FACTSHEET NO. 1

# Physical Fertility : Penetrometry test

## Problem

Soil structure is essential for a resiliant soil. It also helps to increase the water and nutrient retention to have a sustainable cropping system. Therefore, it is necessary to have easy methodology to evaluate the soil structure on the field.

## Solution

The penetrometry test is a cheap and reliable mean to evaluate the soil structure directly on the field.

## Outcome

Assess the resistance of a soil using a rod driven vertically into the ground and identify potential areas of compaction

## Applicability box

**Geographical coverage**
Europe

**Application period**
All year

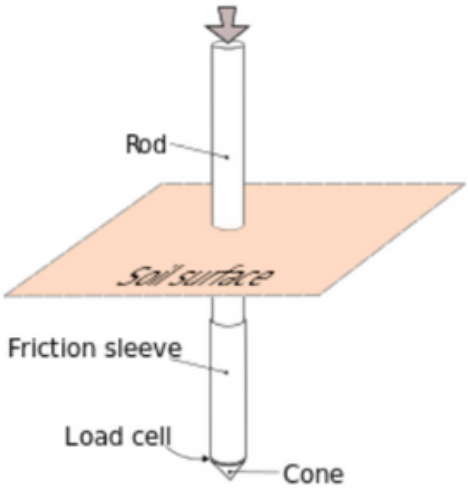
**Required time**
N/A

**Period of impact**
Continuous

**Equipment**
Not specific

## Practical

Principle :
A steel tube with a conical tip is driven into the ground using a compression force. As the tube is driven in, the resistance is recorded. The higher the resistance of the soil and the more difficult it is to push the rods in, the better the soil quality, the more stable it is or the higher the bearing capacity. Based on the results of the penetrometer test and taking into account the geological data available for the soil studied, it is possible to deduce the composition of the soil.




An electronic penetrometer can be used to record resistance as a function of depth. It is necessary to measure the soil moisture profile in order to interpret the curves, as this test is very sensitive to soil moisture.

Interpretation:
This is an indirect measure of soil structure that can complement other indicators such as the spade test.
It can be used to identify a structural problem, to assess the depth of compaction, and to reason intervention according to the problem identified and the following crop. Other factors can influence resistance, in particular soil moisture

## Further information

- https://geotechnica.be/fr/diensten/francais-sonderingen/
- https://geotechnicaldesign.info/collection/cone-penetration-test.html
- Gestion de la fertilité physique des sols ;Deliveralbe of SOL-D'PHY project http://www.agro-transfert-rt.org/projets/sol-dphy/

## About this factsheet

**Authors: Francesca Degan (ARVALIS), Elodie Gagliardi (ARVALIS)**

**Publisher: ARVALIS**

**Date: September 2023**

NUTRI-CHECK NET is a Horizon Europe multi-actor project establishing a self-sustaining, multi-actor, Thematic Network called "NUTRI-CHECK NET" that builds farm-level adoption of best field-specific
nutrient management practices across Europe. In nine countries, farmers' Crop Nutrition Clubs will identify and share the nature of their uncertainties about crop nutrition, their challenges and barriers to change. Decision systems and nutrition tools (including commercial products, services, and recent research outputs) will be assembled by national experts across Europe, including leading farmers, into a common online NUTRI-CHECK NET platform.
Check the project website: https://nutri-checknet.eu

Funded by the European Union
UK Research and Innovation
Funded by the European Union and UK Research and Innovation (UKRI). Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union, European Commission or UKRI. Neither the European Union, European Commission nor UKRI can be held responsible for them.