Chapter 24

Sustainable Solutions

Chapter Objectives

This chapter will help you:

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 promote economic well-being

Describe and assess key approaches to designing sustainable solutions

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

Lecture/Reading Outline

I. Central Case: DeAnza College Strives for a Sustainable Campus

A. Today, De Anza has become one of the "**greenest**" community college campuses, thanks to the ongoing commitment of students, faculty, staff, and administrators.

B. At De Anza College, sustainability efforts reach back to 1990, when faculty member Julie Phillips established the College Environmental Advisory Group (CEAG) to bring together students, faculty, staff, administrators, and community members.

C. Their years of hard work came to fruition in 2005 with the opening of the Kirsch Center for Environmental Studies, the nation's first **LEED-Platinum** sustainable building at a community college.

D. Five other LEED-certified green buildings grace De Anza's campus, which also has a 1.5-acre botanical garden called the Cheeseman Environmental Studies Area. Here, 12 Californian plant communities are represented, with 400 species of native plants.

E. In 2006, De Anza's administrators signed a **sustainability** policy, promising to commit to green building, select vendors striving for sustainability, and "nurture environmental

stewardship and literacy across the curriculum."

F. The school took another major step in 2007 when it adopted the Sustainability Management Plan that CEAG had spearheaded. This plan helps to identify environmental hazards and health risks, and to prioritize opportunities for addressing them. The plan sought to:

   a. reduce **solid** and **hazardous** waste

   b. conserve **energy** and reduce carbon emissions

   c. conserve **water**

   d. make sustainable **purchasing** decisions

   e. pursue **ecologically** responsible landscaping and maintenance

   f. undertake green building practices in construction and renovation

G. De Anza's **administration**, like increasing numbers of others, has recognized that many of the short-term costs associated with sustainability efforts are actually investments that can save substantial amounts of money in the long term.

H. Despite these challenges, De Anza continues to make strides.

I. All in all, De Anza is providing an inspiring model for other community colleges in California and for colleges and universities nationwide as they strive for campus sustainability.

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 act to advance campus sustainability serve as models for their peers, helping to make them aware of the need to address problems.

   3. The student who engages in sustainability efforts learns and grows as a result. The challenges, successes, and failures that you encounter while working with others as part of a team can serve as valuable preparation for similar efforts in transforming inertia-bound institutions in our broader society.

B. Campus efforts may begin with an audit.

   1. An **audit** provides baseline information on what an institution is doing or how much it is consuming. Audits also help set priorities and goals.

      Students can conduct an audit themselves and present their results to their campus. Alternatively, staff or hired consultants may conduct an audit.

   2. Audits work best when specific changes are **quantified**. For instance, an audit should quantify the performance of individual appliances so

that decision makers can identify particular ones to replace.

3. Once changes are implemented, the institution can **monitor** progress by comparing future measurements to the audit's baseline data.

C. Recycling and waste reduction are common campus efforts.

D. Green building design is a key to sustainable campuses.

1. There need to be agreed-upon standards. For sustainable buildings, these are the ***Leadership in Energy and Environmental Design (LEED)*** standards. Developed and maintained by the nonprofit U.S. Green Building Council, LEED standards guide the design and certification of new construction and the renovation of existing structures.
2. The demand for "green buildings" is growing fast.
3. 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. Water conservation is important.

1. Conserving water is a key element of sustainable campuses—especially in **arid** regions.
2. Water conservation is just as important indoors. Water-saving technologies have been installed, and water efficiency projects occur at some campuses.

F. Energy efficiency is easy to improve.

1. Students are finding many ways to conserve energy.
2. Campuses can harness large energy savings simply by not powering **unused** buildings.
3. At a number of schools, students have distributed thousands of energy-efficient **compact fluorescent bulbs** to their peers and to community members, in exchange for standard incandescent light bulbs.
4. One way to get people to conserve energy is to challenge them with a competition.

G. Students are promoting renewable energy.

1. **Solar** energy plays a role on many campuses.
2. Middlebury College and Minnesota's Macalester College were pioneers in installing wind turbines to help meet their energy needs, but today more colleges are doing so.
3. Some institutions invest in renewable energy by purchasing "green tags" to subsidize wind power and other renewable energy sources.
4. College students have been able to promote greater use of renewable energy off-campus as well. In Michigan and New Hampshire, students successfully lobbied legislators to pass bills promoting renewable energy statewide.

5. Some students even design renewable energy technology!

H. Carbon-neutrality is a major goal.

1. Some colleges, such as Lewis and Clark College in Oregon, have focused on ways to reduce **greenhouse** gas emissions.
2. Today, student pressure and petitions at many campuses are nudging administrators and trustees to set targets for reducing greenhouse emissions.
3. Education and advocacy on climate change is spilling out from campuses into general society in a big way these days.

I. Dining services and campus farms can promote more sustainable food.

1. Our food system is a major source of environmental impact, but campus food service operations can promote more sustainable practices.
2. One way is by cutting down on **waste**, estimated at 25% of food that students take. Composting food scraps is an effective method of recycling waste that has already been created, but tray less dining can reduce waste at its source.
3. Food services can buy organic produce, purchase food in bulk, compost food scraps, and buy locally grown or produced foods.
4. Some college campuses even have **gardens** or **farms** where students help to grow food that is eaten on campus.
5. Sometimes campus garden projects start small and end up growing as interest and demand for the produce increases.

J. Purchasing decisions wield influence.

K. Transportation alternatives are many.

1. Commuting to and from campuses in vehicles accounts for over **half** of the carbon emissions of the average college or university.
2. Some are addressing these issues by establishing or expanding bus and shuttle systems; encouraging bicycling, walking, and carpooling; and introducing alternative vehicles to university fleets.

L. Campuses are restoring native plants, habitats, and landscapes.

M. Sustainability efforts include curricular changes.

N. Organizations assist campus efforts.

III. Sustainability and Sustainable Development

A. Sustainable development aims to achieve a **triple bottom line**. B. Environmental protection can enhance economic opportunity.

1. For too long we have labored under the misconception that economic well-being and environmental protection are in conflict.
2. As we decrease our dependence on fossil fuels, green-collar jobs and investment opportunities are opening up in renewable energy sectors, such as wind power and fuel cell technology.
3. People want to live in areas that have clean air and water, intact forests, and parks and open space. As a result, those regions that act to protect their environments are generally the ones that retain and increase their wealth and quality of life.
4. If we look beyond conventional economic accounting (which measures only private economic gain and loss) and include external costs and benefits that affect people on the whole, then environmental protection becomes still more valuable.

C. We are part of our environment.

1. Several factors may account for the widespread assumption that we cannot simultaneously **protect** the environment and **provide** for people's needs.
   a. For one thing, economic development since the industrial revolution has clearly diminished biodiversity, destroyed habitat, and degraded ecological systems.
   b. For another, many people believe that command-and-control environmental policy poses excessive costs for industry and restricts the rights of private citizens.
2. With natural resources in little danger of running out, people were free to exploit them limitlessly and had little reason to adopt a conservation ethic. Once we established sedentary agricultural societies, and then cities, our environmental impact increased. Yet, at the same time, we become disconnected from the economic/environmental relationship.
3. On a day-to-day basis, it is easy to feel disconnected from the natural environment, particularly in industrialized nations and large cities.
4. Once we learn to consider where the things we use and value each day actually come from, it becomes easier to see how we are part of our environment. And once we reestablish this connection, it becomes readily apparent that our own interests are best served by preservation and responsible stewardship of the natural systems around us.

IV. Strategies for Sustainability

A. We can rethink our assumptions about economic growth.

B. Good quality of life does not require intensive consumption.

1. Economic growth is largely driven by **consumption**.
2. Because many of Earth's natural resources are limited and nonrenewable, consumption cannot continue growing **forever**.

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. Sooner or later the human population will stop growing, if not through voluntary means, then through war, plagues, and famine.
3. The demographic transition provides reason to hope that population sizes will stabilize and begin to fall.

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.

E. Industry can mimic natural systems.
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 amount of 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 promote local self-sufficiency yet embrace some aspects 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. Many advocates of local self-sufficiency criticize globalization.
3. Critics of globalization consider corporations more likely than governments to promote a high-consumption lifestyle and less likely than governments to support environmental protection, so they feel that

globalization will hinder progress toward sustainability.

4. One positive aspect of globalization is the way that people of the world's diverse cultures are increasingly **communicating** and **learning** about one another.
5. Moreover, globalization may foster sustainability because Western democracy, as imperfect as it is, serves as a model and a beacon for people living under repressive governments.

G. Citizens exert political influence.

1. Politically-open democracies offer a compelling route for pursuing sustainability: the power of the vote. Citizens in a democratic republic have the same power, *if* they choose to exercise it.
2. Today's major environmental laws came about because citizens pressured their government representatives to do something about environmental problems.

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. Individuals can multiply their own influence by promoting "green" purchasing habits at their school or workplace.

I. We can think in the long-term.

1. Whatever solutions we pursue, we must base our decisions on long-term thinking, because to be sustainable, a solution must work in the future.
2. Businesses may act according either to long-term or short-term interests. A business committed to operating in a particular community for a long time has incentive to sustain environmental quality. However, a business merely attempting to make a profit and move on has little incentive to invest in environmental protection measures that involve short-term costs.

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 on and support a goal.
3. Today's challenge of sustainability is far more important, and there is a real time limit.

B. 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.

There are no Key Terms for Chapter 24