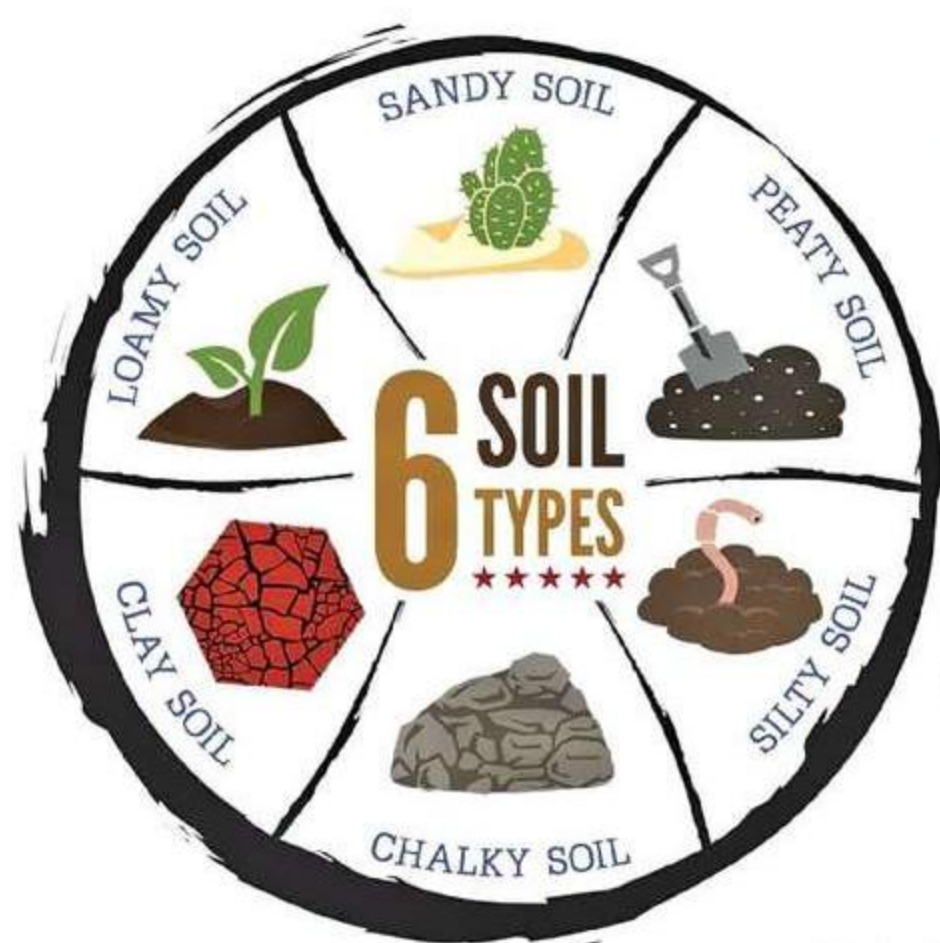


World Soil Day
fell on December 5

SOIL OF THE EARTH: THE VERY CRADLE OF LIFE



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Have you ever seen white crusts on soil? Yes, it is what you think. Soils can be salty. Salts are present naturally in soils and water, and they move freely through the soil. Naturally saline soils may support rich ecosystems, but natural processes such as droughts and human activities, especially improper irrigation, can increase how many salts are in soils, a process that is called salinization. Soil salinization breaks down our soils and reduces their ability to help our food grow.

Soil salinization and sodification are major soil degradation processes threatening ecosystem and are recognized as being among the most important problems at a global level for agricultural production, food security and sustainability in arid and semi-arid regions.

Salt-affected soils have serious impacts on soil functions, such as in the decrease in agricultural productivity, water quality, soil biodiversity, and soil erosion. Salt-affected soils have a decreased ability to act as a buffer and filter against pollutants. Salt-affected soils reduce both the ability of crops to take up water and the availability of micronutrients.

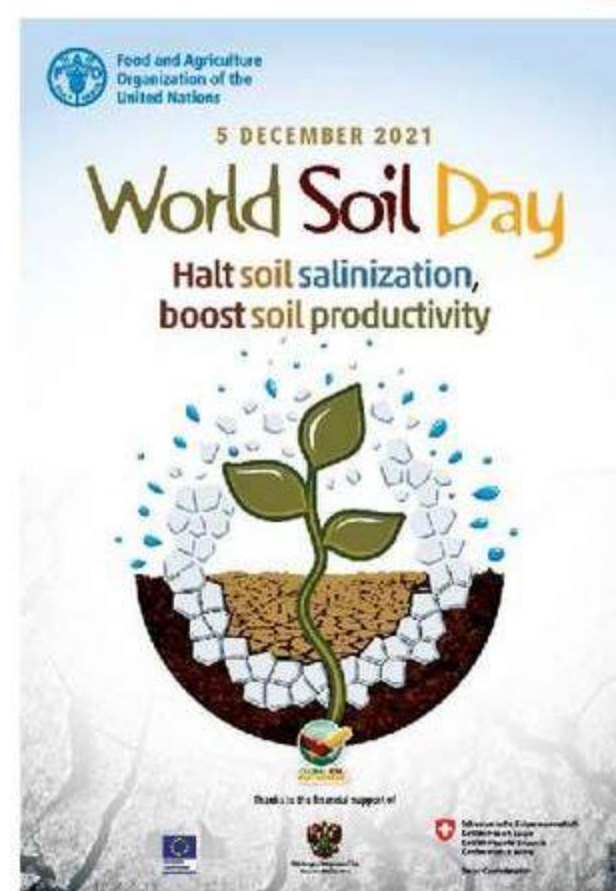
They also concentrate ions that are toxic to plants and may degrade the soil structure.

World Soil Day 2021 (#WorldSoilDay) and its campaign "Halt soil salinization, boost soil productivity" aims to raise awareness of the importance of maintaining healthy ecosystems and human well-being by addressing the growing challenges in soil management, fighting soil salinization, increasing soil awareness and encouraging societies to improve soil health.

To commemorate the Observance, FAO held a virtual ceremony on December 3 with the participation of the FAO Director-General and thousands of soil enthusiasts.

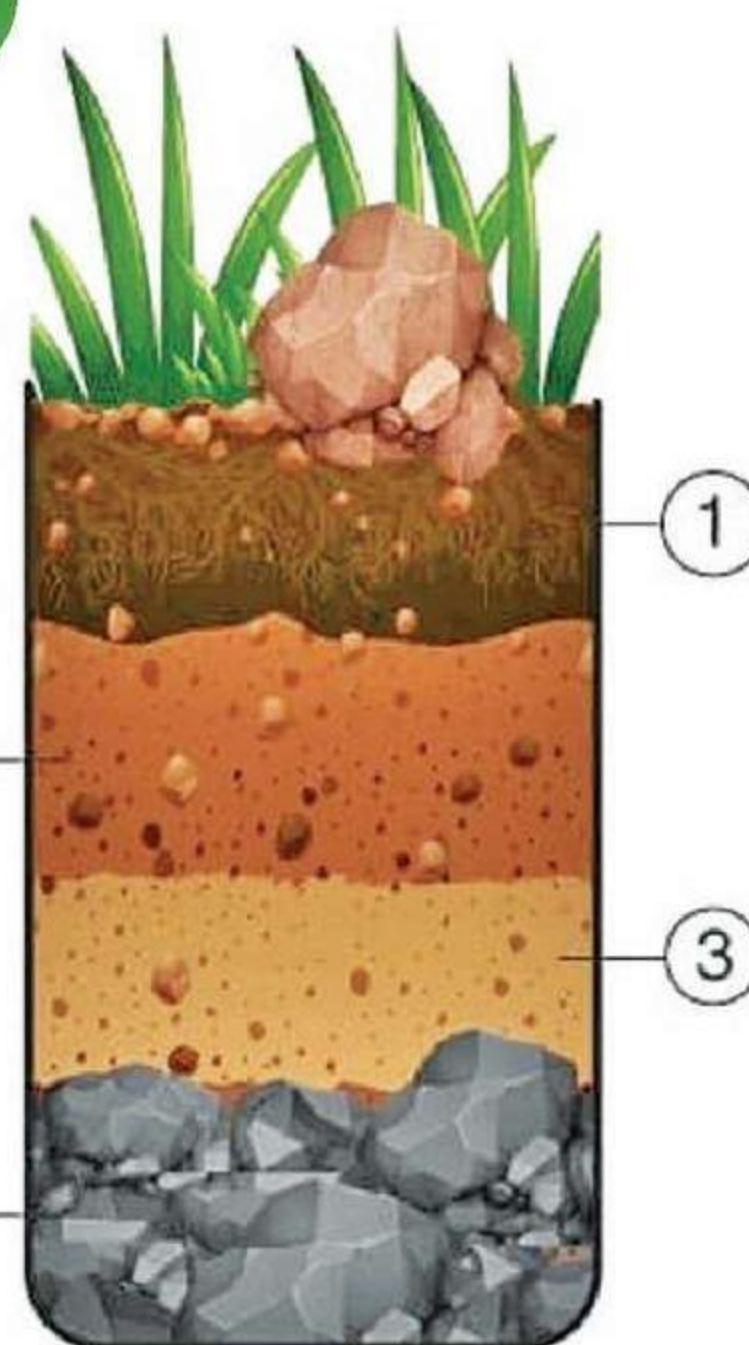
Soils are complex mixtures of minerals, water, air, organic matter, and countless organisms that are the decaying remains of once living things. It forms at the surface of land through weathering of rocks. It is the "skin of the Earth". Soil is the basis for plant life and it is vital to life on earth. Soil is a material composed of five different ingredients such as minerals, soil, organic matter, living organisms, gas, and water.

Vasily Vasilyevich Dokuchaev (March 1, 1846 - November 8, 1903) is credited with laying the foundation of soil science. In 1941, Hans Jenny, considering the soil as the system, presented the conceptual equation through the basic



World Soil Day (WSD) is celebrated annually on December 5 to focus on healthy soil and to advocate for the sustainable management of soil resources. The date of December 5 for World Soil Day was chosen because it corresponds with the official birthday of King Bhumibol Adulyadej, The King of Thailand, who officially sanctioned the event. A cosmopolitan day to celebrate the soil was nominated by the International Union of Soil Sciences (IUSS) in 2002 under the directorship of the Global Soil Partnership. The FAO Conference unanimously endorsed World Soil Day in June 2013 and requested its official adoption at the 68th UN General Assembly responded by designating December 5, 2014 as the first official World Soil Day.

We have some duties and responsibilities to protect the environment and the Planet Earth. There should be nothing more than serving and saving the planet. Without knowing the adverse effects, we are harming everything. Nobody tries to know the value of the blue planet. Let the



- 1 The O-Horizon (Organic)
- 2 The A-Horizon or Topsoil
- 3 The B-Horizon or Subsoil
- 4 The C-Horizon or Bedrock

little ones know the importance of Nature. If we want food we want plants, if we want plants we want soil, just don't spoil it. It is the sole truth of the living planet. So let's rise and join hands to protect the soil.

There can be no life without soil and no soil without life; they have evolved together.
- Charles E. Kellogg

"How can I stand on the ground everyday and not feel its power? How can I live my life stepping on this stuff and not wonder at it?"
- William Bryant Logan

"To forget how to dig the earth and to tend the soil is to forget ourselves".
- Mahatma Gandhi

"To be a successful farmer one must first know the nature of the soil"
- Xenophon (Ancient Greek philosopher)

Pesticides: Enemy of the Soil



Regulations currently ignore pesticides' harm to soil species. Our study leaves no doubt that this disregard must change.

NATHAN DONLEY and TARI GUNSTONE

Scoop up a shovelful of healthy soil, and you'll likely be holding more living organisms than there are people on Earth. Like citizens of an underground city that never sleeps, tens of thousands of subterranean species of invertebrates, nematodes, bacteria and fungi are constantly filtering our water, recycling nutrients and helping to regulate the planet's temperature.

But under fields covered in tightly knit rows of corn, soybeans, wheat and other monoculture crops, a toxic soup of insecticides, herbicides and fungicides is wreaking havoc, according to our recent analysis in the journal *Frontiers in Environmental Science*. The study—to our knowledge the most comprehensive review ever conducted on how pesticides affect soil health—should trigger immediate and substantive changes in how the Environmental Protection Agency assesses the risks posed by the nearly 850 pesticide ingredients approved for use in the U.S.

Regulations currently ignore pesticides' harm to soil species. Our study leaves no doubt that this disregard

must change. For our analysis, conducted by researchers at the Centre for Biological Diversity, Friends of the Earth and the University of Maryland, we looked at nearly 400 published studies comprising more than 2,800 experiments on how pesticides affect soil organisms. Our review encompassed 275 unique species or types of soil organisms and 284 different pesticides or pesticide mixtures. In just over 70 percent of those experiments, pesticides were found to harm organisms critical to maintaining healthy soils—harm that have never been considered in the EPA's safety reviews. Pesticide-intensive agriculture and pollution are driving factors in the precipitous decline of many soil organisms, such as ground beetles and ground-nesting bees. They have been identified as the most significant driver of soil biodiversity loss in the past decade.

SOIL ORGANISMS

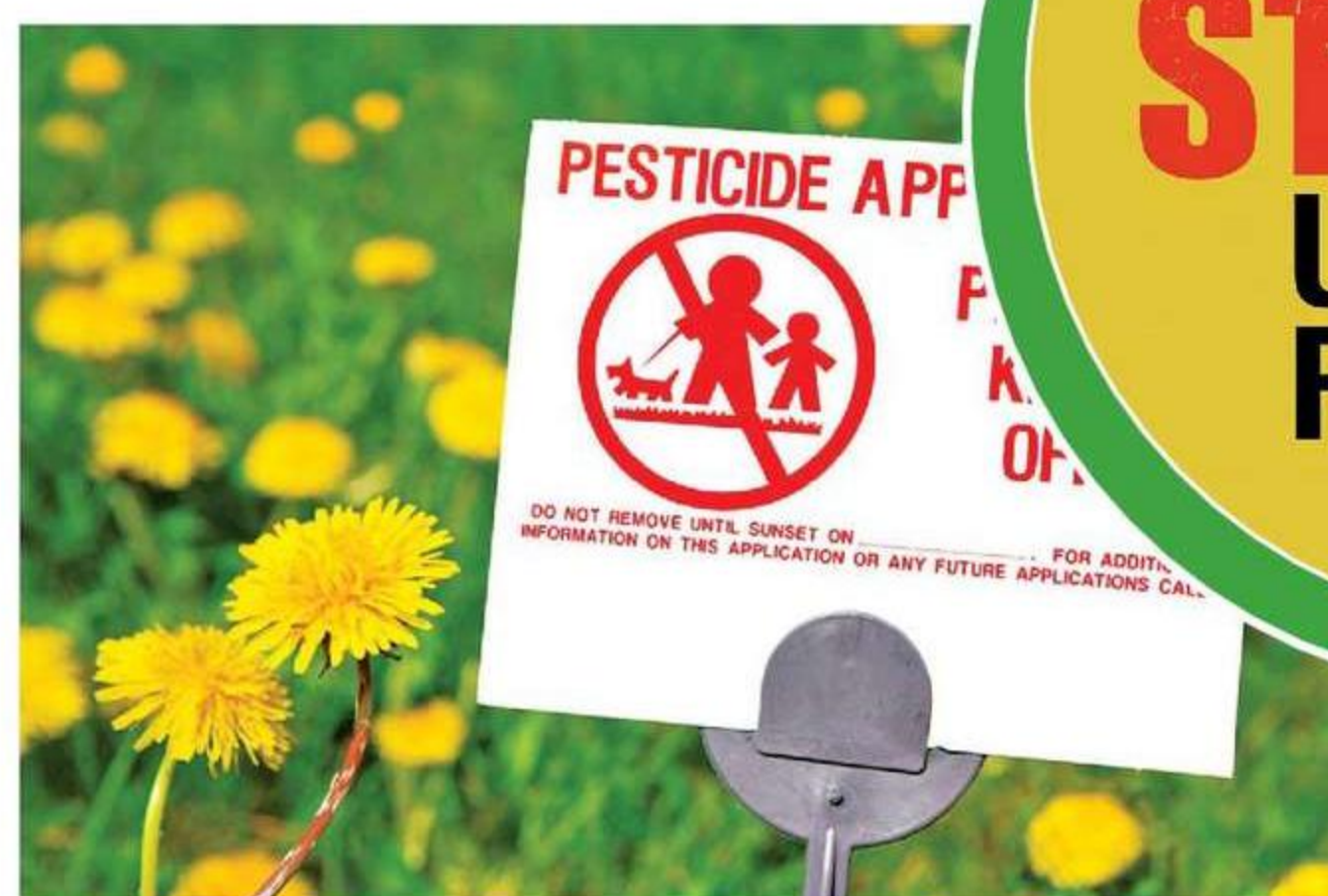
Yet pesticide companies and our pesticide regulators have ignored that research. The EPA, which is responsible for pesticide oversight in the U.S., openly acknowledges that somewhere between 50 and 100 percent of all agriculturally

applied pesticides end up on the soil. Yet to assess pesticides' harms to soil species, the agency still uses a single test species—one that spends its entire life aboveground in artificial boxes—to estimate risk to all soil organisms: the European honeybee.

PESTICIDE INDUSTRY

The fact that the EPA relies on a species that literally may never touch soil in its entire life to represent the thousands of species that live or develop underground offers a disturbing glimpse of how the U.S. pesticide regulatory system is set up to protect the pesticide industry instead of species and their ecosystems. What this ultimately means is that pesticide approvals happen without any regard for how those chemicals can harm soil organisms.

To add to this, as principles of regenerative agriculture and soil health gain popularity around the world, pesticide companies have jumped on the bandwagon to green-wash their products. Every major company now has Web materials touting its role in promoting soil health, often advocating for reducing tilling and planting cover crops. As general tenets, both these



practices are indeed good for soil health and, if adopted responsibly, are great steps to take. But companies know that these practices are often accompanied by increased pesticide use. When fields are not tilled, herbicides are frequently used to kill weeds, and cover crops are often killed with chemicals before crop planting. This "one step forward, one step back" approach is preventing meaningful progress to protect our soils. Pesticide compa-

nies have so far been successful in co-opting "healthy soil" messaging because our regulators have shown no willingness to protect soil organisms from pesticides.

The long-term environmental cost of that failure can no longer be ignored. Soils are some of the most complex ecosystems on Earth, containing nearly a quarter of the planet's biodiversity. Protecting them should be a priority, not an afterthought. Our research indicates that

achieving this will require that we reduce the world's growing and unsustainable reliance on pesticide-intensive agriculture. And it will require that the EPA take aggressive steps to protect soil health.

(Nathan Donley is environmental health science director at the Centre for Biological Diversity, headquartered in Arizona. His work focuses on U.S. pesticide regulation and policy. Tari Gunstone is a scientist who, as a research assistant at the Centre for Biological Diversity, spent more than a year analyzing studies on pesticide impacts to soil health)

- Scientific American