, NGOs [non-governmental organizations], the private sector, and governments to support the development and implementation of national plans for communication and education for a sustainable future.***
>
> -- Jean Perras, Executive Director Learning for a Sustainable Future and North American Regional Chair, IUCN - Commission on Education and Communication

There have already been a variety of dialogues on these issues, including activities begun in the 1970s in Stockholm and continued in Tbilisi, Belgrade, and the work of the Bruntland Commission. In particular, Agenda 21, adopted at the U.N. Conference on Environment and Development (UNCED) held in Rio de Janeiro in June 1992, stressed international cooperation and partnerships to heighten understanding through education as the launching pad for future sustainability initiatives. Many countries have embraced the themes of *Agenda 21* by exploring how sustainability could be integrated into organizations, businesses, and government at the national and community levels. Mandates such as Agenda 21 must trickle down and be incorporated into formal and nonformal educational institutions through curricular and operational changes and into country and regional plans that recognize the importance of sustainability.

Students and youth groups must participate in the emerging global dialogue on sustainability. Information is becoming more accessible as communication methods become faster and more diverse. Additionally, new alliances centered around economic, political, and related issues are continually emerging and have a great influence on global progress toward sustainability. These factors are, in essence, "shrinking" the planet, making information and other resources more readily available. Students must know about these options and opportunities as they embark on a journey of discovery and understanding of global systems and what it means to be a responsible citizen of the global community.

Learning from Thy Neighbor

Canada's Learning for a Sustainable Future (LSF) is a recognized leader in developing education for sustainability strategies. Its five-part approach to sustainable development education comprises the following:

- Integrate the principles of sustainability into educational policies at the provincial and territorial levels, with each province choosing the methods most appropriate to implement their own programs.
- Ensure that teachers receive in-service professional development in sustainability education.
- Offer support for pre-service education.
- Identify successful existing initiatives and disseminate models of innovation in curriculum planning.
- Support program strategies in curriculum design and teacher education.

LSF was formed after a 1987 meeting between Canada's environmental ministers and the Brundtland Commission; this meeting spurred a series of roundtables at the federal and provincial levels. Some of these were hosted by the Subcommittee on Communication and Education of the National Round Table on the Environment and Economy. The subcommittee's focus was to make sustainability education a top priority in Canada. LSF was given its mandate by the subcommittee to facilitate discussion and planning for introducing the principles of sustainable development into the Canadian school system. LSF's board of directors is made up of representatives from the education, government, business, and nonprofit sectors: This helps ensure that the planning process includes the views of as many stakeholders as possible.

LSF has begun establishing networks of educators who will be trained to serve as facilitators for teacher workshops. Internationally, it is working to forge partnerships with a variety of organizations in the United States and abroad. "Linking efforts of organizations such as the PCSD and Learning for a Sustainable Future will strengthen the support for education for sustainability programs not only in Canada and the United States, but in other nations as well," notes Jean Perras, LSF's Executive Director. "This is an issue that transcends borders and should be addressed collaboratively by all nations. Only by working together can we forge a new pedagogy for education that recognizes the increasingly interdependent world in which we live."

Integrating Multicultural Perspectives

Action 4: Formal and nonformal educators should ensure that education for sustainability invites and involves diverse viewpoints, and that everyone -- regardless of background and origin -- has opportunities to participate in all aspects of the learning process. This will ensure that education for sustainability is enriched by and relevant to all points of view.

The demographic composition of classrooms and communities in the United States is more diverse than it has been at any other time in our nation's history. This demographic transformation challenges educators, both in formal and nonformal settings, to develop relevant teaching materials and curricula reflective of the environmental realities in all types of communities.

Education is the most powerful tool we have to combat environmental racism.

Beverly Wright, Director Southern Center for Environmental Justice

As the demographic composition of classrooms and communities becomes more diverse, there is an increased need for relevant and inclusive materials and for teacher training and sensitivity that reflects new approaches for working with culturally, economically, and linguistically diverse children. Whether in classrooms, museums, or the media, new inclusive visions are needed to commit an active, multicultural citizenry to a sustainable future.

The goal of integrating multicultural perspectives in the public dialogue on sustainable development has several corollary issues, notably including the following.

- **Bridging the demographic gap between an increasingly diverse student body and a more traditionally aligned teaching staff.** The teacher population in the nation's classrooms is overwhelmingly female, white, and middle class.[5] The students, however, are more racially diverse and come from nontraditional family structures; for many, English is not their primary language. Teachers need training to address this demographic gap. This training should focus on increasing the cross-cultural competencies of educators to integrate education for sustainability into culturally diverse settings.

- **Ensuring that the relevance of the sustainability message is made clear to all component groups of this nation's multicultural population.** A 1994 Roper survey commissioned by the National Environmental Education and Training Foundation focused on disadvantaged youth (defined as those from ZIP Codes where 30 percent or more of the population is at or below the poverty level). The responses indicated a serious gap in environmental education -- or, more likely, in what is being taught about the environment. Children most likely to be exposed to environmental risks ranked environmental problems as eighth on a list of 10 societal issues they would like to make better. Youth in general rated the environment as second.[11]

One reason for this discrepancy may be that environmental education as well as sustainable development education is either not taught in the target populations' schools or does not incorporate information about environmental issues that relate to students' everyday concerns. For example, urban youth may not see the importance of saving whales, something they have never seen before, as compared with the more pressing and immediate problems of violence and drugs in their own neighborhood. Urban youth may benefit more from learning about environmental justice issues, waste reduction and management, and how environmental hazards affect human health, as well as about preservation of natural resources. Regardless of the specific environmental issues taught, however, the overall programs need to be tailored to meet the needs of the specific constituencies they serve. Programs and curricula should be dynamic and able to adjust to changing community, national, and global circumstances. Linking environmental issues with everyday survival issues can expose disadvantaged students to knowledge that can help them take action and make changes and decisions that benefit themselves, their families, and their communities.

- **Integrating the concept of environmental justice into sustainability education.** Multicultural environmental education focuses on students in industrialized areas who are often disproportionately exposed to toxicants. Historically, the siting of industrial plants, waste incinerators, landfills, and sewage treatment plants in or near poor and minority communities has resulted in discriminatory exposure to pollution and hazardous wastes. In recent years, an explosion of interest in environmental issues among people of color has coalesced in the environmental justice movement, which links environmental issues with social justice movements, such as civil rights. The focus is on toxic waste dumps, poor air and water quality, and pesticides, and their impact on human health. The movement seeks environmental equity for all people, regardless of race, social class, ethnicity, gender, age, or disability. In addition to pointing out discriminatory siting practices, the movement has condemned the uneven enforcement of environmental laws and remediation efforts.

Some or all of the preceding ideas are being incorporated. Successful examples of ongoing initiatives to integrate multicultural perspectives into sustainability education follow.

- **The Southern Center for Environmental Justice.** Since it opened in 1992, the Southern Center for Environmental Justice has been inundated with requests for community assistance in responding to accidents, registering formal complaints, accessing information, and understanding technical documents related to the environment. The center's dual mission is to conduct research and policy studies and create partnerships among universities, grassroots organizations, and individuals in a community to empower coordinated actions in fighting for environmental justice on the local level. In keeping with this mission, the center is facilitating research on three main areas including toxicology hazards and the study of economic development as it relates to environmental justice. The center also runs three training programs: Information Is Power, a course teaching communities ways in which to access environmental information; Computer Ready, a computer skills training course; and Leadership, which teaches community members how to network and form coalitions. The center was started by a consortium of universities including Southern University of New Orleans, University of New Orleans, Dillard University, Xavier University, Clark Atlanta University, and Hampton University; it serves Louisiana, east Texas, Arkansas, Mississippi, and Alabama.

- **Cuyahoga Community College.** In 1992, Cuyahoga Community College was awarded a grant by EPA to offer an associate of science degree for environmental science technicians; develop community outreach and recruitment, especially for people of color; increase their involvement in environmental issues and careers; develop a long-range environmental education plan; and establish a tech-prep program for high school students. The

college is establishing an advisory committee to provide expertise and guidance in developing an Environmental Science Technology program with appropriate course work to enable matriculation agreements with four-year institutions. Additionally, in July 1994, Cuyahoga Community College established a Center for Environmental Education and Training.

- **Davidson School -- Sustainability for the Disabled.** An EPA grant is enabling the Davidson School in Elwyn, Pennsylvania, to provide training in environmental education to teachers and university students majoring in special education. The Curriculum for Environmental Education of the Disabled will be distributed nationwide through a network of participating organizations and agencies. By targeting disabled secondary school students, this program will reach a traditionally underserved audience.

- **Chicago Academy of Sciences.** The Chicago Academy of Sciences' Project Ecological-Citizenship is designed for urban multicultural elementary students; it also involves parents and the community. The project's core element is a multidisciplinary ecology program incorporating hands-on explorations of environmental issues affecting inner-city communities. The academy's model program has been used to introduce environmental education in inner-city schools throughout the nation.

- **Project SEED.** Project SEED (Seniors Environmental Education Development) in Fremont, Ohio, is an excellent example of how a community-based organization can communicate with an audience not typically reached through other methods of environmental education. The project, which is run by four Ohio counties, educates disadvantaged senior citizens about the health hazards of indoor air pollution and about conservation opportunities within their homes, such as weatherization and water conservation.

- **Three Circles Center.** Three Circles Center for Multicultural Environmental Education is a nonprofit organization that aims to introduce, encourage, and cultivate multicultural perspectives and values in environmental and outdoor education, recreation, and interpretation. The center helps create access to environmental education for children of color across the country through teaching, program design, evaluation, curriculum development, and outdoor field study opportunities. It also helps organizations and educators by publishing a journal, offering presentations and workshops, and consulting on a variety of areas including programs and curriculum design, development, and evaluation; community relations; materials review; and board and staff development and facilitation. Two current Three Circles Center efforts are described below.

    - Parker Elementary School in East Oakland, California, has taken a bold step: It will become a magnet school for environmental science. This designation allows the school to build on six years of collaboration with the Inside Out Academy, an environmental education program founded by the executive director of Three Circles Center and a group of progressive teachers at Parker. The Inside Out Academy began by stressing the importance of providing environmental education to children of color in an urban environment; it then saw the potential in linking the program to overall school reform. To help facilitate this, Parker and the Inside Out Academy participated in a collaborative effort to renovate the curricula and develop a positive leadership climate. Many ideas about multicultural environmental education were developed at Parker, where the student body is over 90 percent African American, with an increasing number of Latino students and students of Southeast Asian descent. Three Circles Center is in the process of recording the school's experiences, focusing on how environmental education was taught in such an ethnically diverse context.

    - Three Circles Center has initiated the Multicultural Technical Assistance Project (MTAP) to support the incorporation of multicultural issues and perspectives into selected San Francisco Bay Area environmental education programs. The 10 programs involved in MTAP were selected based on their commitment to change and their ability to identify barriers in meeting organizational goals. MTAP provides peer support and acknowledgment, identification

of significant resources, and supportive and visionary leadership to these programs. Specifically, it held three eight-hour interactive, participatory workshops on building and developing a diverse staff; developing successful relationships with diverse communities; and multicultural environmental education. Numerous "next steps" came out of the workshops, and in the two months following them, participants regrouped to share their challenges and successes in facilitating multicultural change in their programs.

Diversity is as valuable to sustainability in cultures as it is in nature. The whole social "mix" must be nourished and the interconnectedness treasured.

-- Geri Spring, Coordinator Chattanooga/Hamilton County Neighborhood Network

Educators knowledgeable about sustainability can help students make these connections in and out of the classroom. Teachers' familiarity with these issues should begin during pre-service training and continue throughout their tenure. Educator training should stress conflict resolution, intercultural communication, and environmental justice issues while emphasizing an understanding of community-based approaches to environmental education that builds sensitivity toward diverse cultural values. Elisa Adler, an educator involved with a bilingual/bicultural river restoration program, notes that "Until people feel profoundly connected to the Earth, they won't really care what happens to it. [People need] . . . to consider their relationship to the natural environment and to discover themselves as an interdependent and interacting member of a community of diverse species."[12]

The Lesson of the Menominee Indian Tribe

The Menominee Indian Tribe of Wisconsin has created culturally appropriate applications of sustainability that can inform mainstream conceptions. The Menominee, along with other tribes throughout the United States, promote the lessons and concepts of sustainability at an early age and weave them into the levels of education throughout life. At the College of the Menominee, a two-year institution of higher education in Keshena, Wisconsin, concepts of sustainability are integrated into the curricula and hands-on, experiential learning is practiced. Students develop a strong cultural and spiritual bond to the land.

This feeling for the land is bound in an awareness that the tribe has only 240,000 acres which must be passed on to future generations. Therefore, the reservation's natural resources are managed sustainably so that trees and clean water are able to replenish themselves for future use. As Chief Oshkosh, one of the early tribal leaders, once said, "Start with the rising sun, and work toward the setting sun, but take only the mature trees, the sick trees, and the trees that have fallen. When you reach the end of the reservation, turn and cut from the setting sun to the rising sun, and the trees will last forever." Sustainable forest management has been practiced by the Menominee since the creation of the reservation over 140 years ago. Today, the Menominee Tribal Enterprises maintains the tradition of sustainable forestry in the Menominee Forest.

The Menominee recognize that education is one of the keys to preserving and enhancing their sustainable activities. The College of the Menominee Nation has a variety of future activities in the works. In the fall of 1996, the college will launch a new degree program in sustainable development, and the Menominee Sustainable Development Institute is developing a curriculum for high schools with sustainable communities as the theme.

Mainstream multicultural programs could benefit from the example of the Menominee approach -- this could broaden environmental literacy while expanding knowledge about how to balance limited natural resources with everyday consumer demands.

CHAPTER 6

Continuing the Dialogue

Ultimately, our nation's children and grandchildren are the ones who will see the progress of the dialogue on sustainability. If today's adults ask the right questions, generate productive answers, and take meaningful actions, the dialogue will have a much different form by the time the next generation takes charge. If we conduct the exchange well, they will honor us. If we do it poorly, they will be right to blame us for their plight.

The process begun by the President's Council on Sustainable Development (PCSD) has initiated the dialogue, but the question now is how to ensure its continuation. Sustaining a fruitful dialogue in regions of the country that are dependent on resource-based industries is one of the most important next steps. Recent focus groups in Grand Junction, Colorado, and Bend, Oregon, provided insights into how to frame the dialogue so that it resonates with those who have close economic connections with the extraction of resources.[1] The focus group research indicated that residents in Western communities respond to a message that focuses on long-term, stable, and sustainable economic progress. They believe their communities need to achieve greater economic diversity and understand that resource protection is part of a long-term economic strategy.

At the same time, residents of these Colorado and Oregon communities worry that good-paying jobs in extractive industries are being replaced by lower paying jobs in tourism and recreation. A persuasive economic dialogue to these Westerners includes discussion of tax incentives for bringing in the right industries, specific training for future jobs, and support for starting small businesses.

A new type of thinking is essential if mankind is to survive and move toward higher levels.

-- Albert Einstein

The Westerners have a well-developed sense of place, value the beauty of nature, and recognize their responsibility to provide long-term stewardship of the environment for the sake of future generations. Members of the focus groups indicated that they see growth and development as mixed blessings. They also view a healthy environment as a key component of their quality of life. They want to use, but not exploit or destroy, their resources. In short, they are looking for balance and moderation. They believe it is possible to work together toward a realistic balance of environmental protection and economic stability. Notes pollster Celinda Lake, in reference to a question on environment versus jobs in the Pacific Northwest, in an October 1994 survey by the Communications Consortium Media Center, "voters clearly want moderation and a balanced approach which gives them both a strong economy and a strong environment."

These focus group findings can likely be extrapolated to most Americans. If people are indeed looking for a realistic balance, then they are searching for sustainability. Turning that quest into productive action is the reason for continuing the dialogue.

Toward Sustainability

Prosperity, fairness, and a healthy environment are interrelated elements of the human dream for a better future. Sustainable development is a way to pursue that dream through choice and policy. Three themes are essential to any implementation strategy for setting the nation on the path to sustainability:

- expanding the American dream to embrace and value sustainability;
- nurturing grassroots leadership for sustainability, complemented by stewardship and support at all levels, and
- encouraging hope, and cultivating the knowledge, will, and a system of recognition and rewards for individuals and organizations to take the steps toward realizing their dreams for a sustainable future.

Expanding the American Dream

Our vision is of a life-sustaining Earth. We are committed to the achievement of a dignified, peaceful, and equitable existence. A sustainable United States will have a growing economy that provides equitable opportunities for satisfying livelihoods and a safe, healthy, high quality of life for current and future generations. Our nation will protect its environment, its natural resource base, and the functions and viability of natural systems on which all life depends.

-- The President's Council on Sustainable Development

Over the past 50 years, the United States has enjoyed phenomenal success in disseminating the American ideal of democracy, basic human rights, and a decent quality of life. Today, this American dream needs to be expanded to holistically include environmental protection, economic progress, and social equity. Seeking sustainable solutions and taking sustainable action must become an integral part of our daily lives. The fundamental principles of sustainability should serve to guide not only our individual lives, but also those of businesses, communities, the nation as a whole, and societies world-wide.

Although we do not all share the same definition of the American dream, there are certain aspects of our society -- such as spiraling consumerism -- that conflict with the realities of living on a relatively small planet with a finite resource base. Our society's emphasis must shift to bring us together with shared values based on stewardship. Quality of life is enriched not so much by things as by creative accomplishments in every aspect of one's life: job, relationships, and civic contributions to community and society. Organizations that foster the personal growth of citizens and improvements to our communities can produce greater satisfaction and hope, increased productivity and achievement, and an enhanced quality of life.

A prevalent assumption in our country is that technology can continue to produce more and more consumer goods while minimizing adverse impacts to the environment and health. We are coming to recognize that organizations and nations that want to remain competitive, socially well balanced, and healthy must redesign every aspect of their planning and production processes to become "eco-efficient." Environmental technologies and eco-efficient manufacturing and business practices may not constitute a technological fix in the sense of allowing open-ended growth, but they can provide some flexibility and allow us to re-examine and expand our values. Our American culture imposes a moral incumbency to champion a responsible vision and action for the future which embrace and advance the principles and objectives of sustainability.

Patagonia and Sustainable Agriculture

Patagonia, Inc., designer, manufacturer, and distributor of outdoor clothing, is shifting its entire cotton line to organically grown cotton. Organic cotton is grown without the use of harmful chemical pesticides, herbicides, and defoliants. "We have realized for years that every product we make involves some level of pollution," says Yvon Chouinard, Patagonia's founder. "But one of the most surprising things to a lot of us was how damaging conventional cotton really is." To make and deliver a 100 percent cotton shirt requires as much as five gallons of petroleum. In fact, the average so-called "100 percent cotton" product is only 73 percent cotton fiber; the rest is chemicals and resins. "Given what we now know about conventional cotton, there is no going back on this decision, regardless of its impact on the company's sales or profits."

Patagonia is consulting with the Pesticide Action Network (PAN), a global coalition advancing alternatives to harmful pesticides, to draw on its expertise in promoting sustainable agriculture. "When clothing companies buy organic crops, it makes a huge difference in farmers' ability to convert to ecologically sound production, cuts poisonings, and gives consumers a cleaner choice," explains Monica Moore, PAN's North American regional coordinator. Organic farmers try to build a healthy environment for plant growth while reducing the risk of disease and attacks by pests. Water use on organic farms generally declines due to increased soil health and the ability of improved soil with high organic content to hold water. In the United States, certified organic cotton acreage has grown from just 100 acres in 1989 to 15,000 acres in 1994.

Education about problems associated with conventional agriculture and the benefits of sustainable growing practices is critical to promoting change. By educating the public through advertising and promotion of its products, Patagonia can influence consumer buying decisions and the way other companies manufacture their products. Patagonia also has coupled an aggressive employee training program with benefits such as in-house child care and flexible work arrangements. As a result, Patagonia's employees and consumers tend to be on the front line of global awareness and grassroots activism.

The benefits of organic cotton farming make Patagonia's decision clear. The message the company sends is "If we are aware of an environmental problem and can realize a solution, we have an obligation to act."

Consumers and Institutional Stewardship

Many businesses are responding to consumer pressures to use resources sustainably, particularly in the fashion and beauty industry. The International Design Resource Awards Competition rewarded those companies that developed new mass-producible products using materials from recycled or reprocessed materials, as well as markets to promote these products. Award winners include the following:

- ECOSPORT is the nation's first company to produce garments from 100 percent certified organic cotton. It manufactures apparel without bleaching, dyes, or harmful chemicals, thereby reducing the amount of toxins entering the environment. It has created a market for organically grown cotton. Farmers are responding to this need by using new techniques such as hand weeding, mechanical cultivation, crop rotation, planting schedules, mulches, composts, and the use of beneficial insects. ECOSPORT considers itself to be a "benchmark, setting the standard for the apparel industry, and continues to work toward making the Earth a healthier and cleaner place."

- DEJA SHOE is a Portland, Oregon, based company that manufactures footwear using recycled materials, nontoxic adhesives, sustainably harvested plant materials, and leather-free alternatives. DEJA SHOE recently received an award from the U.N. Environment Programme for its "commitment to sustainable development and Earth stewardship and especially for creative and exemplary initiatives in manufacturing products based on principles of waste reduction and sustainable use of the Earth's resources." DEJA SHOE backs its stewardship with a social mission, donating five percent of pretax profits to help support the World Conservation Union's Plants Program of the Species Survival Commission.

- AVEDA, a cosmetic and beauty supply corporation, "is committed to creating products and services beneficial to the consumer and the environment" all over the world. It has formed partnerships with indigenous people throughout the world, and works to promote economic development and cultural awareness among its employees working within these communities. Each year, AVEDA performs an "eco-audit" to determine its environmental performance, initiates aggressive education and training programs for its employees, and promotes an idea exchange with environmental groups to generate new ideas and establish new programs.

- "It's more than how you look," is the creed of SEBASTIAN, a concept-oriented beauty care company dedicated to serving the beauty industry through environmental concern, ethics, and education. SEBASTIAN has developed new hair care products derived from renewable and replenishable rainforest extracts; this in turn has created economic development for the indigenous people of Brazil. SEBASTIAN is also involved in the LITTLE GREEN program, a children's environmental project, and Club U.N.I.T.E. (Unity Now Is a Tomorrow for Everyone), a foundation involved with critical social and health issues. In 1990, SEBASTIAN announced that it would only do business with "responsible" companies. To this end, it has asked clients to sign the following declaration, "I pledge that my company is now, and will continue to be, ecologically conscious and environmentally friendly. I will adhere to and support Sebastian's Environmental Code of Ethics."

These companies each illustrate aspects of sustainability in action. They have demonstrated that environmental and social responsibilities, and profitability, go hand in hand.

Fostering Grassroots Leadership

Surveys indicate that a majority of Americans are convinced of the need for sustainability. They may lack information about sustainable practices, but they find the concept persuasive. They believe in sustainability, and for that reason, many have been initiating action at the individual and community levels. Their efforts are reflected in the success stories documented in this report and give meaning and substantive content to what might otherwise be a vague or abstract concept. Grassroots leadership can stimulate and unleash the creativity and innovation that breathes life into the sustainability movement.

Although some Americans are cynical about government and discouraged about its potential for effective action, there are many positive changes taking place. Success depends upon individual and institutional initiative. Individuals and organizations are often loathe to put into action ideas that they do not themselves originate. Top-down, command and control, stove-pipe strategies are not as effective as relationships which emphasize interdisciplinary teaming, value diversity, and forge strategic alliances and collaborative partnerships at all levels. Government leadership and facilitation can effectively catalyze innovative grassroots leadership and activities, as well as provide coordination for what might otherwise be scattershot or redundant, cookie cutter approaches. As a partnership of public and private leaders -- from all levels of government and the private sector -- the PCSD has aimed to provide leadership in a new manner, and to serve as a new breed of catalyst, facilitator, and coordinator. But what really matters in the end will be the individuals from all corners of the nation -- educators, youth, business leaders and employees, local community leaders, local, state and federal policy makers, and members of the media and other professions -- who will individually and collectively determine whether sustainability is to be our planet's destiny.

Hope for the Future

Encouraging hope for a sustainable future is in part dependent upon continually building awareness and knowledge about sustainability matters into the fabric of individuals and institutions. Sharing information and engaging in open

dialogue in a manner that decreases the likelihood of polarization, and increases collaboration between diverse stakeholders is critical to success. The environmental movement has contributed two very important lessons to the sustainability dialogue. One is to make the issues and the solutions understandable, relevant, and important at a personal level; the other is to make the message and the process for change honest and positive. Applying these lessons has been a powerful force in affecting significant local change on a broad scale; the results are heartening. National environmental groups have learned that local issues are most often responsible for awakening environmental activism. A person's favorite tree being targeted for cutting so that a road can be widened may be enough to transform a passive bystander into an active environmentalist. A parent whose child develops asthma may suddenly exhibit a deep personal interest in air pollution. A homeowner whose neighborhood is slated to be the site of a new industrial facility or sewage treatment plant may seek out an environmental group that is defending property values as a by-product of helping protect the health of the environment. The lesson is that it is easier to assimilate new values if they have direct personal benefits. Another lesson is that the -doom-and-gloom" approach wears thin. Threats of catastrophe become less persuasive over time, especially when the risks are exaggerated or not portrayed credibly. Such negative approaches are less effective than positive ones that incorporate a change in values. If sustainability is to be a persuasive theme, people must find satisfying, alternative values and patterns of behavior. Achieving sustainability depends on motivating people in a positive way to replace non-sustainable practices with sustainable behaviors.

Youth: Our Hope for the Future

Around the globe, more and more youth are becoming aware of, and affected by, environmental issues. As concern for the future grows among the youth of the world -- a group that today represents half of the world's population -- they are becoming a strong voice in the dialogue to raise social consciousness, while increasing environmental protections and global security.

Conferences like the 1994 and 1995 Global Youth Forums, sponsored by the U.N. Environment Programme (UNEP) and S.C. Johnson & Son, Inc. provide a means to build partnerships, share ideas, and work toward delineating and achieving common goals. The 1995 forum was attended by approximately 2,000 youth representatives from over 75 countries who ranged between 8 and 25 years old, each making their own contribution to the conference. Youth presentations included a video encouraging communities to recycle aerosol cans; and highlighted classrooms fueled by alternative energy, youths organizing environmental clubs, establishing an environmental pen pal network, lobbying the government for land for a bird sanctuary, educating homeless families on health and environmental issues, and developing a model for an energy-efficient house. "Every day, young people make decisions that affect this planet, its inhabitants, and its environment," notes Elizabeth Dowdeswell, U.N. Under-Secretary-General and UNEP Executive Director for the 1995 Global Youth Forum. "Young people coordinate and implement projects and programs of tremendous impact in every country on the face of the earth."

At the 1994 Forum, the conference participants ratified Ten Commitments which articulate what they believe needs to be done to achieve a sustainable world. The Ten Commitments focus on: Natural Resource Utilization, Biodiversity, Atmosphere, Water, Energy, Waste, Sustainable Living, Cooperation and Education, Human Rights, and Action. As the rationale for these commitments states, "Ours is a generation unique in the history of our world. Growing up in a reality of ozone holes and global warming, mass extinctions and widespread poverty, we have learned fear, but have confronted it time after time with hope and education... As caring citizens of this planet, we commit ourselves to restoring and preserving our world and to rebuilding our dreams of tomorrow -- pure waters, vast wildlands, clean air and cities free of poverty..." These Ten Commitments were presented, and warmly received at meetings of the United Nations as well as the President's Council on Sustainable Development in January 1995. "Constructing an imaginative and creative scenario for development into the 21st century depends on our faith, our confidence, and our trust in youth."

Bridges to a Sustainable Future

Implementing the recommendations suggested in this report can be effectively accomplished when diverse stakeholders build bridges to attain mutually shared goals. Joint visioning, short- and long-term strategies, and realistic actions to achieve measurable objectives are needed. PCSD is researching implementation strategies for the policy recommendations contained in its report; its most immediate implementation strategy is to disseminate its work as widely as possible. Various venues may be employed, such as enlisting the assistance of national leaders from government, industry, academia, and celebrities from the sports and entertainment industries. Reports are to be posted on PCSD's home page on the Internet.

As the purpose of the dialogue becomes known, various sectors should step forward to meet the challenge of implementing the recommendations contained in the reports of PCSD and its task forces, each of which is a veritable idea bank of activities and success stories for local adaptation. A first step for national groups should be to help recruit leaders from nationwide industry associations, national media, major professional societies, and national nonprofit organizations. It is hoped that these leaders would then enlist the support of their groups in developing appropriate strategies. An immediate initiative should be to recruit champions from local civic groups and businesses who can initiate community "visioning" processes and other grassroots activities. Another early step of national groups should be to explore the impacts of their sector on sustainability and develop plans to mitigate those impacts.

The health care sector has already initiated such activities through the National Association of Physicians for the Environment. Industry has formed the Business Environment Learning and Leadership program, and academia has established the University Leaders for a Sustainable Future. Other sectors, such as the media, advertising, entertainment, and publishing industries, can exert enormous influence by publicizing successful models of sustainability.

Another immediate step, which PCSD is implementing, is to establish linkages with existing global infrastructure that support sustainability. Canada's Learning for a Sustainable Future is a recognized global leader in education for sustainability. PCSD also has reached out to the Canadian National Round Table on Sustainable Development and has learned much from counterparts in Australia and Switzerland. Building bridges internationally will prove as crucial in the long run as forming partnerships within our own borders.

As mid-term strategies, national associations can help spread sustainable practices worldwide by providing training assistance to developing countries in areas important to sustainability, such as environmental technologies. Within the United States, other mid-term strategies might include the revision of tax policies to encourage sustainable practices. A mid-term strategy specific to public linkage and education is to expand professional training for educators in teaching the principles of sustainability; this effort is one in which professional societies, state and local governments, and communities can take the leadership role.

Additional strategies include expanding interdisciplinary research, developing interdisciplinary teaching materials, and publicizing success stories through sustainability awards. These are the kind of strategies that stretch from the near term into long-range goals. Industry's development of eco-efficient production processes is another example of an ongoing strategy, as is the financial community's responsibility to offer enduring support programs in education for sustainability.

A critical component of all strategies, short- or long-range, will be the development of benchmarks that can serve as indicators of success. The North American Association for Environmental Education is working with the World Resources Institute to develop standards for assessing student achievement in education for sustainability; these educational performance standards are one type of benchmark.

Other organizations, such as the World Bank and United Nations, are working to develop indicators that measure progress in sustainable development. John O'Connor, principal author of a recent World Bank report on indicators, notes that significant intellectual retooling for an interdisciplinary approach is needed to develop indicators that are acceptable to disparate disciplines.[2] Economists prefer statistical tables, land managers are accustomed to graphic representations, and still others favor narrative approaches. Finding an acceptable framework of communication across various disciplines is a pressing need. The World Bank considers this mandate to be so urgent that it has developed interim indicators that can be employed by policy makers until an improved, internationally agreed-upon framework is established. As O'Connor notes, even if the Bank's calculations the first time around are only approximations, they are a first step for providing decision makers with an improved basis for assessing policy choices.

In calculating indicators of the wealth of nations, the World Bank concluded that human resources often exceed the sum of the other two components of a nation's wealth: natural resources and manufactured assets. Ismail Serageldin, Vice

President of the World Bank, notes that the organization's findings "suggest that it is time to move beyond the notion that investment is only what is embodied in machinery and buildings. Investment in people, and capacity building in general, is crucial for sustainable development."[3]

By stressing the importance of investing in capacity building -- that is, in education and training -- the World Bank is tacitly recognizing that it is individuals who will determine whether the nations of the world will embark on a sustainable path. It is individuals who will decide whether to act sustainably in their own lives. It is individuals who will influence corporate behavior. It is individuals who will serve as the leaders of communities and nations and help move them toward sustainability.

As individuals, we all need to examine our own lives, decide our priorities, and establish personal benchmarks to judge our progress. In the end, what we do as individuals -- or what we fail to do -- will determine whether humanity begins to live sustainably. One by one, our individual actions will add to the sum total of human behaviors that will determine our collective future.

A National Agenda Supporting Sustainability

"In almost all the natural domains, the Earth is under stress -- it is a planet that is in need of intensive care. Can the United States, the American people, pioneer sustainable patterns of consumption and lifestyle, and can you educate for that? This is a challenge that we would like to put out to you." So said Dr. Noel J. Brown of the U.N. Environment Programme at the 1994 National Forum on Partnerships Supporting Education About the Environment.

To meet this challenge, forum participants -- who included over 100 leaders from government, education, business, and the non-governmental community -- discussed their individual and collective roles, reasons, and opportunities for forming partnerships. The participants realized that, despite their differences, they all shared a common vision: to educate the nation about the benefits of protecting its natural and cultural resources. It was agreed that a blueprint should be developed to explore ways to build effective partnerships to support environmental education and training activities.

Today this challenge has been realized; Education for Sustainability: An Agenda for Action is complete. As a demonstration project of the Public Linkage, Dialogue, and Education Task Force, the document builds on the policy recommendations and actions highlighted in this report by offering implementation options for the future. It presents useful examples of the types of educational partnerships needed to establish an educational infrastructure that successfully places society on a path to sustainability.

APPENDIX A

ENDNOTES

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APPENDIX B

Acknowledgements

This report is about people, and its development was only possible through people -- people who gave generously of their time, knowledge, and resources. The participation of so many individuals and organizations, representing thousands of others, was critical to achieving the goals of the PLTF and PCSD. In this section, we can recognize only a few of those who gave so much to ensure the success of the effort; we extend our sincere thanks to countless others who participated directly and indirectly.

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    - Education Working Group Meeting, Washington, D.C., July 8, 1994;
    - Youth Presentations to the Council, Chattanooga, Tennessee, January 10, 1995;
    - Policy Forum, Ann Arbor, Michigan, February 17-20, 1995; and
    - Sustainable Development Education Roundtable, Washington, D.C., March 24, 1995.

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APPENDIX C

Resource Guide

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