

Key to cleaner environment may be right beneath our feet

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While many people recognize that clean water and air are signs of a healthy ecosystem, most do not realize that a critical part of the environment is right beneath their feet, according to a Penn State hydrologist.

The ground plays an important role in maintaining a clean environment by serving as a natural [water filtration](#) and [purification system](#), said Henry Lin, professor of hydrogeology and soil hydrology. Understanding the components that make up this integral part of the ecosystem can lead to better groundwater management and smarter environmental policy.

"We look at nature and we see all the beauty and all the prosperity around us," said Lin, "But most people don't know or tend to forget that the key to sustainability is right underground."

Lin, who reports on his research at the annual meeting of the American Association for the Advancement of Science in Boston, said that the earth's outer layer—from the top vegetation canopy to the strata of soils and layers of underground material—helps soak up and purify [water](#) by extracting [excess nutrients](#), [heavy metals](#) and other impurities. The ground can also act as a storage container for freshwater.

About 60 percent of the world's annual precipitation ends up in this zone, Lin said. "In fact, there is more water under the ground than there is in the so-called 'blue waters,' such as lakes and rivers," said Lin.

Besides using freshwater for drinking, people use large amounts of water to irrigate [agricultural fields](#) and as part of industrial operations. The researcher said that just as a global green revolution raised awareness about food security, a "blue revolution" may lead to efforts to [water security](#) with clean, safe water supply around the globe.

"Without water there is no life," Lin said. "Without groundwater, there is no clean water."

Lin said that the system is currently under threat from poor land management practices that fail to consider how ground water is affected by land uses, such as new building projects, underground storage and agricultural operations. Planners should consider, for example, how the ground and plants in an area can affect water run-off. In some cases, not taking the ground and underground features of an area into consideration can lead to flooding, or to the addition of impurities into drinking water supplies.

Besides reaching out to managers and planners, Lin said that the general public also must become more aware of [groundwater management](#) issues.

"In a lot of cases, for the general public and even people from government agencies and funding agencies, it's out of sight, out of mind," Lin said. "But, beneath the surface lies the foundation of our sustainability."

Provided by Pennsylvania State University

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