

# Economics

**Guiding Question:** How is sustainability affected by economics?

## Knowledge and Skills

- Describe two basic concepts of economics.
- Explain the relationship between economics and the environment.
- Describe ways that economies are working toward sustainability.

## Reading Strategy and Vocabulary

**Reading Strategy** Before you start reading, skim the lesson. Look at the headings and the highlighted vocabulary. Skim any charts, tables, and maps. Read the captions for photographs and diagrams. Write down (1) what you think this lesson will be about and (2) what you want to learn from this lesson.

**Vocabulary** economics, supply, demand, cost-benefit analysis, ecological economics, environmental economics, non-market value, market failure, ecolabeling

**BECAUSE PEOPLE RELY** on the resources around them to make products or provide services to earn a living, the environment and economics are closely associated with each other. The word *economic* and the word *ecology* come from the same Greek root, *oikos*, meaning “household.” In its broadest sense, the human “household” is Earth.

## What Is Economics?

**Supply and demand and cost-benefit analysis are two economic concepts that greatly contribute to decision making.**

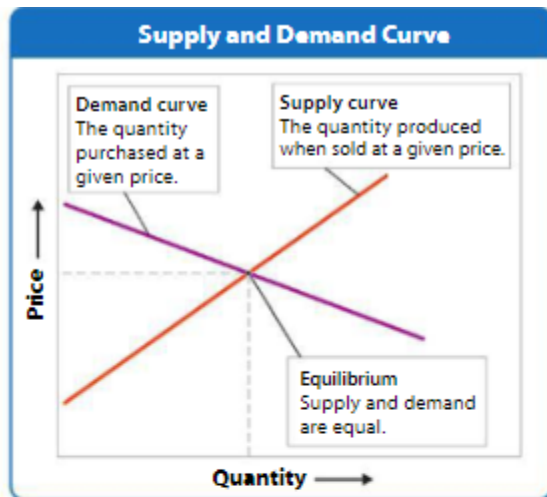
When you hear the word *economics*, the first word that may come to your mind is *money*. But economics also has a lot to do with human behavior and how people interact with nature. **Economics** is the study of how resources are converted into goods and services and how these goods and services are distributed and used. *Goods* are the manufactured materials and products that individual consumers and businesses buy. *Services* are the work that someone or a company does for others as a form of business, such as home repairs.

There are three types of economies. In a *centrally planned economy*, the government decides what is made, how it is made, and who gets what. Socialist and communist governments generally operate this type of economy. In a *free market economy*, individuals decide what is made, how it is made, and how much is made. In a *mixed economy*, both the government and individuals play roles in making these decisions. Almost all modern economies are mixed economies. The degree of government involvement versus individual choice differs from nation to nation. The U.S. economy, for example, leans toward the free market.

Economics is closely tied to decisions that people make every day about their needs and wants. Economists, people who study economics, spend a lot of time examining the factors that influence the decisions of buyers and sellers.

**Supply and Demand** The amount of a product offered for sale at a given price is **supply**. The amount of a product people will buy at a given price if free to do so is **demand**. Sellers aim to sell the most product at the highest price consumers will pay before they turn to other options. When demand is low, the seller may drop the price and slow production. When demand is high, the seller may raise the price and increase production. Under those conditions, the market is expected to reach equilibrium—the point when the amount of product produced is equal to the demand for the product (Figure 1).

**Cost-Benefit Analysis** Decision makers commonly use a method called **cost-benefit analysis** in which they compare what they will sacrifice and gain by a specific action. For example, when a company considers developing a new product, or a city considers improving a transportation system, all of the costs and benefits are considered. If the costs outweigh the benefits, then often the idea will be revised or abandoned. If the benefits outweigh the costs, the action is often pursued. Cost-benefit analyses can be quite complicated and controversial because, as you will learn, not all costs and benefits can be easily identified or defined.



**FIGURE 1 Supply and Demand** In a basic supply-and-demand graph, the demand curve indicates the quantity of a good or service that consumers desire at each price. The supply curve indicates the quantity produced at each price. The market tends to move toward equilibrium, the point at which supply equals demand.

## economics and the environment

**🔗** All economies depend on the environment for resources and for management of wastes, but these connections are often overlooked.

Economies depend on materials from the environment to produce products, and on Earth's systems, such as the water cycle, to handle production wastes. But there are consequences to relying on natural resources and ecological systems in an ever-growing world economy.

### Quick Lab

#### Cost-Benefit Analysis

Maria finishes a jar of peanut butter while making a sandwich. She starts to rinse out the jar so that she can throw it in the recycling bin. But the remaining peanut butter is quite stuck to the inside of the jar. As more and more water flows down the drain, she thinks, "I know that recycling is important, but so is water conservation. At what point should I just throw this jar in the trash?"

#### Analyze and Conclude

- 1. explain** How is Maria's decision similar to the cost-benefit analysis that a company might perform?
- 2. Summarize** In a table, list the costs and benefits of Maria's two choices: continuing to prepare the jar for the recycling bin or throwing it out.
- 3. Pose Questions** Maria decides to research her question. List three questions that Maria should try to answer as she does her research.



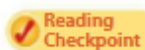
**FIGURE 2 Economic Activity**

Traditionally, economics focused on processes of production and consumption between households and businesses. Traditional economists only considered the interactions that occur in (b). More recently, economists have started to view economies as existing within the natural environment, and consider the interactions that occur among (a), (b), and (c).

**Support From the Environment** Natural resources are the various substances and forces people need to survive, such as the sun's energy, fresh water, trees, rocks, and fossil fuels. We can think of natural resources as "goods" produced by nature. Without these resources there would be no economics. Ecological systems provide "ecosystem services" as they purify air and water, cycle nutrients, and serve as containers and recycling centers for the wastes produced by economic activities.

**Impact on the Environment** When economic activity depletes natural resources or produces too much pollution, ecological systems can be harmed. In return, this will harm economies. For example, what happens to a vacation destination when the local sewage treatment facility can no longer keep up with the waste being generated? Wastes pollute the water, swimming areas are closed, tourists stop coming, and local businesses suffer.

Interactions between economies and the environment, shown in Figure 2, may seem obvious. But, they are not always considered during the cost-benefit analyses discussed earlier. Traditionally, many environmental factors such as beautiful views, fresh air, and clean water don't have a monetary value assigned to them. Some long-held assumptions of economics have led to negative outcomes for the environment.



**Reading Checkpoint**

Briefly describe how economies receive support from the environment and affect the environment.


► **Internal Costs and Benefits** Economists tend to assume that costs and benefits only affect buyers and sellers directly involved in transactions. These factors are known as *internal* costs and benefits. However, beach closures due to Tijuana River pollution lead to economic losses for restaurants and hotels that did not contribute to the pollution. The costs of this pollution are not figured into cost-benefit analyses of new factories opening in Tijuana because their owners will not be paying these costs. Such factors, which involve parties other than a buyer or seller, are known as *external* costs and benefits.

► **Short-Term Effects** Often in planning, short-term costs and benefits are given more weight than long-term costs and benefits. Because many environmental problems unfold slowly, less attention is given to the effects of resource depletion and pollution on future generations.

► **Endless Resources** Economists often do not consider that resources can run out. People may assume that any resource can be substituted with something else. It is true that some resources can be substituted. For example, machines now do work previously done by animals. But some resources, such as fossil fuels, cannot be replaced. Some renewable resources, such as fresh water, can be overused until supply does not meet demand.


► **Growth** Another assumption of economists is that continued growth is required to keep employment high and maintain social order. The rate of economic growth in recent decades has never been seen before. More and more goods are produced and sold. Some argue that because Earth's resources are limited, nonstop economic growth is not sustainable. Others argue that technology will continue to overcome obstacles to economic growth and that growth is sustainable.



 **Connect to the Central Case**

**FIGURE 3 External Costs** Ethically, water pollution poses problems because in most cases pollution from upstream users affects downstream users, who are not responsible for the pollution. **Apply Concepts** Describe how the opening of more factories in Tijuana became a cost for beachfront businesses in southern California.

## Economics and Sustainability

 A new trend in economics is the recognition that suppliers of goods and services need to consider how to conserve resources and reduce harm to the environment.

Can economic growth continue indefinitely with ever-advancing technology, or do we need a more balanced system? An emerging field of economics, **ecological economics**, applies the principles of Earth's systems to economics. These systems, which include complex relationships among living and non-living things, generally have a near-perfect balance of inputs and outputs. Ecological economists argue that history suggests civilizations do not overcome their resource limitations. Many ecological economists advocate economies that do not grow or shrink, but rather are stable and sustainable—like Earth's systems.

Another field, called **environmental economics**, agrees that economies are unsustainable if resource use is not made more efficient. However, these economists argue that economies can become sustainable if environmental challenges are addressed. Some of these challenges include assigning market values to ecosystem services and addressing market failure.

### FIGURE 4 Non-market Value

Keeping in mind non-market values such as those shown here may help people make better environmental and economic decisions.



(a) Aesthetic value



(b) Cultural value



(c) Scientific value

Types of Non-Market Values	
Non-market value	Is the worth we attach to things...
Use value	that we use directly, such as a river for boating.
Option value	that we do not use now but might use later, such as timber in an uncut forest.
Aesthetic value	that we appreciate for their beauty or emotional appeal.
Cultural value	that sustain or help define our culture.
Scientific value	that may be the subject of scientific research.
Educational value	that may teach us about ourselves and the world.
Existence value	simply because they exist, even though we may never experience them directly, such as animals in far-off places.

**Assign Market Values** Ecosystem services provided by Earth's systems are said to have **non-market values**—values not usually included in the price of goods or services. Because many ecosystem services do not have a value associated with them, people tend to exploit them. **Figure 4** gives some examples of non-market values.

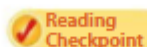
Environmental and ecological economists have developed ways to assign values to services provided by Earth's systems. In one method—surveys—they may ask people to estimate how much they would pay for specific non-market goods, such as clean beaches or preservation of a beautiful view.

Another method is to compare transactions for similar goods or services that only differ because one is associated with a non-market good and the other is not. For example, a comparison could be made of the sale prices of similar homes some of which overlook a woodlot and some of which do not. This comparison could estimate the value of the woodlot.

**Address Market Failure** When markets do not reflect the full costs and benefits of actions, they are said to fail. **Market failure** occurs when markets do not consider the environment's positive effects on economies, such as ecosystem services, or when they do not reflect the negative effects of economic activity on the environment or on people, such as external costs.

For example, smokestacks emit chemicals that may harm trees and pollute water sources hundreds of miles away. Traditionally, the company emitting the chemicals has not been held responsible for these lost resources, cleanup costs, or effects on human health. Instead, another group (usually taxpayers) pays for some of the costs related to the company's activities.

To counteract such external costs, governments sometimes introduce policies that give companies economic incentives to conserve resources and reduce pollution, or that penalize them with taxes or fines for not doing so. These types of policies will be examined more closely in the next two lessons.



Reading  
Checkpoint

*How could addressing market failure help make an economy more environmentally sustainable?*

Your World • Your Turn

### WHAT DO YOU THINK?

Do you think we should attempt to quantify and assign market values to ecosystem services and other entities that have only non-market values? Why or why not?

Examples of Ecolabels	
Ecolabel	Meaning
	The Fair Trade Certified™ standards aim to ensure that farmers in developing nations receive fair prices and encourage sustainable farming methods. TransFair USA, a nonprofit organization, is the certifier of fair trade goods in the United States.
	This seal indicates that a food is produced, processed, and certified to consistent national standards that were developed and are monitored by the U.S. Department of Agriculture's National Organic Program.
	The ENERGY STAR label identifies products that are approved as energy efficient by the Environmental Protection Agency. Purchasing products with this label should lead to lower energy bills, help to conserve energy, and lower greenhouse gas emissions.



**FIGURE 5 Ecolabeling** Ecolabeling allows businesses to promote products that have low environmental impact. These pineapples, grown in Costa Rica, carry a Fair Trade Certified label.

**Changing Consumer Values** Changing consumer values have become a driving force in encouraging corporations and businesses to pursue sustainability goals. Markets are already adapting to the call for sustainable goods and services. For example, manufacturers of certain products explain on their labels how the products were grown, harvested, or manufactured. This method, called **ecolabeling**, tells consumers which brands are made with processes that do not harm the environment. By choosing ecolabeled products, consumers give businesses a powerful incentive to switch to more sustainable processes. **Figure 5** shows examples of ecolabels you might see on products sold in the United States.

**Corporate Responses** As more consumers and investors demand sustainable products and services, more industries, businesses, and corporations are finding that they can make money and improve their public image by supplying the market with these products. Many corporations are finding ways to increase energy efficiency, reduce use of toxic substances, increase the use of recycled materials, and reduce greenhouse gas emissions.

## LESSON 1 Assessment

- Summarize** What is the expected outcome of the relationship between supply and demand? What is the goal of a cost-benefit analysis?
- Relate Cause and Effect** Describe four assumptions traditionally made in economics that can have a negative effect on the environment.
- Infer** What are two benefits that a company can achieve by operating its business in an environmentally sustainable way?
- Explore the BIOQUESTION** Suppose you were developing a survey to determine the non-market value for an ecosystem service in your community. Describe the ecosystem service and list three questions you would put on the survey that would help you determine the value of the service to members of your community.

# LESSON 2

## United States Environmental Policy

**?** **Guiding Question:** How do environmental policies protect the environment?

### Knowledge and Skills

- Explain the purpose of environmental policy.
- Describe the history of U.S. environmental policy.
- Describe the direction of current U.S. environmental policy.

### Reading Strategy and Vocabulary

**✓ Reading Strategy** Before you read, create an outline using the blue and green headings in this lesson. As you read, fill in key phrases or sentences about each heading. If you have a question or an insight, record it on your outline.

**Vocabulary** policy, environmental policy, Environmental Impact Statement (EIS)

**ONCE UPON A TIME** the natural resources of the United States seemed absolutely endless. Settlers who forged into the vast western reaches of the continent probably could never imagine that such careful management of these resources is required today.

Two centuries later, the United States is a much different place. Industrialization made everyday lives easier in countless ways. But it also led to the rapid use of natural resources, pollution, ecosystem degradation, and other problems that affect human health and economic well-being. A challenge of the twenty-first century is maintaining the benefits of industrialization, while both repairing and preventing further damage to the environment.

## What Is Environmental Policy?

**🔑** Environmental policy makes use of science, ethics, economics, and the political process to solve environmental problems.

When a society concludes that a problem needs a solution, it may persuade its leaders to resolve the problem through policy. **Policy** consists of a formal set of general plans and principles for addressing problems and guiding decision making. In particular, **environmental policy** consists of general plans and principles that address the interactions between humans and the environment. Modern-day environmental policy aims to protect environmental quality, protect natural resources, and ensure that resources are shared fairly.

In making environmental policy, government interacts with citizens, organizations, and businesses. Producing effective environmental policy requires input from science, ethics, and economics. Science provides information and analysis needed to identify, understand, and devise potential solutions for problems. Ethics and economics offer criteria to assess problems and to help clarify how society could address them.

The United States provides a good focus for understanding environmental policy in democracies worldwide. It has pioneered innovative environmental policies that have served as models—of both success and failure—for many other nations. Each of the three branches of government—legislative, executive, and judicial—are involved in environmental policy.

**Legislative Branch** A policy enters the realm of the federal government when legislation—a proposed law—is introduced by either the House of Representatives or the Senate. If both houses of Congress pass the bill, its next stop is the executive branch.

**Executive Branch** Legislation is enacted (approved) or vetoed (rejected) by the President. Enacted legislation becomes law and is assigned to an executive agency that puts it into action and enforces it. Dozens of executive agencies influence environmental policy, but a few examples are the Environmental Protection Agency, the U.S. Forest Service, and the Natural Resources Conservation Service.

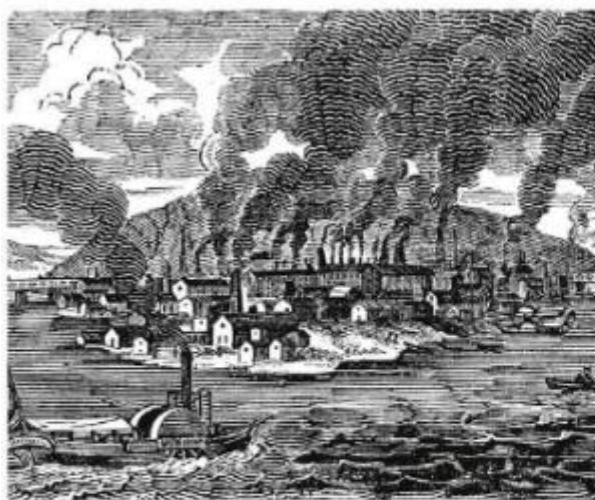
**Judicial Branch** The judicial branch, which consists of the Supreme Court and lower courts, interprets laws. This is necessary because society changes over time and Congress writes broad laws to ensure they apply across the nation. Environmental advocates and organizations use lawsuits as tools to ensure corporations and government agencies comply with laws. Courts also hear complaints from businesses and individuals challenging environmental laws that they feel infringe on their rights.

**State and Local Policy** Important environmental policy is also created at the state and local levels. The structure of the federal government is mirrored at the state level with legislatures, governors, agencies, and judiciaries. However, state laws cannot violate the U.S. Constitution. If state and federal laws conflict, federal laws take precedence.

The strength of environmental policy differs somewhat from area to area. Environmental protection is often considered a great priority in cities, such as Pittsburgh, that have dealt with the impact of human health issues and messy cleanups (Figure 6). California, New York, and Massachusetts are examples of states with strong environmental laws and well-funded environmental agencies. Among states that have not experienced environmental catastrophes, laws may favor development of local economies over environmental protection.

**FIGURE 6 One City's Transformation**

Pittsburgh was once known as the Smoky City because of the air pollution from its steel mills. Its waterways and land were heavily polluted with industrial wastes. Although many problems still persist, the fall of the steel industry and strong local environmental policy have transformed Pittsburgh into a much cleaner and more environmentally friendly city.



(a) Etching of Pittsburgh, 1833



(b) David L. Lawrence Convention Center, a green building in downtown Pittsburgh



# History of U.S. Environmental Policy

Throughout its history, the United States government has re-invented its approach to the relationship between the nation's goals and the environment.

The laws that make up historical U.S. environmental policy can be divided into three periods. The first period ranged from the 1780s to late-1800s, the second period from the late-1800s to mid-1900s, and the third from the mid-1900s to the late-1900s. As you read, note how U.S. environmental policy through these three periods was related to the perceptions and goals of the nation.

**The First Period (1780s to late-1800s)** The laws enacted during this period dealt primarily with the management of public lands—federally owned lands—and accompanied the westward expansion of the nation. U.S. environmental policy of this era reflected the perception that the amount of land and natural resources in the West was endless. **Figure 7** describes some of the important laws of this period.

Western expansion provided settlers with opportunities to be successful, while relieving crowded conditions in eastern cities. However, this expansion was at the cost of millions of Native Americans who were displaced from lands they had long inhabited.

**FIGURE 7** Through the years U.S. environmental policy has changed from promoting land use to protecting and managing resources.

### Land Ordinance of 1785 and Northwest Ordinance (1787)

These ordinances gave the federal government the right to manage unsettled lands.

### General Mining Law (1872)

The act provided land for \$5 per acre and allowed mining to occur subject to local customs with no government oversight.

### Homestead Act of 1862

Citizens could claim 160 acres of public land. After living on it for five years, they could own it for a fee of \$16.



### National Park Service (1916)

Congress created the National Park Service to manage the growing number of national parks and monuments.

1780

1810

1840

1870



**The Second Period (late-1800s to mid-1900s)** Due to the policies of the first period, the West did become more populated, but at the expense of many natural resources that were overused or exploited. Public perception and government policy toward natural resources began to shift. Laws of this period, ranging from the Forest Reserve Act of 1891 to soil conservation laws of the 1930s to the Wilderness Act of 1964, aimed to reduce some of the environmental problems associated with westward expansion. They reflected a new understanding that the West's resources could be used up and required legal protection. The policies of this time eventually led to the national forest system, national wildlife refuge system, and national park system that still serve as global models.

**The Third Period (mid- to late-1900s)** Further social changes in the mid- to late-twentieth century gave rise to the third major period of U.S. environmental policy. America was now an even more densely populated country driven by technology, heavy industry, and intensive resource consumption. Many Americans found themselves better off economically, but living amid dirtier air, dirtier water, and more waste and toxic chemicals. During the 1960s and 1970s several events triggered increased awareness of environmental problems and brought about a shift in public priorities and public policy. Two of these events were the publication of *Silent Spring* by Rachel Carson, and fires on the oil-polluted Cuyahoga River (Figure 8).

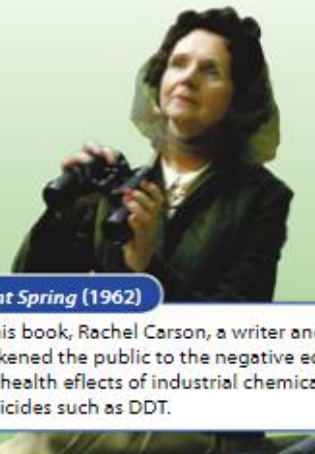


**FIGURE 8 Cuyahoga River Fires** During the 1950s and 1960s, the oil- and waste-polluted Cuyahoga River in Ohio caught fire more than half a dozen times and sometimes burned for days. Events such as this moved the public to prompt the government to do more to protect the environment.



Reading  
Checkpoint

During which period did policy form that would lead to the national forest system and national parks?



**Silent Spring (1962)**

In this book, Rachel Carson, a writer and scientist, awakened the public to the negative ecological and health effects of industrial chemicals and pesticides such as DDT.

**National Environmental Policy Act (1969)**

This act declared that the federal government, in cooperation with state and local governments and the public, would act "to create and maintain conditions under which man and nature can exist in productive harmony."

**Earth Day (1970)**

The first Earth Day, founded by Senator Nelson of Wisconsin, consisted of about 20 million Americans demonstrating their desires for a healthier environment.

1900

1930

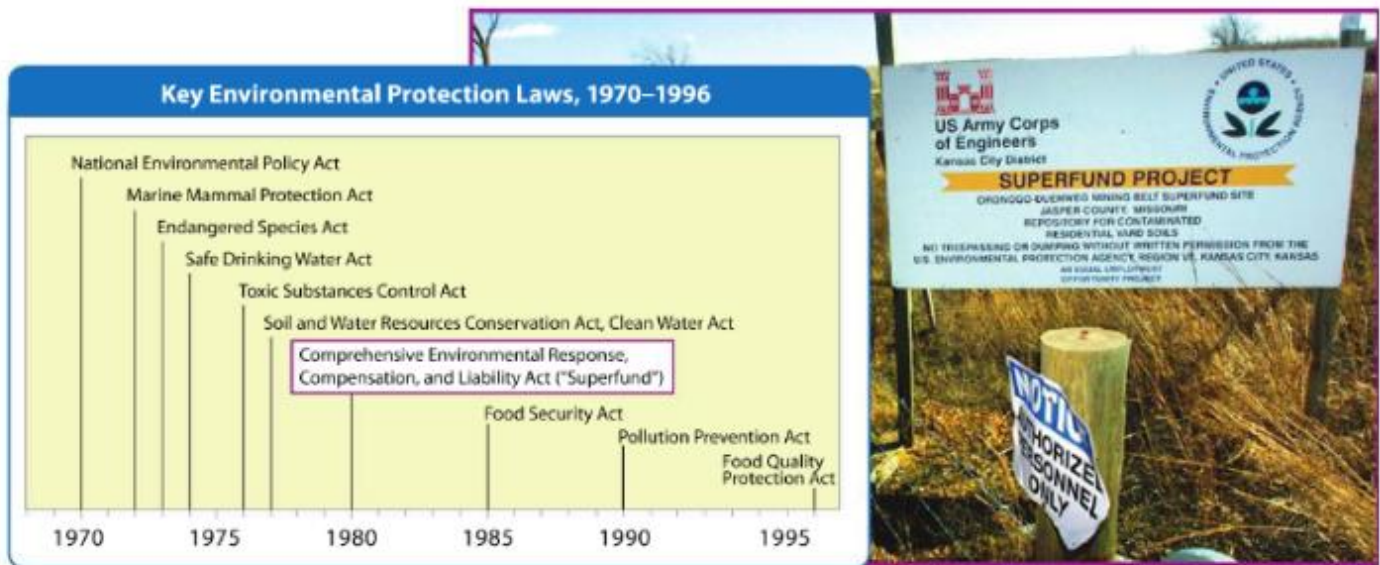
1960

1990

**Emergency Conservation Work Act (1933)**

President Franklin Roosevelt signed this act during the Great Depression. The act gave unemployed men jobs planting trees, fighting soil erosion, and improving wildlife habitats throughout the country.





**FIGURE 9 Key Environmental Protection Laws** Many environmental laws of the late twentieth century focus on cleaning up the environment. For example, the Superfund program identifies sites polluted with hazardous chemicals, such as this mining site in Missouri, and takes action to clean them up.

## Modern U.S. Environmental Policy

**Key Concept** Modern U.S. environmental policy reveals lessons learned from past misuses of resources and strives for a sustainable future.

Today, largely because of environmental policies enacted during the late twentieth century, pesticides are more regulated, and many areas of the nation have cleaner air and water. Examples of key environmental protection laws are provided in **Figure 9**. The public outcry for environmental protection that spurred such advances remains strong today. Such support is evident each year in April, when millions of people worldwide celebrate Earth Day. Since the first Earth Day on April 22, 1970, participation in this event has grown and spread to nearly every country in the world. Besides Earth Day, two other federal actions marked the modern era of environmental policy, the National Environmental Policy Act (NEPA) and the formation of the Environmental Protection Agency (EPA).

**National environmental Policy Act** On January 1, 1970, President Nixon signed the National Environmental Policy Act into law. NEPA created an agency called the Council on Environmental Quality and required that an Environmental Impact Statement be prepared for any major federal action that might significantly affect the environment. An **Environmental Impact Statement (EIS)** requires government agencies and any businesses that contract with them to evaluate the impact of a project, such as a new dam, highway, or building, on the environment before proceeding with the design. EISs involve citizens in the policy process because the statements must be made available to the public for comment.

**environmental Protection Agency** Six months later, Nixon issued an executive order calling for a new approach to environmental policy based on the understanding that environmental problems are interrelated. Now tasks such as regulation of water quality, air pollution, and solid waste that had been divided up among many agencies could be overseen by a single major entity—the EPA.

The EPA is responsible for conducting and evaluating research, monitoring environmental quality, and setting and enforcing standards for pollution levels. It also educates the public and assists states in meeting federal standards.

**Other Important Laws** Ongoing public demand for a cleaner environment resulted in a number of laws that remain key to U.S. environmental policy. For pollution problems like those of the Tijuana River, a crucial law has been the Clean Water Act of 1977. Prior to passage of such federal laws, pollution problems were handled by local and state governments or were addressed through lawsuits. The flaming waters of the Cuyahoga, for example, showed many people that local and state governments weren't doing enough and that federal legislation was needed.

Due to restrictions on pollutants by the Federal Water Pollution Control Acts of 1948 and 1972, and later the Clean Water Act, waterways began to recover. These laws regulate the discharge of wastes, especially from industry, into rivers and streams. The Clean Water Act also aimed to protect wildlife and establish a system for granting companies permits to discharge pollutants on a limited basis.

**Post-1980** The 1960s and 1970s were a time of major advances in environmental reform. At that time, evidence of environmental problems became clear. Also, the political climate was ideal due to a supportive public and leaders who were willing to act.

Starting in the 1980s there was a backlash against these environmental policies. Many felt that some laws imposed too great an economic burden on businesses and individuals. During the next couple of decades, many efforts were made to weaken federal environmental laws.

However, as problems such as global warming and climate change are becoming more evident, the United States and many other nations are now embarking on a new era of environmental policy—one focused on not only cleaning up toxic chemicals, but also on achieving sustainability. Many U.S. environmental policies proposed by the Obama administration and Congress are focused on conserving energy, developing renewable energy technologies, and reducing carbon emissions.



## FIND OUT MORE

Choose a local department or agency that handles the management of natural resources in your area. Find out about the projects the office is currently working and those planned for the future.

## LESSON 2 Assessment

- Synthesize** Draw a cluster diagram that shows how science, economics, ethics, and politics are related to environmental policy.
- Compare and Contrast** Compare and contrast the first period of U.S. environmental policy with the third period.
- Explain** Why do you think that 1970 could be considered the first year of modern environmental policy in the United States?
- THINK IT THROUGH** You are probably familiar with titles that historians have given to specific periods in history such as Pax Romana, the Renaissance, and the Victorian Era. What title would you give to each of the three periods of U.S. environmental policy discussed in this lesson? Explain your choices.

# LESSON 3

## International Environmental Policy and Approaches

**Guiding Question:** How can governments work with each other and citizens to form sound environmental policy?

### Knowledge and Skills

- Identify major international institutions involved in environmental policy.
- Discuss different approaches to environmental policy.
- List the steps involved in the environmental policy process.

### Reading Strategy and Vocabulary

**Reading Strategy** As you read the section under each blue heading, stop and write a brief summary of what you just read.

**Vocabulary** command-and-control approach, subsidy, green tax, cap-and-trade, lobbying

**WE ALL INHABIT** the same small planet. Ocean and wind currents have no regard for each nation's individual environmental policies. The currents move around the globe carrying pollution from one region of the world to another. The planet also has a limited amount of nonrenewable and renewable resources that must be shared for there to be peace. Solving many environmental problems requires creativity and cooperation among nations.

## international environmental Policy

**International organizations, laws, and treaties help governments of the world come to agreement on environmental issues.**

Environmental problems are not restricted to the national borders drawn on maps. Because the laws of one nation have no authority in other nations, international laws are needed to solve issues that involve more than one nation. Following are some examples of environmental issues that involve more than one nation, which are sometimes called *trans-boundary problems*.

- Many rivers flow through more than one nation. Like the Tijuana River, they may carry water pollution across borders.
- Air pollutants that are emitted in one nation may travel on wind currents far across the globe.
- Migrating animals travel across international borders both on land and in the oceans. Over-hunting and over-fishing in one area of the world can affect food availability or the success of a fishing industry in another part of the world.
- Multinational companies operate outside of national laws and may not conserve resources or conduct business in sustainable ways.

International laws may arise from multinational conventions or treaties, such as those mentioned in **Figure 10**. Many international organizations have emerged to help promote problem solving and cooperation among nations. Most of these organizations do not have power to enforce laws, but they can influence the behavior of nations by providing funding, applying peer pressure, or directing media attention toward a problem.



**The United Nations (U.N.)** In 1945, representatives of 50 nations founded the U.N. Now over 190 nations are members. Headquartered in New York City, this organization's purpose is to promote peace and to help solve economic, social, cultural, and humanitarian problems. The U.N. has helped shape international environmental policy. The United Nations Environment Programme, based in Nairobi, Kenya, is an example of a program that promotes sustainable development with research and programs that provide information to international policymakers.

**The European Union (EU)** The EU, which currently consists of 27 member nations, was formed after World War II with the goal of promoting Europe's economic and social progress. The EU can sign treaties and enact regulations that have the same authority as national laws in each member nation. The main objective of the EU's European Environment Agency is to produce thorough, current environmental data and analyses that can be used to guide policymakers.

**FIGURE 10 treaties** When nations sign international treaties, they agree to abide by and enforce the treaties' terms. The figure describes just a few of the many treaties related to international environmental policy.



**FIGURE 11 Non-Governmental Organizations** Conservation International teamed up with a Swiss fragrance company and community members to discourage illegal logging in the Caura River basin of Venezuela.

### The World Trade Organization (WTO)

The WTO, which was established in 1995, promotes free trade and enforces fair trade practices among its member nations. The WTO has authority to impose financial penalties on nations that do not comply with its directives. Critics have charged that the WTO often adds to environmental problems. For example, in 1995, the EPA issued regulations requiring cleaner-burning gasoline in U.S. cities. Brazil and Venezuela complained that the new rules discriminated against their petroleum products. The WTO agreed and the EPA had to change its regulations.

**World Bank** Established in 1944, the World Bank is owned by 186 member nations and provides interest-free credits, low-interest loans, or grants to poor nations for projects that will improve their citizens' living standards. The institution shapes environmental policy by funding projects such as dams and irrigation systems. The World Bank's mission may be admirable, but critics say that in its efforts to help growing human populations in poor nations, it sometimes funds projects that are not environmentally sustainable.

**Non-Governmental Organizations (NGOs)** Many environmental organizations that are not affiliated with governments exert influence over international environmental policy. Groups such as Greenpeace, Population Connection, and Conservation International (shown in Figure 11) attempt to shape policy through research, lobbying, education, and protest. NGOs contribute considerable funding, expertise, and research toward solving environmental problems.



Reading  
Checkpoint

*Make a table with a list of the international agencies that affect environmental policy and a brief description of their roles.*

## Approaches to Environmental Policy

 Approaches to environmental policy may include direct laws from a government body or policies with economic incentives.

Over the years, a great deal of environmental policy throughout the world has used a **command-and-control approach**. With this approach, a government body sets rules and threatens punishment for violations. In the United States, most federal policy consists of legislation from Congress and regulations from administrative agencies. This simple and direct approach to policymaking has given the nation cleaner air, cleaner water, safer workplaces, and healthier neighborhoods. A cost-benefit analysis performed by the White House Office of Management and Budget in 2003 revealed that the benefits of this approach outweighed the costs by even more than people estimated.

Although the command-and-control approach has had many successes, there have also been failures. Sometimes government actions are well meaning, but not well informed, which leads to unexpected circumstances. Policy can also fail if a government does not live up to its promises or if citizens view laws and regulations as restrictions on their freedom.

The most common critique of the command-and-control approach is the argument that companies competing in a free market will produce better solutions at lower cost than the government can produce. To answer this critique, policymakers now often try to combine the approaches of government and of private industries. One example of this alternative approach is ecolabeling, which you read about in the last lesson. Other examples often involve economic incentives for companies such as tax breaks and subsidies.

## Real Data



### Analyzing Plans

The International Boundary and Water Commission (IBWC) constructed and now maintains the South Bay International Wastewater Treatment Plant (SBIWTP) in San Diego County. It treats 25 million gallons per day (mgd) of sewage from the Tijuana River. The first phase of the plant was completed in 1999. A secondary treatment facility that further treats the sewage was needed so that the water released from the plant met the regulations of the Clean Water Act. In 2008, the IBWC compared the costs and benefits of two construction plans—a secondary treatment facility in South Bay or a new facility in Mexico called the Bajagua Project built by a private company.

- Analyze Data** What is one perceived benefit that the private plan has over the IBWC plan?
- Interpret Tables** Under each plan, which nation is the funding source for construction?
- Evaluate** After considering both options, the IBWC decided to move forward with building the secondary treatment facility at South Bay. Considering that the population in the Tijuana area continues to increase, describe one factor that the plans for this facility should take into account.

Comparison of Two Options for Secondary Treatment

	Upgrade SBIWTP	Bajagua Project
Ownership	IBWC	Private/Mexico
Plant Location	San Ysidro, California	Tijuana, Mexico
Capacity	25 mgd	59 mgd
Construction Cost	\$101 million	\$178 million
Estimated 20-Year Cost of Operating and Management (O & M)	\$242 million	\$377 million
Estimated 20-Year Cost of Administrative and Other Fees	\$0	\$187 million
Total Estimated Costs	\$343 million	\$742 million
Funding Source — Construction	U.S. 100%	U.S. 100%
Funding Source — O & M	U.S. 80% / Mexico 20%	U.S. 100%
Estimated Completion Date	January 2011	March 2011

Source: Courtesy of the U.S. International Boundary & Water Commission





### FIGURE 12 Financial Incentives

Companies that build green buildings or that make green changes to existing buildings may receive incentives such as tax breaks. The solar panels and pond seen here are two features of this energy efficient office building in Vermont.

**Tax Breaks and Subsidies** Governments may give tax breaks to businesses or individuals who participate in environmentally friendly actions, such as producing electricity from coal with new technologies that reduce emissions. Lowering their taxes encourages them to continue with the activity.

Governments also may provide subsidies to some industries. A **subsidy** is a giveaway of cash or public resources that is intended to encourage a particular activity or lower the price of a product. Subsidies are often controversial. In the United States, some subsidy money goes to renewable resources. However, enormous subsidies are provided for nonrenewable fossil fuels, road building in national forests for removing trees, and mining on public lands.

**Green Taxes** Taxes imposed on companies that participate in activities or produce products that are harmful to the environment are known as **green taxes**. These taxes are widely used in Europe, but are not as popular in the United States.

Under green taxation, a factory that pollutes a waterway would pay extra taxes based on the amount of pollution it produces. The idea is to give companies an incentive to reduce pollution, while allowing the company to decide how best to do it. One polluter may decide to invest in technologies to reduce its pollution and avoid taxes. Another may choose to pay the green tax. The government could then apply the tax money to the cleanup. A disadvantage of green taxes is that businesses may pass their tax expenses to consumers in product prices.

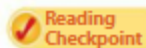
**Cap-and-Trade** In a **cap-and-trade** system, a government determines the overall amount of pollution it will accept for a specific pollutant and issues permits that allow polluters to emit a certain fraction of that amount. These permits then can be bought, sold, and traded among companies, utilities, or industries.

For example, suppose a factory owner has permits to release 10 units of a pollutant. The factory becomes more efficient and releases only five units. Now the owner can sell his extra five permits to another factory that releases more pollution than is allowed. Ideally, this system allows the owner to make money, meets the needs of the other factory, and does not increase pollution levels. In some cases, environmental agencies may buy surplus permits and “retire” them, which reduces pollution.

The cap-and-trade system does not always have positive results in every situation. Although the system can reduce pollution overall, it does allow concentrated areas of pollution to occur around companies that buy extra permits. Critics also say that giving companies permission to pollute will not solve environmental problems in the long run.

**Local Incentives** Many policy tools of local governments involve financial incentives. Local governments may charge residents for waste disposal based on how much waste they generate. Rebates may be given to residents who buy water-efficient toilets and other appliances, because these products will save the town or city money over time.

At all levels of government from local to international, market-based incentives can reduce environmental impact, reduce industry costs, and ease concerns about government regulation. Market-based approaches can be more complicated than command-and-control approaches, but they can lessen environmental impact at a lower overall cost.



*In a cap-and-trade system, what does the term cap refer to and what does the term trade refer to?*



**FIGURE 13 Reducing Acid Rain With Cap-and-Trade** The 1990 amendments to the Clean Air Act called for reduced emissions of sulfur dioxide, a contributor to acid rain. A cap-and-trade system was put into place. The cap-and-trade, along with other factors, led to a 35 percent drop in sulfur dioxide emissions, which protects other trees from the acid rain damage suffered by those in this photograph.

## The Environmental Policy Process

Steps of the environmental policy process include identifying a problem, finding the cause, proposing solutions, getting organized, gaining access to policymakers, and guiding the solution to law.

In constitutional democracies like the United States, it is true that each and every person has a political voice and can make a difference. However, this is not always as easy as it sounds! Individuals who push for a policy must be ambitious, resourceful, and persistent, and must understand how the system works. **Figure 14** on the next page illustrates the steps of environmental policy process.

**1 Identify the Problem** The first step is to clearly identify an environmental problem. Identifying a problem requires curiosity, observation, recordkeeping, and an awareness of the relationship between people and their environment. For example, assessing the contamination of San Diego- and Tijuana-area beaches required an understanding of the ecological and health effects of untreated wastewater.

**FIGURE 14 Policy Process Steps** Understanding the steps of the policy process is an essential element of solving environmental problems.



1 Identify the problem.



2 Identify specific causes of the problem.



3 Envision a solution and set goals.



4 Get organized.



5 Gain access to influential people.



6 Manage drafting of bill and development of policy.

● **Identify Causes** Discovering specific causes of the problem is the next step in the policy process. Identifying causes often requires scientific research. A person seeking causes for pollution in the Tijuana River might notice that pollution became worse once U.S.-based companies began opening factories in Mexico. Much of a scientist's work at this step would also involve risk assessment—evaluating the extent of a problem and judging the risk to public health and the environment.

● **Envision a Solution** Science plays a vital role in proposing solutions to environmental problems. The solutions often involve social or political actions. In San Diego, activists wanted Tijuana to be encouraged to enforce its own pollution laws more effectively. This began to happen once San Diego city employees helped train their Mexican counterparts on keeping hazardous waste out of the sewage treatment system.

● **Get Organized** Once a problem has been identified, researched, and a solution is proposed, it is time to organize. When it comes to getting the attention of elected officials, organizations are generally more effective than individuals. One reason is that organizations are more effective at raising funds that can be contributed to political campaigns. But even small groups and individuals who are motivated, informed, and organized can find ways to get their ideas heard.

● **Gain Access** Now that the group is organized, the next step in the policy process is gaining access to officials who have the ability to sponsor new bills. This is often done through lobbying and campaign contributions. **Lobbying** involves efforts to influence an elected official into supporting a specific interest. Anyone can lobby, but it is more difficult for the average citizen rather than the thousands of lobbyists employed by businesses and organizations. Supporting a candidate's reelection efforts is another way to make one's voice heard.

**Help a Solution Become Policy** Once access to elected officials has been gained, the next step is to prepare a bill that describes the desired policy. Anyone can draft a bill, but a member of the legislature has to introduce it and follow it until it is passed. If it gets through these steps, the bill may become law, but there are still obstacles to its long-term survival. The law may undergo changes once it is passed to the administrative agency that will implement and regulate it.

**Getting Involved** The policy process is long and often difficult. But it has yielded effective results across the nation. However, what can you do if you aren't even old enough to vote? What influence can young people have on environmental policy?

Many national environmental policies began as movements in towns and small cities inspired by one person or a small group of people. Many Web sites such as those for the EPA and the United Nations recommend ways that young people can make an impact on environmental policy from the smallest to the grandest scales. These tasks could include pinpointing a specific way a school could improve energy efficiency, joining a local environmental group, or even taking part in an international meeting like the students in **Figure 15**.



**FIGURE 15 Youth Involvement** In August 2009, about 800 young people met in the Republic of Korea for the Tunza International Youth Conference on Climate Change. They prepared a statement for world leaders attending the United Nations Framework Convention on Climate Change in Copenhagen, Denmark.

## LESSON 3 Assessment

- 1. Explain** In your own words, explain why international environmental laws are needed.
- 2. Compare and Contrast** Compare and contrast green taxes and subsidies.
- 3. Summarize** Describe the environmental policy process, from identification of a problem through enactment of a federal law.
- 4. THINK IT THROUGH** You are the new head of the EPA. New legislation from Congress says water pollution caused by oil spillage from commercial and recreational boats needs to be reduced by 25 percent within ten years. What policy approaches would you pursue to carry out these instructions? Explain your choices.