

How to Conduct a Rapid Soil Test



WHAT IS IT?

A simple way to assess the health of a soil without expensive equipment or lab tests.



WHY DO WE DO IT?

Even on a small compound, soil quality can vary. Program staff can help farmers assess the health of their soil before deciding where to place a garden. Conducting a soil test can also help build farmers' knowledge about what a healthy soil is and what soil management steps can be taken to improve the health of a soil.

TERMS USED

Soil compaction: Compaction happens when soil particles are pressed together, reducing pore space that holds air and water within the soil. This happens through tillage or when wet or moist soil is driven on or stepped on, either by animals or humans. Farmers using permagardens should try to avoid compaction as much as possible as compaction reduces the air and water necessary for biological life in soils.

Soil texture: The proportion of sand, silt and clay sized particles within the soil.

Conduct a Rapid Soil Test

Adapted from Permaculture Association UK's [Soil Test Handbook](#)

METHOD



STEP 1

Check **soil temperature** by putting your hand or wrist on the soil. Compare the surface temperature of soil that is both covered and uncovered.

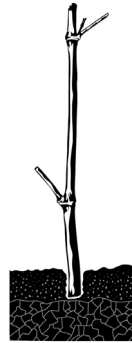
- The temperature of a healthy soil surface is that of a normal healthy human.
- Below the surface the soil should be cooler to allow plants to grow well.
- If the soil surface is exposed to the sun it will overheat; this makes it difficult for plants to grow and for the soil life, such as earthworms, to survive.
- Covering soils with either mulch or living plants is the best way to keep the soil temperature optimal for plant growth and soil life.



STEP 2

Check **soil smell** by digging a small hole and carefully smelling a handful of soil.

- A healthy soil has an earthy and fresh smell.
- If there is no smell at all, which is often the case with very sandy and dry soils, the soil needs lots of organic material added to it.
- If there is a strong putrid smell, the soil is waterlogged because it is not draining properly. These soils should not be used for crop production, or they should be amended with a lot of dry material and compost.
- If the soil has a strong chemical smell, it is best not to use it.



STEP 3

Check **soil compaction** with a 80-100 cm long stick. Push the stick into the soil and see how far down it goes before it hits compaction. Remove the stick and measure the depth of loose soil.

- Soils that are compacted do not have pore space between soil clumps where air and water can easily flow and roots can easily grow. Soils easily get compacted by people and animals walking on them. It is difficult to cultivate a field with a hoe deeper than 20 cm, but roots on healthy plants often need 60 cm or deeper to grow.
- In order for plants to grow well, soils should be deep, loose, and easy to dig. An ideal depth of soil before hitting compaction is 60 cm.
- Adding organic material and keeping soils covered with vegetation will reduce compaction over time as plant roots break up compacted areas and organic material clumps soil so that pores can re-form.



STEP 4

Check **soil structure** by carefully removing a few large clumps of soil from the hole. Examine their outer surface and break them apart to see if they have any air pockets or pores running through them.

- A healthy soil is soft and crumbly and made up of clumps of different sizes that retain their shape even when wet. The pore spaces between these clumps allow water and air to flow through the soil. Pores are used by soil life to burrow through the soil. Soil life also creates more pores as they move through the soil that are then used by plant roots to grow and access air and water.
- In degraded soils, there is a lack of organic matter and soil life, which makes it difficult for these pores to form. This means there is poor water infiltration and water runs off the soil quickly rather than soaking into the soil.



STEP 5

Check **soil texture** by taking a handful of soil, wetting it slightly, and rolling it into a sausage shape.

- Soil that is best for plant growth contains just enough clay and silt to make it stick together into a sausage shape. This kind of soil is called loam. It is good for growing plants because it has the right balance of sand, silt, clay, and organic matter to enable it to act as a 'sponge' that will retain enough moisture for plants to use.
- If soil has heavy clay content, you will be able to roll the sausage into a ring. Clay soils will easily become waterlogged and are difficult for plants to grow in.
- A soil that falls apart when you try to roll it into a sausage is a sandy soil. Sandy soils lack organic materials and nutrients and will drain very quickly. They will need a lot of organic materials added to them to get a sponge-like texture.



Tips for building healthy soil:

- Add organic material and compost to soil as much as possible.
- Protect soils from sun and wind exposure by covering them with mulch or vegetation.
- Protect soils from compaction by ensuring they are not stepped on by humans or animals.



STEP 6

Check **soil moisture** by taking a handful of soil and squeezing it.

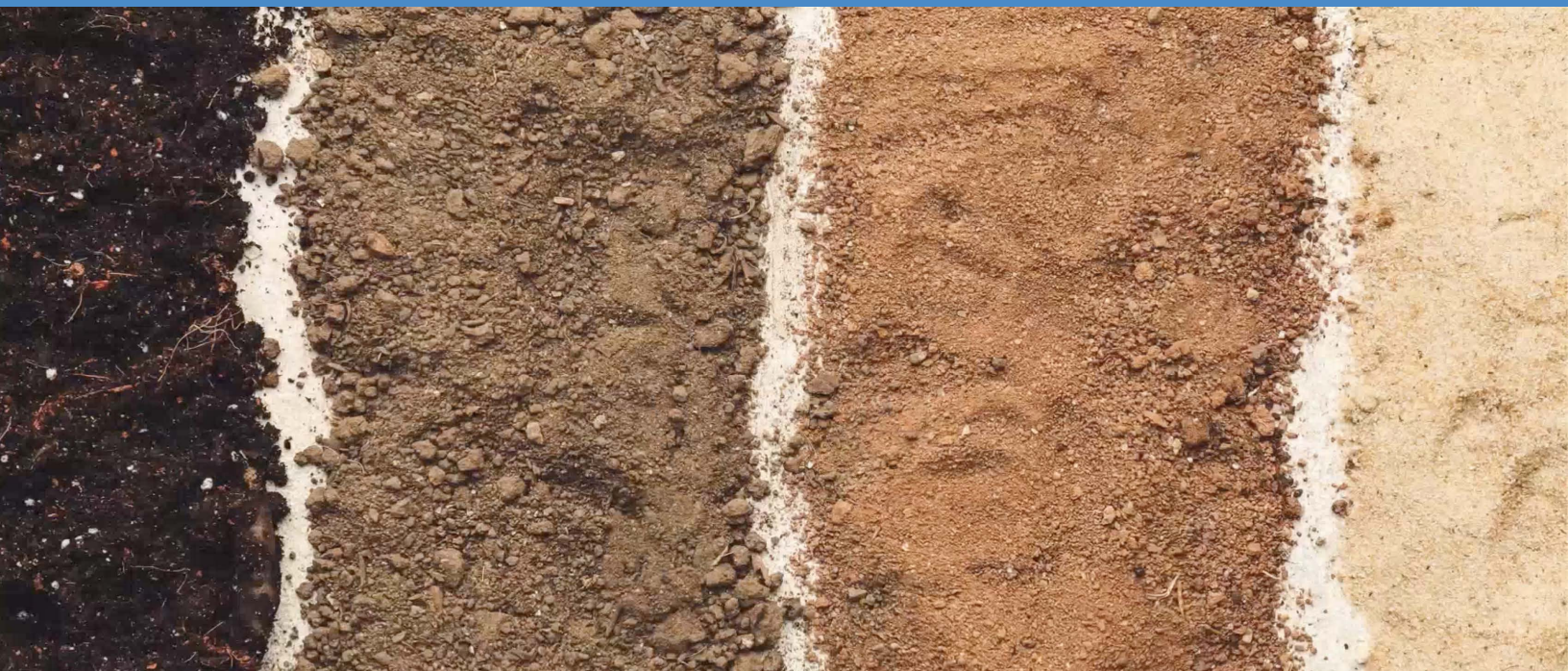
- *Too dry:* There is no moisture when you squeeze the soil, and it does not stick together. This soil will need lots of organic material added to help it retain moisture and allow plants to grow.
- *Moist:* No water comes out when squeezing the soil, but it still feels wet. This is perfect for growing plants.
- *Wet:* If there is water coming out when you squeeze the soil, then the soil is too wet. This will cause plant roots to rot.



STEP 7

Check **soil life** by making the hole slightly bigger and sifting through the soil to look for signs of life.

- A healthy soil is filled with earthworms, bugs, and other soil critters.
- Earthworms and other soil critters help decompose plants so that the nutrients in this material can be returned to the soil. They also help create pores in the soil, which aid in the infiltration of water and air into the soil.
- Lots of earthworms, other soil critters, and decaying organic material are an indication that the soil also contains soil microbes. Soil microbes are impossible to see, but they are essential to returning nutrients to the soil. Soil microbes can even help plants fight off many soil diseases. Soil microbes flourish in moist soil because they need water to move around to feed on decaying organic material.



This document is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of the SCALE Award and do not necessarily reflect the views of USAID or the United States Government.