



# SOIL

Soil, also called earth, is the covering of our planet. Known in the scientific community as the “pedosphere,” most lifeforms could not exist and virtually none could thrive without it. Along with water and air, it is the basis of life. It is full of life itself: a complex structure of organisms living within it and keeping it healthy. In the natural world, soil is moving all the time.

Animals, insects, birds, all move it around as part of their daily routine, such as:

- digging for food.
- burrowing for shelter.
- building colonies just under the surface of the soil, using it to create mounds.
- carrying it about on their bodies and dropping it elsewhere.



***Natural elements play a part in the life of soil: rainfall can cause landslides, moving huge amounts of soil. Earthquakes and volcanoes change whole landscapes. Wind dries soil out, and moves it around. Sun bakes the soil dry. Rivers take soil along their courses.***

## **What is soil? How is it made?**

Soil is made from the stone on which it lies and the environment that surrounds it, which creates *humus*. Humus comes from the organic material which falls onto the surface of the soil. In a deciduous forest there will be rich abundant food for the soil, such as leaf fall, animal manure, the vegetation growing on the forest floor (bramble bushes), and fruits and nuts. All of these things fall to the ground and are drawn into the soil where over time it will be munched, excreted, dissolved, infused with enzymes, to become humus. Over time, this worked on by the organisms in the soil to decompose them down to a fine tilth. These organisms include worms, nematodes, mitochondria, and a whole host of microorganisms. The type of soil that results varies depending on the type of rock, the variety of material that falls onto the soil, and environmental conditions.

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One forest will vary from another in the type of soil, depending on the type of rock it sits on and the type of trees and the fauna and flora feeding into it. This all plays into deciding how acidic or alkaline the soil will be. The soil from these very different environments will also be totally different. In a desert area, there will be very different conditions. The hot, dry environment creates a very different soil because there are few trees, with tough dry foliage. Less foliage means less animals, which means less animal manure and thus less moisture. As a result, there will be less vegetation growing. Left undisturbed, each soil type and the fauna and flora who depend upon it and feed it, will live in a symbiotic balance.

### **The Influence of Human Activity on Soil**

In cities it can be difficult to find any soil, as it has all been compacted and covered in roads or buildings. In gardens or on waste ground, however, nature will be busily working away to build new soil. It is amazing how an undisturbed corner under a tree will soon start to build a new community of life, plants will colonise the cracks in the concrete, and decaying buildings will host shrubs.

The biggest threats to the quality of the soil, even in the countryside, are:

- Pollution in the air, which also comes down to the soil as raindrops.
- Pollution in the water courses, in the form of fertilizer run-off from fields and discharge from industry into the rivers.
- Pollution from all the chemicals and hormones used by people in their day to day lives, and poured down the drains.
- Herbicides and pesticides applied to the fields
- Animal slurry pumped onto the fields, as fertiliser but if not organic then this too contains chemicals and hormones.
- Manure from the animals in the field. If they are not organic, they will be laden with chemicals and hormones.
- Growing monoculture crops (using the same piece of land again and again for the same crop with no rest or rotation).



***For the future of the planet, it is imperative that soil is cherished by working organically and treading lightly!***

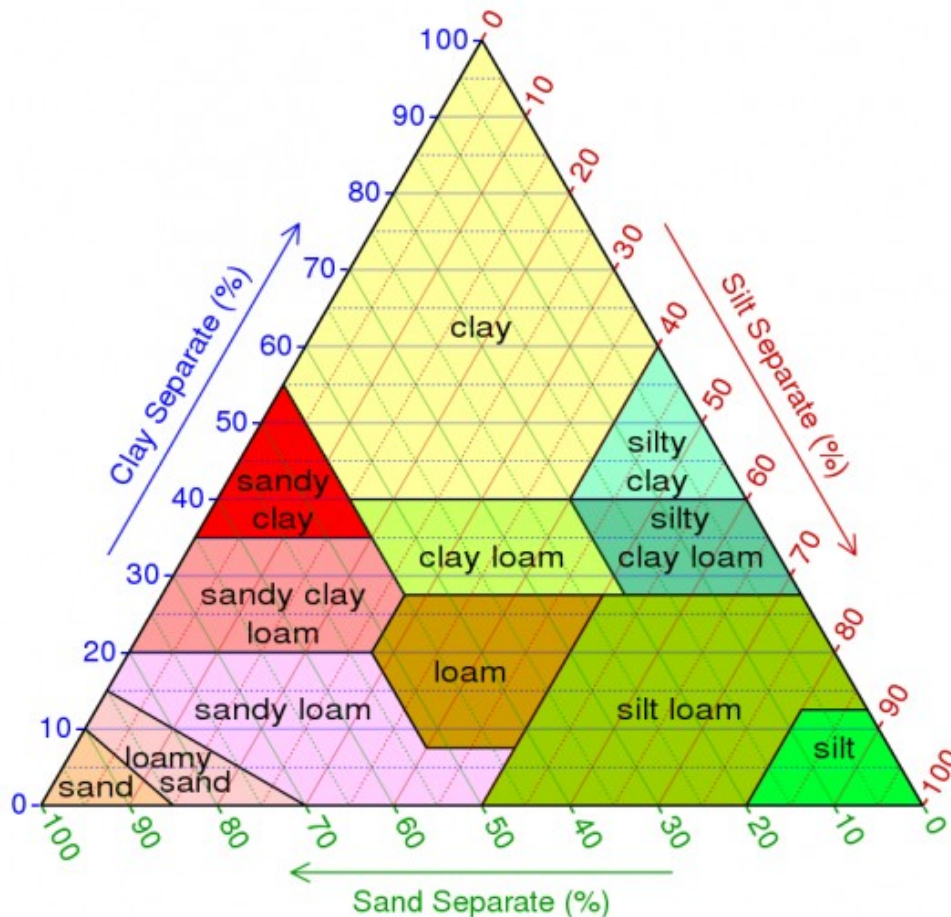
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## Soil Analysis

Traditional farming had developed soil management techniques over generations. Through observation, their understanding of nature improved. Scientific methods have confirmed and extended this knowledge, showing scientifically what good farmers have always known: that the soil is a living and complex ecosystem.

Just looking at the land can tell you a lot, but testing the soil allows the grower to get the level of nutrients in the soil and its acidity level. Digging up a clump allows a viewing of the structure: a good soil appears to be made of clumps that break down into smaller clumps and crumbs in a fractal manner. The soil should be dark, decayed organic matter breaks down to carbon, which gives the soil a dark brown colour. Life---insects, worms and roots---should all be visible and possibly appear as white strands. The soil should appear to have random air gaps between the blocks. Testing kits are available from garden centres or rural co-Ops. More extensive testing is available from professional testing labs, who can also test for the presence of pollutants.



**Soil has three main components: sand, silt, and clay. Soils are classified according to their mix of these three components (see diagram above).**

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### No-Dig Method

Plants, especially in their younger stages, can benefit from a light and aerated soil. Seeds also benefit from being covered, as otherwise they may dry out or be eaten. Digging the soil is a way to achieve this, but it may also damage the soil structure, harm soil organisms, and encourage weed seeds to grow. Some farmers have developed no-dig techniques that do not damage the soil.



Modern farming has increased field sizes, deep steel ploughshares, and uses tractors that weigh over 20,000 kilos (not including fuel and the plough). It commonly uses chemical fertilisers that do not feed the soil and pesticides that harm the life of the soil. Soil loss, soil compaction, as well as the death and loss of diversity of the soil life are all caused by the large-scale use of ploughing and the other chemical methods used in modern farming.

### Keeping Soil Healthy

Soils are living ecosystems, which need food. Soil is fed on organic matter. The insects, fungi, worms, and bacteria will break the composts down and release nutrients, while also aerating the soil and building soil structure. The most important factor in soil health is the incorporation of composts and other feeds.



Rain can wash away many of the soil components over time. Rain and water dissolve calcium and magnesium from soil of rock that it flows over, washing it away to sea where it eventually is deposited as limestone. This makes soils more acidic. Acid soil can damage many plants, so growers add crushed limestone to the soil to reduce acidity and to maintain the calcium-magnesium balance. Dolomitic and

other rock dusts also contain trace nutrients and can absorb carbon into the soil.

Some soils are naturally alkaline and some plants have evolved to tolerate acid conditions. The use of additives, like sulphur for acidity and limes for alkalinity, allow growers to develop the correct conditions for each plant type. In depleted soils, the addition of fungal spores and bacterial cultures may also help restore a natural balance.

### Related Videos & Websites

- ⇒ [For a Comprehensive Article on Soil](#) ⇐
- ⇒ [What is Soil?](#) ⇐
- ⇒ [Soil Types](#) ⇐
- ⇒ [What is Humus](#) ⇐
- ⇒ [Most Important Three Nutrients in Soil](#) ⇐

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