WHAT IS YOUR BUSINESS COST OF GRAIN, WOOL AND MEAT PRODUCTION?

As most Australian farmers are ‘price takers’ rather than ‘price makers’, it is important to know the business cost of production for your various commodities. Knowing this cost will inform your marketing decisions and ensure that you are selling at a profit.

What is the ‘Cost of Production’?

Cost of Production (COP) is the total cost to produce a unit of any given commodity. It must be expressed in the same terms for which the farmer is paid for that commodity: $/t for cereal, grain legume or oilseed, $/kg for beef or lamb, c/litre for milk etc. It must include:

- All variable costs to produce a unit of commodity (divide $costs/ha by yield per hectare).
- An allocation of overhead costs to producing a unit of commodity.

How do I allocate overhead costs to an enterprise?

There are three common ways to allocate overhead costs: on the basis of land, whole farm gross revenue or whole farm gross margin. Each option allocates costs based on a percentage of use or contribution:

**Option 1: Percentage of Land Area**
- Calculates the % of the total usable hectares devoted to each enterprise and apportions that percentage of total overhead costs to each enterprise.

**Option 2: Percentage of Gross Revenue**
- Calculates the percentage of total gross revenue which each enterprise contributes and apportions overhead costs on the same percentage basis.

**Option 3: Percentage of Whole Farm Gross Margin**
- As for (2) above, but allocates overheads on the percentage contribution of the enterprise to the Whole Farm Gross Margin.

Case Study

In the following example, we have assumed a 2,500ha mixed farming operation producing cereal, oilseeds and wool, with total overhead costs of $350,000pa and total revenue of $1,147,400pa.
Each of the three calculation options are presented to illustrate the alternative overhead cost allocations and the effect that this has on estimated cost of production for each commodity.

**Which method should I use?**

Option 1 (% Land Area) is probably the simplest and is fine if you have a single enterprise, or a purely cropping business with predominantly one land class over most of the farm. However, for more complex businesses, which could include intensive enterprises such as chicken or pork production or those with varying land classes, options 2 or 3 tend to be more accurate.

For the case study above, imagine most arable land (say 1,800ha) was cropped most years and the sheep grazed cropping paddocks in fallow and scrubby and rocky country, which accounts for the other 700ha. To apportion overhead costs on a percentage of land area would unfairly bias against the sheep enterprise. Indeed, the cost of production for a kg of wool on %Land Area is $12.05 while on %Gross Revenue is $8.64. At the wool price of $9.70/kg used in the example, merinos are a loss making enterprise by Option 1, but are profitable by Options 2 and 3.

Options 2 and 3 tend to be more accurate. Option 3 can unfairly weight overheads towards the enterprise with the highest gross margin, which may not in fact be fair either. To illustrate this, refer to Table 1 again. Overhead cost allocated to wheat is $88/t and to barley is only $50/t. In reality, this may be an unreasonable allocation.

Our preference is to use Option 2: %Gross Revenue when calculating past COP for a commodity and estimating future COP. Overhead costs are unlikely to change greatly from year to year, however crop yield, for example, will. Chances are that if your wheat yield is down, so are the other crop yields, but their contribution as a percentage of gross revenue will likely be of similar proportion.

**Table 1 Options of calculating Cost of Production**

<table>
<thead>
<tr>
<th>Enterprise</th>
<th>Wheat</th>
<th>Barley</th>
<th>Canola</th>
<th>SR Merino</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterprise Area</td>
<td>500ha</td>
<td>500ha</td>
<td>500ha</td>
<td>1,000ha</td>
</tr>
<tr>
<td>Yield (t/ha or kg/ha)</td>
<td>3.2t</td>
<td>3.2t</td>
<td>1.4t</td>
<td>22kg</td>
</tr>
<tr>
<td>Total Commodity Production (t or kg)</td>
<td>1,600t</td>
<td>1,600t</td>
<td>700t</td>
<td>22,000kg</td>
</tr>
<tr>
<td>Commodity Price ($/t or $/kg)</td>
<td>$220</td>
<td>$180</td>
<td>$420</td>
<td>$9.70</td>
</tr>
<tr>
<td>Variable Costs ($/ha)</td>
<td>$300</td>
<td>$345</td>
<td>$390</td>
<td>$125</td>
</tr>
<tr>
<td>Overhead Costs ($/ha)</td>
<td>$140</td>
<td>$140</td>
<td>$140</td>
<td>$140</td>
</tr>
</tbody>
</table>

**Option 1: COP based on % Land Use**

| Enterprise % of Farm Area | 20% | 20% | 20% | 40% |
| Variable Costs: ($/t or $/kg) | $93 | $107 | $278 | $5.68 |
| Overhead Costs: ($/t or $/kg) | $43 | $43 | $100 | $6.36 |
| Cost of Production: ($/t or $/kg) | $137 | $151 | $378 | $12.05 |

**Option 2: COP based on % Gross Revenue**

| Enterprise % of Gross Revenue | 31% | 25% | 26% | 19% |
| Variable Cost ($/t or $/kg) | $93 | $107 | $279 | $5.68 |
| Overhead Costs ($/t or $/kg) | $67 | $54 | $128 | $2.96 |
| Cost of Production: ($/t or $/kg) | $160 | $161 | $407 | $8.64 |

**Option 3: COP based on % Gross Margin**

| Enterprise % of Whole Farm Gross Margin | 40% | 23% | 20% | 17% |
| Variable Cost ($/t or $/kg) | $94 | $108 | $279 | $5.68 |
| Overhead Costs ($/t or $/kg) | $88 | $50 | $100 | $2.70 |
| Cost of Production: ($/t or $/kg) | $182 | $158 | $379 | $8.39 |

*Source: Holmes and Sackett (2010)*
So, for a quick analysis Option 1 is fine, but for greater accuracy, we recommend Option 2: Percentage of Gross Revenue. The important point is to be consistent with the option used for allocating overheads across years so actual COP results can be compared.

**Once I know my COP, how does it help?**

Knowing the COP for a commodity has several benefits to your business. It will assist you to:
- Identify enterprises which consistently have a commodity price higher than your COP and so are consistently profitable.
- Identify enterprises with a commodity price which is consistently below COP and investigate cost savings, or changes to your enterprise mix.
- Use commodity price projections to enhance profitability in the medium term.
- Select a consistently profitable enterprise mix across the business.
- Gain clarity around marketing decisions. It is easier to sell grain when you know the profit it will generate.
- Decrease business risk.

In Figure 1, the average cost of production for wheat in Australia for the last decade is the middle, bright red line at $214/t. At this cost, wheat is break-even or profitable in 8 of the 10 years and significantly profitable (more than $40/t over COP) in 4 of those years. However, if your COP is around the yellow line at $240/t, there are only 5 years in 10 when growing wheat has made you any profit, it has lost you money in several years, and on average over the decade, your profit is only $12/t. Issues such as expansion, debt reduction and improving quality of life are a struggle at this COP, and you might be asking yourself:

1. How can I grow wheat more cheaply?
   or,
2. Are my odds of success better if I grow something else?

If however, you are producing wheat on average at the green line at $180/t, you are making profit every year and averaging $72/t profit over the period. It still requires comparison with alternative enterprises, but wheat is profitable for you most of the time.

Figures 2-5 below plot annual commodity prices from 2002-2012 for barley, wheat, canola and wool against the average COP for those commodities over the years 1998-2010.

Given the average COP over the decade, the results are pretty clear. On average, growing wheat was more profitable than canola or barley and growing wool was profitable every year for an average producer.

- How could we use this data to vary our enterprise mix towards greater profitability?
- Do we need to consider how we manage the riskier crops, especially in tight seasons?

This seems a good time to discuss the data itself. The period of analysis includes significant periods of drought where crop yields were low or zero. Under these conditions, barley is often the 'go to' crop, as it is seen by many as a lower risk, easier to grow and more tolerant of a dry spring than wheat or canola. The argument...
could be made therefore that the figures are giving barley a bad rap, due to it being the crop of choice when ‘rolling the dice’ in a tight season. Wool obviously has the benefit of complementary lamb production included in the figures and ‘wipe out’ yields are highly unlikely from sheep. You may ask how the sheep numbers would stack up if they didn’t get the benefit of grazing failed cereal crops year after year!

Make what you will of the data, the important point is that you understand the need to calculate your Cost of Production and use it to help analyse input expenditure and guide production and marketing decisions in your business.

Cost of Production calculations are unique to each farming business and while the results in Figures 2 to 6 show industry trends, this would be very powerful business information if it were known for your particular farm. The use of trend data from a business is an essential tool to demonstrate (1) business performance to banks and (2) provide a ‘big picture’ view of the business performance, especially when a poor season is being experienced. In a poor season, it is important not to lose sight of the long-term trends, which will assist in managing the physical effects that a poor season brings.

FAQs

What about allocation of depreciation to livestock enterprises?

What we are trying to achieve is reasonable allocation of costs. Cropping machinery is expensive and tends to lead to high depreciation expense figures. If this applies to your business, allocate depreciation in a manner which you believe represents the true cost to each enterprise. For example, if you have $1m of machinery and $800k of it is solely cropping related, then apportion the depreciation accordingly to the cropping enterprise.

How do you account for useful by-products, e.g. lamb from a merino flock, or wool from a prime lamb producer?

Focus on the key enterprise, so if it is lamb you produce, you need to know COP per kilogram carcass weight. The wool income is generally incidental, but to be accurate, add the wool income back as a deduction from the total costs (a negative cost if you like) and you will arrive at the correct cost to produce a kilogram of lamb.