

Humans and the Water Supply

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CHAPTER

1

Humans and the Water Supply

Lesson Objectives

- List ways that humans use water.
- State why some people don't have enough water.
- Explain why poor quality water is a problem.

Vocabulary

- drought
- irrigation

Introduction

All forms of life need water to survive. Humans can survive for only a few days without it. That's a lot less time than we can live without food. Besides drinking, people also need water for cleansing, agriculture, industry, and many other uses. Clearly, water is one of Earth's most important natural resources. It's a good thing that water is recycled in the water cycle.

How We Use Water

Figure 1.1 shows how people use water worldwide. The greatest use is for agriculture and then industry. Municipal use is last, but is also important. Municipal use refers to water used by homes and businesses in communities.

Water in Agriculture

Many crops are grown where there isn't enough rainfall for plants to thrive. For example, crops are grown in deserts of the American southwest. How is this possible? The answer is irrigation. **Irrigation** is any way of providing extra water to plants. Most of the water used in agriculture is used for irrigation. Livestock also use water, but they use much less.

Irrigation can waste a lot of water. The type of irrigation shown in **Figure 1.2** is the most wasteful. The water is sprayed into the air and then falls to the ground. But much of the water never reaches the crops. Instead, it evaporates in the air or runs off the fields. Irrigation water may cause other problems. The water may dissolve agricultural chemicals such as pesticides. When the water soaks into the ground, the dissolved chemicals do, too. They may enter groundwater or run off into rivers or lakes. Salts in irrigation water can also collect in the soil. The soil may get too salty for plants to grow.

Global Water Use

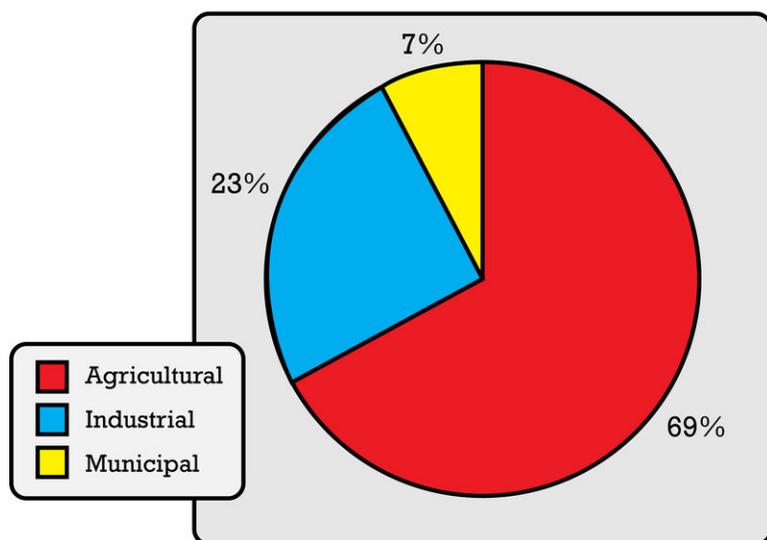


FIGURE 1.1

In this global water use chart, see how much is used for agriculture. Why do you think so much water is used in agriculture?



FIGURE 1.2

Overhead irrigation systems like this one are widely used to irrigate crops on big farms. What are some drawbacks of irrigation?

Water in Industry

Almost a quarter of the water used worldwide is used in industry. Industries use water for many purposes. Chemical processes need a lot of water. Water is used to generate electricity. An important way that industries use water is to cool machines and power plants.

Household Uses of Water

Think about all the ways people use water at home. Besides drinking it, they use it for cooking, bathing, washing dishes, doing laundry, and flushing toilets. The water used inside homes goes down the drain. From there it usually ends up in a sewer system. At the sewage treatment plant, water can be treated and prepared for reuse.

Households may also use water outdoors. If your family has a lawn or garden, you may water them with a hose or

sprinkler. You probably use water to wash the car, like the teen in **Figure 1.3**. Much of the water used outdoors evaporates or runs off into the gutter. The runoff water may end up in storm sewers that flow into a body of water, such as the ocean.

**FIGURE 1.3**

What will happen to the water that runs off the van? Where will it go?

Water for Fun

There are many ways to use water for fun, from white water rafting to snorkeling. When you do these activities you don't actually use water. You are doing the activity on or in the water. What do you think is the single biggest use of water for fun? Believe it or not, it's golf! Keeping golf courses green uses an incredible amount of water. Since many golf courses are in sunny areas, much of the water is irrigation water. Many golf courses, like the one in **Figure 1.4**, have sprinkler systems. Like any similar sprinkler system, much of this water is wasted. It evaporates or runs off the ground.

**FIGURE 1.4**

Sunshine brings golfers to the desert but a lot of water is needed to make the desert green enough to play.

Water Problems: Not Enough Water

Most Americans have plenty of fresh, clean water. But many people around the world do not. In fact, water scarcity is the world's most serious resource problem. How can that be? Water is almost everywhere. More than 70 percent of Earth's surface is covered by water.

Where Is All the Water?

One problem is that only a tiny fraction of Earth's water is fresh, liquid water that people can use. More than 97 percent of Earth's water is salt water in the oceans. Just 3 percent is freshwater. Most of the freshwater is frozen in ice sheets, icebergs, and glaciers (see **Figure 1.5**).



FIGURE 1.5

This glacier in Patagonia, Argentina stores a lot of frozen freshwater.

Rainfall and the Water Supply

Rainfall varies around the globe. About 40 percent of the land gets very little rain. About the same percentage of the world's people don't have enough water. You can compare global rainfall with the worldwide water supply in **Figure 1.6**. Drier climates generally have less water for people to use. In some places, people may have less water available to them for an entire year than many Americans use in a single day! How much water is there where you live?

Wealth and the Water Supply

Richer nations can drill deep wells, build large dams or supply people with water in other ways. In these countries, just about everyone has access to clean running water in their homes. It's no surprise that people in these countries also use the most water. In poorer nations, there is little money to develop water supplies. Look at the people in **Figure 1.7**. These people must carry water home in a bucket from a distant pump.

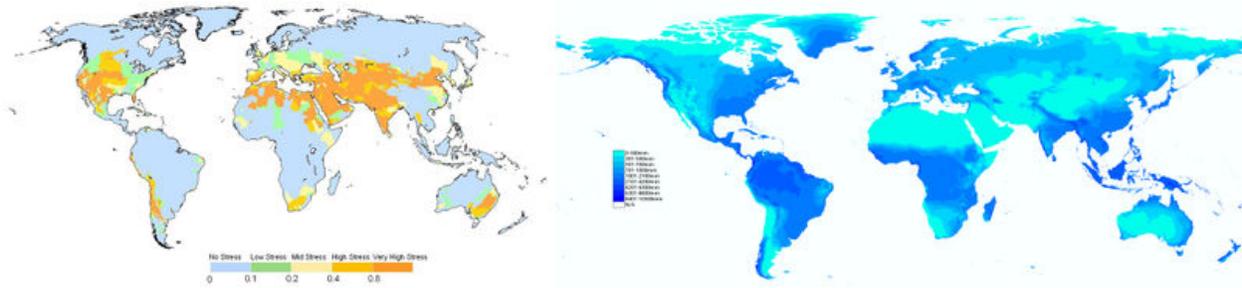


FIGURE 1.6

Rainfall is a major factor affecting the water supply. Compare rainfall and the water supply in your part of the world.



FIGURE 1.7

Water is a luxury in Africa, and many people have to carry water home. How would you use water differently if you had to get your water this way?

Water Shortages

Water shortages are common in much of the world. People are most likely to run short of water during droughts. A **drought** is a period of unusually low rainfall. Human actions have increased how often droughts occur. One way people can help to bring on drought is by cutting down trees. Trees add a lot of water vapor to the air. With fewer trees, the air is drier and droughts are more common.

We already use six times as much water today as we did a hundred years ago. As the number of people rises, our need for water will grow. By the year 2025, only half the world's people will have enough clean water. Water is such a vital resource that serious water shortages may cause other problems.

- Crops and livestock may die, so people will have less food available.
- Other uses of water, such as industry, may have to stop. This reduces the jobs people can get and the products they can buy.
- People and nations may fight over water resources.
- In extreme cases, people may die from lack of water.

Water Problems: Poor Quality Water

The water Americans get from their faucets is generally safe. This water has been treated and purified. But at least 20 percent of the world's people do not have clean drinking water. Their only choice may be to drink water straight from a river (see **Figure 1.8**). If the river is polluted with wastes, it will contain bacteria and other organisms that cause disease. Almost 9 out of 10 cases of disease worldwide are caused by unsafe drinking water. Diseases from unsafe drinking water are the leading cause of death in young children.



FIGURE 1.8

This girl is getting drinking water from a hole that has been dug. It may be the only source of water where she lives.

Lesson Summary

- People use water for agriculture, industry, and municipal uses. Irrigation for agriculture uses the most water.
- Too little water is a major problem. Places with the least water get little rainfall. They also lack money to develop other water resources. Droughts make the problem even worse.
- Poor water quality is also a problem. Many people must drink water that contains wastes. This causes a lot of illness and death.

Lesson Review Questions

Recall

1. List the three major ways that humans use water.
2. What is the single biggest use of water in agriculture?
3. Give an example of an industrial use of water.

4. Why does golf use a lot of water?
5. What problems may result from serious water shortages?

Apply Concepts

6. Briefly describe a typical day in your life. Identify each time you use water. Don't forget that producing power, food, and other goods uses water.

Think Critically

7. More than 70 percent of Earth's surface is covered by water. Why is scarcity of water the world's most serious resource problem?
8. Relate droughts to water shortages. Explain why droughts are becoming more common.

Points to Consider

In this lesson, you learned that many people don't have clean water to drink. They must drink polluted water instead.

- How does water become polluted?
- Can polluted water be treated so it is safe to drink?

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