



## **Soil Characteristics as a Functioning Natural System**

Soils are not just passive mediums for plant growth; they are dynamic, self-regulating natural systems with physical, chemical, and biological properties that enable and sustain life. Farming is not what gives soil its value—rather, it is the inherent composition and functioning of the soil itself that makes agriculture possible.

### **1. Soil is a Complex Living System**

Healthy, agricultural-grade soils are teeming with life—microbes, fungi, invertebrates, and plant roots all form intricate relationships that continuously cycle nutrients, manage water, and support plant growth. This living ecosystem is essential for fertility. No human-made system has been able to replicate the full complexity and effectiveness of natural soil biology.

### **2. Physical Structure and Texture**

The texture of soil—its proportion of sand, silt, and clay—determines how well it retains water, drains excess moisture, and allows for root penetration. Agricultural soils naturally balance these elements to support plant roots while managing air and water availability. Compacted, rocky, or overly sandy soils lack the physical framework to support productive agriculture, regardless of how much artificial input is added.

### **3. Nutrient Availability and Cycling**

Natural soils have evolved to hold and release nutrients through organic matter and mineral content. High-quality agricultural soils contain a natural balance of nitrogen, phosphorus, potassium, and micronutrients that plants require. While fertilizers can supplement nutrients, they cannot replicate the precise timing and buffering capacity of a living soil system. In poor or non-agricultural soils, added nutrients often leach away or become unavailable, rendering them ineffective.

### **4. Soil pH and Chemistry**

The chemical composition of soil affects nutrient solubility and plant uptake. Agricultural soils typically maintain a near-neutral pH, fostering optimal nutrient absorption and microbial activity. Soils that are too acidic or alkaline inhibit plant growth, and adjusting pH artificially is expensive, temporary, and rarely completely effective—especially at scale.

### **5. Biological Resilience and Self-Regulation**



Healthy soils contain symbiotic relationships, such as mycorrhizal fungi, which extend root systems and improve water and nutrient uptake. These are naturally occurring and not fully replicable in greenhouse or hydroponic environments. Poor soils lack this resilience, and without the biological support systems present in naturally fertile soils, plants struggle to thrive—even in controlled environments.

---

### **Why Farming Depends on Natural Soil Systems**

Farmers don't create agricultural soils; they *use* them. The success of farming operations, especially those that grow sensitive or high-value crops like nursery stock, is limited by the natural properties of the soil beneath them. Even with the use of greenhouses, irrigation, fertilizers, and technology, farmers cannot overcome the absence of a fundamentally healthy and functioning soil system.

You cannot grow robust nursery stock on desert sand, toxic clay, or compacted urban fill—even if you dump in all the modern chemicals and inputs. These soils do not have the biological life, structure, or chemistry necessary to support plant health. It is the soil that allows the farmer to succeed—not the other way around.

---

### **Conclusion**

Soil characteristics are not secondary to agriculture—they *are* the foundation that makes agriculture possible. Soil, in and of itself, is a functioning natural system. Farming is simply one way humans tap into the complex and irreplaceable functions that soil systems provide. Without the right soil, there is no agriculture—only the illusion of it, propped up temporarily by unsustainable means.

Kurt Clemence

General Manager

Tree Source – Boring OR

Office: 503-668-4577 x 300

[kurtc@treesource.com](mailto:kurtc@treesource.com)