

Weekly Newsletter
from Agresource Inc.
for turning waste into
opportunity

Takeaway

Healthy soils are the foundation of productive agriculture, resilient landscapes, and thriving ecosystems. Across the world, many soils are becoming increasingly depleted of the nutrients needed to support plant growth and biological activity. Understanding why this occurs is the first step toward restoring soil health and long-term productivity.

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*"Nature does not hurry,
yet everything is
accomplished."*
— Lao Tzu

Why Are Soils Becoming Depleted of Nutrients?

The Nutrient Mining Problem

Every time crops, grass clippings, timber, or other plant materials are removed from a site, nutrients leave with them. Nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, and micronutrients are all taken up by plants and incorporated into the biomass. If these nutrients are not replaced, the soil gradually becomes depleted. This process is often referred to as "nutrient mining." Natural ecosystems recycle nutrients through the decomposition of leaves, roots, and organic matter. In managed systems, however, much of this material is removed, interrupting the natural nutrient cycle.

Soil Erosion Accelerates Nutrient Loss

Topsoil contains the highest concentration of nutrients and organic matter. When wind or water erosion removes this valuable layer, significant amounts of nutrients are lost along with it. Agricultural lands, construction sites, and poorly vegetated areas are vulnerable to erosion. In some regions, soil is being lost faster than it can be naturally replenished.

Declining Organic Matter

Organic matter acts as a reservoir for nutrients and supports microbial communities responsible for nutrient cycling. As soil organic matter declines, soil's ability to store and supply nutrients decreases as well.

Factors contributing to organic matter loss include:

- Intensive tillage
- Excessive soil disturbance
- Removal of crop residues
- Overgrazing
- Limited additions of compost or other organic amendments

Nutrient Leaching and Runoff

Nutrients are not always retained in the soil. Nitrogen, particularly in nitrate form, is highly mobile and can move below the root zone through leaching. Phosphorus and other nutrients may be carried away in stormwater runoff. Heavy rainfall events and poor soil structure can significantly increase these losses.

As nutrients leave the soil profile, both soil fertility and water quality can be negatively impacted.

Reduced Biological Activity

Soil microorganisms play a critical role in converting organic materials into plant-available nutrients. When soils become compacted, excessively dry, overly disturbed, or low in organic matter, microbial populations decline. Reduced biological activity slows nutrient cycling and limits the soil's natural ability to replenish fertility.

