

FINAL REPORT

LWR0003

Healthy Soil for Sustainable Farms

PROJECT DETAILS

PROJECT CODE: LWR0003

PROJECT TITLE: HEALTHY SOIL FOR SUSTAINABLE FARMS

START DATE: 01.09.2008

END DATE: 30.09.2008

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Summary

This project was developed to help farmers and advisors in the sugar, grains and cotton industries of Queensland and northern New South Wales to understand of soil health and to develop more sustainable soil management practices for their farms.

Project activities have improved the understanding of the principles of soil health, and helped to develop the knowledge and skills of participants (i) to assess soil health on their own farms, (ii) to select practices that can improve their soils, and (iii) to implement management practices that will maintain and improve Australia's soils for the future. A range of interactive workshops and field activities was developed and these are being used across the region. They include (i) introductory workshops to understand and assess soil health; (ii) specialised workshops to balance nutrients and soil water and during the prolonged drought, (iii) to understand soil organic carbon (SOC) and carbon

Fifty-seven (57) workshops have been attended by 758 farmers, advisors and RDE staff. Feedback from participants shows that they strongly believe that they now have better knowledge and skills to improve the health of their soils. Property areas collected from just 337 of the participants from the grains industry show they currently manage 2,188,000 hectares of crop and 359,000 hectares of pastures. More than 400 farmers and agronomists have assessed soil health of 570 soils on their farms and these assessments have been included in the project's 'benchmarking database'. Participants consider that 30% of their crop land and 26% of their pasture land have significant soil health problems. While few major changes in practice are anticipated within the current funding term of the project, 55% of evaluation respondents reported an intention to change their soil management practices.

We consider that the material developed by the project has been successful. It has helped many farmers and agronomists to understand soil health and to improve their soils. T

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Outcomes

Introduction

Managing soils to maintain and improve soil health is increasingly recognised by agricultural producers, advisors and researchers as the cornerstone of sustainable production. However, traditional farming practices in Australia's extensive cropping industries are also acknowledged to have reduced the quality, or health, of many soils. For example:

- Traditional tillage systems and the use of heavy machinery leading to a decline in soil structure, reduced infiltration rates and increased runoff and soil loss
- Negative net nutrient balances leading to a reduction in soil nutrient fertility
- Tillage and reduced plant biomass returns to the soil leading to declining organic carbon (OC) levels, further exacerbating structural and nutrient fertility decline, and
- Monoculture systems, or a lack of diverse rotation species, leading to a build up in pathogenic soil organisms
- Fallowing in order to store soil moisture resulting in a decline in soil organic matter (SOM) and beneficial soil organisms.

This decline in our soils may reduce potential yield gains and increased production costs. Consequently, producers and advisors are constantly seeking new information to understand their soil's processes and soil health in general.

There is a perception that there has been less emphasis on soils RDF in the last decade. However, Australian agriculture has generated a considerable body of soil knowledge and information from a long history of research on soils and soil fertility. Much research has been conducted to investigate soil properties and processes, the impact of management practices on soil health and the implications of these impacts for decision making in agricultural systems. For example, the Grains Research and Development Corporation (GRDC) recently undertook major national RDF initiatives in nutrient management, sub-soil constraints, soil borne diseases and soil biology, while the Sugar Research and Development Corporation (RDC) has made significant investments in the Sugar Yield Decline joint venture (JV) investigating similar issues in the cane industry.

Such major funding initiatives increased community awareness of soils and 'Soil Health' across the broadacre cropping industries of Queensland and New South Wales. Indeed, 'Soil Health' has emerged to be a top priority, alongside climate change and water management, for governments, farmer research advisory committees, and Natural Resource Management (NRM) bodies and Catchment Management Authorities nationally. The 'Healthy soils for sustainable farms' program provided timely opportunity to collate materials from our long-term research and focus activities to support more informed and better soil management on farms.

The outcomes of previous soils research has been delivered to producers through a range of extension and communication processes, generally addressing single aspects of soil health. However, a healthy soil is maintained by the interaction of these aspects, and so a true understanding of soil health and the impacts of management on soil health can only be gained by considering soils in a holistic manner.

This project was developed to synthesise and integrate existing knowledge on various aspects of soil health, and to help broadacre crop producers and their advisors in QLD and NSW to understand this information, integrate it, and to apply this understanding to develop more sustainable soil management practices on their farms.

Project Summary

This project has comprised an integrated suite of learning and extension activities to improve the capacity of producers and advisors in the QLD and NSW grains industry, the dryland cotton industry, and the sugar industry to better manage their soils health. These activities supported project participants to better understand the principles of soil health and develop the knowledge and skills to assess soil health on their own farms, select practices that can improve their soils, and to implement management practices that will maintain and improve Australia's soils for the future.

Interactive workshops used soil health assessment tools developed in the project and soil tests from participants' farms to support them to assess their own soil health. Soil test data and their interpretation are helping to benchmark the current status of soil health on QLD and NSW cropping farms, and to identify future opportunities for on-farm research and development.

These project activities ultimately contribute to healthier and more resilient soils that can adapt to new practices that may be required to manage climate change and support efficient use of water for more profitable and environmentally sustainable cropping systems.

Project objectives

1. To develop and deliver 'Sustainable soil management' workshops to >500 grain, sugar and dryland cotton producers and their advisors in QLD and northern NSW;
2. To develop and deliver extension publications and activities relating to soil health throughout the QLD and northern NSW grains, dryland cotton and sugar industries;
3. To develop and validate tools and processes to quantify the soil health status of cropping soils.
4. To facilitate the conduct of on-farm research to validate and demonstrate locally relevant best soil management practices; and
5. To compile a database to benchmark the current soil health status of QLD and northern NSW cropping soils.