



ABOUT THE INITIATIVE

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The Healthy Soils Initiative promotes better understanding of soil health and constraints in Central Victoria. It provides landowners with information and tools to assess soil health and constraints, manage soil to build improve and maintain soil health, and monitor their soils' health from season to season into the future. The initiative aims to promote practical soil health management that boosts farm productivity and helps farmers to benchmark, build and maintain soil health.

The initiative has been developed by the Mount Alexander Sustainability Group and Federation University, with funding support from the Australian Government through the National Landcare Program Smart Farms Small Grants initiative.

The initiative team has worked with farmers in central Victoria to identify constraints to healthy plant and root growth occurring in the upper 50-60cm of their soil, and develop management plans to improve plant and soil health.

Research by CSIRO and others suggests that on average, crops and pastures in central Victoria only produce 30-50% of their seasonal yield potential (i.e. what they could produce if seasonal rainfall and temperature were the only constraints to growth). Although factors such as disease, weeds and pest animals can contribute to reduced yields, the main factors limiting yields is soil fertility, depth and access of plants to water and nutrients in the soil.

A key message of the initiative is that plant health and increased organic matter and carbon down the soil profile drives soil health. This means that management to improve crop and pasture yields by improving soil fertility, aeration, drainage, pH, and water- and nutrient-holding characteristics down the soil profile will make soils healthier, deeper, more productive and more resilient to drought.

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Many central Victoria soils have inherent natural constraints and 'inherited' constraints from how they have been managed in the past.

Common constraints to soil and plant health in the project area include:

- Poorly structured and shallow soils that reduce water infiltration and air flow down the soil profile and reduce healthy root growth.
- Nutrient deficiencies. The most common deficiencies are phosphorous, nitrogen, zinc, and copper, and sometimes sulphur, potassium, molybdenum, and calcium.
- Unfavourable pH. Soil acidity is common and can reduce the availability of plant nutrients, and also result in toxicities associated with aluminium, iron and manganese.
- High sodium and low calcium levels that result in poor soil structure and heavy and compacted clays.

- Soils that are naturally shallow due to their inherent geology – including naturally shallow soils and soils with ‘dispersive’ clays that are very dense and impede root growth and water infiltration.
- Soils that are shallow because of heavier and compacted clay sub-soils due to historic cultivation and grazing practices.
- Low levels of organic matter and less active soil biology. Organic matter and soil biology help improve soil structure and the water infiltration and water and nutrient holding capacity of soils. They also form the basis of nutrient cycling that keeps a pool of nutrients available to plants during growing seasons.
- Climatic extremes – with typically dry and hot summers (particularly in the northern part of the project area), cold winter periods (particular to the south), and periodic droughts and extreme heat events.

The Healthy Soils Initiative has developed a series of information sheets and planning tools to help farmers assess soils, identify constraints, plan how to manage these, and monitor and continually improve soil and plant health.

Sustainable Agriculture

There is increasing focus on the need to reduce the environmental impacts of our food and fibre production systems. Supply chains and markets are increasingly requiring farmers to demonstrate adoption of more sustainable production methods. Healthy soils help to improve the efficiency of water and nutrient use and reduce the environmental impacts per unit of farm yield. Healthy soils can reduce the amounts of fertilisers and other mined soil amendments (e.g. lime, gypsum, rock dusts, guano, etc) needed for unit of farm yield, and also reduce emissions of greenhouse gases such as nitrous oxide and methane from soil. Where levels of soil carbon can be increased and maintained, there is potential for soils to act as a ‘carbon sink’, drawing-down the equivalent of around 100 to 220 tonnes of carbon dioxide per hectare for per every additional 1 percentage point of soil organic carbon added to the upper 20-40cm of soil. Healthier soil management also increases the infiltration and holding of soil which

reduces nutrient and soil loss from farms and reduces pollution of waterways. A focus of the Healthy Soils Initiative is to increase productivity and the efficiency of production so that the environmental impacts for unit of grain, hay, meat, wool, milk or other farm products are minimised. This approach focuses on addressing soil physical, chemical and biological constraints; efficient and sensitive use of farm inputs such as fertilisers, soil amendments and other chemicals; and managing crops and pastures improve plant growth and farm yield and build and maintain soil health. The Healthy Soil Initiative recognises that every farm is different and doesn’t promote a single ‘right way’ to manage soil health. It promotes better understanding of soil and climate constraints to plant growth and soil health, and a practical, pragmatic and flexible approach to addressing these using a range of management methods and technologies.