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BioScience

American Institute of Biological Sciences

Soil as an Endangered Ecosystem

More than 99% of food worldwide comes from the soil ecosystem. Rapid erosion of soil is reducing food production—and causing serious losses in biodiversity. Over the past 40 years, approximately 30% of the world's cropland has become unproductive, which has contributed to the malnourishment of more than 3 billion people.

Soil erosion on US cropland each year averages about 13 tons per hectare, or 13 times more than sustainable soil formation. In Africa, Asia, and Latin America, where soil erosion is intensifying, it ranges from 30 to 40 tons per hectare, leaving the land unprotected from rainfall and wind energy. Adding insult to injury is the fact that forestland is garnered to replace the abandoned agricultural land. This accounts for more than 60% of the world's deforestation and is the major cause of loss of biodiversity.

Another concern is the estimated \$20 billion cost of fertilizer nutrients that are lost each year through soil erosion. The soil, with its nutrients and pesticides, is washed into streams and lakes, where it causes serious pollution problems for fish and other aquatic organisms. The offsite environmental and health impacts from soil erosion are estimated at an additional \$18 billion per year.

Not to be ignored is the concern raised by the extremely slow rate of soil replacement. It takes approximately 500 years to replace 25 millimeters (1 inch) of topsoil lost to erosion. The minimal soil depth for agricultural production is 150 millimeters. From this perspective, productive fertile soil is a nonrenewable, endangered ecosystem.

—DAVID PIMENTAL

*College of Agriculture and Life Sciences
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Soil and biological scientists face many challenges and opportunities. With the world's population estimated to reach 8–10 billion by 2050, the wise use of soil ecosystems will become increasingly important for meeting food production needs.

A major role for us as scientists is to educate laypersons, students, colleagues in other disciplines, and policymakers about the importance of science. As soil scientists, we must elevate the visibility of our field. To help do this, the Soil Science Society of American (SSSA) has appointed a committee to develop educational and marketing materials.

We must also be strong advocates for science funding. I encourage each of you to contact your federal and state legislators about the critical need for financial resources. SSSA officials have personally visited program directors at USDA, NSF, DOE, EPA, and NASA to discuss funding opportunities and to offer assistance in seeking increased funding for all the sciences. I look forward to a continuing dialogue on these very significant issues.

—DONALD L. SPARKS

*President,
Soil Science Society of America
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