



Horticulture Australia

InnoVeg

Horticulture Australia Limited



BUSINESS CASE

Tractor Replacement



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Business Case

REPLACING A TRACTOR

What is a business case?

A business case is a formal process of planning to provide the decision-maker with useful information to help them make a decision. You will have greater confidence in your decision, if you use a formal process and make sure you count the right things the right way, whilst also considering the things that cannot be counted.

This business case has been developed as an example. You can use the method described here to help you with your own decisions by inserting your figures into the 'How to calculate it?' tool.

Introduction

A vegetable grower is considering replacing their old tractor with a new one. There are lots of jobs going on around the farm and they feel that a modern tractor will offer greater benefits (e.g. technology and safety improvements). However they are worried whether the extra capital required to replace the tractor is worth it.

The grower is also not sure whether it might be worth keeping the old tractor to do some of the odd jobs that they get contractors for, because the timing of operations means that they could not use the new tractor in both roles.

What is the decision?

The decision for this grower is “do I replace the old tractor and keep the contractors?” or “do I buy a new tractor, keep the old one and save on contractors?” Thus, there are really two separate decisions, or scenarios.

What do you have to count?

Depreciation

An investment in new machinery will increase the grower's **depreciation**. This is not a cash cost, but a critical allowance to make when calculating profit. If you do not account for depreciation, then you will not have any money available to replace the machinery when needed.

In this case, the old tractor and the new tractor both depreciate. It is sometimes difficult to estimate machinery depreciation, however, it is important to estimate and test your thinking with a few different figures.

Cost of capital

An investment in new machinery also means that the business will need to use spare cash or increase borrowings to pay for the machine, thus they will need to consider the **cost of capital**. The cost of borrowed capital is obvious (i.e. the interest cost), but the cost of your own capital is less so. Why should you value it any less? Money spent on a tractor, means less money to spend elsewhere, e.g. increase marketing, pay less overdraft interest, improve irrigation systems. Thus, your own capital has a value too, it is known as an 'opportunity cost'.

Productivity benefits

Why does the grower want to buy the new tractor? **Productivity benefits**. Some productivity benefits may include: reduced labour costs, reduced machinery costs, greater area planted, same area planted quicker, and/or access to different higher priced markets. Thus, these benefits need to be defined and quantified.

In this case, defining the financial benefits can be difficult. It is important to think carefully about how the new (or extra) tractor will improve management and either reduce costs or increase income.

Operating costs

The grower is comparing two different tractors, so they will have different **operating costs**. They need to quantify the cost to run the tractor, any changes in repairs and maintenance, and of course, labour efficiency.

Contracting costs

Finally, upgrading to a new tractor may provide the opportunity to reduce the **cost of contractors**, as there are some jobs the grower cannot do at present, which they will be able to do with the new tractor. This is a benefit to the business, but make sure you count your own costs of doing these jobs, e.g. labour, fuel and oil.

The scenario

Here are the three scenarios to be considered describing the current situation, possible future situation of a new tractor and possible future situation of a new plus an old tractor:

What do you count?	Current situation <i>(Existing tractor)</i>	Possible future situation #1 <i>(New tractor only)</i>	Possible future situation #2 <i>(New tractor + old tractor)</i>
Depreciation	The current tractor is 10 years old and worth about \$15,000. It probably has 5 more years before it has scrap value only (\$0).	The new tractor (90HP) will cost \$75,000 plus the grower will receive \$15,000 for the trade-in. The new tractor will be worth about \$25,000 in 10 years time. If the tractor is very well maintained, it may not depreciate by this amount. It is worth testing a number of scenarios.	The new tractor will cost \$75,000 but there will be no trade-in. The new tractor will be worth about \$25,000 in 10 years time. If the current tractors hours are reduced, then its life could be extended out to 10 years.
Cost of capital	With a bit of debt to repay, any spare cash is valued at 8%.	Capital is still worth 8%, whether borrowed or not.	Capital is still worth 8%, whether borrowed or not.
Productivity benefits	The current tractor does about 500 hours work per year.	The new tractor will reduce labour costs. Jobs will be done in about 70% of the time, so each hour of using the new tractor will save 0.3 of an hour of labour.	The labour productivity gains are still available, but cannot be used for the contracting jobs as both jobs happen at the same time.
Operating costs	The old tractor costs \$5,000 to maintain, and \$5 per hour in fuel and oil.	The new tractor will use the same amount of fuel as the old one, but will cost less per year to maintain (\$3000).	The new tractor will use the same amount of fuel as the old one, but will cost less per year to maintain (\$3000). If the current tractors hours are reduced, then its maintenance costs could be halved to \$2,500.
Productivity benefits	Contractors are used for some jobs because there is only one tractor available. For example – minor earthmoving, cleaning drains. The business spends around \$7,500 per year on these jobs, as there are about 75 hours of work for which the contractor charges \$100 per hour.	The timing of operations means that the contractor will still have to be used.	By keeping the old tractor, the grower will not need the contractor any more. However, they will need to count the labour, fuel and oil costs required to run the old tractor for those 75 hours.

How do you calculate it?

Figure 1:
Cost of tractor operations

ASSUMPTION	NOW	NEW ONLY	NEW + OLD	CALCULATION	NOW	NEW ONLY	NEW + OLD
Capital Costs				Costs			
Current value	\$15,000	\$75,000	\$90,000	Depreciation	\$3,000	\$3,500	\$6,500
Trade-in	\$0	\$15,000	\$0	Interest / opportunity cost	\$1,200	\$4,800	\$7,200
Salvage value	\$0	\$25,000	\$25,000	Labour costs	\$11,000	\$7,700	\$7,700
Expected life (years)	5	10	10	Repairs & maintenance	\$5,000	\$3,000	\$5,500
Interest rate / opportunity cost	8.0%	8.0%	8.0%	Fuel & oil	\$2,500	\$1,750	\$1,750
				Cost of contracting jobs	\$7,500	\$7,500	\$2,025
Labour Costs				Total costs	\$30,200	\$28,250	\$30,675
Number of hours used	500	350	350				
Number of staff	1	1	1				
Staff costs (incl. on costs)	\$22	\$22	\$22				
Operating Costs							
Repairs & maintenance - old	\$5,000		\$2,500				
Repairs & maintenance - new		\$3,000	\$3,000				
Fuel and oil (\$/hr)	\$5	\$5	\$5				
Cost of Contracting Jobs							
cost of contractor	\$100	\$100	\$0	Is it more profitable?		YES	NO
number of hours	75	75	75	by how much?		\$1,950	\$-475

NB: Refer to the appendix for a more detailed example of how these numbers were calculated.

The calculations show that the most profitable scenario is to purchase the new tractor and trade-in the old one. However, it is a near thing, i.e. the change in total costs is only about \$2,500 from the NEW ONLY to NEW + OLD scenario. Thus, other non-financial considerations such as increased flexibility will become really important in the final decision.

The key factor which will determine if it is worth replacing an old tractor with a new one, is just how much it will cost (depreciation and interest) versus what productivity benefit (labour, repairs and maintenance) you can capture.

However, when considering keeping the old tractor in addition to the new tractor, in this situation, the key variable is the cost of the contractor.

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Figure 2:

Effect of the cost of the contractor on the savings achieved.

Scenario	COST OF THE CONTRACTOR		
	\$150/hr	\$100/hr	\$50/hr
New Only	\$1,950	\$1,950	\$1,950
New + Old	\$3,275	-\$475	-\$4,225

The numbers presented in Figure 2 are the savings that can be achieved by replacing the old tractor (NEW ONLY) and buying a new tractor, but keeping the old one to replace the contractor (NEW + OLD) at different contractor costs.

1. The savings caused by replacing the old tractor do not change with changes in the cost of the contractor.

2. However, as the cost of the contractor reduces, the savings that can be achieved by keeping the old tractor to do those jobs are less. At \$150/hr, it is worth it, but at \$50/hr or below, it is not.

Use the “How do you calculate it?” tool provided at www.ausveg.com.au/businesscases to test your own numbers.



What are the risks and how can they be managed?

What is the risk?	Why is this a risk?	How can this risk be managed?
Occupational Health and Safety (OH&S)	The old tractor might be unsafe, or becoming increasingly unsafe if not maintained appropriately.	Keep your equipment regularly maintained and ensure you are up to date with all OH&S requirements.
The right tractor for the right job	The jobs that you have used a contractor for might require a tractor with different capabilities than the old one and as it ages it might be less capable.	Have a look at the jobs you need done, consider the tractor required, consider what type of tractor the contractor used and make sure you have the right tractor for the right job.
Staff error	Getting used to using a new machine can take a while, especially if you or your staff have been using the old ones for a long time. The automated systems will be more sensitive, so it might need a little bit of extra care when operating it.	Staff training is essential. Not just when you first buy it, but throughout the season to ensure you learn while you use it and maximise the benefit to your business.

What else is important?

Unmeasurable benefits and costs

Every decision involves changes (benefits and costs) in your business, some that can be measured and those that cannot. The calculation above demonstrates how to count the things that should be counted, but it is also important to consider those things that cannot be calculated.

When the calculation shows a clear benefit, it is a “no brainer”! Similarly, if there were a clear cost disadvantage from making the change, it would be obvious. However, it may well be the unmeasurable benefits and costs that swing your decision when the calculation is a “close thing”.

Occupational Health and Safety (OH&S)

At a minimum you must comply with the relevant OH&S legislation to ensure the health and safety of your employees, your family and yourself. If in doubt, a few extra dollars invested in quality machinery might save you heaps in medical bills, fines and, more importantly, the welfare of everyone who works in your business.

Timeliness

An updated tractor might help you get those critical jobs, like planting, spraying and harvesting, done on time. This can increase your yields and save you a fortune in downgraded product. Often when the calculations are a “close thing”, this is the issue which will tempt people to update.

Comfort and ease of use

The old tractor may be rough to drive, temperamental, hot, dusty and noisy. A new tractor that improves the comfort and ease of use will improve staff motivation and productivity, and simply make those important jobs easier to do.

New technology

Most new machinery comes with upgraded technology these days. Thus, you are rarely simply replacing the old one with a new replica. The new tractor may have increased technological capabilities like auto-steer, or GPS compatibility. These technologies may have benefits for your business in the future, if not now, and need to be factored into such a decision.



Appendix – Detailed calculation

ASSUMPTION	NOW	NEW ONLY	NEW + OLD	CALCULATION	NOW	NEW ONLY	NEW + OLD
Capital Costs				Depreciation			
Current value	\$15,000	\$75,000	\$90,000	current value	\$15,000	\$75,000	\$90,000
Trade-in	\$0	\$15,000	\$0	less trade-in	\$0	\$15,000	\$0
Salvage value	\$0	\$25,000	\$25,000	less salvage value	\$0	\$25,000	\$25,000
Expected life (years)	5	10	10	equals amount to depreciate	\$15,000	\$35,000	\$65,000
				divided by expected life	5	10	10
Interest rate / opportunity cost	8.0%	8.0%	8.0%	Equals depreciation	\$3,000	\$3,500	\$6,500
Labour Costs				Interest / Opportunity Cost			
Number of hours used	500	350	350	current value	\$15,000	\$75,000	\$90,000
Number of staff	1	1	1	less trade-in	\$0	\$15,000	\$0
Staff costs (incl. on costs)	\$22	\$22	\$22	equals total investment	\$15,000	\$60,000	\$90,000
				multiplied by interest rate	8.0%	8.0%	8.0%
Operating Costs				Equals interest / opportunity cost			
Repairs & maintenance - old	\$5,000		\$2,500		\$1,200	\$4,800	\$7,200
Repairs & maintenance - new		\$3,000	\$3,000	Labour Costs			
Fuel and oil (\$/hr)	\$5	\$5	\$5	Number of hours used	500	350	350
				multiplied by number of staff	1	1	1
				equals total staff hours	500	350	350
				multiplied by staff costs/hr	\$22	\$22	\$22
Cost of Contracting Jobs				Equals labour costs			
cost of contractor	\$100	\$100	\$0		\$11,000	\$7,700	\$7,700
number of hours	75	75	75	Repairs & Maintenance			
				repairs & maintenance - old	\$5,000	\$0	\$2,500
				plus repairs & maint. - new	\$0	\$3,000	\$3,000
				Equals repairs & maintenance	\$5,000	\$3,000	\$5,500
				Fuel & Oil			
				number of hours used	500	350	350
				multiplied by fuel & oil cost/hr	\$5	\$5	\$5
				Equals fuel & oil	\$2,500	\$1,750	\$1,750
				Cost of Contracting Jobs			
				cost of labour per hour	n.a.	n.a.	\$22
				plus cost of fuel & oil/hour	n.a.	n.a.	\$5
				equals own costs	n.a.	n.a.	\$27
				cost of contractor	\$100	\$100	n.a.
				multiplied by number of hours	75	75	75
				Equals cost of contracting jobs	\$7,500	\$7,500	\$2,025
				Total Cost			
				Depreciation	\$3,000	\$3,500	\$6,500
				Interest / opportunity cost	\$1,200	\$4,800	\$7,200
				Labour costs	\$11,000	\$7,700	\$7,700
				Repairs & maintenance	\$5,000	\$3,000	\$5,500
				Fuel & oil	\$2,500	\$1,750	\$1,750
				Cost of contracting jobs	\$7,500	\$7,500	\$2,025
				Total cost	\$30,200	\$28,250	\$30,675
				Is it more profitable?		YES	NO
				by how much?			
				total cost of now		\$30,200	\$30,200
				less total cost of new only		\$28,250	
				less total cost of new + old			\$30,675
				Equals by how much?		\$1,950	-\$475

Disclaimer

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