

EXPLORE THE SCIENCE

HOW BIOSOLIDS BUILD SOIL.

Healthy soil isn't just dirt. It's a living system of nutrients, organic matter, and microbial life that crops, forests, and ecosystems depend on. Biosolids **return what soil needs to grow** - the same essential elements farmers buy in commercial fertilizer, applied responsibly.



Photo: Trudy Johnston's home garden, grown with biosolids · Courtesy Material Matters, Inc.

THE SHORT ANSWER

Biosolids deliver the same nutrients plants get from commercial fertilizer - plus organic matter that improves soil structure, water retention, and long-term productivity.

N

NITROGEN, PHOSPHORUS, POTASSIUM

The three macronutrients every crop needs - the same N-P-K found in commercial fertilizer.

+

CALCIUM, MAGNESIUM, SULFUR

Secondary nutrients that support strong roots, healthy growth, and balanced soil chemistry.

Mn

ESSENTIAL MICRONUTRIENTS

Copper, zinc, iron, manganese, molybdenum, and boron - elements humans get from multivitamins.

~

ORGANIC MATTER

Improves tilth, reduces compaction, increases water retention, and feeds soil microbes.

"

Crops were much more drought resistant than crops that did not receive biosolids. Yields of corn and hay **more than doubled** after application.

— JOE HAZELGROVE, FARMER · CUMBERLAND COUNTY, VA

THE EVIDENCE

2x+

CORN & HAY YIELD INCREASE
DOCUMENTED IN VIRGINIA TRIALS

10-85%

HIGHER CROP YIELDS VS.
COMMERCIAL FERTILIZER (YUMA, AZ)

3x

TREE GROWTH INCREASE IN
PACIFIC NORTHWEST SILVICULTURE

REAL-WORLD RESULTS

- 1 STRONGER, MORE DROUGHT-RESISTANT CROPS**
Multiple Virginia farms reported corn and hay yields more than doubling after biosolids application, with crops showing significantly better drought resistance compared to untreated fields. Similar results have been documented across the Mid-Atlantic.
- 2 FOREST PRODUCTIVITY GAINS**
University research in the Pacific Northwest and U.S. Forest Service studies in the Southeast have shown up to three-fold tree growth increases on land fertilized with biosolids - particularly on low-productivity sites needing soil rebuilding.
- 3 HEALTHIER SOIL STRUCTURE LONG-TERM**
Beyond nutrients, biosolids add organic matter that improves cation exchange capacity - the soil's ability to hold and release nutrients over time. The result: soil that holds more water, resists erosion, and supports microbial life crops depend on.

LEARN MORE

SEE IT WORKING IN THE FIELD

mabiosolids.info

SOURCES

U.S. Environmental Protection Agency, 1994. · Water Environment Research Foundation, 1993. · Statement by Joe Hazelgrove, 2005. · Van Ham & Kimmins, "Recycling Biosolids and Other Organic Wastes as Slow Release Fertilizers," Science Council of British Columbia, 1994. · Dickens, "Effect of a One-Time Biosolids Application in an Old-Field Loblolly Pine Plantation," USDA Forest Service, 2002.