



# KNOW SOIL KNOW LIFE



## THE CHALLENGE OF DESERTIFICATION

### HISTORICAL CASE: THE DUST BOWL

When the High Plains of Texas, Oklahoma, Kansas, and Colorado were settled in the decades after the Homestead Act of 1862 was passed, the ranches and farmsteads enjoyed abundant rainfall. However, a ten-year drought, from the early 1920s to 1930s, followed the overgrazing and excessive tillage that had been encouraged to meet food needs during World War I. Crops failed in the drought, and when winds came, the fertile soils went with them. People wore dust masks and hung wet sheets over windows to keep out the dust. The towering dust storms generated by these conditions were called black blizzards.

Many farmers lost all their money, and farms failed. By 1934, the drought covered 75% of the country. It was estimated that 100 million acres had lost most of their topsoil. Soil rained down as far east as Washington, DC, so the federal government declared erosion a menace, created the Soil Conservation Service (now the Natural Resource Conservation Service), and implemented federally mandated soil and range conservation areas. These programs are still active today in protecting soils from erosion and other degradation, although some Dust Bowl lands are still at high risk for desertification.

### MODERN CASE: THE DISAPPEARING ARAL SEA

The Aral Sea, located between Kazakhstan and Uzbekistan, was once one of the largest lakes in the world, but more than 80% of it has disappeared in the past 50 years. Starting in the 1960s, the Soviet Union diverted water from the Aral into irrigation canals to grow cash crops like cotton, transforming the semi-arid region into a productive agricultural area temporarily. The cotton farming disrupted a delicate soil ecosystem and decimated the lake and surrounding region. While the devastating effects on the lake ecology and fishing industry are well known, the problems facing the soil are just as severe.

As the area of the lake shrank over the years, more and more of the lakebed became visible. The strong dry winds in the region picked up the newly exposed sediments, blowing dust and salts over the surrounding land. The dust contained pesticides, fertilizers, and other chemicals that then contaminated the soil and

vegetation. Without the mitigating effect of the large sea, the regional climate became more arid, increasing each of these problems. The United Nations claimed that by 2001 more than 45% of Uzbekistan's soil had been degraded, with crop yields only one-third of the historical production. As crop yields declined and fewer native plants grew in the new conditions, more water and chemicals were needed to grow crops, further draining and destroying the Aral Sea. The lake shrank even more, more toxic dust blew around, more soil was contaminated and degraded, and the cycle worsened until the once productive area became a dry barren wasteland.

The local communities are now dealing with the result of the desertification of the Aral region. Unfortunately, the southern half of the sea, now called the Big Aral, has been separated by an exposed land bar and little can be done to restore it. It is expected to completely disappear by 2020. The World Bank and some nongovernmental organizations are putting effort and millions of dollars into the recovery of the Small Aral in the north, with some positive results. In the south, people must adapt to the more desert-like conditions. Community projects are planting large tracts with the saxaul bush, a salt- and drought-resistant plant, to slow the extent of desertification and restore some health to the soils.

### LOOKING AHEAD: PLANTING A GREEN BARRIER IN AFRICA

In the dry regions of the Sahel, the region bordering the southern parts of the Sahara desert, desert-like conditions exist where productive land once supported many people. Land degradation here is mostly caused by wind erosion, as decades of extensive tree cutting, overgrazing, and droughts have reduced the amount of vegetation and roots holding the soil together. Winds blow and transport the fragile soils elsewhere. To mitigate this, the African Union developed the Great Green Wall Project. This project aims to replant and reforest this region and reverse the relentless pace of desertification in Africa. The plan is to work with local communities to improve the soil and regional climate by planting a wall of trees at least 15 kilometers (9.3 miles) wide across 11 countries.

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## THE CHALLENGE OF DESERTIFICATION—2

The West African country of Senegal is a leader in the project, planting an average of 2 million trees a year since 2008. New trees increase biodiversity, which enhances soil biology and rejuvenate the soil, while greatly decreasing soil erosion. These trees will also help recharge the water table by increasing soil water retention, as well as block the blowing sand grains from landing on farmland.

The tree planters in this project are local volunteers, driven to improve their country and to fight poverty.

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[www.soils4teachers.org](http://www.soils4teachers.org)