Central West catchment management authority

The economics of No Tillage farming practices

CASE STUDY Cumnock

The costs and benefits of converting to conservation farming practices arise from:

- Altering machines or purchasing new seeding machines
- Machinery dealers do not trade in farm equipment that has been extensively modified
- Enables producers to down-size tractors at replacement if compaction is not an issue
- Central West CMA has provided financial incentives for conservation farming equipment
- Cost savings arise from reduction in chisel or disc plough operations for weed control.

Current research knowledge does not allow all landholder identified benefits of management for improved soil condition to be costed.

Farm Model

A gross margins budget for Cumnock shows the value of different farming practices 1999-2006. This includes a five-year rotation of wheat, feed barley, oats, albus lupins and canola. In 2000 the planting area was predicted as 86% of normal reflecting below average stored moisture at sowing. In 2002 the area planted was predicted to be 40% and in 2006 the area planted was reduced to 32%. In this budget the uncropped percentage of land is treated as fallow.

The regional average yields for each crop have been used to provide an estimate of a typical cash flow scenario. The prices and costs used in the budget are constant 2006-2007 values.

The Available Water Holding Capacity (AWHC) of soil is expected to increase with time reflecting improved soil structure, maintained or improved soil organic contributions and reduced evaporation/runoff associated with stubble retention and minimal soil disturbance.

The benefits from an increase in the AWHC for the past eight seasons is estimated to be $7.71/ha where retained soil moisture is modelled as increasing by 9% over the period 1999 to 2006. The results for different farming sizes are shown in **Table 1**.

Some research has shown an increase in accumulated soil nitrogen in No Tillage systems. The Farm Model is used to estimate potential cost savings for accumulating nitrogen over the period 1999 to 2006 by reducing fertiliser inputs increasingly to 8% over 8 years. Total financial benefit is shown in **Table 1**.

Many farmers have obtained guidance systems so as to minimise soil compaction and overlap in cropping operations. A guidance system that reduces overlap by 10% has a modelled associated cost saving of approximately $11.72/ha. This value does not account for purchase price or on-going costs of using guidance technology. The total values for four different farm sizes are shown in **Table 1**. The value does not account for yield advantages obtained due to improved water holding capacity that are expected to occur as soil structure improves in the absence of traffic.

Table 1
Annual saving arising from increased AWHC, accumulated nitrogen (N 9%) and reduced overlap by 10% (Inputs 90%) — Cumnock

SCENARIO	$/ha	250 ha	500 ha	750 ha	1000 ha
AWHC 8%	7.71	1,928	3,855	5,783	7,710
Nitrogen 9%	0.41	103	205	308	410
Overlap 10%	11.72	2,930	5,860	8,790	11,720

Tillage and spray cost comparison

Tillage practices are expensive and degrade soil structure with each pass. The cost of a single tillage pass with a 164 kW 220 HP tractor is estimated to be $35.26/ha.

The cost to apply Garlon® and Glyphosate is $17.31/ha. The difference between the two practices is $17.95/ha.

Over a 1000ha farming operation the savings are potentially $4,224.35. This includes a time saving of 99 hours, but does not account for changes in fuel or chemical prices.

Managing livestock in the cropping system

Maintaining livestock in a farming system has the benefit of sustaining the cash flow in seasons where crops yields are low, but livestock impact on soil compaction, on water infiltration and on Available Water Holding Capacity.

Gross margin modelling shows that the cost of compaction is $8.54/ha. This does not account for the return gained from a livestock enterprise as part of the business **(Figure 1)** and both sheep and cattle provided positive income flows during the 2002 and 2006 seasons.

Breakeven analysis

Using the Cumnock Farm Model the estimated breakeven time for conversion of a 8.5m seeding machine, on a cropping area of 1000ha, is 4 years **(Table 2)**.

Figure 1
Estimated gross margins ($/ha) for a range of crops in the Cumnock region over the period 1999 to 2006

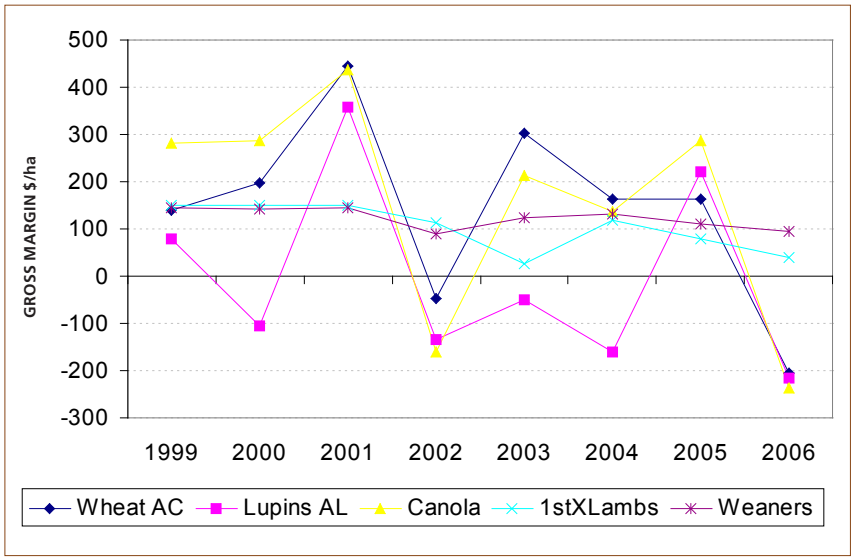

Table 2
Breakeven analysis – Cumnock

	SAVINGS ($)	YEARS	TOTAL ($)
Tractor capital savings			10,000
Tractor operating	4,224	4	16,897
Increased water holding capacity	7,710	4	30,840
Nitrogen accumulation	410	4	1,640
Total benefits		**A**	**59,377**
Machine conversion cost		**B**	**51,200**
Net benefit after 3 years		**A-B**	**8,177**