

BUSINESS MANAGEMENT FACT SHEET

SOUTHERN REGION

MACHINERY INVESTMENT AND COSTS

Investment in technology-enhanced machinery has provided significant productivity gains for grain growers over the last 10 years. However, determining the appropriate level of machinery investment for an individual farm business can be a challenge.

KEY POINTS

- ▶ Investment in better machinery can offset the need for additional labour.
- ▶ On average, farming businesses have a 1:1 machinery income efficiency ratio.
- ▶ Machinery costs, including the use of contractors, are, on average, one third of farm income and are higher 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 being a fixed overhead cost in all years, and averages 11 per cent of farm income.

Improvements in machinery capacity and technology have been responsible for substantial gains in farm productivity and efficiency in recent years. The increased capacity of farm machinery has allowed many growers to meet the challenge of increased scale without the need for increased labour. However, higher machinery investment and costs have the potential to erode farm profits.

The level of investment in machinery is driven by factors such as changes to farming practices, farm scale expansion, labour skills and availability, family and lifestyle needs, the importance placed on


PHOTO: BRAD COLLIS

To understand the impact of machinery cost on business profitability, all machinery related costs need to be captured. This includes tractors and vehicles. Machinery costs often work out to be a similar percentage of farm income regardless of whether machinery is owned or contractors are used.

machinery relative to other aspects of the business, and the competing investment and personal demands for capital.

The role of machinery

Machinery is an essential tool of the trade for grain production. It can be accessed through direct ownership, outsourced through contractors, hired machinery, syndication or by sharing with neighbours.

The contribution of machinery to a farm business can be measured through:

- ▶ timeliness of operations;
- ▶ labour efficiency; and
- ▶ lifestyle and operator comfort.

The value of machinery in specific operations can be measured as:

- ▶ seeding and crop establishment accuracy and timeliness;

- ▶ efficiency and timeliness of chemical application;
- ▶ maximising grain quality through timely harvest; and
- ▶ soil health through stubble retention and no-till practices.

Increased machinery capacity can improve operational timeliness and if crops are planted, sprayed and harvested on time, productivity gains and reduced losses can be realised. For example, a four to seven per cent yield loss occurs in wheat for each week of delay after the optimum sowing time (NSW DPI Primefact 913, *Guide to machinery costs and contract rates*).

Rules of thumb can provide some guidance on the level of machinery capacity and productivity required, as outlined in Table 1.

How much capital should I commit?

As a measure of affordability, investment in owning machinery can be compared with farm income, as seen in Table 2.

'Machinery income efficiency' is an 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 business's machinery income efficiency should fall between 0.7 and 1.2.

$$\text{Machinery income efficiency} = \frac{\text{total machinery assets}}{\text{farm income}}$$

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

The most profitable farms tend to run, on average, a machinery income efficiency around 0.7. Those with the highest total debt levels tend to be around 1.1. If a farm business outsources some operations to contractors, then they should expect to be at the lower end of the range, see Table 2.

This indicator is useful when assessing the capital value of owned machinery. In addition to the capital costs, all farms have operating expenses relating to a combination of owned and hired machinery,

TABLE 1 Some rules of thumb about machinery capital investment.

Machinery should be capable of sowing the crop in	21 sowing days
Machinery should be capable of harvesting the crop in	21 harvest days
Harvester capacity per annum	250 rotor hours
The seeding tractor should have	6 to 8 horsepower per sowing tyne

SOURCE: ORM PTY LTD

contractors and labour. To analyse the full picture in relation to machinery affordability, businesses should understand more about all the costs associated with machinery and the factors influencing these cost structures.

TABLE 2 Machinery income efficiency benchmark indicator for a sample of Victorian Wimmera Mallee cropping business, 2009–12.

Indicator	Average	Range
Machinery income efficiency	1.0	0.7-1.2

SOURCE: AG PROFIT

Understanding the cost of machinery

To understand the impact of machinery cost on business profitability, all machinery related costs need to be captured. This includes tractors, vehicles, implements and so on.

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; and
- ▶ insurance, registration and shedding.

When machinery is financed, the capital cost is reflected in the principal component of machinery finance repayments.

Tip: Finance repayment costs can be structured so that principal repayments are similar to the average change in value of the machine.

The real cost of owning machinery is calculated as:

$$\text{Annual change in capital value} = \frac{\text{cost at start (\$)} - \text{end value (\$)}}{\text{years owned}}$$

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

The opportunity cost of capital reflects the return that could be achieved by alternative investment of that capital. As a general guide, the opportunity cost is associated with the cash or bank deposit rate.

Operating costs

Machinery operating costs, also known as variable costs, differ depending on the amount of use. Operating costs include:

- ▶ repairs;
- ▶ fuel and oil; and
- ▶ tyres and batteries.

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, 15 per cent of farm income is required to cover labour costs, see Table 3.

Tip: The labour required to operate machinery includes travel time as well as time spent carrying out the activity, such as sowing or spraying. It also includes downtime where labour is retained and deployed on-farm to be available for peak work periods.

Contracting costs

If a farm business outsources machinery work to contractors, then machinery capital and operating costs should be lower to offset higher contracting costs.

Tip: Contracting and freight costs need to be included in the overall machinery and labour costs as they are a cost undertaken to perform the task instead of incurring capital, operating and labour costs.

Benchmarking machinery and labour costs

Machinery and labour costs can be expressed as a percentage of farm income, which enables benchmarking and comparison between farm businesses. Table 3 shows a recent analysis of these costs, indicating that the combined cost of machinery labour and contracting is, on average, 47 per cent of the four year average income.

The ranges in Table 3 indicate the variation from average. Businesses on the higher side of the range for one indicator typically offset that by being on the lower end of the range for another indicator. Some examples of the variation within businesses follow.

- ▶ A business with higher labour costs has an average level of machinery

TABLE 3 Machinery and labour costs for a sample of family farm businesses in the Victorian Wimmera Mallee.

Indicator	% of farm income (4 year average)	
	Average	Range
Machinery costs	26	23–29
Fuel and oil	7	+/- 2
Machinery repairs	6	+/- 2
Machinery capital (annualised)	11	+/-3
Other	2	+/-1
Labour costs	15	10-20
Family labour adjustment	12	+/- 3
Employed labour	3	+/- 1
Contracting, freight and other costs	6	2–10
Total machinery and labour costs	47	36–58

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

SOURCE: AG PROFIT

Reasons for variations in machinery investment and costs

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

Income

- ▶ Is your last four 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 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?

Stage in 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?

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

investment but lower capital costs. They have adequate machinery, however, machinery is kept longer. Fuel and repair costs are also typical, which indicates the business does not spend extra 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, lower capital and labour costs. This indicates they are achieving cost savings through efficient production and/or economies of scale.

- ▶ A business with higher debt also has a higher machinery value, as well as a higher labour cost. As a result of these higher costs, it has lower profits.

- ▶ In contrast, the highest profit businesses (top 20 per cent) are typically on the lower end of the range for machinery income efficiency, labour and contracting costs.

Variation between businesses

While it is important to have a set of guidelines and benchmarks for machinery investment and costs, variation might occur due to differences in business circumstances, lifestyle choices and risk profiles. If your business operates outside the benchmarks, it is important to

reflect on whether there are valid reasons for doing so.

For example, growers will often upgrade machinery in preparation for growing business scale in the future. In such cases, it is common to use current profit to invest in machinery and therefore exceed current machinery needs in anticipation of an opportunity to expand the land base. During this period, the farm business may have a weak machinery income efficiency in order to position the business for the upcoming opportunity.

If a grower chooses to maintain a higher level of investment in machinery, then the business needs to have significantly lower costs in other areas, such as lower financing costs, or increased income, to counteract the investment.

If a business operates outside the guidelines for an extended period of time it can impact on the business's overall profitability. Each business has a different cost structure and a different set of resources available, therefore individual situations need to be analysed carefully before making investment decisions.

Tip: If you have higher costs in one area, aim to offset this with lower costs in other areas. An example is higher machinery investment, but significantly lower labour or financing costs compared to benchmark figures.

FREQUENTLY ASKED QUESTIONS

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

On average in south-eastern Australia, farms invest in machinery at a ratio of 1:1 to farm income. That is, for every dollar of farm income (as an average of the last four years), they have a similar amount invested in machinery assets (at current market value).

Is it a problem if our machinery asset income efficiency ratio is higher than average?

There may be a number of valid reasons why a farm business can have a high level of machinery assets, increasing the ratio to farm income above average. Consider whether you have a high level of machinery investment because you are planning to increase farm scale in the future or whether income has been weaker than normal due to adverse climates or low prices. Also consider whether you can generate more income from your machinery, such as contracting, in the short term to bring your ratio closer to the guidelines.

USEFUL RESOURCES

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

Farm Business Management Fact Sheet: Farm business risk profiles

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

NSW DPI PrimeFact 913: Guide to machinery costs and contract rates

www.dpi.nsw.gov.au/__data/assets/pdf_file/0011/302699/Guide-to-machinery-costs-and-contract-rates.pdf

MORE INFORMATION

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