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## Sustainable Solutions

### Chapter Objectives

This chapter will help students:

List and describe approaches being taken on college and university campuses to promote sustainability

Explain the concept of sustainable development

Discuss how protecting the environment can be compatible with promoting economic welfare

Analyze the roles that consumption, population, and technology play in efforts to achieve sustainability

Describe and assess key approaches to designing sustainable solutions

Explain how time is limited but how human potential to solve problems is tremendous

Analyze the role that consumption, population, and technology play in efforts to achieve sustainability

### Lecture Outline

- I. **Central Case: Ball State University Aims for Campus Sustainability**
  - A. Ball State University in Muncie, Indiana, has made sustainability a goal for over a decade and is a leader in the international movement for campus sustainability.
  - B. The **Talloires Declaration** is a statement committing university leaders to pursuing sustainability. This document was composed in Talloires, France, in 1990, and has since been signed by over 350 university presidents and chancellors from more than 40 nations.
  - C. Green initiatives include shifting to recycled paper, purchasing hybrid and biodiesel vehicles, phasing out mercury use, and limiting secondhand smoke exposure.
- II. **Sustainability on Campus**
  - A. Why strive for campus sustainability?

1. Reducing the ecological footprint of a campus can make a difference; the consumptive impact of educating, feeding, and housing hundreds or thousands of students is immense.
  2. Students who care about the environment may wish to persuade others, and campus sustainability efforts are an excellent way to achieve this. This becomes part of a student's broader learning environment.
  3. Students who engage in sustainability efforts learn and grow as a result of the experience, preparing for similar efforts in the broader society.
- B. Campus efforts may begin with an audit.
1. Audits work best when specific changes are quantified. For example: Provide the necessary information about appliance performance.
  2. Once changes are made, track the benefits to the system.
- C. Recycling and waste reduction are the most common campus efforts.
- D. Green building design is a key to sustainable campuses.
1. LEED Certification (Leadership in Energy and Environmental Design) is now adopted by colleges like Ball State University, University of Florida, and Catawba College in North Carolina.
  2. Green design not only includes buildings, but also the grounds surrounding these facilities. Wildlife habitat improvement and edible gardens can also be part of the criteria.
- E. Efficient water use is vital.
1. Water-saving technologies have been installed, and water efficiency projects occur at some campuses.
  2. Retrofitting buildings and upgrading their energy efficiency can also reduce energy use and carbon dioxide emissions.
  3. Students also examine their behaviors, taking shorter showers for example. Water efficiency and conservation indoors as well as outdoors is important.
- F. Efficient energy use is important.
1. Solar energy plays a role on many campuses.
  2. Some institutions invest in renewable energy by purchasing "green tags" to subsidize wind power and other renewable energy sources.
  3. Some colleges, such as Lewis and Clark College in Oregon, have focused on ways to reduce greenhouse gas emissions.
  4. User analysis helps campus managers shut down buildings not in use to redirect energy more efficiently.
  5. Students can also encourage fuel switching to encourage their college or university to adopt renewable energy standards for power needs.
  6. Climate neutrality is now a new goal of several colleges in the U.S.
- G. Dining services aim to let students eat sustainably.
1. Food services can buy organic produce, purchase food in bulk, compost food scraps, and buy locally grown or produced foods.
  2. Some campuses grow food and bake bread on campus. Supporting local farmers through purchasing food grown near the college is another way to make dining sustainable.

3. “Zero-Waste dining” uses biodegradable dining ware that can be composted along with uneaten food.
- H. Institutional purchasing can be influential.
- I. Transportation alternatives are many.
1. Some colleges establish or expand bus and shuttle systems.
  2. Others encourage bicycling, walking, and carpooling.
  3. Some institutions introduce alternative fuels and vehicles to university fleets, including vehicles using electricity or biodiesel fuels.
- J. Campuses are restoring native plants, habitats, and landscapes.
- K. Sustainability efforts include curricular changes.
1. Activities are included that provide hands-on learning experiences for students that include sustainable design and environmental issues.
- L. Organizations are available to assist campus efforts.

### **III. Sustainability and Sustainable Development**

1. One goal is to sustain human civilization in a healthy state.
  2. Another goal is to sustain the natural environment, its species, and its systems in a healthy and functional state.
- A. Sustainable development aims to reach a “triple bottom line” including environmental quality, economic well-being, and social justice.
- B. Environmental sustainability is one of the “Millennium Development Goals” set by the United Nations at the turn of the century. It can enhance economic opportunity as well.
1. One common perception is that environmental protection measures hurt the economy by costing people jobs.
  2. Even as some industries decline, new ones spring up to take their place.
  3. People desire to live in areas that have clean air and water, intact forests, and parks and open space.
  4. Environmental protection need not lead to economic stagnation; it is often likely to enhance economic opportunities. Alternatively, environmental degradation is a major barrier to Millennium Development Goals.
- C. What accounts for the perceived economy-versus-environment divide?
1. Economic development since the industrial revolution has clearly diminished biodiversity, decreased habitat, and degraded ecological systems.
  2. Some people view command-and-control environmental policy as posing excessive costs and restrictions.
  3. Throughout human history we have been free to exploit all natural resources without limits.
  4. Today’s urbanization causes us to overlook the connections between our economies and our environments.
- D. Humans are not separate from the environment.
1. In developed nations and in the large cities of the developing world, it is easy to feel completely disconnected from the natural environment.

#### IV. Strategies for Sustainability

- A. We can refine our ideas about economic growth and quality of life.
- B. We can consume less.
  - 1. Economic growth is largely driven by consumption. This is reinforced by advertisers seeking to sell more goods more quickly.
  - 2. Cornucopian critics often scoff at the notion that resources are limited, but we must remember that our perspective in time is limited—our lavishly consumptive lifestyles are a brand-new phenomenon.
  - 3. Social critics have a word for the failure to achieve happiness from material goods: **affluenza**.
  - 4. We can reduce consumption while enhancing happiness in at least three ways.
    - a. Improve the technology of materials and the efficiency of manufacturing so that industry uses fewer natural resources to produce the same amount of goods.
    - b. Develop sustainable manufacturing that is circular and based on recycling.
    - c. Modify our behavior, attitudes, and lifestyles, and make personal choices that minimize consumption.
- C. Population growth must eventually cease.
  - 1. No population of organisms can continue growing forever.
  - 2. The demographic transition provides reason to hope that population sizes will stabilize and begin to fall.
  - 3. Sooner or later the human population will stop growing, if not through voluntary means, then through war, plagues, and famine.
- D. Technology can help us toward sustainability.
  - 1. It is largely technology that spurred our population increase.
  - 2. Technology can exert either a positive or a negative impact on the environment.
  - 3. Recall the  $I = PAT$  equation from Chapter 8, which summarizes human environmental impact (I) as the interaction of population (P), consumption or affluence (A), and technology (T).  
Technology can either have a positive or negative value on the equation.
- E. Industrial systems can mimic natural systems by recycling and become circular.
  - 1. Natural systems are sustainable; output is recycled into input for the same system or for another.
  - 2. Human manufacturing processes have always been run on a linear model in which raw materials are input and processed, creating a product with one or more usable by-products, with the rest regarded as “waste” in need of disposal. The amount of waste may greatly exceed the product.
  - 3. Given the right technology, many proponents believe that virtually all products can be recycled through entirely closed loops, generating no waste.
- F. We can think on the long term.

1. Businesses may act according to either their long-term or short-term interests.
  2. In 2002, the U.N. Environment Programme conducted analyses to predict the likely effects of a large-scale shift to sustainable development strategies over the next 30 years.
  3. In 2005, a similar review by the Millennium Ecosystem Assessment concurred that proactive protection and management of ecosystems will best maintain ecosystem services, whether the management is locally based or globally based.
  4. An approach that prioritizes security above all else is the only approach that showed a decrease in human well-being.
- G. Many wish to promote local self-sufficiency and a mindfulness of globalization.
1. Many proponents of sustainability believe that local self-sufficiency is important; people tend to value the area and seek to sustain it.
  2. The prominent ecological economist Herman Daly has untangled two distinct sets of ideas that people have often lumped together under the term *globalization*.
  3. Daly calls *internationalization* the process of gaining familiarity with many cultures and the ability to partake in the diversity.
  4. People who view globalization in a negative light generally accentuate certain aspects that Daly reserves for his understanding of globalization. These include the homogenization and displacement of many cultures and worldviews, along with the growing power of large, multinational corporations.
- H. Consumers vote with their wallets . . .
1. Consumers can exercise a great deal of power through what they choose to buy.
  2. Products produced by sustainable methods are labeled as such, so that consumers can make choices and exert power in the marketplace to reward these efforts.
  3. Motivated individuals can often promote institutional change.
- I. . . . as well as with their ballots.
1. Although economic decisions can make large differences, many of the changes that will be needed to attain sustainable solutions are political, requiring policymakers to see them through.
  2. Today's major environmental laws came about because citizens pressured their governmental representatives to do something about environmental problems.
- J. Promoting research and education is vital.

## V. Precious Time

- A. We need to reach again for the moon.
1. John F. Kennedy's proposal in 1961 to send humans to the moon and back had a powerful motivation behind it.
  2. The rapid and historic accomplishments of both the United States and the Soviet Union during the space race show what societies can accomplish when they focus support for a chosen goal.

3. Today's challenge of sustainability is far more important, and there is a real time limit.
- B. We must pass through the environmental bottleneck.
  1. As we decrease the amount of natural capital, we give ourselves and the rest of the world's creatures less and less room to maneuver.
  2. Until we implement sustainable solutions, we will be squeezing ourselves through a progressively tighter space.
- C. We must think of Earth as an island.
  1. As Easter Island's trees disappeared, some individuals must have spoken out for conservation and sustainability. Others ignored those calls, assuming that things would turn out all right.
  2. It would be tragic folly to let such a fate occur to our planet as a whole.

## **VI. Conclusion**

- A. Today we have thousands of scientists who study Earth's processes and resources.
- B. We have access to an accumulated knowledge and ever-developing understanding of our dynamic Earth.
- C. The challenge to our global society today is to support that science and to listen to those scientists, so that we can accurately distinguish false alarms from real problems.
- D. This science is what offers us hope for our future.