



Australian Government  
Cotton Research and  
Development Corporation

# TRAVEL & CONFERENCE REPORT

## ***Part 1 - Summary Details***

*Please use your TAB key to complete Parts 1 & 2.*

**CRDC Project Number:** **DAN1303**

**Project Title:** Soil Science Conference 2012, Hobart 2-7th Dec 2012

**Project Commencement Date:** 1/12/2012 **Project Completion Date:** 30/1/2013

**Select Research Program (from CRDC Strategic R&D Plan 2008-2013):**

2. Farming Systems

## ***Part 2 – Contact Details***

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**Signature of Research Provider Representative:** \_\_\_\_\_

## ***Part 3 – Travel Report***

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### **1. A brief description of the purpose of the travel.**

The purpose of the trip was to attend the 5<sup>th</sup> Joint Australian and New Zealand Soil Science Conference in Hobart, Tasmania from the 2-7 December 2012 to present the results of my research of the movement of Organochlorine Pesticides in irrigated Vertosols funded by the CRDC. I was also a co-author of a second paper presented at the conference that contained my research work using chloride mass balance models to estimate deep drainage under irrigated Vertosols.

### **2. What were the:**

#### **a) major findings and outcomes**

Professor Robert White (Emeritus Professor of Soil Science – Melbourne School of Land and Environment) an invited speaker delivered an excellent review of the 20 papers presented at the conference under the subject matter “Soil Carbon and Climate Change (Chemistry/Biology). The main findings from the review were that:

- one of the main ways of avoiding emissions from agriculture is to conserve wetlands.
- the use of green compost was shown to have a very small positive affect on the reduction of GHG emissions.
- considering the heterogeneous background on the farm scale soil organic carbon change is statistically difficult to measure. There needs to be a focus on the precision and accuracy of SOC analysis and therefore reducing variability in results. To improve accuracy and reduce variability the papers reviewed suggested bulk samples, accurate re-sampling, high sampling density or stratified sampling was suggested and the use of equivalent soil masses for carbon stock comparison.
- there is an over-emphasis on sequestering C in soil as a means of climate change mitigation.
- there are limitations of C sequestration. There is a point at which larger crop yields can only return more carbon through an increased supply of N, therefore contributing to N<sub>2</sub>O in GHG emissions negating any gains made.

The overall and final outcome of the review by Professor White was the need to develop a robust soil C accounting method that is validated against reliable measurements of soil C. This could be achieved with adhering to the suggestions already mentioned and the further development of soil C models such as RothC (Rothamstad Carbon Model - <http://www.rothamsted.ac.uk/ssgs/RothC/RothC.php>) embedded in FullCAM (Full Carbon Accounting Model).

#### **b) other highlights**

Dr Ants Roberts (Chief Scientific Officer for Ravensdown Fertiliser Co-Operative) an invited plenary speaker reviewed all papers in the soil fertility and contamination theme. During the review Dr Roberts highlighted my paper and included my research findings in his PowerPoint presentation by including a summary dot point.

### **3. Detail the persons and institutions visited, giving full title, position details, location, duration of visit and purpose of visit to these people/places. (NB:- Please provide full names of institutions, not just acronyms.)**

A Field Trip was scheduled for Wednesday 5<sup>th</sup> December 2012. The Field Trip visited the Huon Valley and focussed on soil and water studies of various land uses: pasture, plantation, orchard and vineyard. The visitations encompassed:

1. ‘Willow Bend Farm’, Wattle Grove with Dr Philip Smethurst CSIRO Ecosystem Sciences: Site Leader (Sandy Bay), Soil and Water Scientist and Plant Nutritionist.

‘Willow Bend Farm’ is owned by Chris White and is primarily a Dairy Farm. We spent 1.5 hours looking at streamside management zone plantation effects on water quality and stream flows. Paired catchments consisting of pastures were being monitored for stream water salinity, turbidity and tunnel erosion. One of the catchments had been planted with *Eucalyptus globulus*, *Eucalyptus nitens* and *Acacia melanoxylon* at approximately 1419 trees ha<sup>-1</sup> the other catchment was 99% pasture. The initial results indicate that Turbidity decreased after plantation establishment. Tunnel erosion (the result of a dispersive high sodium sub-soil), however remained a problem. Bacteria and Phosphate concentrations decreased in the water samples after plantation establishment.

2. Lucaston Orchard, Lucaston with Dr Brent Clothier, Plant and Food Research NZ, Science Group Leader, Systems Modelling Sustainable Production.

Lucaston Orchard is a commercial operation that has allowed research to be undertaken under the Apple & Pear Australia Limited (APAL) programme PIPS (Production, Irrigation, Pests & Soils). We visited the orchard for 1 hour learning about research of tree structure, integrated pest management and soil, water and nutrient issues. We looked at field equipment such as fluxmeters, sapflow monitoring and TDR probes. Monitoring the nutrient movement through the plants root and sap flow allowed for specific timing of fertigation. Timing of N, Ca and K is very important with apple and pear fruit set. The research will hopefully ensure accurate application of nutrients and lead to an increase in orchard productivity.

3. Hansen’s Orchard, Grove also with Dr Brent Clothier.

We spent an hour at an apple and cherry orchard that was researching the trends of soil carbon, the role of soil carbon and orchard management to enhance soil carbon stocks as part of the national sampling strategy. The sampling strategy that would best capture soil carbon stocks to 1 metre under orchards was developed and the process carried out across 10 orchard regions of Australia. The process will allow detection of any temporal change in the stocks of soil carbon under the 10 orchards.

4. Home Hill Landslide, Ranelagh with Dr Richard Doyle, Deputy Head and Senior Lecturer in Soil Science, School of Agricultural Science, University of Tasmania.

We spent 1.5 hours at the Home Hill landslide learning about the morphology and nature of the landslide. Dr Richard Doyle hosted the visit and spoke to the group about the radiocarbon dating and associated land slip movement of the paleosol. The use of an Oktokopter (unmanned aerial vehicle - UAV) fitted with a canon 550D digital camera was used to produce an ultra high resolution map of the landslide that enabled monitoring of the landslide in future years. This was an interesting use of technology to map and measure the volume of soil that had moved down the slope. It enables monitoring of the landslide and assess if further movement has occurred.

**4. a) Are there any potential areas worth following up as a result of the travel?**

As discussed in the major findings from Professor White’s presentation, it would be suggested that a review of SOC sampling and analysis be undertaken of projects funded by the CRDC. It would also be worth following up if the SOC data generated from CRDC funded projects have been used in the RothC model for future predictions for the cotton industry.

**b) Any relevance or possible impact on the Australian Cotton Industry?**

The presentation of Professor White highlighted to me the need for the cotton industry to ensure they are researching soil organic carbon accurately and correctly. The correct

method of sampling and analysing for SOC is critical if we want to accurately evaluate farming systems and there affects on increasing/decreasing soil C stocks.

**5. How do you intend to share the knowledge you have gained with other people in the cotton industry?**

In my role of District Agronomist with NSW DPI I have an opportunity to share with cotton growers at meetings and field days. I have contact with cotton growers in the Walgett district and there will be opportunity to talk with them in regard to the content of the conference as I am involved in the CRDC project moving in and out of Cotton – Identifying Farming Systems Issues in Western NSW Irrigation Areas.

**Please email at least 30 days after travel/conference to: [research@crdc.com.au](mailto:research@crdc.com.au)**