

## Chapter 7

## SCIENCE &amp; SOCIETY

## ● Erosional Forces

## Humans and the Land

There are now about 6 billion people on Earth, and the numbers are growing rapidly. All over the world, people use the land for food, wood, paper, and other essential products. However, the land in many parts of the world is severely damaged. Sometimes the land is so damaged that it cannot support life.

A United Nations Environmental Programme study found that between 1945 and 1990, about 11 percent of Earth's plant-supporting soils—a total of nearly 3 billion acres—had been *degraded*. This means that these soils could only partially process nutrients into a form that plants can use. This degraded land can be used again for agriculture only at great cost. The study found that another 1.8 billion acres have been lightly degraded. Lightly degraded land can support plant life if it is restored through conservation.

Another study found that the leading causes of soil degradation in the world were overgrazing (35 percent), deforestation (30 percent), and poor agricultural practices (28 percent).

**Overgrazing**—When animals overgraze their pastures, grasses do not reseed. New growth of grass becomes scarce, and the topsoil is exposed to wind erosion. Also, soil that has been trampled by grazing animals cannot hold as much water. This trampled soil dries out quickly, and rainfall runs off along the surface. The result? Erosion of topsoil.

**Deforestation**—Heavy logging machinery and bulldozers can cause severe damage to soil structure. Often after trees are cleared, the land is burned, which can cause large amounts of ash to enter the soil. At first this leads to good harvests because the soil is richer. But soon, harvests decrease because nutrients in the ash leach out of the soil. Also, after forests are cleared, the

remaining soil can easily be washed away or chemically altered. Loss of tropical rain forest land is especially serious because it leads to extinction of a broad range of species of plants and animals.

**Poor Agricultural Practices**—The following agricultural practices lead to soil erosion.

- Some hillsides are not plowed correctly, leading to erosion of soil by water.
- Fields not used for crops in a certain season are left without protective ground cover, leaving them easily eroded by wind.
- Use of heavy farm machinery causes soils to be packed down. Such soils cannot hold as much water, so root growth is reduced, while water runoff and erosion are increased.
- There is too much irrigation and/or insufficient drainage, causing salts to build up in the soil.
- Drainage is too rapid, leading to erosion of topsoil.
- There is improper and excessive use of chemical fertilizers, pesticides, and herbicides.

**Paving Over Soil**—As cities expand, more soils are covered with asphalt and concrete. In addition, when the same crops are planted every year, soil nutrients are used up quickly.

It is very important that damage to the land be reversed. Everyone can play a role in this. Farmers can plant a variety of crops, limit the use of chemicals, and make sure that irrigation levels are correct. Livestock owners can keep their herds moving among many grazing areas. The logging industry can plant trees to replace those that it cuts down. Also, everyone should recycle paper and use products made from recycled paper.

## You Decide

1. Can you imagine why livestock owners, especially in poor countries, often have a problem with overgrazing? What do you think could be done about that?
2. Some species of insects can be controlled by using other animals that eat them. Also, there are ways of stopping insects from reproducing. How can these methods of "biological control" help conserve the soil?
3. A farmer's main crop is wheat. However, he grows soybeans every few years instead. What effect do you think this practice has on the soil?
4. "Clearcutting" means removing all the trees in a certain part of a forest. This practice has been criticized by environmentalists. What problems does clearcutting cause? Can you imagine a way to avoid these problems while still getting wood from a forest?