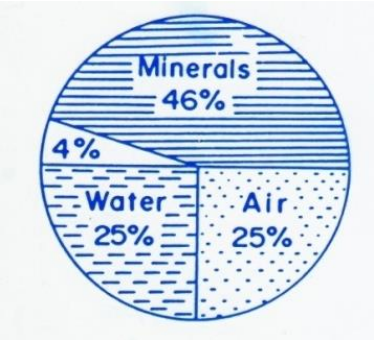
Demonstrating Sustainable FARM PRACTICES

## Understanding Soils - Chris Alenson July '14

***"Can mankind regulate its affairs so that its chief possession - the fertility of the soil - is preserved? On the answer to this question the future of civilisation depends."*** **Sir Albert Howard, 1943**

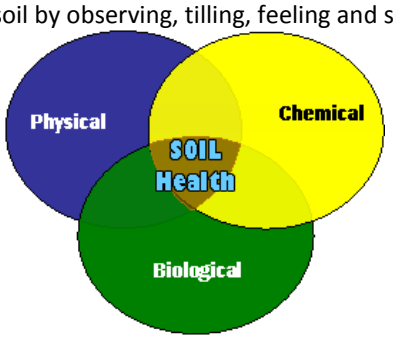
In a pie chart illustrating the volumetric composition of an average silty loam soil the chemistry or mineral component of the soil makes up 46%, the air and water volume is about 25% and the organic/biological component 5%. This will vary according to the soil type. It is this mineral component that we are sampling to understand what plant nutrients may or may not be in sufficient quantities to provide the production we require. This is what you as a land owner inherits in terms of a soil and its geochemistry. You may be fortunate in that previous owners have recognised the soil's deficiencies and applied a range of required plant nutrients and restored fertility. It is more likely that it will be up to the landowner to assess the soils fertility and to develop management strategies to enhance it for sustainable production.




**What is the soil health we are assessing and monitoring?**

Soil quality and soil health are terms that are used almost interchangeably in discussions on agricultural production. Soil quality takes on a more scientific approach in its more precise characterisation of the soil's productive capacity, whereas soil health takes on a more sensory level of understanding.

Soil health is a term which is widely used within discussions on sustainable and organic agriculture to describe in some detail the general condition of the soil resource including its biological properties. Farmers therefore, those that work the soil, do recognise a healthy soil by observing, tilling, feeling and smelling it.




*The concept of soil health integrating the three key areas of soil health. Adapted from The Rodale Institute.*

The FAO of the United Nations describes soil health in the following terms:

- Healthy soils are a living system
- Healthy soils help control plant disease
- Healthy soils form beneficial associations with plant roots supplying plant nutrients
- Healthy soils recycle essential plant nutrients
- Healthy soils improve soil structure
- Healthy soils store more nutrients ,air and water
- Healthy soils ultimately improve crop production

It is in this context that we need to assess the soil to understand its deficiencies.

**Functions of a healthy topsoil are therefore one that;**

- supplies plant nutrients
- cycles organic matter
- provides a pore structure that is a suitable habitat for aerobic organisms
- provides a structured aggregated soil that encourages root penetration
- suppresses plant pathogens
- stores carbon and water

If these functions are being optimised the soil is said to be in a high state of fertility, i.e. "healthy', and capable of good productivity.

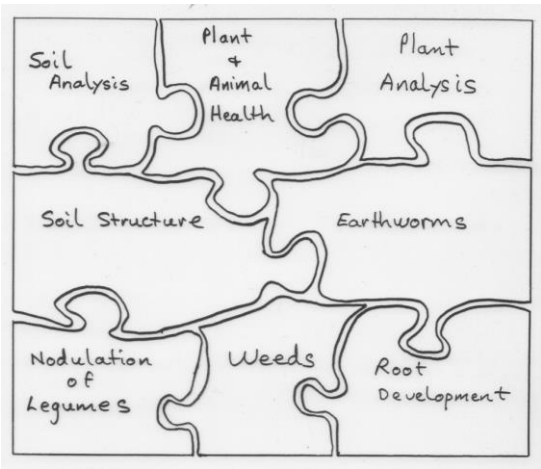
wpcln Western Port Catchment Landcare Network Central Region

***This project is supported by Western Port Catchment Landcare Network through funding from the Australian Government's National Landcare Programme and PPWCMA***

Australian Government | National Landcare Programme

**Soil Assessment**

A thorough soil assessment is like compiling a jig saw puzzle of observations and analytical data. No one piece of this puzzle should be relied on for making on-farm management decisions. Visual soil assessment of physical and biological soil characteristics, observations on plant and animal health along with soil and or plant analysis will provide the necessary information on which decisions can be based.




Home-made penetrometer for indicating soil compaction

**Sustainable Strategies**

Remember that sustainable strategies focus on feeding the soil while more conventional approaches rely on feeding the plant at the expense of the enhancement of the soil fertility. After careful assessment of all the soil characteristics management strategies will be targeted at optimising soil fertility as a base for nutrient supply and where indicated a topping up of key essential plant nutrients may be required. This may be through application of organic or mineral based fertilisers. There may be a need for strategic soil aeration and additions of biological stimulants to further stimulate soil biological activity.

These notes are freely available as a resource for farmers and may be of assistance to you but the WPCLN does not guarantee that they are without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequences which may arise from you relying on information from these notes.

wpcln Western Port Catchment Landcare Network Central Region

*This project is supported by Western Port Catchment Landcare Network through funding from the Australian Government's National Landcare Programme and PPWCMA*

Australian Government | National Landcare Programme