

Prime lamb case study



MLA Cost of Production

The following case study outlines how a prime lamb producer would calculate their lamb cost of production using the MLA Cost of Production calculator.

The prime lamb flock used in this case study is described in Table 1 below.

Table 1: Profile of the prime lamb flock used in this case study

Hogget and adult ewe numbers	1,500
Ram breed	Dorset
Ewe breed	Border Leister x Merino
Weaning percentage	125%
Lambing date	July
Target market	18–22 kg, dressed in late spring
Ewe replacement method	Purchase replacement ewes

This case study business also has a beef herd, comprising 55% of the business's total dry sheep equivalents (DSEs), and an opportunistic goat-harvesting operation (refer to the case studies of goat and southern beef for trading details and expenses). This enables users to see how the Cost of Production tool and resulting reports will look for a multi-enterprise business. Businesses with one enterprise or wishing to use the tool with only one enterprise are able to tick which enterprise before starting in the tool, and the tool's functionality will be adjusted for the enterprise nominated.

However, note that if a business does have multiple enterprises and chooses to calculate the cost of production of only one, they must be careful not to over-allocate expenses, such as overhead and labour expenses, to that enterprise. This will generate an inflated cost of production estimate.

It is recommended to use the same opening and closing inventory values, based on about five-year average prices, at the beginning and the end of the year. This prevents changing prices, which are a function of the market, having undue influence on the cost of production calculation. It can do so by influencing the percentage of total income from each product in the enterprise, which then determines what percentage of the costs is allocated to that product.

Trading details

When in the 'Trading details' tab, you will need to navigate your way to the 'Sheep' section if you are calculating the cost of production of multiple livestock enterprises. Once here, you will need to complete the 'Lamb income', 'Trading income' and 'Wool income' sections. If the sheep are a shedding variety, you can un-tick the box 'I produce wool' to remove the 'Wool income' section (you will need to reload the page).

Lamb income

The 'Lamb income' component of the tool captures any production and financial gains or losses associated with lambs less than 12 months of age.

Since some prime lamb enterprises do not carry lambs from one year into the next, it is not always necessary to have opening and closing inventory values. However, if there are carry-over weaned lambs 3–12 months of age present at the start or end of the year, it is important to provide the required detail as it contributes to the calculation of cost of production.

If lambing occurs close to the end of the year and exact weaning numbers are not yet known, it is recommended to leave them out of the 'Lamb Income' closing numbers. Once the lambs are weaned, they should be included in inventory values or sales.

Production systems that breed replacement ewe lambs within the flock do not need to account for internal transfers from lambs to ewes. These are captured in the opening and closing numbers.

As an example, replacement ewe lambs at the start of a year (i.e. less than 12 months of age and represented in the lamb trading inventory) have to be greater than 12 months of age at the end of the year, and will therefore be represented in the adult sheep trading numbers. It is not necessary to 'sell' and then 'purchase' the replacement ewe lambs between the two accounts.

Similarly, production systems that purchase replacement ewe lambs less than 12 months of age will account for these in the 'Lamb Income' section. As for self-replacing flocks, these replacement ewe lambs will then be accounted for in the inventory of the sheep trading page once they have reached twelve months of age.

The key to getting the livestock inventories to balance is to make sure all sheep are where they belong in the inventory, based on their ages, at the opening date and closing date.

It is important to pay close attention to livestock age brackets. To do this, ensure that the 'Lamb income' and 'Trading income' sales, purchases and inventory numbers contain only the livestock age groups that they represent; that is, no animals greater than 12 months of age in 'Lamb income', and no animals less than 12 months in 'Trading income'.

Replacement ewe lambs transferred from another enterprise within the business, such as a Merino x Border Leicester flock, are to be treated as purchases. Any transfers in or out of the prime lamb flock, whether within the business or not, need to be done at market values.

Livestock sale receipts including sale values and weights should be used to complete the lamb trading income section of the tool.

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In the case study (Figure 1), 1,500 ewes are lambled down in July and 1,800 lambs sold within the year, hence there is no need for opening or closing values. From the 1,800 lambs, 86,000 kg of lamb liveweight is sold for a total value of \$200,000. No lambs are purchased in this year, and there are 75 lamb deaths.

Figure 1: Example of how to complete the 'Lamb Income' section

Trading Details
Expenses
Labour & Overheads
Cost of Production

Cattle

Sheep

Goat

I produce wool

Lamb Income

Trading Income

Wool Income

		Opening [?]	Closing [?]	Change
Lambs	# stock	0	0	0
	kg/head lwt	0	0	0kg
	\$/head	0	0	\$0
Total stock		0	0	0
Total kg/lwt		0kg	0kg	0kg
Total value		\$0	\$0	\$0

	Total weight (kgs) [?]	Total value (\$) [?]
SALES [?]		
Lambs	86,000	200,000
PURCHASES		
Lambs	0	0
TOTAL (sales - purchases)	86,000	\$200,000

KG of Liveweight Produced 86,000kg	Lamb Income \$200,000
(Change in inventory kg + Sales kg - Purchases kg)	(Change in inventory \$ + Sales \$ - Purchases \$)

Trading income

The 'Trading income' section of the 'Trading details', 'Sheep' tab captures any production and financial gains or losses associated with animals greater than one year of age.

It is not necessary to 'purchase' replacement ewes from 'Lamb income'. This transfer is captured automatically in the opening and closing inventory values.

Production systems that purchase replacement ewe lambs less than 12 months of age will do so into 'Lamb income'. Replacement ewes greater than 12 months of age will be purchased directly into 'Trading income'.

Replacement ewes transferred from another enterprise within the business, such as a Merino x Border Leicester flock, are to be treated as purchases. Any transfers in or out

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of the prime lamb flock, whether within the business or not, need to be done at market values.

Table 2 describes the livestock flow for the prime lamb case study. Despite 'Lamb income' and 'Trading income' being in separate sections of the Cost of Production tool, a whole-flock approach such as this helps reconcile the numbers.

Table 2: Illustration of livestock reconciliation for financial year reconciliation

	Opening	Purchases	Natural increase (lambs marked)	Sales	Deaths	Closing
Ewes	1,500	300	0	200	50	1,550
Lambs	0	0	1,875	1,800	75	0
Rams	35	10	0	3	7	35
Total	1,535	+ 310	+ 1,875	- 2,003	- 132	= 1,585

In this case study, ewes and rams have been valued at \$120 and \$300 per head, respectively (Figure 2). As replacement ewes are purchased off-farm for this enterprise, 300 have been purchased for a total cost of \$36,000. Likewise, 200 cull-for-age ewes have been sold out of the flock for an income of \$16,000. There were 50 ewe deaths, hence ewe inventory only increased by 50. The result is that the ewe inventory has increased by 50, attributing \$6,000 to 'Trading Income' (Figure 2).

This process needs to be performed for rams as well. Here, 10 rams were purchased for \$12,000, and three cull-for-age rams sold for \$300 (Table 3). Seven older rams died in this year and are not present in the closing inventory numbers.

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Figure 2: Example of how to complete the 'Trading income' section

Trading Details
Expenses
Labour & Overheads
Cost of Production

Cattle

Sheep

Goat

I produce wool

Lamb Income
Trading Income
Wool Income

		Opening [?]	Closing [?]	Change
Ewes	# stock	1,500	1,550	50
	\$/head	120	120	\$0
Rams	# stock	35	35	0
	\$/head	300	300	\$0
Total stock		1,535	1,585	50
Total value		\$190,500	\$196,500	\$6,000

		Total value (\$) [?]
SALES		
Ewe		16,000
Ram		300
PURCHASES		
Ewe		36,000
Ram		12,000
		\$-31,700

Trading Income \$-25,700

(Change in inventory \$ + Sales \$ - Purchases \$)

Table 3: Example of sales and purchases

Sales					
Livestock category	Number sold	Liveweight (kg/hd)*	Sale value (\$/kg Lwt)**	Total liveweight sold (kg)	Total value sold
Ewes	200	60	\$1.33	12000	\$16,000
Lambs	1800	48	\$2.33	86000	\$200,000
Rams	3	80	\$1.25	240	\$300

Purchases					
Livestock category	Number purchased	Liveweight (kg/hd)*	Purchase value (\$/kg Lwt)**	Total liveweight purchased (kg)	Total value purchased
Ewes	300	60	\$2.00	18000	\$36,000
Lambs	NA				
Rams	10	80	\$15.00	800	\$12,000

* Rounded to nearest kg. ** Rounded to nearest cent.

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Wool income

The 'Wool income' component of the Cost of Production tool captures any production and financial gains or losses associated with wool produced by the prime lamb enterprise. If the 'Wool Income' section is not visible in your account, tick the 'I produce wool' tick box to make this section of the calculator available.

It is important to note that it is not necessary to have opening and closing inventory values for prime lamb enterprises that do not carry wool from one year into the next. However, if there is carry-over wool present at the start or end of the year it is important to provide the required detail, as it contributes to the calculation of cost of production.

The weight of wool carried over should be recorded in clean kilograms. If your records reflect greasy kilograms of wool, you can multiply it by its average yield. If this data is unavailable, contact your wool broker and ask what they would estimate the clip to yield. Likewise, the value of the carry-over wool should reflect clean wool market prices.

In this case study, wool shorn from the ewes, rams and a portion of the lambs was sold within the year for an income of \$36,000 (Figure 3).

You should use your wool sales receipts and your wool broker to help complete this section.

Figure 3: Example of how to complete the 'Wool income' section

		Opening	Closing	Change
Wool	Kg Produced	0	0	0kg
	\$/kg	0	0	\$0
	Total value	\$0	\$0	\$0

		Total value (\$) ?
SALES		
Wool	36,000	
		\$36,000

Wool Income \$36,000
(Change in Inventory \$ + Sales \$)

Expenses

Direct sheep expenses

When in the 'Expenses' tab, users with multiple livestock enterprises will need to navigate their way to the 'Sheep' section. Once here, users can **enter all the expenses that are directly attributable to the prime lamb flock**. All expenses should be GST free.

For users with other sheep enterprises, some prime lamb direct costs may be hard to distinguish, e.g. drenches or shearing costs if they have not been differentiated at the time of recording. To overcome this, you can extract the cost attributable to the prime lamb flock by dividing the cost by the number of sheep in the enterprise. If the Cost of Production tool does not have an expense category you need, you can click '+ Add expense' and enter it yourself. In this case study, total direct expenses attributable to the prime lamb flock totalled \$34,920 (Figure 4).

Purchase receipts and the tax chart from the business's accounts can be used to help complete this section. When the tax records do not allow for expenses to be apportioned easily, then use common sense to arrive at the appropriate numbers, but aim to create more categories for the subsequent years to allow more accurate allocation. Bookkeepers and accountants should be able to do this easily.

Note that when there are multiple enterprises, and records do not allow expenses to be allocated easily between enterprises, using the tool for all enterprises helps users to be confident that allocations are sensible. If one enterprise is allocated a disproportionate amount of the expenses it will look wrong in the cost of production outcome, and the user can go back and reallocate expenses until the outcomes make sense.

Figure 4: Example of how to enter prime lamb direct expenses

DIRECT SHEEP EXPENSES	Total \$ (Excl. GST)
Total flock health costs ?	8,000
Contractors ?	2,200
Transport and cartage ?	220
Selling costs ?	12,500
Shearing and crutching ?	12,000
+ Add expense	\$34,920

Supplement Expenses + Expand

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Supplement expenses

When in the 'Expenses' tab, users need to click 'Expand' on the 'Supplement expenses' section to enter the cost of any supplements fed to the prime lamb flock. All expenses should be GST free (Figure 5).

Supplementary feeding for maintenance can be divided among all livestock enterprises, even if it was only used in one enterprise on the basis that feeding that enterprise meant the other did not have to be fed. This removes bias that occurs if one enterprise is preferentially fed over another. For example, in this case study, the prime lamb ewes are fed 14 tonnes of purchased feed for maintenance. Because feeding the prime lamb flock leaves more pasture resources available to the beef herd, which represents 55% of the farm's DSEs, only 45% of the feed cost is attributed to the prime lamb flock.

When production feeding is occurring (e.g. to put weight on lambs, spike feeding ewes, feed lupins to rams), the cost is allocated directly to the prime lamb flock.

Supplementary feed costs should reflect market values of the supplement at the time it was fed out, whether it is purchased off farm or grown on farm. Feed purchase receipts should be used to help complete this section.

Figure 5: Example of how to enter prime lamb supplement expenses

SUPPLEMENT EXPENSES ?	Quantity (t)	Value (\$/t)	
Home grown feed fed out ?	0	0	= \$0
Purchased feed fed out ?	6.3	210	= \$1,323
Total supplement			\$1,323

Labour and overheads

Labour

In the 'Labour' section of the 'Labour and overheads' tab, users can allocate labour expenses to the various livestock enterprises. All expenses should be GST free. Capital labour should not be included in the cost of production calculation. Significant capital labour is usually associated with infrastructure improvements.

Of the non-capital labour, some will be attributable directly to enterprise-related activities, such as lamb marking, crutching, shearing, etc. The amount used is easy to establish by estimating the number of labour days associated with each of these activities and adding them together.

The remaining labour will be spent in general administration, pasture maintenance, general monitoring, and repairs and maintenance. As it is harder to clearly distinguish what enterprise this labour is servicing, it is sufficient to simply pro-rate this remaining labour across the enterprises, based on their relative DSE contribution.

The labour of owner/operators and additional family members needs to be assigned a value in the Cost of Production tool, net of non-cash benefits. Although there is a range of suitable salaries for both roles, values of \$70,000 and \$50,000 are recommended for owner/operators and family members, respectively.

A full labour unit constitutes five labour days per week for 48 weeks, totalling 240 labour days per year. Any less than this is considered part-time labour, and would be expressed as a proportion of a full-time unit. For example, if the owner/operator works for three days per week, this constitutes 0.6 labour units. To calculate the cost of this labour unit to the enterprise, the value of the labour unit is multiplied by the number of labour units it represents. For example, if the labour of the owner/operator in this scenario is valued at \$70,000, the cost to the enterprise would be \$70,000 multiplied by 0.6 labour units, which equals \$42,000.

The Cost of Production tool allows users to add permanent and casual labour units by clicking the '+' button. It also allows users to alter the distribution of each labour unit among the enterprises.

In this business case study, 45% of the labour is attributed to beef and 55% to prime lamb (Figure 6). This reflects the greater labour efficiency of the beef enterprise. No labour is attributed to the opportunistic harvesting of goats, as this is performed by a contractor and is accounted for in direct costs.

There is only one full-time owner/operator in this case study, whose labour is valued at \$70,000. There are no family members or permanent employees working in the business. There is a casual employee who assists with calf marking (one week) and lamb marking (one week), at a cost of \$2,940. As the casual employee spends an equal

amount of time on each enterprise, his labour is split 50% each way to beef and sheep. Shearing and crutching labour costs are accounted for in direct costs. This brings total labour costs to \$72,940.

Figure 6: Example of how to allocate prime lamb labour expenses

Trading Details | **Expenses** | **Labour & Overheads** | **Cost of Production**

Labour - Minimise

Allocate Labour Costs to Enterprise ?

Cattle %	Sheep %	Goat %
45	55	0

Permanent Employees

Type	Salary (per an)	Cattle %	Sheep %	Goat %
Owner / operator allowance ?	70,000	45	55	0
Cost of family labour ?	0			
Salaried employee ?	0			

Casual Employees

Wage	Hours	Weeks	Total
\$ 35 (hourly)	42 (per week)	2 (per year)	= \$2,940

Total Labour Costs **\$72,940**

Overheads

When in the 'Labour and overheads' tab, users need to click 'Expand' on the 'Overheads' section to enter the business overhead expenses. All expenses should be GST free.

Capital expenditure should not be included in overhead expenses. Capital items are those that have a useful life beyond the current year, and are purchased in the interest of future productivity or efficiency. Because there is room for interpretation of capital and non-capital expenditure, some capital items are treated as non-capital items for taxation reasons. It is recommended that true capital expenditure is extracted from financial records to provide a better indication of the cost of production. Capital expenditure may include that used for new fencing, road building, installing new water systems or raising soil fertility levels.

Overhead expenses are those that are difficult to attribute to any one enterprise. The overhead expense categories provide an indication of what these expenses will be, and users can add their own overhead expense categories by clicking on the 'Add overhead' box. Users can allocate overhead expenses to the enterprises either as a whole, or individually by ticking the 'Edit individual overhead allocations' tick box.

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To allocate expenses as a whole, they may be pro-rated to enterprises based on their contribution to annual average DSEs. Alternatively, overhead expenses may be entered individually by ticking the 'Edit individual overhead allocations' tick box. To allocate overhead expenses individually, other measures such as the enterprises contribution to total income or relative use of labour resources provide a good guide to allocation. Table 4 provides a suggestion of how to best allocate overheads individually.

Table 4: Overhead cost categories and suggested allocations

Overhead cost categories	Allocation basis
Repairs and maintenance (sheds, yards, fences, land)	Dry sheep equivalents
Repairs and maintenance (plant and equipment)	Labour
Depreciation	Labour
Admin expenses	Income
Electricity and gas	Labour
Insurance	Income
Pasture costs	Dry sheep equivalents
Rates and rents	Dry sheep equivalents
Fuel and oil	Labour

In the case study, overheads have been distributed to the enterprises as a whole. As prime lambs represent 45% of the total DSEs, they assume 45% of the overhead expenses. Total overhead expenses for the business are \$128,000 (Figure 7).

Figure 7: Example of how to allocate prime lamb overhead expenses

Trading Details
Expenses
Labour & Overheads
Cost of Production

Labour
+ Expand

Overheads
- Minimise

Allocate Overheads to Enterprise ?

Cattle %	Sheep %	Goat %	
<input type="text" value="55"/>	<input type="text" value="45"/>	<input type="text" value="0"/>	or <input type="checkbox"/> Edit individual overhead allocations

Enterprise Overheads	Value (\$)
Repairs and maintenance (sheds, yards, fences, land) ?	<input type="text" value="12,000"/>
Repairs and maintenance (plant and equipment) ?	<input type="text" value="8,000"/>
Depreciation ?	<input type="text" value="10,000"/>
Admin expenses ?	<input type="text" value="9,000"/>
Electricity and gas ?	<input type="text" value="8,000"/>
Insurance ?	<input type="text" value="12,000"/>
Pasture costs ?	<input type="text" value="40,000"/>
Rates and rents ?	<input type="text" value="16,000"/>
Fuel and Oil ?	<input type="text" value="13,000"/>
+ Add overhead	\$128,000

Cost of Production

The 'Cost of Production' tab provides users with a breakdown of production, income and expenses for all enterprises, based on the information provided.

The first pane in this tab ('Enterprise') shows the relative income, expenses and cost of production for the three enterprises (cattle, sheep and goats) (Figure 8).

Figure 8: The 'Enterprise' pane shows relative income, expenses and cost of production for the three enterprises



The 'Sheep' pane, showing more detail, helps users better understand the cost of production of their prime lamb enterprise (Figure 9).

Prime lamb cost of production is calculated as total cost of lamb production divided by the kilograms of dressed lamb produced, and expressed as \$/kg dwt. The tool also provides the margin between lamb price received and lamb cost of production.

If either the lamb cost of production or lamb margin seems illogical, use the income, expense and production data from higher in the pane to help diagnose where the error may be. Return to the section that seems to be the source of the error and check the inputs to ensure they reflect your prime lamb production system.

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Figure 9: Example of 'Sheep' pane, showing cost of production = \$3.21/kg dwt, leaving a margin of \$1.84/kg of dwt sold

