

Acid Rain



Effects Felt Through the Food Chain **Here's what you need to know about the warming planet, how it's affecting us, and what's at stake.**



Acid rain describes any form of precipitation with high levels of nitric and sulfuric acids. It can also occur in the form of snow, fog, and tiny bits of dry material that settle to Earth.

Rotting vegetation and erupting volcanoes release some chemicals that can cause acid rain, but most acid rain falls because of human activities. The biggest culprit is the burning of fossil fuels by coal-burning power plants, factories, and automobiles.

When humans burn fossil fuels, sulfur dioxide (SO₂) and nitrogen oxides (NO_x) are released into the atmosphere. These chemical gases react with water, oxygen, and other substances to form mild solutions of sulfuric and nitric acid. Winds may spread these acidic solutions across the atmosphere and over hundreds of miles. When acid rain reaches Earth, it flows across the surface in runoff water, enters water systems, and sinks into the soil.

Acid rain has many ecological effects, but none is greater than its impact on lakes, streams, wetlands, and other aquatic environments. Acid rain makes waters acidic and causes them to absorb the aluminum that makes its way from soil into lakes and streams. This combination makes waters toxic to crayfish, clams, fish, and other aquatic animals.

Some species can tolerate acidic waters better than others. However, in an interconnected ecosystem, what impacts some species eventually impacts many more throughout the food chain—including non-aquatic species such as birds.

Acid rain also damages forests, especially those at higher elevations. It robs the soil of essential nutrients and releases aluminum in the soil, which makes it hard for trees to take up water. Trees' leaves and needles are also harmed by acids.

The effects of acid rain, combined with other environmental stressors, leave trees and plants less able to withstand cold temperatures, insects, and disease. The pollutants may also inhibit trees' ability to reproduce. Some soils are better able to neutralize acids than others. In areas where the soil's "buffering capacity" is low, the harmful effects of acid rain are much greater.

The only way to fight acid rain is by curbing the release of the pollutants that cause it. This means burning fewer fossil fuels. Many governments have tried to curb emissions by cleaning up industry smokestacks and promoting alternative fuel sources. These efforts have met with mixed results. But even if acid rain could be stopped today, it would still take many years for its harmful effects to disappear.

Individuals can also help prevent acid rain by conserving energy. The less electricity people use in their homes, the fewer chemicals power plants will emit. Vehicles are also major fossil fuel users, so drivers can reduce emissions by using public transportation, carpooling, biking, or simply walking wherever possible.