

Precision business management: Burdekin

The information in this publication is derived from work completed with growers in the Herbert and Burdekin “Soil Health Project” (SRA Project 2017/005 - Measuring soil health, setting benchmarks and supporting practice change in the sugar industry).

This publication has three main sections and provides a series of questions to help you explore whether you can save time and money, and begins by zooming in on how machinery operation costs can be calculated before zooming out to address bigger picture aspects of farming system adjustments.

Pin-pointing how much each operation costs

- Ranges of costs are provided for different implements to generate discussion about the factors that can drive operational costs.

Adjusting farming system components

- Growing costs and machinery operation labour hours are presented for two representative scenarios to highlight how economic analysis can help identify time and cost saving opportunities.

Managing knock-on effects

- The last section addresses some of the knock-on effects that can be considered if you wish to make adjustments to your farming system. Because each farming system is unique, it is important to consider the impact of any farming system adjustments on overall profitability.

To download the Farm Economic Analysis Tool (FEAT) from the Department of Agriculture and Fisheries website, please visit: <https://www.daf.qld.gov.au/business-priorities/agriculture/plants/crops-pastures/sugar/farm-economic-analysis-tool>.

For info on SRA’s overarching soil health program (including SRA Project 2017/005 and other soil health projects), please visit: <https://sugarresearch.com.au/soilhealth>.

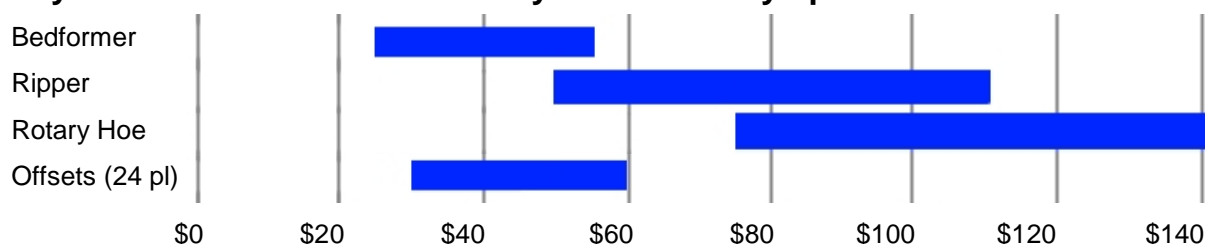
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Pin-pointing how much each operation costs

Do you know the cost for each of your machinery operations?



Implements and 'cost range' scenarios (FORM and labour cost \$ / ha / pass)

The figure above displays different cost scenarios for common cultivation practices (for a farmer doing their own operations). The 'cost ranges' for on-farm tractors and implements are associated with fuel, oil, repairs, maintenance (FORM) and labour costs (these DO NOT include overheads/fixed costs such as depreciation and interest).

Although the cost ranges may not cover all situations in the Burdekin, it is clear that there can be differences between implements (e.g. the rotary hoe cost range is quite different to the offsets cost range). There can also be a broad range in costs for a particular type of implement (e.g. ripper costs range from about \$50 to \$110/ha). Given machinery operation costs are influenced by factors such as fuel use and work rates, the variations in costs between implements and within implements suggest that opportunities may exist to reduce costs. For example, the use of zonal tillage has potential to improve fuel use and work rates and, in turn, reduce machinery operation costs.

Table 1: 24 plate offset discs example

Scenario parameters			
Fuel cost (after rebate) ex GST	\$1/L	Discs width of pass	3.6m
Labour cost allowance	\$40/hr	Discs speed	7.5 kph
Tractor HP PTO	140 hp	Discs field efficiency	70%
Tractor fuel use at full load	26 L/hr	Discs % of full load on tractor	80%
Tractor repairs & maintenance	\$14,200/ 2200hrs	Discs repairs & maintenance	\$6,700/ 500hrs
FORM and labour cost: (fuel, oil, repairs, maintenance and labour cost)			\$45/ha/pass

Stepping back and looking at the economics of your business allows you to compare various operations and see how factors such as fuel use and work rate impact your costs. Table 1 presents an example of the parameters used to calculate machinery operation costs for a tractor and offset discs. A planning and decision-making tool developed for the Australian sugar industry, called the Farm Economic Analysis Tool (FEAT), was used to calculate the FORM and labour cost.

Importantly, also examining fixed costs (such as depreciation and interest) can provide useful insights into overall machinery and implement costs. For example, newer machinery (that may have higher fixed costs) can be compared against older machinery (that may have higher repairs and maintenance costs), or the fixed costs of a particular tractor can be considered with its variable costs for a more complete picture when comparing operations.

Adjusting farming system components



Can you save time and money?

Comparisons of the representative scenarios displayed in Table 2 illustrate how the time and money spent on operations can vary if adjustments are made to a farming system. On a per hectare basis there is a 1 hour 25 minute time difference and \$110 cost difference in fallow between scenario 1 and 2 (costs are based on a farmer doing their own operations). There is also a 55 minute time difference and \$60 cost difference in plant cane. But what could these differences mean across a larger area? If the farm has 50 hectares of fallow and 50 hectares of plant cane then a reduction in tillage (a transition from Scenario 1 → 2) results in:

- potential savings in tillage costs of **\$8 500 per annum**
- potential time savings of over **115 hours** (around three working weeks).

What impact can tillage operations have on growing costs?

Table 2: Scenarios with different operations*

	1: Farming system with legume fallow on beds	2: Farming system with legume fallow on permanent beds
		
STAGE: FALLOW (costs below exclude legume harvesting)	Spray out cane Offset disc x 2 and Ripper x 2 Bed-form x 1 Plant legumes Spray out legumes and harvest	Spray out cane Wavy disc x 2 and Zonal rip x 1 Bed-form x 1 Plant legumes Spray out legumes and harvest
Tillage costs & machinery operation labour hours	\$270/ha 3hrs 35 mins/ha	\$160/ha 2hrs 10mins/ha
Planting (planting material & application costs)	\$200/ha	\$200/ha
Ameliorant (gypsum)	\$160/ha	\$160/ha
Weed Control	\$165/ha	\$165/ha
Insect & Disease Control	NIL	NIL
Irrigation costs	\$250/ha	\$250/ha
Partial Fallow Costs	\$1,045/ha fallow ex GST	\$935/ha fallow ex GST
		
STAGE: PLANT CANE (costs below exclude cane harvesting)	Offset discs x 2 Bed-form x 1 Plant cane	Wavy discs x 2 Plant cane
Tillage costs & machinery operation labour hours	\$130/ha 1hrs 45mins/ha	\$70/ha 50mins /ha
Planting (planting material & application costs)	\$820/ha	\$820/ha
Fertilising costs	\$490/ha	\$490/ha
Weed Control	\$160/ha	\$160/ha
Insect & Disease Control	\$65/ha (applied with planter)	\$65/ha (applied with planter)
Irrigation costs	\$650/ha	\$650/ha
Partial Plant Cane Costs	\$2,315/ha plant cane ex GST	\$2,255/ha plant cane ex GST

*Based on the following costs per pass: rotary hoe \$110/ha, offset disc \$45/ha, ripper \$70/ha, zonal ripper \$50/ha, bedformer \$40/ha, renovator \$60/ha (for fuel, oil repairs, maintenance and labour, incorporating a labour cost of \$40/hr and fuel cost of \$1/L (after rebate and ex GST)). Irrigation is based on a BRIA FEAT scenario. Note that a more detailed analysis could factor in any income from harvested legumes and cane as well as how practice implementation might vary depending on soil types and soil condition.

Managing knock-on effects

What about the bigger picture?

Every farm is different and that's why it's important to look at your own situation and the knock-on effects of any adjustments to your farming system. Some growers who have participated in past DAF case studies have explored the knock-on effects of changes (and managed risks) by obtaining farm-specific advice from local advisors, speaking with other growers, implementing changes in a step-by-step way and using FEAT to consider economic impacts. The more details that are considered with a program like FEAT the more you can look at whole-of-farm performance from year to year, inform decision making with economics (e.g. when considering farming system adjustments) and use cash flow budgets to see if such adjustments are likely to be affordable.

Table 3: Some factors that inform precision economics

Considering...	Helps to identify...
Yield/CCS	Productivity
Sugar Price	Gross incomes
Variable Costs	Gross margins (variable costs include e.g. machinery operation costs as well as the costs of other inputs such as fertiliser)
Fixed Costs	Profitability (fixed costs include e.g. depreciation, interest, insurance)
Assets	Return on investment
Cash flow budgets	The affordability of changes (based on your circumstances)
Sensitivity analyses	Benefits of a system under different scenarios (e.g. variations in production).

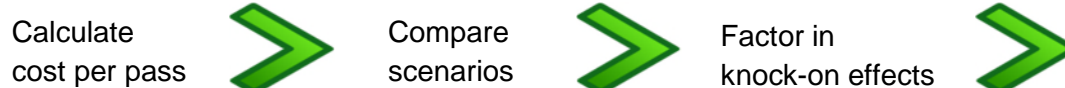
Table 3 shows how economics can bring together the various inter-related aspects of your business that you juggle from day to day. Can your decisions be better informed by looking at how any farming system adjustments might impact on each of the items in Table 3? Can you expect soil health benefits and longer-term productivity improvements?



"We provide support across a lot of farms in the Burdekin and see some big differences between farming systems and how operations are put into effect. It makes sense to know your machinery costs so you can look at opportunities for improvements."

Terry Granshaw, Soil Health Officer, Burdekin Productivity Services

Identifying machinery operation costs provides a foundation to consider your system with greater precision and to identify opportunities to save time and money. Although this publication focuses on machinery costs, looking at the broader farming system and your own unique circumstances is important to maximise any potential benefits of system adjustments.



The Soil Health Project is a collaborative project. Please contact:

- Anthony Curro from SRA (accurro@sugarresearch.com.au) for general project info
- Caleb Connolly from DAF (caleb.connolly@daf.qld.gov.au) for economics info
- Terry Granshaw from BPS (tgranshaw@bps.net.au / 0437 553 149) for info on implementing practices.