



NEWS BULLETIN

Plants and Pollution ENVIS RP-NBRI

Vol. 12, December 2021

World Soil Day 2021: Halt soil salinization, boost soil productivity

CSIR-NATIONAL BOTANICAL RESEARCH INSTITUTE, LUCKNOW

How plastic is infiltrating the world's soils

UN Environment Programme, 03 December 2021

The images are sobering: dead sea birds and choking turtles caught in the plastic that is increasingly flooding into marine ecosystems. In many parts of the world, this type of plastic pollution has grabbed headlines.

Yet there's a similar environmental blight that gets far less attention but is potentially as harmful, say experts: agricultural plastic pollution. Recent research by the United Nations Environment Programme (UNEP) and the Food and Agriculture Organization of the United Nations (FAO) indicates that agricultural soils may receive greater quantities of microplastics than oceans.

A byproduct of the slow deterioration of everything from protective mesh to greenhouse panels, this plastic leaches into soils around the world, reducing its quality and often entering the food chain.

With World Soil Day around the corner – it falls on 5 December – experts are raising the alarm about what they call an invisible threat to the world's food systems.

"Our accounting systems don't assign a value to healthy soil, so incentives to keep soil healthy are weak," said Mahesh Pradhan, Coordinator of UNEP's Global Partnership for Nutrient Management. "Plastic products on farms are really part of the toxic trail of economic growth."

Plastics in soils is a global problem that usually goes hand-in-hand with intensive agriculture. Experts say it's present everywhere from Asia to North America to Africa. Stemming the tide will be crucial in the coming years. Researchers estimate that more than 8.3 billion tons of plastic,.....

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New tests track sources of lead contamination in urban soils and assess its risks

Science Daily, 10 December 2021

Duke University scientists have developed a suite of isotope-based tests that can be used to identify the origin of lead contamination in urban soils and assess the risk it poses to children who inhale or ingest contaminated dirt or dust.

"These tests give public health officials reliable new ways to track the legacy of contamination that still persists in some urban soils decades after federal bans ended the widespread use of lead-based paint and gasoline," said Avner Vengosh, Distinguished Professor of Environmental Quality at Duke's Nicholas School of the Environment.

"We developed these tests to assess lead contamination in soils around Durham, N.C., but they could be used in similar cities anywhere," Vengosh said.

The new study builds upon another Duke-led study of lead contamination in Durham soils, published earlier this year, that showed while lead levels in urban soils around Durham are declining overall, hotspots of contamination remain, especially in foundation soils around older houses and apartment buildings -- likely the legacy of lead paint use in these homes.

The new tests can distinguish between the isotopic ratio, or unique geochemical "fingerprint," of lead contamination from different sources, including pre-1970s vehicle exhaust fumes, lead paint from that era, or lead from more recent atmospheric sources.....

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Bare winter fields to disappear as part of new plan for healthy greener countryside

The Conversation, 10 December 2021

Soil is one of the world's most precious resources, but is often overlooked. The soil does many important tasks. It provides food and energy, keeps water clean, acts as a place to store carbon in the fight against climate change, and maintains biodiversity.

But some modern farming and countryside management practices have been degrading our soil, causing erosion and causing other issues in the surrounding landscape.

Now soil is at the centre of a recently announced UK government policy that will pay farmers to improve the environment by growing plants in fields through winter. It could transform how some of England's countryside looks in the winter months and may lead to a more sustainable future for England's agriculture.

The Sustainable Farming Incentive will replace existing payments that were part of the European Union's Common Agricultural Policy.

The new policy aims to establish new standards for arable and horticultural soils (grassland and moorland standards were also published). While the policy, due to be rolled out in 2022, is light on detail, the fact that these initial standards aim to promote soil health is a promising step towards providing and securing these essential ecosystem services on which society relies.

Changing countryside

The plans to encourage the planting of more winter crops will mean that visitors will see legumes such as vetch and grasses such as rye, sometimes planted together. This "cover" is designed to protect the soil from erosion caused by winter rains falling on bare soil by ensuring early,.....

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Nitrogen's impact on soil carbon sequestration

Science Daily, 15 December 2021

Soil organic carbon is a cornerstone of soil health. It improves soil structure while enhancing water- and nutrient-holding capacity, key factors for any agricultural production system. To build it up, farmers incorporate crop residues into soils.

So why, despite decades of residue inputs, is soil organic carbon diminishing in corn production systems? Short answer: it's the nitrogen.

"With intensive nitrogen fertilization, you may get more corn biomass and yield, which means you end up putting more residue into the soil. But you cannot keep that carbon in the soil," says Richard Mulvaney, professor in the Department of Natural Resources and Environmental Sciences (NRES) at the University of Illinois. "The nitrogen in the residues stimulates the microbes to burn carbon off through respiration. So you can put more in, but you can't keep it."

The concept that nitrogen fertilization affects residue decomposition -- and therefore the incorporation of residue into soil organic matter stores -- isn't new. But previous studies showed conflicting results. That's why Mulvaney and Tanjila Jesmin, a doctoral researcher in NRES, set out to clarify how residue quality and the form of nitrogen affect corn residue decomposition in a typical Corn Belt soil.

Thanks to the historic Morrow Plots at Illinois, the team was able to test,.....

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