Measuring SIMPLE SOIL HEALTH PARAMETERS IN THE FIELD

A common indicator of soil health used by sugarcane growers is crop size. Whilst this may provide part of the story for a particular season, it does not provide the whole story or an accurate assessment of the long-term performance of the soil.

There are many ways to measure soil health, and many are complicated and expensive. However, with the availability of SRA'S Soil Health Extension Toolkit (SHET), growers together with their advisor, can conduct a whole array of tests for free.

The Soil Health Project - Central project conducted a range of soil assays at ten sites in 2020/2021 to evaluate how different farm management systems influenced soil health. The project was also responsible for preparing a number of SHETs, distributing them to local service providers and delivering user training. The equipment included in the SHET test a suite of chemical, biological and physical soil health indicators.

Some of the most useful and basic tests that growers can conduct themselves are soil compaction and soil pH.

SOIL COMPACTION

Results from sampling the ten sites showed that compaction was less of a constraint in farming systems where controlled traffic with increased row spacing was implemented, and break crops, such as legumes, were incorporated between sugarcane cropping cycles.

Compaction was measured using a soil penetrometer, a very simple to use tool. Growers will need a penetrometer *(Figure 1)* (available in the SHET), a tape measure, and a way of recording the readings.

Figure 1: Penetrometers are a simple way of measuring whether compaction is a soil health constraint.

Penetrometers can also be purchased online. Below are some basic instructions on how to perform on-farm compaction assessments:

1. Choose a location based on the aim of the assessment. Sugarcane row shoulders or immediately adjacent to the stool is ideal. Make sure to always choose the same sampling location if comparing different areas within a block or between blocks.
2. Gently clear any trash or debris away from the soil surface.
3. Position the penetrometer and apply gentle, even downward pressure until the needle of the face reaches 300 PSI on the inside gauge (this is the pressure where sugarcane root penetration becomes restricted).
4. Slide the marker clamp down to the soil surface and tighten the bolt.
5. Pull out the penetrometer and use a tape measure to measure the distance from the tip of the penetrometer to the marker. This will provide an indication of the effective rooting depth of the soil at that location.

SOIL PH

Soil pH is important to monitor as microbial communities prefer a neutral pH (7). Nutrient availability can also be affected by soil pH. Results of soil assays performed at the ten sites indicated that sites where soil pH was monitored and amended as needed, not only had a greater soil microbial population, but also a higher stalk population and heavier stalks.

Soil pH can be measured in many ways. For the Soil Health Project - Central project, soil was sent away to the lab for routine laboratory analysis. Growers can use the SHET to access the pH meter, or a basic soil pH kit can be obtained from local hardware stores and/or online.

The following outlines the basic instructions on how to perform an on-farm soil pH assessment:

1. Follow pH kit instructions on obtaining a soil sample and mixing the soil.
2. Place a small amount of soil on the testing plate.
3. Add a few drops of the indicator, just enough to stir into the soil and make a thick paste.
4. Dust the white powder over the moist soil sample.
5. Wait a minute for the colour to develop.
6. Compare the colour developed against the colour chart to determine the approximate pH range *(Figure 3)*.
7. If soil pH is low, growers should consider an application of lime. Local agronomists will be able to assist with determining suitable products and appropriate application rates.

Growers wanting immediate and cost-effective soil health testing performed can seek assistance from service providers trained in using the SHET.

There are currently six toolkits strategically hosted by the following key service providers across the Central growing region.

- Mackay Area Productivity Services
- Sugar Research Australia Mackay (two available)
- Sugar Services Proserpine
- Farmacist Pty Ltd
- Plane Creek Productivity Services Limited

USEFUL RESOURCES

The impact of long-term practices on soil health (PDF)

The impact of fallow management on soil biology (PDF)

Legumes pros and cons (PDF)

The economic and environmental impacts of managing soil health. Case Study 3 - Ray Abela (Central Region) (PDF)

Soil Biology Sample Collection (Video)

Soil Biology - Testing (Video)

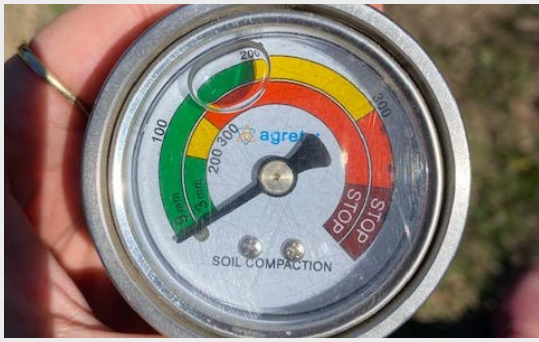

Figure 2: The face of a penetrometer pressure gauge.

Figure 3: A pH chart is provided in the SHET or any simple pH testing kit to assess the pH of the soil. It is important to work with an advisor to ascertain whether more in-depth laboratory testing is needed prior to implementing a soil amelioration program.

Figure 4: Sugar Services Proserpine host one of the SHETs and have been training in use of all equipment contained in the toolkit.

MORE INFORMATION

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The Soil Health Project - Central is supported by the Department of Agriculture, Water and the Environment through funding from Australian Government's National Landcare Program, SRA and project partners.