



# KNOW SOIL KNOW LIFE



## THE CHALLENGE OF DEFORESTATION

### HISTORICAL CASE: EASTER ISLAND

The setting sun silhouettes some 600 massive stone statues, averaging more than 20 feet high, on Easter Island, a small remote island in the middle of the Pacific Ocean. When Polynesian explorers arrived there, dated by some as about 1,000 years before European discovery, they found an island with adequate rainfall and decent soil.

The only crop that grew well on the island was the sweet potato, which required very little time and effort to grow. Some anthropologists believe that perhaps because of this, the islanders had a lot of time to dedicate to building the impressive stone statues. Pollen and other scientific evidence indicate that an ample number of trees were on Easter Island in the early days of the fifth century when the population was relatively small. The islanders cleared trees for farms and for heating, cooking, building homes, and creating canoes for fishing. They also used the trees to help roll the statues from one location to another.

By 1550, the population had grown to at least 15,000 people. With so many islanders, there was more competition for resources, resulting in the development of a number of clan groups, which competed with each other to acquire resources and build the grandest statues. This led them to cut down more trees, which greatly increased soil erosion, decreasing soil fertility. By about 1650, wood on Easter Island ran out, and the food began to run out as well because the soils were so badly eroded. The islanders did not realize that they needed to replenish nutrients in the soil, and even if they had, they lacked nutrient sources, such as manure from domesticated animals, on the island. Centuries of deforestation intensified soil erosion, removing the topsoil in a short period of time.

Recent studies have turned up evidence indicating that severe sheet erosion occurred between about 1250 and 1500, corresponding with the period of intensive agriculture and land clearing. Crop yields declined suddenly, and starving people engaged in warfare. When Dutch explorers discovered the treeless island on Easter morn-

ing in 1722, they found about 2,000 poverty-stricken inhabitants, living in caves and reed huts. A great society had fallen because of the effects of deforestation, soil loss and loss of productivity, and uncontrolled population growth.

### MODERN CASE: HAITI

Haiti is considered to be the poorest country in the Western Hemisphere and one of the poorest countries in the world. This unfortunate ranking can be directly linked to the degradation of Haiti's environmental resources. Before colonization, the country was covered with trees; now, less than 1% of the original tree cover remains. The country is also relatively mountainous, so most agricultural land is prone to erosion. Like the Easter Islanders before them, the Haitian population is rapidly growing, from 3 million people in 1940 to 10 million in 2010, requiring more and more food and resources. However, the soils are so degraded and infertile, that it is difficult to generate any more food.

Most Haitians are subsistence farmers, forced to clear more mountainsides to grow more food. The farmers also need the trees as a source of fuel and cash. People living in Port-au-Prince, the capital of Haiti, are in dire need of charcoal as an energy source. Many trees must be cut down and slowly burned in kilns to make charcoal, which is easily transported to urban areas. For rural people, providing charcoal to the cities accounts for nearly 20% of their income. This leads to rampant deforestation, especially on the mountain slopes. The result is dramatic soil erosion, an estimated 6,000 hectares (14,862 acres) of soil lost per year. When it rains, or there is a hurricane, these soils have nothing to hold them in place, resulting in landslides, mudslides, and even more severe flooding, which further erodes the soil.

—continued on reverse



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## THE CHALLENGE OF DEFORESTATION—2

### LOOKING AHEAD: TACKLING RAINFOREST DESTRUCTION IN BRAZIL

Brazil today has the world's highest annual rate of deforestation. As a result, the populous country faces a loss of 20 tons of soil per hectare per year, with 2 billion tons muddying the Amazon and other rivers annually. Brazil saw the productivity and biodiversity of its ecosystems plummet, so the Brazilian government stepped in to reverse the forest destruction. National laws now protect more than 110 million hectares of rainforest, representing the largest safeguarded area in the world. Such policies have resulted in a 40% decrease of annual deforestation since 2004.

While this indicates an admirable effort, the Amazon rainforest is still disappearing at an alarming rate. As the thin layer of productive soil washes away, the sediment load in the rivers increases, damaging aquatic life downstream.

Since large-scale forest removal is now restricted, most of the current land clearing is due to localized slash and burning for cattle ranching and subsistence farming. Monitoring has increased, and both government agencies and nongovernmental organizations are working together, using technology to monitor the forests. Aerial photography and satellite imaging keep track of holes in the forest and sediment loads in the waters.

Brazil's National Institute of Space Research released satellite images in 2011 indicating that deforestation had actually increased since 2010. The alarmed government used this information to focus enforcement activities in areas suffering from illegal logging and land clearing. This enforcement showed results, and the Brazilian government estimates that the deforestation rate for the last half of 2011 was the lowest ever recorded. This is good news for the biodiversity of Brazil's rainforests, with benefits extending to the nation's soil and freshwater health as well.

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