Saving Soil

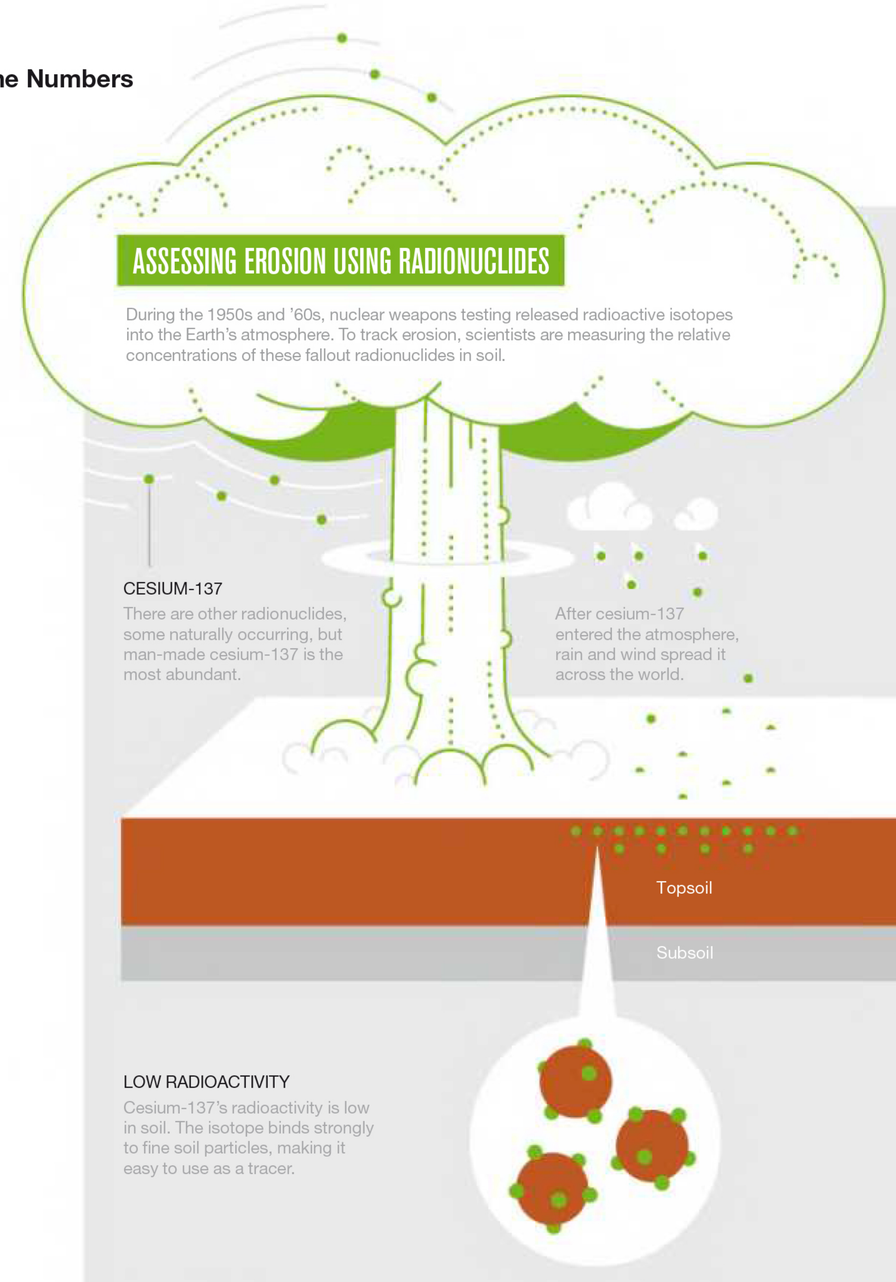
World Soil Day is celebrated every December 5. Soil, in which nearly all our food grows, is a living resource that takes years to form. Yet it can vanish in minutes, says Ronald Vargas of the United Nations Food and Agriculture Organization (FAO).

Each year 75 billion tons of fertile soil are lost to erosion. That's alarming—and not just for food producers. Soil can trap huge quantities of carbon dioxide in the form of organic carbon and prevent it from escaping into the atmosphere.

"If we protect and sustainably manage soils," says Vargas, "we can combat climate change." *—Kelsey Nowakowski*

ASSESSING EROSION USING RADIONUCLIDES

During the 1950s and '60s, nuclear weapons testing released radioactive isotopes into the Earth's atmosphere. To track erosion, scientists are measuring the relative concentrations of these fallout radionuclides in soil.



CESIUM-137
There are other radionuclides, some naturally occurring, but man-made cesium-137 is the most abundant.

After cesium-137 entered the atmosphere, rain and wind spread it across the world.

LOW RADIOACTIVITY
Cesium-137's radioactivity is low in soil. The isotope binds strongly to fine soil particles, making it easy to use as a tracer.

HOW IT WORKS

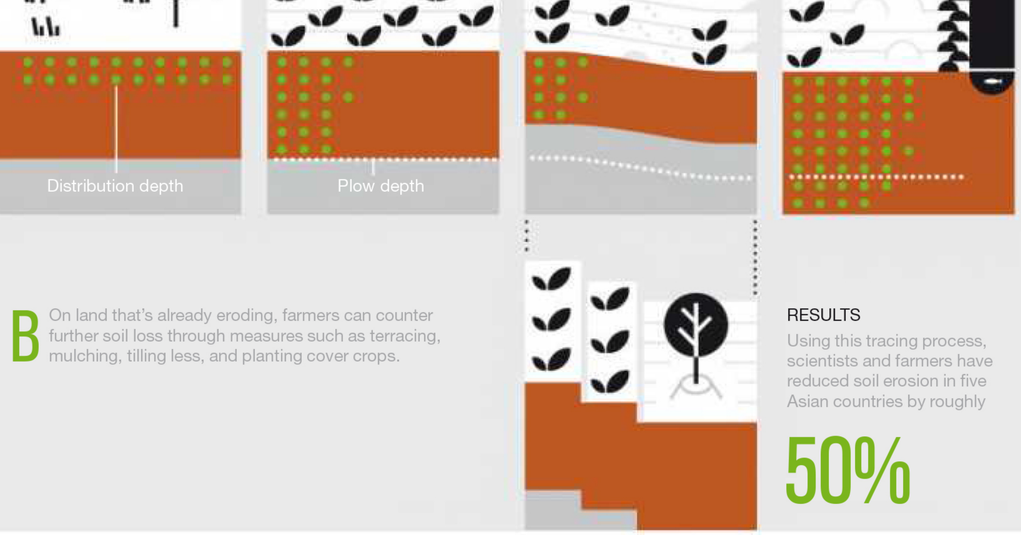
A Cesium-137 is a tracer that has allowed soil scientists at the FAO and the International Atomic Energy Agency to measure the variation in levels of cesium-137 to see where soil has eroded. Farmers can then work to stop the erosion.

REFERENCE SITE
To establish a base for comparison, scientists measure the cesium-137 levels of soil on a flat, undisturbed site.

FLAT FARMLAND
Tilling flat land distributes cesium-137 relatively evenly down through the soil to the depth the plow reaches.

SLOPED FARMLAND
Farming on steep hillsides can allow rain to wash away soil—and with it cesium-137.

EROSION SIGNPOSTS
Eroded soil often collects at the base of a hill or near waterways, concentrating the cesium-137.



B On land that's already eroding, farmers can counter further soil loss through measures such as terracing, mulching, tilling less, and planting cover crops.

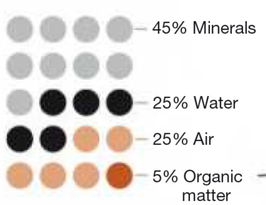
RESULTS
Using this tracing process, scientists and farmers have reduced soil erosion in five Asian countries by roughly

50%

SOIL MATTERS

95%
OF THE WORLD'S FOOD GROWS IN SOIL.

AVERAGE SOIL COMPOSITION



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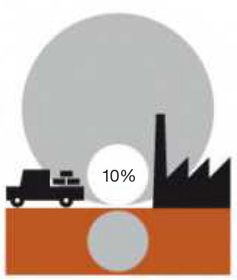
OF THE WORLD'S SPECIES LIVE IN SOIL.

CARBON CAPTURE
Over the course of 25 years healthy soils can absorb an estimated 10 percent of human-generated carbon emissions.



A DWINDLING RESOURCE

Poor land management, urbanization, and climate change are making soils more prone to erosion. Population growth increases pressure on farmlands.

Soil is now eroding up to 20 times faster than it's being developed.

Since 1960 one-third of the world's arable land has been lost to erosion.

GRAPHIC: ÁLVARO VALIÑO. SOURCE: FAO, LAND AND WATER DIVISION; IAEA, JOINT FAO/IAEA DIVISION