

# LAND

## Biosolids

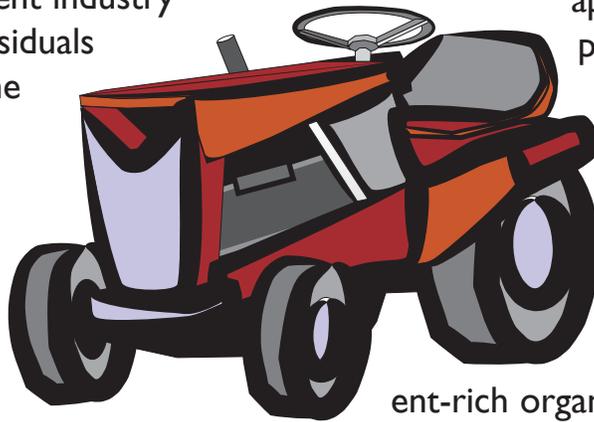
Biosolids are solid, semisolid and liquid residues generated during the treatment of sanitary sewage, or publicly owned treatment works (POTW). The term was introduced by the wastewater treatment industry in 1991 to describe the residuals or solids created during the biological treatment of wastewater (hence “biosolids”). The U.S. Environmental Protection Agency (USEPA) recently adopted the name: biosolids” to differentiate high quality treated sewage sludge from raw sewage sludge and from sewage sludge containing large amounts of pollutants. Therefore, sewage sludge must be processed to meet USEPA standards for beneficial reuse before they can be called biosolids.

In 1993, EPA promulgated Standards for the Use or Disposal of Sewage Sludge (Code of Federal Regulations title 40, Part 503), which set pollutant limits, operational standards for pathogen and vector attraction reduction, management practices, and other provisions intended to protect public health and the environment from any reasonably anticipated adverse effects from chemical pollutants and pathogenic organisms.

After treatment and processing, biosolids can be recycled and applied as fertilizer to improve and maintain productive soils and stimulate plant growth. The controlled land applications of biosolids complete a natural cycle in the environment. By treating sewage sludge, it becomes biosolids that can be used as a valuable fertilizer, instead of taking up space in a landfill.

Biosolids are the nutrient-rich organic materials resulting from the treatment of domestic sewage in a wastewater treatment facility. Biosolids are a beneficial resource, containing essential plant nutrient and organic matter and are recycled as a fertilizer and soil amendment. When treated and processed, these residuals can be recycled and applied as fertilizer to improve and maintain productive soils and stimulate plant growth.

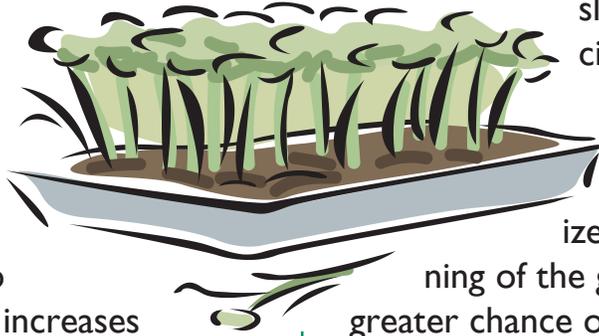
Biosolids contain the three primary crop nutrients: nitrogen, phosphorus, and potassium. Biosolids contain several other nutrients that crops need in smaller amounts, such as calcium, magnesium, sulfur, zinc, copper, and iron. Most commercial fertilizers do not contain these necessary micronutrients.



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Agricultural uses of biosolids, that meet strict quality criteria and application rates, have been shown to produce significant improvements in crop growth and yield.

By using biosolids, farmers are able to replenish the soil's organic matter and help maintain long-term productivity of the soil. The organic matter in biosolids helps to improve soil structure and increases the soil's ability to absorb and store water which helps sustain crops through dry spells



and reduce runoff and soil erosion. Organic matter also releases nitrogen and other nutrients over several growing seasons as soil bacteria slowly break it down. This slow release is more beneficial to crops as the nutrients become available as crops need them. Most nutrients in commercial fertilizer are available at the beginning of the growing season and have a greater chance of leaching away in the soil, especially nitrogen.

**Land** application is closely monitored to ensure that it is safe and there are no increased risks to humans, animals, or the environment

**EPA** estimates that approximately 7.1 million tons of biosolids are generated by the 16,000 wastewater treatment facilities. About 63% of all biosolids are beneficially used as a fertilizer on farm land following treatment; 17% ends up buried in a landfill; 20% is incinerated; and about 3% is landfill or mine reclamation. By 2005, that amount is expected to reach 7.6 million tons (66% of the total) and 8.2 million tons (70%) by 2010.

**In Oklahoma** approximately 52,500 tons of biosolids were generated in 2003. About 80% is land applied and 20% goes to landfills.