

Across the fenceline

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Key messages

- “Across the Fenceline” provides soil water and drainage data to farmers via a web interface.
- Drainage under crops is significant during or following years with above average rainfall.

Background

“Across the Fenceline” is a collaborative initiative of the Harden Murrumburrah Landcare Group (HMLG) and CSIRO, established in 2001. It was originally proposed as a project to monitor deep drainage under different management practices in the Jugiong Creek Catchment, at a time when the leakage of excess water from beneath crops was widely thought to be contributing to groundwater recharge and the extensive occurrence of dryland salinity in the area. With the onset of the drought coinciding with the establishment of the project, it has evolved into a project monitoring plant-available soil water.

Drainage measurements at Harden

In April 2000, the Harden Tillage Trial became the test site for the first prototype of a newly conceived “drainage meter” for measuring the downward percolation of excess water below the crop rootzone. Described by Hutchinson and Bond (2001), this device used soil physical principles to estimate the drainage. Measurements were made during the 2000 and 2001 growing seasons.

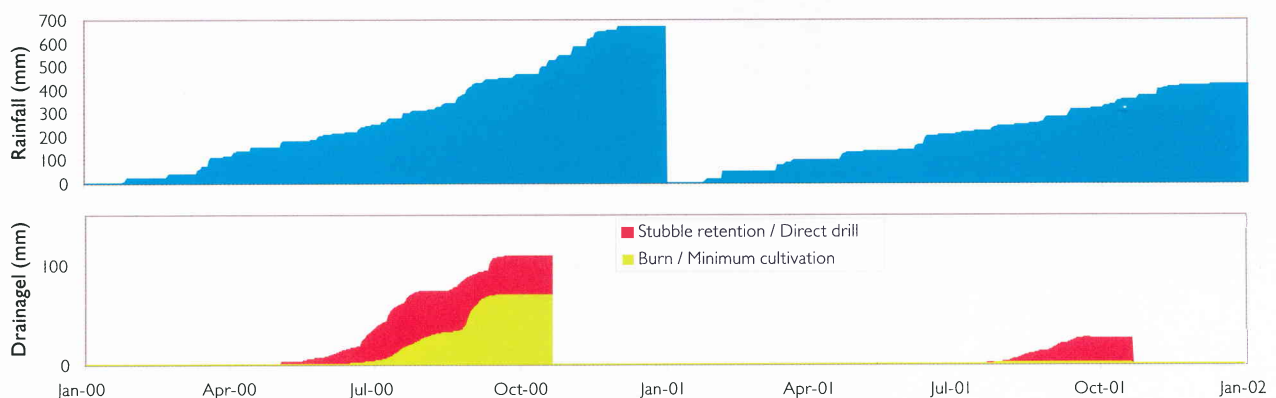
Much more drainage was observed in 2000 than in 2001 (Fig. 1), partly because there was considerably less rainfall in 2001, and partly because the soil was wetter at sowing in 2000. The stubble retention/direct drill (SR/DD) treatment resulted in higher drainage in both years, and this was attributed to larger infiltration under the SR/DD treatment as a result

of water entrapment by stubble, improved macroporosity of the soil and more residual soil water following reduced uptake by previous crops (Kirkegaard et al., 2001).

The “Across the Fenceline” project

Inspired by the results of this trial, the “Across the Fenceline” project was proposed in 2001, and commenced in 2002 with funding from the National Heritage Trust and GRDC. The concept was to monitor soil water content in the root zone and deep drainage below it in response to different management practices on 5 farms across the Jugiong Creek catchment, within a 20 km radius of Harden (Fig. 2). On each farm, a pair of paddocks across an adjoining fence was instrumented where one paddock was under pasture and the other under crop. The 5 farms initially included one near Binalong, but when this property changed hands in 2005 Kia-Ora near Bookham was included. The Binalong and Bookham sites were the exception, in that they did not involve cropped paddocks, only different pasture treatments.

Soil water monitoring equipment was installed in each paddock, at a distance of between 20 and 50 m from the fenceline, by early 2003. Although one drainage meter was installed in 2004, the rest were not all in place until 2006 because of delayed development. All instruments at a particular farm were linked by buried cables to a single data logger located on the fenceline (Fig. 3) together with a tipping bucket rain gauge, and powered by a battery charged with a solar panel.



> Figure 1. Cumulative rainfall and deep drainage for two treatments at the Harden experiment.



> Figure 2. Location of Measurement sites.

Each logger was equipped with a modem (CDMA initially, replaced by Next G in 2008), enabling regular downloading of the data. The data were processed, graphs drawn, and summary information posted to the project website: www.clw.csiro.au/fenceline/. This whole process occurred automatically on a daily basis.

Various forms of presentation of the data have been trialled during the last 6 years. The format currently thought to be most useful is illustrated in Figure 4.

In 2005, which was the wettest year since the project was established, deep drainage was measured by the one drainage meter that was installed at the time, under a cropped paddock at the Garangula site.

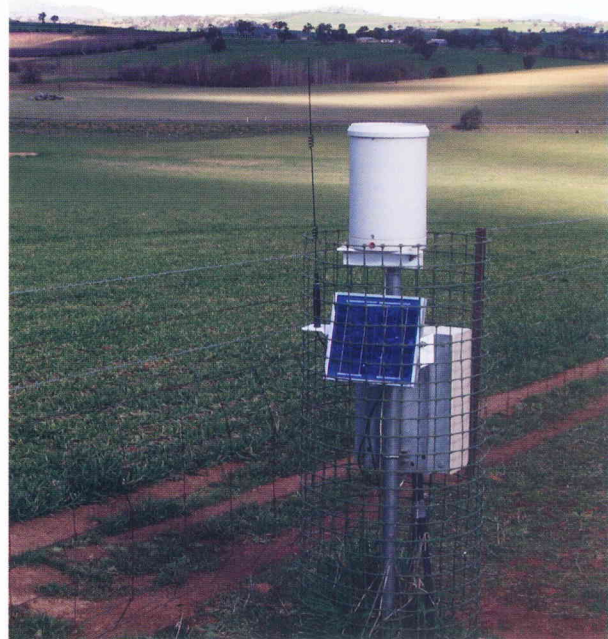
Further reading

Hutchinson, P.A. and Bond, W.J. (2001) Routine measurement of the soil water potential gradient near saturation using a pair of tube tensiometers. *Australian Journal of Soil Research* 39, 1147-1156. <http://www.publish.csiro.au/nid/84/paper/SR00079.htm>

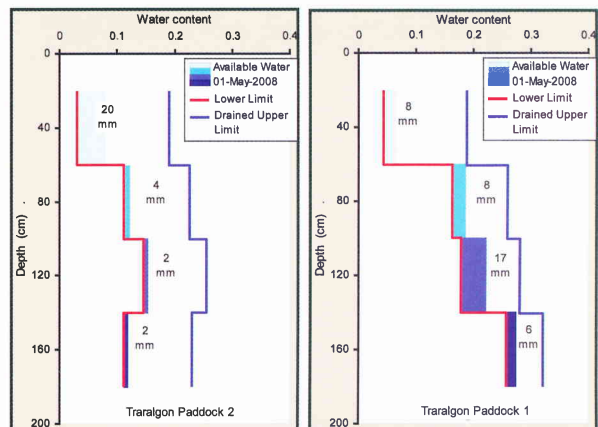
Kirkegaard, J.A., Howe, G.N., Simpfendorfer, S., Angus, J.F., Gardner, P.A. and Hutchinson, P.A. (2001) Poor wheat yield response to conservation cropping – causes and consequences during 10 years of the Harden tillage trial. Proceedings of the 10th Australian Agronomy Conference, Hobart, 2001. <http://www.regional.org.au/au/asa/2001/4/c/kirkegaard.htm>

Acknowledgements:

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> Figure 3. Central data logger at Garangula.



Latest Data - Quick Summary		01-May-2008		
Rainfall		Available Water		
		Paddock 1	Paddock 2	
last 7 days	28.2 mm	01-May-2008	39 mm	29 mm
Year to date	146.0 mm	7 days ago	42 mm	28 mm
1 year ago	110.6 mm	1 year ago	44 mm	52 mm

> Figure 4. Extract from "Across the Fenceline" website, showing a quick summary of the rainfall and total water storage for each paddock.