

Soil, like any other part of the environment, frequently is host to pollutants and contaminating substances. Yet plants still can grow without human intervention to replace lost nutrients. What are the qualities of soil that encourage plant growth, and how can communities make them more widespread?

Organic matter is decomposed material that was once alive, such as leaves, fallen trees, animal remains, and soil microorganisms. This material is beneficial to the soil, as it stores and releases nutrients that promote plant growth. It also holds water, which improves soil structure and prevents erosion. According to the U.S. Composting Council, soils should contain at least 5% organic matter, but many cities fall beneath this threshold.

Tacoma, Washington - Biosolids, or recycled sewage waste, can be a great source of organic matter. The city of Tacoma provides a free biosolids-based soil product to gardeners, recycling 4,000 dry tons of biosolids each year. This keeps waste from draining back into the water supply while also benefiting the soil, and the program has resulted in 30 new urban gardens since 2010.

San Francisco passed the Mandatory Recycling & Composting Ordinance in 2009. Three bins are used for waste -- black for trash, blue for recycling, and green for compost. Food scraps such as apple cores, takeout containers, and coffee grounds go into the compost bin, and facilities make it usable for soil. The use of compost in soil increased crop yields, the amount of carbon stored in the ground, the amount of water stored in soil, and nutrient contents.

In areas that are not intended for farming, planting trees can improve the soil. Pioneer species or fertilizer trees are resistant to drought, and can thrive in dry areas that are at risk of desertification. The Moringa tree can be planted in depleted soils in Africa and the Caribbean. Its roots break up the dirt, and the leaves that fall to the ground decompose, and are broken down by microorganisms, creating compost that will nourish the tree and other plants.

Healthy soil can help mitigate the effects of both floods and droughts. Many farms have historically only planted cash crops, growing a field full of corn, for example, during the spring and summer months, and leaving the field bare for the rest of the year. Farms are now transitioning to cover crops, which are planted in the off-season, and perennials, which grow year-round. Cover crops like grasses can also be used as grazing fields for livestock. The roots of these plants hold soil in place by making it "spongier" with water. The plants can help to absorb water in a flood, and the soil holds onto water in a drought. This saves downstream cities from many of the worst effects of these weather conditions.