

# Innovations in Cropping Systems: a step-change towards sustainable soil management

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Given that water is the principal limiting factor in rain-fed cereal production in Victoria, practices that improve water capture and use are required. Improvement in soil condition to increase agricultural resilience could be considered a climate change adaptation practice. Research has shown that practices that improve soil condition can increase water use efficiency and yield. Agriculture has the opportunity to adopt innovative practices that not only increase production and environmental sustainability, but also address the growing challenges that climate change will have on society.

This federally funded project investigated the benefits of two innovations, subsoil manuring (SSM) and controlled traffic farming (CTF) practices to address declining soil condition and severe subsoil constraints in cropping enterprises in the low to medium rainfall zones of Victoria. The project established demonstration sites (eight SSM sites and eight CTF paddocks paired with non-CTF paddocks) across western Victoria to engage with local farmers whilst exploring the effect of these practices on crop performance and soil properties.

Despite experiencing below average rainfall conditions for both years of the project (2014 and 2015) there are encouraging signs to both innovations. SSM intervention has shown positive spring crop biomass responses over the controls in both years and improved macro-porosity, saturated hydraulic conductivity and bulk density in the subsoil horizons. Crop yields were found to increase by 20 to 60 percent on the CTF paddocks compared to non-CTF paddocks. Reduced soil compaction and improved water infiltration were realised under both practices. These results suggest the potential for longer term yield and soil condition responses.

The partnership between local farmers and farmer groups was a highlight of the project. Engagement with farmers using locally significant sites and data gave the project team a greater ability to share and discuss opportunities for these innovations to be adopted in those regions.