

healthy soils case study

SUSTAINABLE FARMING



Bore Water Quality and Rotations in Sustainable Farming Systems

A 'Beechworth' Merah North case study

Why Act?

Sharon and Dave Grellman live on 'Beechworth', a cotton farm west of Merah North within the Namoi Catchment. The Grellmans discovered that their bore water was prone to variability in quality. The variability in relation to chlorides was leading to soil salinisation and an overall reduction in their soils health. This combination of salinisation, sodicity and reduction in soil structure was resulting in reduced soil productivity.

What is science saying?

In 1993, Sharon and Dave became involved in a farming systems project with the Cotton Catchments Communities CRC. This project, directed by Dr Nilantha Hulugalle, Senior Research Scientist with the NSW Department of Primary Industries, looked at the effects of rotation crops and management of soil properties on the cracking clay soils. Trial results showed that the soil structure improved most under the cotton and wheat rotation system.

The rotation program of cotton and wheat, plus the addition of a green manure crop, is more effective in cycling organic carbon and improving structure than a continuous cotton treatment. This environmental benefit is also transferred to an economic one with higher returns per crop per hectare (see Figure 1 and Table 1).

Their Solution

The Grellmans' solution of using wheat in rotation with cotton allowed the wheat roots to penetrate deep into the soil profile, helping to improve soil structure. This, combined with amplified gypsum levels and increased organic matter from the lablab rotations, resulted in the overall health of the soil profile on Beechworth to improve noticeably.



Dave Grellman amongst his cotton stage of the Beechworth crop rotation

"It's not just about making a profit now, it's about making a profit for tomorrow"

"The profit from making sustainable changes is both an economic and environmental one"

"If you can't change something then learn to work with it"

The identification of the variability in the quality of the bore water led the Grellmans to change their irrigation practices and adopt more sustainable land and water management practices to work with the problem. Based on the research into deep drainage, nutrient leaching and salinity that was undertaken on their farm, they were able to improved their on-farm water and soil monitoring by introducing a

sustainable leaching fraction to their irrigation scheduling.

The Merah North Landcare group was formed in 1998 as an initiative of the Grellmans and their neighbours. 14,000 trees were planted within the landcare area, with over 2,000 of these planted on the Grellman's property. Not only did these

Figure 1 Cotton yield (bales per hectare) after rotation crops at Beechworth from 1994 to 2001

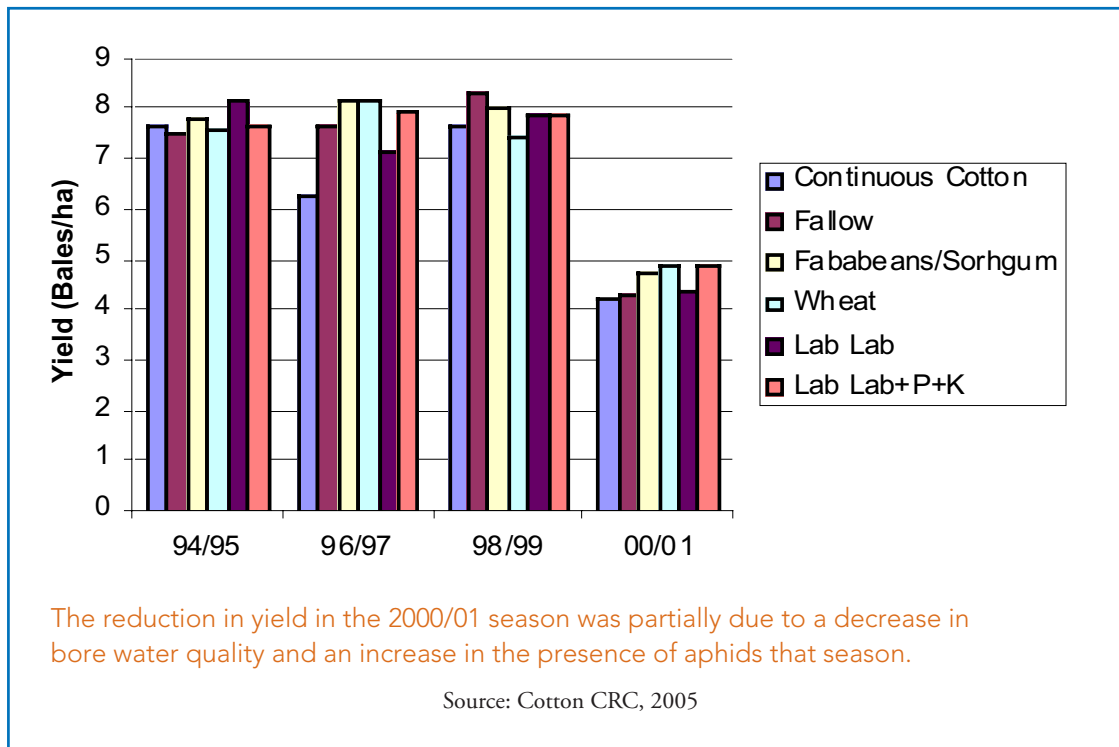


Table 1 Outcomes from the rotation trial at Beechworth from June 1993 to May 1999

| Treatment | No. of cotton crops | Average yield (bales/ha) | Gross margin per crop (\$/ha) |
|---|---------------------|--------------------------|-------------------------------|
| Continuous-cotton | 6 | 6.4 | \$1589 |
| Long fallow-cotton | 3 | 7.8 | \$1978 |
| Fababean-cotton | 4 | 6.1 | \$1103 |
| Lablab/fababean/wheat-cotton ¹ | 3 | 7.7 | \$1981 |
| Lablab-cotton | 3 | 7.6 | \$1812 |
| Lablab (P+K)-cotton ² | 3 | 7.9 | \$1774 |

¹ Lablab and fababean green manured in the first year followed by a wheat-cotton rotation
² Phosphorus and Potassium equivalent to that removed in seed cotton added as fertiliser

(Source: Modified from Cotton CRC, 2005)

additional trees increase native vegetation and create wild life corridors, they also act as a buffer against any possible spray drift without any great effect on the trees.

Sharon and Dave Grellman are currently in the process of accrediting 'Beechworth' as a Best Management Practices farm, as they believe it is important to reduce the impacts of cotton farming on the natural environment, neighbours, workers and the community.

The Future

The cotton industry's Best Management Practices program provides growers with a farm management system where pesticide use is kept to a minimum, weeds and diseases are well controlled, water use efficiency is maximised, native plants and animals are protected, riverine ecosystems and floodplain management and replenishment are enhanced, and soil health is improved to achieve a sustainable farming system. For more information about Best Management Practices and industry accreditation, visit www.cottonaustralia.com.au

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Source

Cotton CRC Project 3.1.7 Progress Report, 2005

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Disclaimer

The information contained in this publication is based on knowledge and understanding at the time of writing (July, 2007). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate adviser.

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