

FARM BUSINESS FACT SHEET

BUSINESS MANAGEMENT

PHOTO: MELISSA POWELL - GRDC



Cost-effective investment in machinery

Key points

- The higher capital cost of machinery is offset by the efficiency gains of new technology and the reduced need for additional labour.
- Machinery operating costs, including the use of contractors, on average are one third of average farm income, and are larger than fertiliser and chemical costs combined.
- Machinery replacement can be delayed until there are sufficient surplus funds in good years. However, the trend towards financing machinery over three to five years results in machinery capital effectively being a fixed overhead cost in all years, and averages seven per cent of total farm income (but does vary from as low as five per cent to as high as 11 per cent).
- The average WA farming business has a 0.7:1 machinery to income efficiency ratio.

Substantial gains in farm productivity and efficiency in recent years can be linked to improvements in machinery

capacity and technology. The increased capacity of farm machinery has allowed many WA growers to meet the challenge of increased scale without the need for increased labour. However, higher machinery investment costs have the potential to erode farm profits.

Some of the factors to consider when deciding the appropriate level of machinery investment include:

- future changes to farming practices
- farm scale expansion
- labour skills and availability
- family and lifestyle needs
- competing investment and personal demands for capital.

COUNTING THE COST

Machinery is an essential tool of the trade for grain production in Western Australia, just how valuable that contribution actually is to the entire farm enterprise can be measured by considering:

- operational effectiveness
- timeliness of operations
- labour efficiency
- lifestyle and operator comfort.

Increased machinery capacity can improve operational timeliness and

production gains, as well as reducing losses if crops are planted, sprayed and harvested on time. For example, a 35kg/ha/day average loss occurs in WA for each week of delay after the optimum sowing time for wheat.

Drilling down to estimate the value of machinery in specific operations can be measured against:

- efficiency and timeliness of chemical and fertiliser application
- the accuracy and timeliness of seeding and crop establishment
- maximising grain quality and quantity by harvesting at the right time
- maintaining soil health through stubble retention and no till practices
- maximising crop yield through deep ripping, crop establishment on non-wetting soils or minimising soil compaction through tramline farming.

Some rough guidelines on the WA experience about the level of machinery capacity and productivity required are outlined in Table 1.

Having considered the value of machinery to your enterprise, the question now turns to how much you are prepared to pay for those advantages.

TABLE 1 Some rules of thumb for WA machinery productivity and capacity.

Machinery should be capable of sowing the crop	21 sowing days
Machinery should be capable of harvesting the crop	30 harvest days
Harvester capacity (per annum)	500 rotor hours

SOURCE: ORM PTY LTD

TABLE 2 Machinery efficiency benchmark indicator from Planfarm clients 2010–15.

	Average	Range
Machinery to income efficiency ratio	0.7	0.6–1.1

Note: Machinery investment to six-year average income.

SOURCE: PLANFARM PTY LTD

How much capital should I commit?

There are a range of options when it comes to how the cost of machinery can be resourced including direct ownership, outsourced through contractors, hired machinery, syndication or by sharing with neighbours.

The one thing all of these options have in common is a requirement to contribute some capital. One simple way of assessing just how much you can afford to invest in machinery is by directly comparing investment in machinery against farm income.

This equation gives you a measure of ‘machinery income efficiency’, which is a benchmark indicator that reflects the ratio of machinery assets to farm income. It is a whole-of-business benchmark that provides a guide to the typical amount a farm business can invest in owning machinery.

A typical WA farm business’s machinery to income efficiency ratio should fall somewhere between 0.7 and 1.0.

$$\text{Machinery to income efficiency ratio} = \frac{\text{Total machinery assets}}{\text{Farm income}}$$

Note: Total machinery assets are determined by their current market or clearing sale value for all machinery and vehicles owned. Farm income should be based on a six year average, assuming a steady state of business.

The most profitable farms tend to run, on average, machinery to income efficiency ratio at about 0.7 to 0.8 (Table 2). Those with the highest total debt levels tend to be >1.1. Outsourcing some operations to contractors will generally move a farm business towards the lower end of the range.

It should be noted that some farms and landscapes are less efficient for cropping operations yet can still be very profitable. An example is in highly

undulating and broken country frequently found in higher rainfall zones. For these a machinery to income efficiency ratio of 1:1 is often a more realistic target.

This gauge is particularly useful when assessing the capital value of owned machinery. As well as capital costs, all farms have operating expenses relating to a combination of owned and hired machinery, contractors and labour.

To get a complete picture about machinery affordability, you need to understand more about the costs associated with machinery and the factors influencing these cost structures.

THE VIEW FROM ABOVE – CONSIDERING ALL THE COSTS OF MACHINERY

Capital costs

Machinery capital costs are referred to as fixed or ownership costs. They are the annual costs incurred regardless of whether machinery is used or not. Capital costs include:

- the change in capital value of the machinery over time
- opportunity cost of capital invested in machinery
- insurance, registration and shedding

When machinery is financed, the capital cost is reflected in the principal component of machinery finance repayments. The opportunity cost of capital reflects the return that could be achieved by doing something else with your capital as opposed to investing in machinery. As a general guide, the opportunity cost is compared with the current cash or bank deposit rate.

The real cost of owning machinery is calculated as:

$$\text{Capital cost} = \frac{\text{Purchase value (\$)} - \text{end value (\$)}}{\text{Years owned}}$$

Note: The end value is equivalent to market value, which is often different to the trade-in value.

REPAYMENT

Finance repayment costs can be structured so that principal repayments are similar to the average change in value of the machine. They can also be structured to match up with average farm income (i.e. 8% of average income of \$2,000,000 = \$160,000pa).

Operating costs

Machinery operating costs, or ‘variable costs’, differ depending on the amount of use. Operating costs include:

- **repairs** – Which range from replacement parts to fault finding, diagnosis and specialist labour (mechanic charges)
- **consumables** – Which start with the daily costs of fuel, oil & grease, and extend to the less often costs of tyres and batteries?
- **labour** – Time spent carrying out the activity, such as sowing or spraying, as well as travel time. It also includes down time where labour is retained and deployed on-farm to be available for peak periods.

A special note about labour costs

It is important to put a value on all labour that is used to maintain and operate the business, including employed and family labour. Generally, 10 to 16 per cent of farm income is required to cover labour costs.

Contracting costs

If a farm business outsources machinery work to contractors, incurring higher contracting costs, those additional costs are offset by lower machinery capital and operating costs.

Contracting and freight costs need to be included in the overall assessment of machinery and labour costs as contracting charges are a cost to perform the task instead of incurring capital, operating and labour costs.

Expressing both machinery and labour costs as a percentage of farm income opens the door to benchmarking and the potential to compare those costs between farm businesses. This comparison is particularly important when it comes to considering machinery resourcing arrangements beyond direct ownership and sharing the machinery

TABLE 3 Machinery and labour costs for 2014 in Western Australia.

Indicator	% of farm income (six-year average)	
	Average	Range
Machinery costs	22	23–29
Fuel and oil	5	± 2
Machinery and vehicle repairs	5	± 2
Machinery capital (annualised)	11	± 3
Other	1	± 1
Labour costs	13	10–16
Family labour adjustment	9	± 2
Employed labour	4	± 1
Contracting, freight and other costs	7	4–11
Total machinery and labour costs	42	33–56

Note: Machinery costs include fuel and oil, machinery and vehicle repairs, machinery hire costs, machinery capital costs. Employed labour costs include wages, superannuation, training and other employment costs. Family labour adjustment includes allowance for family labour equivalents and superannuation. Contracting, freight and other costs include hired contracting, cartage and freight, harvesting, sowing and fertiliser.

SOURCE: PLANFARM PTY LTD.

cost through sharing or syndication.

Table 3 shows an analysis of WA machinery and labour costs, indicating that the combined cost of machinery labour and machinery is, on average, 42 per cent of the six-year average income.

While these benchmarks provide a reference point for considering machinery investment and costs across a range of enterprises, for a combination of reasons variation might occur due to differences in business circumstances, lifestyle choices and risk profiles.

Businesses on the higher side of the range for one indicator (as in Table 3) typically offset that by being on the lower end of the range for another indicator. In contrast, the highest profit businesses (top 25 per cent) are typically on the lower end of the range for machinery income efficiency, labour and contracting costs.

Some of the reasons for these variations within businesses include:

- A business with higher labour costs has an average level of machinery investment but lower capital costs. They might have adequate machinery; however, they tend to hold onto their machinery for longer. With typical fuel and repair costs, this indicates the business is not spending any more to maintain or run their older machinery.
- A business with high use of contractors offsets this with reduced labour, fuel and repair costs. This results in their total machinery and labour cost being similar to the overall average.

- A larger-scale business, measured by farm income, has a less-than-average level of capital invested in machinery and lower capital and labour costs. This shows it is achieving cost savings through efficient production and/or economies of scale.
- A business with higher debt often has a higher machinery value, as well as a higher labour cost. As a result of these higher costs, it has lower profits

BALANCING THE BOOKS

If your business operates outside the benchmarks, it is good cause to investigate the reasons behind that variation. Operating a business outside these guidelines for an extended period of time, can affect the business's overall profitability unless a balance can be made across the enterprise.

If a grower chooses to maintain a higher level of investment in machinery, then the business needs to ensure it has significantly lower costs in other areas such as lower financing costs, reduced labour costs or increased income to balance the impact of its machinery investment.

Each business has a different cost structure and resources available, therefore individual situations need to be analysed carefully before making investment decisions to ensure enough compensation measures have been included.

For example, growers will often upgrade machinery in preparation for

The search for answers – a checklist

The following questions may prompt you to think about reasons why your machinery investment and costs might vary from the benchmarks.

INCOME

Is your past six-year average farm income similar to your expected or budgeted income going forward?

Will farm scale or enterprise mix change or remain similar to current levels?

COSTS

Have operating costs, such as fuel and repairs, been unusually low or high?

Have there recently been one-off or abnormal repair or fuel bills, or are they likely to stay at current levels?

Have contracting costs been low or high?

Have freight costs been low or high?

Are higher machinery costs offset by lower labour costs or vice versa?

CAPITAL

Is farm profit sufficient to cover machinery replacement, including technology upgrades?

FARMING SYSTEM

Does your business have sufficient machinery to farm at your current business scale?

Are you missing productivity and/or income opportunities because machinery is limiting?

Are all operations timely and with no impact on production or quality?

Do you have the machinery to achieve the farming system you prefer?

THE BUSINESS CYCLE

Are you a new, growing or stable business?

Would future changes in business lifecycle influence your need for machinery?

What is surplus or a priority – labour or machinery costs?

Adapted from: *Business health indicators for professional farmers*, Farm Management 500.

expanding the scale of their business in the future, using current profit to invest in machinery and exceeding current machinery needs in anticipation of an opportunity to expand the land base. During this period, the farm business may have weak machinery income efficiency in order to position the business for the upcoming opportunity. If you have higher costs in one area, the aim should be to offset this with lower costs in other areas, potentially using the significantly lower labour costs that come with higher machinery investment.



PHOTO: BRIANNA SMITH

Additional investment in machinery can reduce labour requirements

FREQUENTLY ASKED QUESTIONS

What is a common level of machinery investment for a cropping farm?

In Western Australia the average farm investment in machinery is a ratio of 0.7:1 to farm income, so for every \$100,000 of farm income (averaged over the past six years), they have \$70,000 invested in machinery assets (at current market value).

What if our machinery income efficiency ratio is higher than average?

Just as important as considering this question is a deeper examination of the reasons why a farm business might have a high level of machinery assets, increasing the ratio to farm income above average. One example might be during the planning stage for increasing farm scale, machinery investment may increase in anticipation of that expansion. Another common reason for a blow-out in the machinery income efficiency ratio is declining income due to adverse climates or low prices. One possible solution is considering whether you can generate more income from your machinery, such as contracting, in the short term to bring your ratio closer to the guidelines.

What is the best way to finance machinery purchases?

With current interest rates including forward rates at all-time lows, the most common option for most WA farm businesses to finance equipment is with a chattel mortgage, which makes the investment a potential hedge against interest rates. There are two main reasons why equipment finance is the preferred option by the majority of farm businesses.

- The loan funds are secured against the item of equipment and therefore do not tie up farm borrowing capacity which may be required in the future (i.e. following severe drought or for farm expansion).
- A payment schedule is a good way of forcing discipline on a farm business for plant purchases/replacement. The total repayments for a given year should be below or at least at the annual target. Heavily cashed up businesses that farm without borrowing may be an exception.

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Useful resources

Machinery purchasing decision support for broadacre growers

www.agric.wa.gov.au/harvesting/machinery-purchasing-decision-support-broadacre-growers

Analysing the economics of machinery purchases

www.grdc.com.au/Media-Centre/Ground-Cover/Ground-Cover-Issue-104-May-June-2013/Analysing-the-economics-of-machinery-purchases

Machinery replacement decisions

www.grdc.com.au/Media-Centre/Ground-Cover/Ground-Cover-Issue-105-July-August-2013/Machinery-replacement-decisions

GRDC Farm Business Management Fact Sheet: Farm Business Risk Profiles

www.grdc.com.au/GRDC-FS-FBM-AttitudeCapacityForRisk

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