

## Population and the Environment

In this chapter, you will learn about:

- how population changes and is measured
- theories of population growth
- how population and the environment influence each other

*In 1986, one of the worst catastrophes ever triggered by human technology took place at Chernobyl in northern Ukraine. A nuclear reactor exploded, eventually showering radioactive debris over much of eastern Europe. Normal air circulation carried measurable amounts of radiation as far as Japan and the United States. In many countries, farm animals—even reindeer—that had grazed on contaminated vegetation had to be destroyed, as did milk and crops that had been exposed. An estimated 32,000 people died as a direct result of Chernobyl. Many others suffered serious illness and were unable to work.*

*The role of humans on Earth has always been a subject of debate. As the growing population continues to alter the environment to suit its needs, previously unheard-of problems multiply. Sociologists use both demographics (the study of populations) and ecology (the study of the interactions among living things and their environments) to better understand how this complex process operates and what might be done to address emerging problems.*

## The Changing Population

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### Studying Population

Sociology is the study of human interaction—a complex subject that isn't easily measured quantitatively. One of the areas where sociologists can get meaningful data is in the study of populations.

### Demographics

**Demographics** is the field of sociology that scientifically studies the size, composition, and distribution of populations. It is also concerned with the social factors that influence these variables. The size and composition of a population affect nearly every aspect of people's lives. A sudden change in the population can mean that adequate resources are not available.

**EXAMPLE:** After World War II, men from what would have been five years' worth of freshman classes returned from war to seek education. All at once there were more students on campuses than there was housing available for them.

Other factors that are affected by the size of a population include:

- \* Diet.
- \* Work.
- \* Marital status.
- \* Family size.
- \* Access to medical and social services.

By *composition*, we mean the makeup of different groups within the population being measured. The sizes of different population groups put different kinds of pressure on a society.

**EXAMPLE:** When many dependent people (children, the elderly) are being supported by a smaller number of employed people, people's priorities change.

*Distribution* simply refers to the placement of different populations.

**EXAMPLE:** The elderly in the United States are concentrated in some states—such as Arizona and Florida—and not in others.

### Taking a Census

The practice of counting the population of an entire country is called taking a **census**. Census taking has gone on for thousands of years.

**EXAMPLE:** In ancient China, government officials counted people for the purposes of taxation, military service, and to determine how many people were available to build the Great Wall.

### Census Data and Vital Statistics

The census in the United States has been taken every ten years since 1790. Because it is used for everything from assigning congressional seats to locating businesses, accuracy is important. States get certain funds from the federal government based on their demographics, so recent censuses have made a particular effort to count people who would normally be missed, such as the homeless.

Compiling census data involves more than “counting noses.” Different segments of our society have urged the government to collect demographic data that can help:

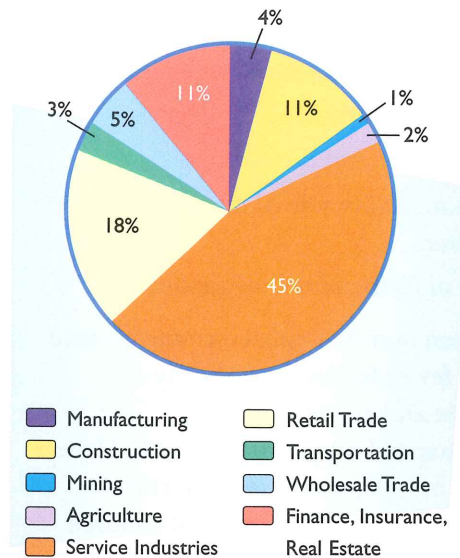
- \* Legislators enact social policy.
- \* State and local governments plan for new school construction.
- \* Educators anticipate changes in the school population that require more or fewer teachers, or teachers with special skills.
- \* Business people locate shopping malls, factories, and distribution centers.
- \* Health care providers locate clinics and hospitals and plan for the needs of future populations.

The data gathered in our modern census include a wealth of information on age, sex, education, occupations, ethnicity, and types of residence. During non-census years, more information is gathered on many other facets of society. The graph on the right shows the distribution of workers in various sectors of the economy. It is based on data collected between the 1990 and 2000 censuses.

In addition to the information gathered in a census, other information comes from **vital statistics**. These are records of births, deaths, marriages, divorces, and migration from one region to another.

The United Nations collects global demographic statistics. In 2000, the world’s population stood at just over 6 billion people. Through the UN’s efforts, we can compare demographic data from different countries and understand worldwide trends.

### U.S. Business Distribution



Source: U.S. Bureau of the Census

### Population Change

Factors that change the population include births, deaths, and migration.

#### Births

When demographers study birth rates, they look at **two** factors:

1. **Fertility**—the actual number of children born per woman between the ages of 15 and 44, which are considered the child-bearing years.
2. **Fecundity**—the potential number of children that could be born to the average woman of childbearing age.

The economy, health, and customs of a population generally determine the difference between the fertility and fecundity rates.

The birth rate of most industrialized nations is less than 20 per 1,000. Agricultural nations typically exceed 30 per 1,000. In poor countries, women have more children for **three** reasons.

1. Custom.
2. High mortality rate of infants and children.
3. Lack of birth control information.

Women in industrialized countries tend to have fewer babies for a variety of economic and cultural reasons.

The map below, published by the United Nations in 1997, shows world fertility patterns (the average number of children per woman).

### Deaths

**Mortality** (or *death*) **rate** is the number of deaths per year for every 1,000 members of a population. The relative number of

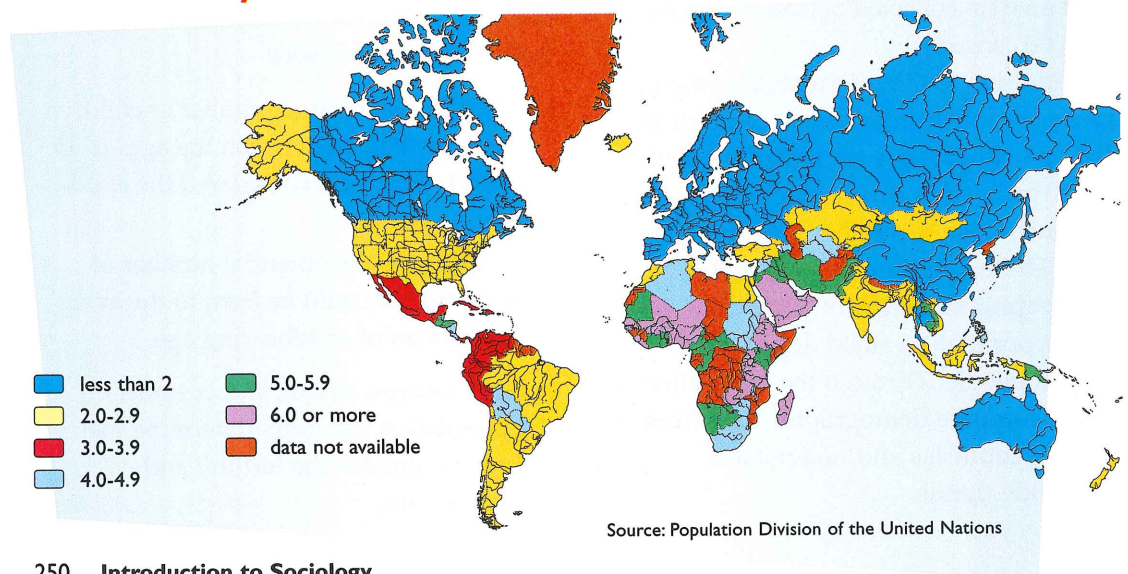
young and older people in a population influences its death rate, so the death rate by itself isn't a good measure of health and living conditions. Important are **two** other measures:

1. **The infant mortality rate**, which describes the number of deaths among infants less than a year old for every 1,000 live births. This ranges from about 13 in developed countries to 70 for developing nations.
2. **Life expectancy**, which is the average number of years the average infant born into a population can expect to live.

Factors influencing these rates include:

- \* Medical practices, such as the availability of immunizations and vaccines.
- \* Economic conditions and the standard of living.

### World Fertility Rates



## Migration

**Migration** refers to the movement of people from one geographical location to another with the intent of establishing a new residence. People migrate for many reasons. Factors that *push* people away from a country or a region include:

- \* Social upheaval.
- \* Lack of jobs.
- \* Lack of religious or political freedom.
- \* Natural disasters such as floods or drought.

Factors that *pull* people to an area include:

- \* Enhanced economic or social opportunities.

- \* The locale itself, including climate or geographical features.

Migration can be internal or international. Knowledge of the following **three** terms will help you understand data about migration:

1. **Immigrants** are people who migrate into a country.
2. **Emigrants** are people who migrate out of a country.
3. The **migration rate** is the difference between the number of immigrants and emigrants in a society.

### Did You Know?



#### Migration Trends

Around the world, migration trends have played a major part in changing the populations of many countries—increasing or decreasing populations and changing the cultural makeup.

- \* During the late 1800s and early 1900s, more than 28 million Europeans emigrated to the United States. In those years, more than 14 percent of U.S. residents were foreign-born.
- \* Since its establishment as a nation in 1948, the population of Israel has grown 24 percent a year. By 1980, more than

42 percent of Israel's residents were foreign-born.

- \* Today, there is a worldwide mass movement away from underdeveloped countries and toward countries with greater economic opportunity. This is owing to **two** technological changes:
  1. The information revolution allows people to see what life is like elsewhere.
  2. The transportation revolution makes it easy for people to travel long distances.

## Forms of Migration

A country permits immigration only when a person meets certain conditions.

Countries restrict immigration in order to preserve resources and limit demographic changes that might alter their own standard of living. Immigration laws in the United States set restrictions on the number of people who can enter legally. Quotas are set for the numbers admitted from each country or region. Preferences are given to people who have family members here.

Sometimes people must be able to show they can find employment. Criminals are not admitted, with the exception of those whose "criminal record" is based on imprisonment for political beliefs.

**Refugees** are people who flee a region because of its dangers.

**EXAMPLES:** People who leave an area destroyed by a volcano's eruption, those escaping floods, earthquakes, or a region torn by warfare.

Across  Cultures

## Refugees and Asylum Seekers

At the end of 1998, the world's population of refugees, asylum seekers, and internally displaced persons totaled more than 30.4 million people. Nearly half of those people were:

- \* People fleeing the bloody civil wars in Sudan (4.3 million).
- \* Palestinians (3.8 million).
- \* Afghans (2.6 million).
- \* Iraqis (1.5 million).
- \* Colombians (1.4 million).

Nearly two-thirds of all refugees worldwide go to Middle Eastern or African countries. Eighty percent of all the uprooted people in Africa seek protection in countries that are themselves experiencing internal conflict.

In Europe, countries have been criticized for turning away those seeking asylum. Since the late 1980s, European countries have had a policy that prevents refugees and asylum seekers from choosing the country to which they migrate. According to this policy, refugees must seek protection in the first "safe" country they enter. Thus, a Kosovo Albanian woman who crosses Hungary and Austria (both considered "safe") before asking for asylum at the German border can be refused, even though she is seven months pregnant, traveling with two small children, and her husband is already in Germany. Critics say that such cases should be decided on an individual basis.

Some refugees seek **political asylum**. They can't or won't return to their country of nationality because of persecution. In many countries, a person's race, religion, nationality, or membership in a particular social group makes him or her the target of government oppression. Persons requesting asylum fear physical brutality, jail terms, and often death.

**Illegal aliens** are people who enter or remain in a country without permission. In 1996, it was estimated that there were about 5 million illegal aliens in the United States, more than half of whom came from Mexico. About 40 percent of the illegal aliens had entered the country legally on a temporary visa, but did not leave when the visa expired.

## Population Growth and Society

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As populations increase, societies face challenges in providing for the needs of the greater numbers of people. Throughout history, major changes in population have been among the greatest challenges facing civilizations.

### World Population

In 1750, there were about 800 *million* people in the world. By the year 2000, there were more than 6 *billion* people on Earth. Nearly 15,000 children are born

each hour and about 6,200 people die. Several factors that have contributed to this rise in population include:

- \* Technological changes in agriculture that have made food more plentiful.
- \* Improved medical care that has reduced infant mortality rates and cured many adult diseases.
- \* Improved economic conditions that make food and sanitation available to greater numbers of people.

### Growth Rate and Doubling Time

A population's **growth rate** is the difference between the birth rate and the death rate, expressed in annual percentages. If the growth rate is zero, the same number of people die as are born in a year. Growth rate is closely related to fertility rate.

The rate at which a population is growing is often expressed in how long it will take for the population to double. A country with a growth rate of 1 percent doubles in size in only 70 years.

#### EXAMPLES:

- \* Kenya's population, with a growth rate of 4.2 percent, will double in just 24 years if it continues growing at that rate.
- \* If the current growth trend continues, more than 80 countries will double their populations in 30 years or fewer.
- \* At current rates, the world's population will double in the next 50 years.

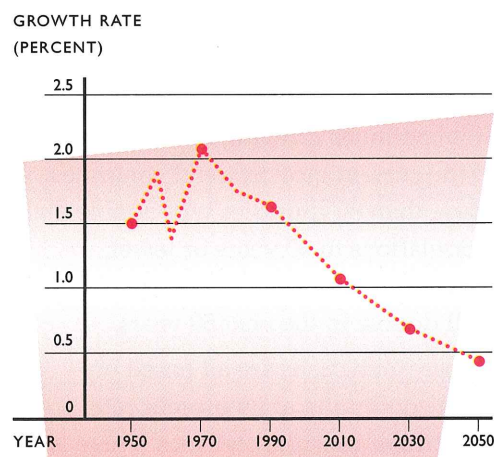
Those predictions are all based on growth continuing at its present rate. You must always question statistics. There are reasons why growth may not continue.

A number of different methods are used to predict the growth rate in the future. Both the United Nations and the U.S. Census Bureau currently project that the growth rate of the world population, now 1.3 percent, will decline over the next 50 years, as the chart below shows.

### Challenges of Population Growth

Some observers of world population growth worry that the number of people in the world may someday outstrip the world's resources. Certainly, in some regions, local resources cannot sustain populations. Years of drought may create famine and bring death to populations, particularly those in desert regions. Overcrowding causes rats to go berserk, and it has had a similar effect on some urban populations from time to time.

### Projected World Population Growth Rate



Source: U.S. Bureau of the Census, International Data Base

In 1968, biologist Paul Erlich wrote a bestseller, *The Population Bomb*. In it he warned that not only would population growth lead to widespread food shortages, but also that air and water would become so polluted that life could not be sustained. These are certainly problems to consider seriously. But Erlich also warned that by 1985, there would be worldwide famine, life expectancy would decrease to only 42 years, and the U.S. Midwest would become a vast desert!

Several factors encourage a belief that the challenges of growth can be met:

- \* Food output is rising significantly, particularly in Asia and Africa.
- \* Food prices worldwide are coming down.
- \* Technology to make ocean water drinkable and usable for irrigating crops is available now, and wide-scale use is foreseeable.
- \* Abundant energy resources—such as solar energy and radioactive minerals—have not yet been tapped to any real extent, and new technologies may one day do so.

There are, to be sure, serious social problems of poverty, starvation, environmental degradation, and pollution in the world. Many argue, however, that these are not the result of too many people but of warfare and of oppressive governmental practice or neglect.



## Population Growth and Economic Development

Historically, it has been the case that with industrialization have come reductions in birth rate and the emergence of small families. This has not only been true in Europe and North America, but in other parts of the world as well. Several reasons for smaller family size have been proposed:

- \* People feel secure and do not feel the need to have children to take care of them in old age.
- \* People do not need as many hands to do the work as they did in a preindustrial age.
- \* People do not need to offset high infant mortality rates.

Societies that have high levels of education and high standards of living, and that protect women's rights as well as men's, have lower birth rates.

In most countries, parents decide how many children to have. In some societies, governments try to influence birth rates by providing economic advantages to families who have fewer children. Governments may also use coercion, requiring a license for each new child and punishing couples who disobey.

For the last 20 years of the last century, China enforced a one-couple, one-child policy. As China's population neared the one billion mark, abortions, forced sterilization, and very significant fines were imposed on families who did not respect the policy.

## Population Growth in the United States

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Population in the United States has been growing since the first census. Although the birth rate is decreasing, immigration continues to increase the total population.

### Historical Background

The first U.S. census in 1790 counted 3.9 million people. That number almost doubled in the next 20 years and reached 9.6 million by 1820. By 1900, there were more than 76 million people in the United States.

It took 50 years for the population to double again, although the growth rate dropped to an all-time low, roughly 0.5 percent, during the depression years of the 1930s.

Following World War II—in the late 1940s and the 1950s—the number of marriages and babies jumped dramatically. Soldiers returning from the war married, and people felt safe to get on with their lives. Baby boomers—people born between 1945 and 1964—have had and continue to have a significant effect on every aspect of society, from values to shopping to television programming.

When the "boomers" had their children, a smaller, but significant, rise in birth rate occurred. This is sometimes called the "baby boom echo." During the 1990s, the growth rate fell below 1 percent, but the population continued to increase because of the large number of young people. The 2000 population of over 275 million people is expected to climb to nearly 350 million by 2050.

## Trends

Although the U.S. population is expected to grow in the near future, the birth rate is decreasing for **three** main reasons.

1. **Economic Factors.** To maintain their standard of living, many couples choose to have a small family.
2. **Lifestyles and Values.** Due to more economic opportunities, women are delaying marriage, limiting the number of children they have, or choosing to remain childless. Large families are no longer necessary to assure that a family survives.
3. **Birth Control.** U.S. families have the education and access to information to help them choose the number of children they have. The government has been spending over \$100 million a year to support family planning.

The **replacement rate** is the fertility rate required to replace the parents—generally set at 2.1 children per family to account for early mortality. The fertility rate in the United States at the end of the 20th century was 1.99, below the replacement rate.

Immigration will continue to increase the population. The Census Bureau estimates that legal and illegal immigration will account for about half of the United States' increase in population after the year 2050.

## The Environment and Society

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Humans depend on the environment for air, food, water, and other resources to sustain life. Early people had little control over their environments. Technology has enabled humans to change the environment. In recent times, people have begun to realize the cumulative effect of those changes.

### Ecology and Human Behavior

**Ecology** is a branch of science that studies the relationship between living things and their natural environment. An **ecosystem**, such as Earth, is a self-contained community of organisms that depend on one another and their environment for survival.

When the human population of Earth was small, resources seemed endless. As populations increased and industrialization developed, people and their machines demanded more energy and resources. People are now aware that:

- \* Natural resources are limited.
- \* Nonrenewable resources, such as oil and coal, cannot be replaced.
- \* Renewable resources, such as trees, must be used carefully and their replacement must be planned.

In understanding the effects of a group of people on the environment, it is not enough just to know how many there are. We also need to know how crowded the people are in a specific location. Six million

people spread over 1,000 square miles will have a very different effect from that of the same 6 million in 50 square miles.

**Population density**—the number of people in a given area—plays an important role in how quickly resources disappear. In 2000, New York City had a population density of over 24,000 people per square mile. Hong Kong had 270,750 people in the same space!

In every ecosystem, there is a limit to the population of each organism that can be sustained by available resources. This limit—the maximum number of organisms resources can support—is called the **carrying capacity**.

## Environmental Concerns

Among the many concerns of ecologists are the loss of biodiversity and habitat, species extinction, depleted resources, and the pollution of existing resources, such as air and water.

### Biodiversity

The number of species that share the planet with humans has been estimated at between 3 and 30 million. Fewer than 2 million of those have actually been identified. **Biodiversity** is the term given to this rich variety of life forms. Biodiversity is valuable to humans for many reasons.

#### EXAMPLES:

\* **Genetic diversity** enriches agriculture by producing disease-resistant and high-yielding crops.

\* **Species diversity** supplies new medicines and the resources to produce new products.

\* **Ecosystem diversity** provides “ecological services,” by keeping the water clean, producing oxygen, and preventing soil erosion.

Of equal importance, biodiversity enriches a human’s psychological environment, inspiring wonder, curiosity, and respect.

### Habitat Loss

The habitat in which an organism lives is critical to its survival. As human populations increase, many habitats are destroyed, diminished, or so altered that native species can no longer survive.

**EXAMPLES:** In the last 200 years, 53 percent of the wetlands in the United States have been drained and converted to agricultural or commercial land. Seventy-eight million acres of tropical forest are similarly destroyed each year to increase agricultural land or provide resources.

As habitat is destroyed, some species become extinct. Species extinction is a natural process, but it is estimated that human-caused extinction occurs at 1,000 times the natural rate. Between 10 and 20 percent of all species are projected to become extinct in the next 20 to 50 years. Many of those species have never even been identified.



### Lake Victoria—A Case Study

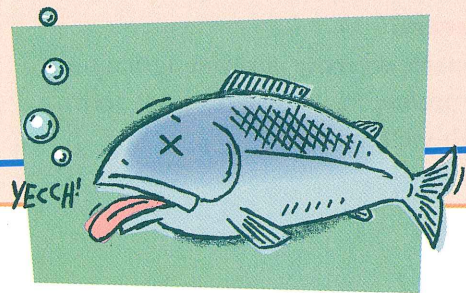
Lake Victoria in Africa is the second largest lake in the world. Surrounded by Uganda, Kenya, and Tanzania, the lake is about the size of Ireland. In 1858, the lake was home to more than 500 species of freshwater fish. Four hundred species of cichlid, a small fish, provided 200,000 tons of protein a year for residents. Today, researchers from around the world are trying to keep the lake from dying.

- \* In the 1860s, a railroad was built into the area. Vegetation around the lake was cleared to plant tea, coffee, and sugar. Agricultural chemicals began washing into the lake during the rainy season. They provided nutrients for unwanted algae.
- \* Plantations attracted migrant workers. Overfishing became a problem.
- \* Officials introduced new fish species, including the Nile perch, to remedy the overfishing problem. Nile perch typically grow to several feet and 100 pounds. Commercial fishing fleets and processing plants were introduced to catch and package this new cash crop.
- \* By 1980, over 200 species of cichlid had been eaten to extinction. The many species of cichlid served a wide range

of functions within the ecosystem, functions that the new fish did not perform. For example, disease-carrying snails, once controlled by the cichlids, increased rapidly in number.

- \* Water hyacinths, another human introduction, multiplied rapidly, choking harbors. By late 1998, nearly 1 million acres of the surface on the Kenyan side of the lake were covered with plants, and the water hyacinth population doubled every two weeks.
- \* Two hundred thousand tons of fish are exported annually, yet local villagers are threatened with malnutrition.
- \* Among other programs, researchers are now breeding many species of cichlid in aquariums, looking for ways to kill and control the water hyacinths, and working with local governments to educate the people.

Humans have a choice. They can change themselves to suit the environment, or change the environment to suit themselves. Lake Victoria is an example of what can happen when people make the second choice.



## Resource Depletion

Overpopulation can lead to the depletion and eventual shortage of many natural resources, some of which cannot be renewed.

### Deforestation

- \* Logging and clearing land for agriculture is depleting forest habitats at the rate of 2.4 acres per second.
- \* Seventy-eight million acres of rainforest are destroyed each year. Tropical rainforests cover only 7 percent of Earth's surface, but contain as much as 80 percent of Earth's plant species.
- \* Thailand, which once had 435,000 acres of forest, now has only 22,000. At the current rate, this will be gone in fewer than 4 years.

### Desertification

- \* As forests are lost, soil washes away; 26 billion tons of topsoil are lost per year.
- \* For every ton of grain produced in the United States, 6 tons of topsoil are lost.
- \* It takes between 100 and 1,500 years to replace an inch of topsoil.

### Water Shortages

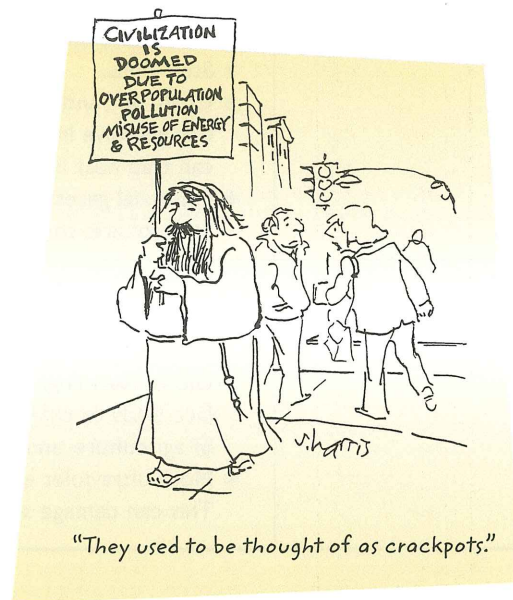
- \* The amount of water available today is the same as it was when humans first inhabited Earth. It is self-renewing and will not run out.
- \* Fresh water makes up only 3 percent of all water, and only 1 percent of that is easily accessible.
- \* Until we learn to convert sea water to fresh water in sufficient quantities for our needs, we must conserve fresh water.

## Metals and Fossil Fuels

- \* If present rates continue, the world's supply of lead, silver, tungsten, and mercury will be depleted in 40 years.
- \* If present rates continue, the global supply of oil will be depleted in 50 years.
- \* Solar power and wind power are available as sources of energy to replace fossil fuels, but the technology to use them affordably on a large scale has not yet been developed.

## Pollution

In addition to causing shortages of resources, humans influence the environment by polluting air, water, and the land. As humans consume more, they produce more, creating more waste. Nature has mechanisms for transforming some of those wastes, but others, such as dioxin and radioactive waste, are not recycled by natural processes. These result in pollution.



The chart below describes the effects of common types of pollution.

### Our Environmental Future

Here are some ways people are addressing the issues.

#### Habitat and Species Loss

The United States has laws against the destruction of prime habitat and/or endangered organisms. Around the world, many countries have passed similar legislation or have agreed to address the issue. However, illegal poaching and traditional practices still threaten many species.

#### Depletion of Resources

Six kinds of ways to address this issue have been found to work. The first three are already happening in U.S. society.

1. Conservation.
2. Recycling.
3. Development of new technologies.

We can look beyond our borders for other solutions. Most European countries consume much less energy than the United States while maintaining a high standard of living. These countries encourage people

Pollution	
Type of Pollution	Air Pollution
<b>Sources</b>	<ul style="list-style-type: none"> <li>* The automobile—it accounts for at least 80 percent of air pollution.</li> <li>* Power-generation facilities.</li> <li>* Refineries.</li> <li>* Chemical plants.</li> <li>* Steel mills.</li> <li>* Coal-, oil-, and wood-burning, which release acid-producing chemicals that dissolve in water and can produce acid rain and carbon dioxide that can trap heat in the atmosphere and cause the “greenhouse effect.”</li> <li>* Industrial gases, including those used in aerosol containers, that destroy atmospheric ozone.</li> </ul>
<b>Effects</b>	<ul style="list-style-type: none"> <li>* Irritated eyes, noses, and throats.</li> <li>* Erosion of buildings, destruction of crops, and the “death” of some lakes and rivers.</li> <li>* Global warming. An increase in the average temperature at Earth’s surface leads to changes in weather patterns, a rise in sea level, disruption of agriculture, and stress to ecosystems.</li> <li>* More ultraviolet energy from the sun entering the atmosphere. This can damage skin and some crops and wild plants.</li> </ul>

to drive smaller cars, lower their thermostats, and insulate their homes by offering:

4. Tax credits.
5. Government subsidies.

In addition, not only because its production consumes resources, but also because it adds to pollution, we could:

6. Discourage disposable packaging.

## Pollution

Fighting pollution is possible, but it is expensive. One reason SUVs became popular is because they were classified as

light trucks and did not have to meet the same emission standards as cars. Therefore, they did not have expensive equipment to control emissions, and buyers could get more car for the money.

Antipollution laws are controversial. Manufacturers don't like them because they increase their costs of doing business.

Workers fear that the laws threaten jobs. How? When a business's costs rise, the officers look for ways to lower them. Often they reach their goal by laying people off or by relocating their plants to regions or other countries where everything—including

Water Pollution	Land Pollution
<ul style="list-style-type: none"> <li>* Runoff from agriculture—it's the single most important cause of water pollution.</li> <li>* Industrial discharge—including chemicals used or produced in processing paper, textiles, metals, oil, and petroleum.</li> <li>* Domestic wastewater and raw sewage.</li> <li>* Accidental oil spills and the regular dumping of fuels into the oceans during the cleaning of ships' tanks.</li> </ul>	<p>Solid waste from:</p> <ul style="list-style-type: none"> <li>* Agriculture.</li> <li>* Mining.</li> <li>* Industry.</li> <li>* Cities (only about 1.5 percent of the total).</li> <li>* Spent nuclear fuels.</li> </ul>
<ul style="list-style-type: none"> <li>* Poisoning of humans and animals.</li> <li>* Increased algae growth in lakes and streams, which eventually kills other organisms.</li> <li>* Disease among the half the world's population that lacks sanitary facilities. More than a third suffer from water-related diseases.</li> <li>* Death of ocean plants and wildlife.</li> </ul>	<ul style="list-style-type: none"> <li>* Landfills are rapidly filling. Runoff from poorly designed landfills can pollute water sources.</li> <li>* Air pollution from incomplete incineration.</li> <li>* Illness from disease-carrying insects that thrive in the open waste dumps of developing countries.</li> </ul>



## U.S. Culture Connection

### Noise Pollution

In the 18th century, a crier shouted a fire alarm from the top of a watchtower in the center of town. Today, fire vehicles in large cities must use ear-splitting sirens to be heard. This type of pollution is often overlooked. In many cities, the rumble of trucks, honking horns, jackhammers, air conditioners, factory noises, and even boom boxes have polluted the air as seriously as smog.

The World Health Organization (WHO) lists many physical and psychological problems caused by noise:

- \* Hearing impairment and ear pain.
- \* Speech interference.
- \* Sleep disturbances.
- \* Cardiovascular effects.
- \* Performance reduction.
- \* Psychological stress and annoyance.

These, in turn, can lead to reduced productivity, decreased learning, absenteeism, increased drug use, accidents, and the lowering of property values.

In the United States, laws regulate noise near airports and in factories, but even the noises in some operating rooms are enough to produce physical and psychological damage. A single loud sound can rupture the eardrum and continued exposure, even to loud music, can produce permanent damage in some frequencies.

Rural areas also suffer. Unacceptable noise levels can be produced by snowmobiles and agricultural machinery. WHO recommends stiffer noise-reduction laws as well as increased education of the public on the dangers of noise pollution.





labor— is cheaper. Also, workers fear people will not buy products as their prices rise to absorb the increased expense, and, again, layoffs can result if sales plummet.

Finally, consumers worry that prices will rise. They will have difficulty buying things they need and want when prices go up.

But everyone is in favor of clean air and a clean environment. It takes people with good ideas and good people skills to find solutions. Negotiation will be necessary to resolve these conflicts. Can we do it?

What do you think?

## Chapter 13 Wrap-up

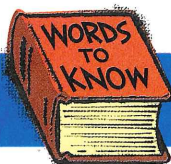
### POPULATION AND THE ENVIRONMENT

*Sociologists study human populations and how they change. The census and vital statistics are among their tools. Factors that influence a population include birth and death rates and migration trends.*

*World population is growing. In nations that are industrialized, birth rates are declining. The U.S. birth rate is below the level needed to maintain a population, but the population is growing nevertheless through immigration.*

*The relationship between people and the environment is key to human survival on Earth. Natural resources are limited, and traditional energy resources are being depleted. Environmental issues that cause concern are biodiversity and habitat loss, resource depletion, and pollution.*

*Technology may provide answers to some of these problems. New ideas and strong people skills will be needed to negotiate solutions to problems of conflicting values.*



**biodiversity**—variety of life forms on the planet. *p. 257*

**carrying capacity**—number of organisms a particular environment can support. *p. 257*

**census**—official count of the people of a country or district. *p. 248*

**demographics**—field of sociology that scientifically studies the size, composition, and distribution of populations. *p. 248*

**ecology**—study of the relationship between organisms and the natural environment. *p. 256*

**ecosystem**—self-contained community of organisms that depend on one another and the environment for survival. *p. 256*

**emigrants**—people who leave a country to establish a residence elsewhere. *p. 251*

**fecundity**—potential number of children that could be born to the average woman of childbearing age. *p. 249*

**fertility**—actual number of children born per woman between the ages of 15 and 44. *p. 249*

**growth rate**—difference between the birth rate and the death rate, expressed in annual percentages. *p. 253*

**illegal aliens**—people who enter or remain in a country against its immigration laws. *p. 253*

**immigrants**—people who move into a country to live there. *p. 251*

**migration**—movement of people from one geographical location to another with the intent of establishing a new residence. *p. 251*

**migration rate**—difference between the number of immigrants and the number of emigrants in a society. *p. 251*

**mortality rate**—number of deaths in a year per 1,000 members of a population. *p. 250*

**political asylum**—place offering protection and shelter from persecution for views that are contrary to an established government. *p. 253*

**population density**—measure of the concentration of people in a given area, usually described as number of people per square mile. *p. 257*

**refugees**—people who flee a region because of its dangers. *p. 252*

**replacement rate**—fertility rate required to replace the parents. *p. 256*

**vital statistics**—official records of births, deaths, marriages, divorces, and migration. *p. 249*