

Earth's soils bear unmistakable footprints of humans

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The dirt under our feet is being so changed by humans that it is now appropriate to call this the "Anthropocene (or man-made) Age," says a new worldwide overview by Duke University soil scientist Daniel Richter.

"With more than half of all soils on Earth now being cultivated for food crops, grazed, or periodically logged for wood, how to sustain Earth's soils is becoming a major scientific and policy issue," Richter said. His paper appears in the December issue of the research journal *Soil Science*.

"Society's most important scientific questions include the future of Earth's soil," Richter added. "Can soils double food production in the next few decades? Is soil exacerbating the global carbon cycle and climatic warming? How can land management improve soil's processing of carbon, nutrients, wastes, toxics and water, all to minimize adverse effects on the environment?"

"Each of these questions require long-term observation and analysis, and we know far too little about how to answer them in much detail," he said. "We need to work to sustain soils with a greater sense of urgency."

As an example of the challenges, Richter said leading scientists are concerned that agriculture in Africa has so degraded regional soil fertility that the economic development of whole nations will be diminished without drastic improvements of soil management.

"This is an old story writ large of widespread cropping without nutrient recycling, with the result being soil infertility," he said. "And agriculture is only part of the reason why soils are so rapidly changing. Expanding cities, industries, mining and transportation systems all impact soil in ways that are far more permanent than cultivation."

"If humanity is to succeed in the coming decades, we must interact much more positively with the great diversity of Earth's soils," his Soil Science report said. The research was funded by the National Science Foundation, the United States Department of Agriculture, the Andrew W. Mellon Foundation and Duke's Center on Global Change.

A professor of soils and ecology at Duke's Nicholas School of the Environment and Earth Sciences, Richter and his international colleagues have recently established what is described as the first global network of long-term soil experiments, a network with an extensive web site [.](#)

The network has two objectives, he said. "The first is to bring more attention to how fundamental soil is to environmental quality, the global carbon cycle, and climate change, all in addition to soil being the basis for food and fiber production."

The second objective, emphasized in the Soil Science report, "is to strengthen and renew the world's long-term soils research sites, because those provide our best direct observations of how soils are changing on time scales of decades," he said.

"One problem is that such studies have not worked together in the past. Study sites have never been comprehensively inventoried, and many operate without stable institutional support. Several highly productive long-term experiments have even been abandoned in recent years, including important studies in Africa and South America."

Despite those problems, “long-term soil studies are clearly demonstrating the susceptibility of soils to change in response to land management,” Richter said. “They also provide important data to model climate warming and the global carbon cycle.”

Source: Duke University

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