Fact Sheet no. 1

Sequestering Soil Carbon in an Irrigated Landscape turned Dry Ecological Grazing

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This *Action on the Ground* (AotG) project will trial and demonstrate innovative on-farm practices to increase the sequestration of carbon in soil. These practices are centred on the conversion of flood irrigated cropping to dryland cell grazing on native forage, interspersed with protected biodiversity corridors.

The project is supported by the funding of DAFF through Round 1 of its *Carbon Farming Futures Action Program* under the Australian Government's *Securing a Clean Energy Future* plan.

Where's it happening?

The project sits within the Torrumbarry Irrigation District (TID) of northern Victoria, on the riverine plain between Kerang and Swan Hill. The land subject to the project is managed by Kilter Pty Ltd (Kilter) as part of the 9000ha estate that it oversees for sustainable agricultural and environmental revenues.

The project provides a unique window into a changing landscape, one where a range of dryland enterprises is being strategically introduced to complement a smaller modernised irrigation footprint.

The core area of this trial is based around the 1250ha *5-on-7* grazing block west of Lake Tutchewop. This block was reconfigured in early 2012, and comprises over 20 cells for block grazing together with a central biodiversity corridor. Sheep were introduced to the landscape in June 2012.

Additional trial paddocks are located north and east of Lake Tutchewop. In total there are 9 trial paddocks typically varying between 30 and 60ha in size.

Why are we doing it?

The TID, like much irrigation country, is experiencing a period of rapid change. Change is being driven by both long-term structural adjustment pressures and periodic short term climatic and price shocks.

As part of this adjustment, water infrastructure is removed and rationalised

as part of irrigation modernisation. With this it is possible that water use across the TID could reduce by 50% over the next five to ten years.

Farming systems that increase soil carbon provide one way for dewatered land to have both a productive and profitable future. Soil organic carbon across Kilter lands is typically around 1.5% of soil mass, however the cracking floodplain clays of the region are of the type to offer good potential for storing greater amounts of soil carbon. In the longer term it is expected that carbon mass in well-managed dryland soils can build by a further 1% (so to 2.5%), translating to an average increase of 50tCO2-e/ha sequestered in the top 10cm alone.

How does the project work?

The premise of this project is that increased plant biomass associated with the restoration of permanent and diverse groundcover to the landscape will result in enhanced vegetative decomposition and therefore availability of organic carbon to the soil.

Dryland cell grazing is the dominant land use planned for the Kilter landscape where irrigation is being removed. The restored grazing lands are being managed in sympathy with the physiological needs of native grasses and shrublands – for instance the recruitment requirements of winter or summer active grasses. A number of trial paddocks in the project also include those that are subject to active restoration such as direct seeding.

Key aspects of the trial include:

- The examination of 4 land use change scenarios, from ex-flood irrigated land to (i) cell grazing and protected biodiversity, and also subject to both (ii) passive and active restoration.
- 'Book-end' spring soil samplings for soil organic carbon in 2012 and 2014
- Statistically designed survey with replicates and multiple paddock sample points to maximise the identification of trends.
- Supplementary monitoring of grazing pressure and vegetation health, partly through photography

The challenge

By definition, permanently building carbon in the soil is a slow process, masked by the rapid cycling of carbon in association with seasonal variation. Earlier work has indicated the possibility of carbon restoration rates of typically between 0.02 and 0.2%/yr in Victorian soils (ENRIC 2010 Inquiry into Soil Carbon Sequestration in Victoria). In the 3 year timeframe of this project it is hoped that a soil carbon increase of in excess of 0.1% can be achieved.

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