

WHAT YOU WILL NEED:

- TerraTest kit
Bucket, Sieve, Digital Scales, Plastic Jars, Terra Test Solution
- A timing device
Cell phone or watch etc
- Spade or shovel
- Ruler or tape measure
- Small quantity of water
- Camera
Useful to provide a visual record

TERRA TEST

Instruction guide

Most mineral¹ soils can be classified according to the relative percentage of sands, silts and clays that make up the subsoil profile. A sandy soil, being “coarse” in structure will hold less irrigation water. A finer textured soil such as a silt or silt clay has better water holding capacity. Knowing your subsoil profile is the first step in understanding how best to irrigate your land.

The Terra Test Kit provides an easy method of sampling your subsoil, and separating out sands, silts and clays. The process (using water) is known as “Sedimentation” and takes about 48hrs to complete. The result of this separation is the numerical ratio of **sand to silt to clay**. Using this ratio, in combination with the Terra Test Calculator you can identify your **Soil Textural Class** (eg: a silt loam) and its **Water Holding Capacity**.

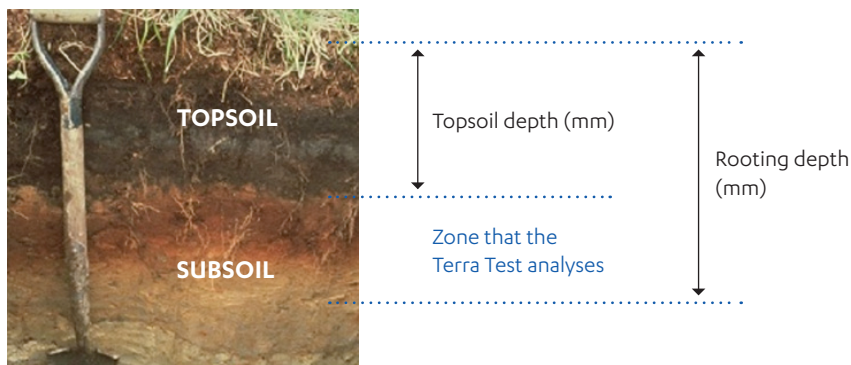
By taking multiple samples over your farm, you can easily build up a farm-wide soil map. This will help you optimise your irrigation water use, target problem areas, maximise overall production and reduce runoff and leaching.

1. *Mineral soils are those produced from the breakdown of rock. This contrasts with “organic” soils such as peat. If you have a peat or other highly organic soils, then the Terra Test is not recommended*

THE METHOD

SAMPLE COLLECTION

1. Select an area which is representative of the paddock, and currently growing pasture or crop. Avoid rocky outcrops, bare areas of ground or trees.
2. Using a good spade, remove the turf, then dig a rectangular hole at least 300mmW x 500mmL by 500mm deep with nice vertical sides. As you dig, separate topsoil from the subsoil. It is the subsoil you are after. If stone is present, keep this mixed with the soil (DO NOT separate out the stone!).
3. Observe the cut face of the soil.



Estimate the following:

- i) Depth of topsoil (in mm)
- ii) Rooting depth of the pasture or crop (in mm)

Note that roots usually penetrate well into the subsoil layer. For pasture growing on good "open" soil you can expect the rooting depth to be around 400mm.

Record Topsoil and Rooting depths in your **"Soil Record"** sheet

4. Next, place the sieve on the bucket, turn ON the scales, and weigh the empty sieve and bucket together. This reading is the **"Tare Weight"** (typically about 0.8kg). Write this down under "Tare Weight" in the "Soil Record" sheet provided.

Note the scales will hold the reading steady even after releasing the load. Press the ON/OFF button to reset to zero.

5. Load several shovel-fulls of soil into the sieve, and shake through. The main function of the sieve is to separate out stone (and any sticks or remaining roots).

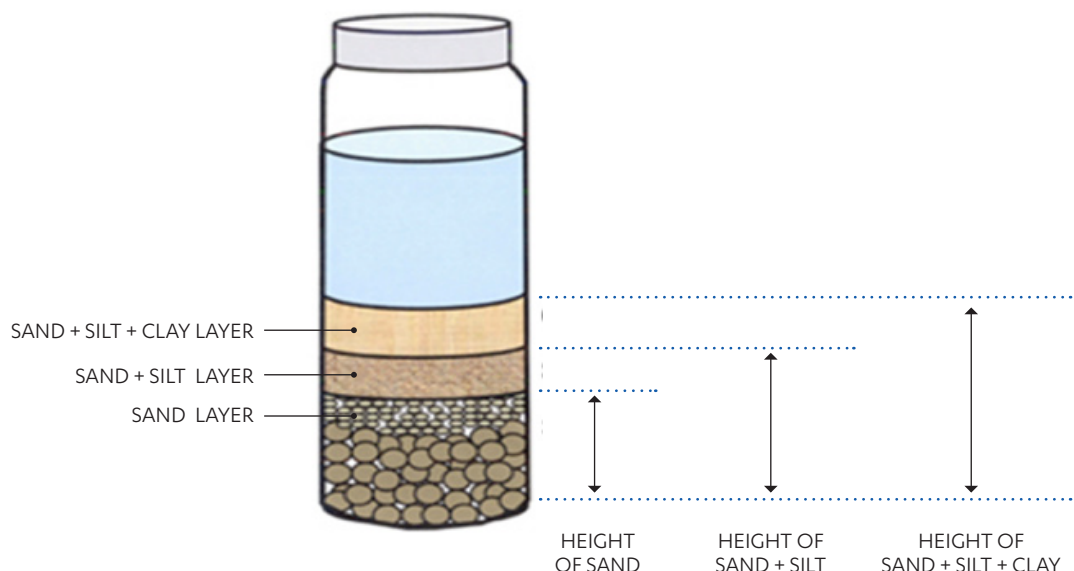
Make sure you carefully push ALL soil clumps through the sieve by hand. You only want to leave stones (and any remaining sticks, roots etc) in the sieve.

6. Weigh the bucket, soil and sieve complete. This reading is the **"Weight with Soil"**. Record in your "Soil Record" sheet. Now reset the scales to zero.

7. Take the sieve, throw out the contents, then return empty to the bucket. Now weigh again. This reading is the **"Weight Minus Sieve Contents"**. Record in your Soil "Soil Record" sheet.

SAMPLE SEPARATION

1. Take a representative sample of sieved soil from the bucket and fill a plastic jar (from your kit) to about 1/3 full.
2. Add water until the jar is about 2/3 full in total, and then add a few drops of Terra Test Solution (supplied in the small squeeze bottle).
3. Tighten lid securely. Label the lid with the marker pen provided. Typically you should identify the soil location eg: north corner paddock 12...
4. **SHAKE VIGOROUSLY FOR AT LEAST 10 MINUTES.**
This shaking breaks apart the soil into individual particles. The success of this test depends on complete separation. Keep shaking for 10 complete minutes!
5. If further sampling is required, head to the next site and repeat the "Sample Collection" steps above, and steps 1 – 4 of "Sample Separation".
6. When you've completed soil sampling, head back with your samples.
7. Now, take the first jar and shake vigorously for about a minute to redistribute soil particles. Then set the jar down (where it won't be disturbed for 2 complete days!) and immediately start your timer.
8. After 60 seconds, note the level of the settled particles (mostly sand). Measure the height in mm from the base of the jar to the top of this layer on the scale provided. This reading is "**Height of Sand**". Record in the "Height of Sand" column.
9. If you have further samples to test, repeat steps 7 & 8 for each, and make sure you record results in the "Height of Sand" column for each.
10. After 48 hours, note the silt and clay layers that have been added. Measure the following: Height of "Sand + Silt" (see below) and height of "Sand + Silt + Clay". Record each in the correct columns of your "Soil Record" sheet.





TERRA TEST CALCULATOR

Once you have conducted your Terra Test, use this online calculator to determine your results.

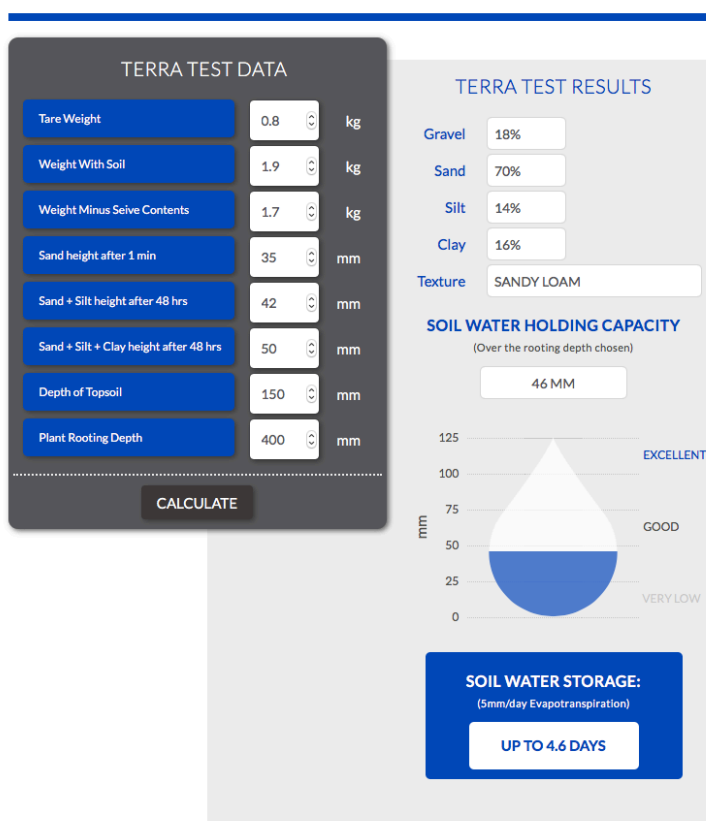


SAMPLE ANALYSIS

Now go to the WaterForce Terra Test site: www.waterforce.co.nz/terra-test-calculator
(Or click on the Terra Test link, shown above on the WaterForce homepage)

Transfer your eight readings from your Soil Record sheet into the Terra Test Calculator. Hit the "Calculate" button.

Depending on your input values, your results may look something like to the following.

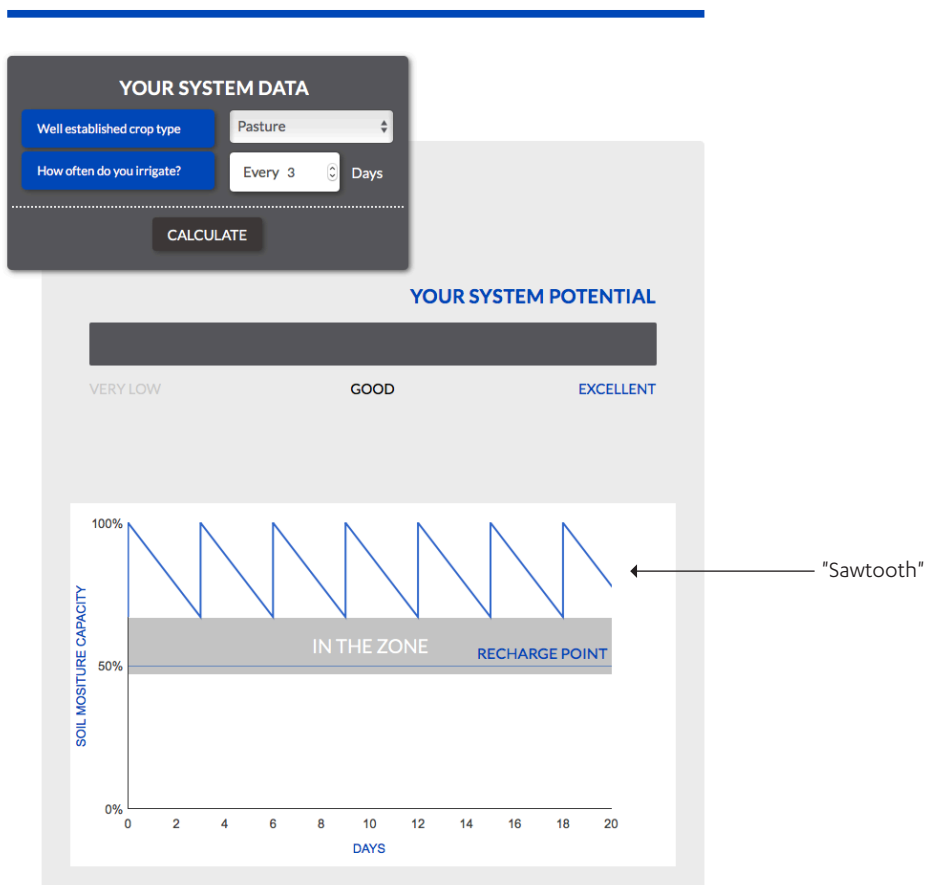


OF PARTICULAR NOTE ARE THE FOLLOWING:

- Percentage of Gravel (in this case 18%)
- The Percentage of Sand, Silt and Clay (in this case 70%, 14% & 16%)
- Your Soil Texture Class (in this case Sandy Loam)
- Your Soil Water Holding Capacity (In this case 46mm OVER THE ROOTING DEPTH)
- Potential Water Storage of 4.6 days FOR YOUR SOIL AND CROP

Next, scroll down to the second part of the calculator. Select your crop (eg: pasture) and your usual irrigation frequency (eg: 3 days), and hit “Calculate”

A typical result may appear as below:



The “sawtooth” provides a “picture” of how your irrigation system is probably performing. The “Your System Potential” slider also gives an indication of performance.

Ideally you should aim to have the bottom edge of the sawtooth “in the zone”. If this is not the case, then you may need to re-adjust your irrigation frequency (by adjusting “how often do you irrigate”).

NOTE: these results are based on an assumed level of Evapotranspiration of 5mm/day

For more information, watch the Terra Test video. The video link can be found within the “Terra Test Calculator” online.

SOIL RECORD

IN THE Paddock	Soil Location & Crop Type						
	Tare Weight (Kg)						
	Weight with Soil (Kg)						
	Weight minus sieve contents (Kg)						
	Rooting depth (mm)						
	Topsoil depth (mm)						
TERRA TEST	Height of sand (mm)						
	Height of sand + silt (mm)						
	Height of Sand + silt + clay (mm)						
TEST RESULTS	Sand (%)						
	Silt (%)						
	Clay (%)						
	Gravel (%)						
	Soil texture class						
	WHC (mm)						

Name: Address:

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waterforce.co.nz