# SOIL WATER INFILTRATION

## DEFINITION

Infiltration is the downward entry of water into the soil. The velocity at which water enters the soil is the infiltration rate. Infiltration rate is typically expressed in millimeters or centimeters per hour. Water from rainfall or irrigation must be able to enter the soil for it to be valuable.

## TEST

Water infiltration is an indicator of the soil's ability to allow water movement into and through the soil profile. Soil temporarily stores water, making it available for root uptake, plant growth and habitat for soil organisms.

Knowing how easily water infiltrates into your soil tells you how well it is soaking up rain.

**You want water to be stored in the soil profile, and not to run off into water courses.**

# SOIL WATER INFILTRATION

## FIELD

- **Material :** Metal tube, Hammer and wood block, Marker, 500 mL bottle or container, Water, Stopwatch or timer

- **Time needed:** take around 15-30 min per sample (depending on infiltration rate)
- **Procedure:**

1. Select one or ideally two sample(s) site per zone

2. Label these points with numbers, letters or names (e.g. inf1) both physically (e.g. using marking sticks) and on your site map so that you are able to come back to them again for taking subsequent measurements

3. Free a 1x1 m area of soil from vegetation

4. If the soil is too dry: Soak the soil slowly for several hours with water before the test until saturated OR do the test after 3 days after a substantial rainfall event with a clear forecast for the next three days.

4. Clear sampling area/trim vegetation

5. Drive the metal tube in the soil it is half-way in

6. Start the timer as you pour 500 mL water as gently as possible into the tin

7. Stop time when water is infiltrated (when surface is just glistening rather than submerged). If soil is uneven, count time until half of the surface is exposed and just shining.

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8. Record time counts for each of the sample sites/management areas in the following table.

## RESULTS

How long did it take, in minutes, for the water to completely infiltrate?

| Sample | Sample 1 | Sample 2 | Sample 3 | Sample 4 | Sample 5 | Sample 6 |
|---|---|---|---|---|---|---|
| **Site** | | | | | | |
| **Date** | | | | | | |
| **Time (min)** | | | | | | |

**Basic infiltration rates, based on FAO data are shown below:**

- Quick draining soil (5 minutes or less) will not hold the water plants need in dry weather. Slow draining soil (15 minutes or more) may become waterlogged.
- Faster rates can suggest good crumb structure and aggregation, such as a healthy soil with high organic matter.
- Slower rates suggest the presence of compaction, reduced porosity (high traffic by machinery and/or livestock) and lower organic matter.

## INTERPRETATION

If your infiltration rate is quick, it indicates your top soil structure is good, with stable aggregates, around which water can percolate down into the soil profile.

If your infiltration rate is slow, it indicates your top soil structure is poor. The top soil has unstable aggregates and is compact, blocking water from percolating downwards. Instead water runs off taking topsoil and nutrients with it.

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- Healthy soils hold and infiltrate water, unhealthy soils don't.
- Clay soil will drain more slowly than sandy soil.
- Heavily compacted soil will not drain well.
- Shallow soil will not drain well.

## HOW TO IMPROVE SOIL WATER FILTRATION

- ☐ Increasing the amount of organic matter in the soil will improve water infiltration regardless of soil texture type, so add a 5cm deep layer of good compost or well-rotted manure to the soil every year.
- ☐ Mulch regularly if possible using natural mulch such as grass clippings; man-made mulch, such as sheets of cardboard; or living mulch like clover under fruit trees. Mulch is best applied in spring when the soil is damp.
- ☐ Water the soil regularly in dry weather with a hose or bucket.
- ☐ Improve your soil by double digging.
- ☐ Consider raised beds. These will allow you greater control over the type of soil in the beds and are ideal for improving drainage but on a dry, windy site they will dry out very quickly.