

Desertification

What causes desertification?

One of the world's greatest deserts, the Sahara Desert of North Africa, was created over long periods of time by natural processes. Deserts can grow and deserts can shrink, but it is the edges of deserts that worry geographers. The edges of the Sahara Desert merge into a transition zone called the Sahel. The Sahel is the semi-arid steppe grassland region that lies between the Sahara Desert to the north and the wetter savanna grasslands to the south. The Sahel consists of a very fragile belt of grasses, shrubs, and forests that stretches 3,000 miles across Africa. Some of the plant life that grows at the edges of the Sahara pick up heat from the hot winds and protect the land from the prevailing winds. Because these areas are often cooler than surrounding areas, humans use this land, especially for grazing livestock.



Goats overgrazing argana trees. Photo courtesy of Jeannine Kuropatkin

Nomadic tribes, who inhabit the Sahel, raise herds of cattle, sheep, goats, and camels. Since the nomads depend upon the Sahel for grazing their livestock, they travel across the Sahel in search of grasslands. Unfortunately, due to rapid population growth and recent droughts, the fragile vegetation of the Sahel is being destroyed by the practice of overgrazing. Overgrazing occurs when nomadic herders allow too many animals to graze on the land for an extended period of time. This causes the natural grasses to die out. Without plant life, there is nothing left to hold down the precious topsoil, the layer of nutrient-rich soil that enables plants to grow. Dry winds then blow away the naked topsoil and sand from the Sahara's fringes overtakes the land. This "spreading of deserts" into once productive grasslands is called desertification and it is occurring at an alarming rate in the Sahel.

Grazing livestock also pose another problem for the Sahel. As nomadic herders travel from place to place with their livestock, the animals' hooves pound and compact the soil, making it more difficult for water to percolate down to the plants' roots. In addition, the herds trample and kill the grass. Without plant life, the topsoil is exposed to the natural elements of wind and rain. Thus erosion occurs, degrading yet another patch of the Sahel to barren rock or sheets of sand.

Droughts alone do not cause desertification. It is natural that some semi-arid regions, like the Sahel, may experience long periods of time without adequate rain. In fact, well-managed lands can recover from drought when the rains return. However the needs of an increased population, combined with land abuse practices (such as cutting down trees and shrubs for fuel), does contribute to desertification, especially in drought-stricken areas. The Sahel of West Africa has suffered from drought since 1968. By 1973, the drought and poor land-use practices resulted in the deaths of 100,000 people and 12 million cattle, the loss of farmland, and the disruption of millions of lives. It was the combination of drought, overgrazing, and poor land management that resulted in this disaster. Although the environmental plight of the Sahel has received a lot of publicity, the desertification process is occurring on almost every continent. Often the desertification process has advanced too far to prevent some of the destructive cause and effect sequences, but there are some remedies to reverse the trend of advancing deserts.

What can be done about desertification?

In order to stop desertification, governments must fully understand the geography of human environment interaction. Scientific studies on water management and land use practices contribute valuable information about the impact of people on the Sahel. In the last two decades, satellite technology has provided global monitoring, giving researchers a clearer picture of the desertification process. Landsat images of the same location, taken over a period of time, show changes in the land. This data helps scientists pinpoint probable causes of land degradation that lead to desertification.



**A dust storm kicks up on the Sahara Desert.
Photo courtesy of Jeannine Kuropatkin**

There are a number of ways both individuals and governments can help to reclaim their land. In windy areas, the faces of sand dunes can be covered by large boulders or oil to keep the sand from moving. Sand fences can be built in the same manner that snow fences are used in the northern United States. Plants can also be irrigated and grown at the base of sand dunes. Since the plants bind the soil, this helps prevent erosion and stop the blowing sand.



**Trees stabilize the soil
on the edge of an oasis.
Photo courtesy of
Jeannine Kuropatkin**

Oases and farmlands can be successfully protected by planting tree fences 50 to 100 meters downwind from grass belts. That way, any sand that passes through the grass belts will be stopped by the rows of trees acting as wind breaks. A “Green Wall” of trees, which will stretch more than 5,700 kilometers, is currently being planted in China to protect sandy areas created by human activity.

Employing proper conservation practices and improving land and water management can reduce the risk of desertification. More efficient use of water resources and the control of salt levels in the soil can improve land quality. New ways are being investigated for collecting seasonal run-off from nearby highlands and rainwater. More effective irrigation methods and crop rotation techniques are also being researched.

Desertification is a complex process of land degradation, involving both natural processes and human activity. Effective solutions for preventing and reversing desertification currently exist. Good practices, continual monitoring, and further geographic research are all necessary for a long term remedy.

Adapted from a USGS (United States Geological Survey) article “Desertification” on the USGS website: <http://pubs.usgs.gov/gip/deserts/desertification/> by Jeannine Kuropatkin