

# Future SOILS

**Soil acidity and declining soil organic carbon (SOC) affect more than half the agricultural soils of southern and central NSW, and threaten the viability and resilience of farming systems.**

**Current acid soil management practices are based on outdated models, and are failing to prevent the widespread development of subsurface acidity in modern cropping and pasture systems.**

Over the next three years, FarmLink will coordinate the gathering of historical and new soil data across south-eastern Australia through a new research project called 'FutureSOILS'.

Funded by the Australian Government's National Landcare Program, the work is a collaboration between NSW DPI, the Australian National University's Centre for Entrepreneurial Agri-Technology and School of Computing, FarmLink, Holbrook Landcare Network, Central West Farming Systems and Incitec Pivot Ltd. Three farmers from Grenfell, Trundle and Burrumbuttock are also involved.

Initially, historical trial data where soil pH has been a focus is being identified and examined to track the long-term changes in soil carbon and soil pH through time, under current farming practices. These existing datasets will form important inputs to the Machine Learning component, where a new soil pH model will be developed.

The research will look at changes in soil pH as influenced by various liming rates and management to develop a predictive model, using machine learning to improve decision-making around optimum lime rates and incorporation strategies.

The outputs of the model will be used to develop a free online decision-support tool that can integrate with existing digital platforms that growers are using. This tool will enable growers and advisers to input paddock locations (auto-populating climate information), target pH, soil parameters and sample depths, as well as information about the farming system/rotation and management actions (e.g. cultivation) to receive customised liming and management recommendations.

In addition, the tool will also allow end-users to forecast and visualise future soil conditions through the soil profile and explore the economics of adjusting inputs and management actions.

**The decision-support tool will provide updated liming recommendations and interactive scenario forecasting, helping growers to make more informed decisions around optimum lime rates and incorporation methods.**





**Farm-scale trial sites on five strategically located farms will validate the model's outputs:**

- ▶ **Grenfell**  
– hosted by FarmLink
- ▶ **Temora Agricultural and Innovation Centre (TAIC)** – hosted by FarmLink
- ▶ **Burrumbuttock**  
– hosted by Holbrook Landcare Network
- ▶ **Condobolin Research Station**  
– hosted by Central West Farming Systems
- ▶ **Trundle**  
– hosted by Central West Farming Systems.

The sites will test new approaches and practical options for growers. Lime rates and incorporation methods are being tested to explore the impact of these on ameliorating subsurface acidity.

The treatments involve surface-applied lime both unincorporated and incorporated, which will examine the effect of incorporation on the movement of lime through the soil profile. The trials also include treatments involving the incorporation of stubble with offset disc, K-Line Speedtiller® or K-Line Speed chisel after harvest, to determine whether the extra organic matter in the soil has any effect on pH.



**Progress to date**

All treatments were implemented and the first year of cropping post-treatment was monitored throughout 2020. A round of segmented soil sampling was conducted in April 2021 to track progress of the various treatments. Data from these samples is currently being analysed.

As the project progresses, the project team will communicate findings to growers via a suite of extension activities spearheaded by the three farming systems groups: FarmLink, Central West Farming Systems and Holbrook Landcare Network.

Trial sites will be a two-way learning resource, both for testing the model and for extension activities. The farming systems groups will hold workshops throughout the project to gather feedback from end users, and to trial and refine projects outputs.

The project will substantially improve the awareness, knowledge and skills of farmers and agricultural advisors around managing soil acidity and soil organic carbon. This will ultimately result in more sustainable soil management and productive farming enterprises for southern NSW.

**More information**



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