

If you are going to the effort of making up a diet that includes more than pasture only, the diet needs to be:

- Nutritionally balanced
- Cost-effective
- Palatable

Diets can get complicated. This fact sheet will give you some ideas but a nutrition adviser can help you achieve optimal results.

Are you going to feed your cows for high milk production?

You need to decide what level of milk production you are going to feed for, as this will impact on the choices you make in planning the diet. Cows fed to achieve high daily milk production use proportionally less feed to maintain themselves

– a greater percentage of feed is used to produce milk. The cost of feeding cows in a Flexible Feeding System that are using half the feed to maintain themselves is too high for a business to sustain long term.

When asked the question, 'Are you going to feed your cows for high milk production?' three farmers offered their views:

Bargain Bob:

I'm not chasing higher milk production. I'm ready to snap up cheap feeds when I find them. There's no way I'm going to get sold expensive feeds. The cows will get plenty to eat provided I can keep the feed cost per tonne down. The herd can't be too bad, they got to 22 litres this year.

Bargain Bob's cows will not be efficient feed converters. An increased percentage of feed will be used just for maintenance or to put lost body condition back on. He needs to crunch the numbers on his Milk Income less Purchased Feed Cost to work out if his approach will sustain adequate cash flow.

Not sure Nelly:

Boy, I'd like to, but it's a real stretch to pay the big feed bills each month. I'm trying to feed a little more but it's always so tight.

Nelly is in a pinch. By not maximising milk production, a lot of the money she is spending on purchased feed is just going to maintenance and the milk income won't be enough to cover other farm costs. Nelly must make changes. She could feed a better balanced diet based on high-quality fodder/concentrates and focus carefully on reducing feed wastage. A nutrition adviser can help Nelly fine-tune her diet.

Go for it Glen:

We do our best to! It hasn't been easy, but we worked with an adviser on a diet to achieve our target production. I rang a few blokes and sourced some cheap troughs. I just use a silage cart. It took us a bit to find some of the feed ingredients, but we now have a pretty good idea where to find feed, which we always get tested. We're planning our next steps so we can use a wider range of ingredients and push production up further.

The new feeding system wasn't a quick fix for Glen's problems. The planning he did to make sure that each decision paid off was the key. By feeding his cows well, Glen is able to comfortably cover all his farm operating costs, finance and capital costs.

No grass? Feeding on the cheap won't work.

What does a balanced diet look like?

If you are used to using hay and grain, you might not be used to thinking of a balanced diet in these terms. Essentially, a cow's diet is primarily made up of energy, protein and fibre. It is the proportions of each that determine if the diet is nutritionally balanced. These guidelines are the basis for a high production diet.

Nutrient	Rec. level	Nutrient	Rec. level
Crude protein:	16-18%	Undegradable Dietary Protein (UDP):	35% of the total crude protein
Non-fibrous carbohydrate (NFC):	34-42%	Sugar:	4-8%
		Starch:	22-28%
		Soluble Fibre:	7%
Neutral Detergent Fibre (NDF):	30-35%	Effective NDF:	>22%
Crude fat:	0-5%		
Minerals, vitamins, buffers, rumen modifiers, other additives	Speak to a nutrition specialist		

What feedstuffs to use?

- Use ingredients in your diet that are palatable, digestible, and free of toxins and chemical residues.
- There is little room for guessing, so get a feed test on a representative sample of each ingredient.
- If purchasing a commercial concentrate mix or pellet to feed

with hay/silage, make sure the protein content is adequate. If you are able to mix your own grain/concentrates, consider using high-quality protein sources, such as canola, soymeal or cottonseed meal. Urea can be used, but only with extreme caution – seek advice first.

You may start with hay and grain-based diets



- Hay/grain alone may limit production as too much grain is an acidosis risk and too much fibre will reduce intake.
- Good quality hay and grain can form the base of a very high production diet. Think about offering other feeds, such as PKE.
- To ensure all cows get the right amounts, include any protein sources, minerals and other additives in the grain/concentrate fed in the bail.

Then think about adding other useful feed ingredients



- There is often an upper limit on how much you can feed of particular ingredients.
- Research each ingredient to see if it will suit your system:
 - High-quality protein sources, such as canola, soymeal or cottonseed meal or a commercial protein concentrate.
 - Brewers grains, citrus pulp, PKE and other co-products.
 - Molasses or liquid distillers syrup.
- Buy with a Commodity Vendor Declaration

With the right equipment you can also include additives in the mix in small amounts



- Use scientific data and professional advice to decide if you will include:
 - Major and trace minerals.
 - Vitamins.
 - Buffers
 - Rumen modifiers.
 - Urea (caution!).
 - Protected fat supplements.
 - Others.
 in your mix or in your bail feed. See Fact Sheet 6 for equipment options.

You can't afford to guess. Get a feed test.

Purchased feed cost?

Once you know what feed ingredients are available and at what price, it is time to do the calculations. To achieve the best results, focus on formulating diets that will generate a higher Milk Income less Purchased Feed Cost for you. This is how much of your milk income is left over after paying for purchased feed. This left-over amount needs to pay for all your operating expenses, including herd, shed, labour, pasture growing and overhead costs, plus your finance and capital costs. Aim for a thrifty diet, but don't go as far as feeding the least cost per tonne or per cow as it is unlikely to give you enough milk production to generate a decent margin.

Let's have a look at how milk production affects Milk Income less Purchased Feed Cost, using a simple example:

A nutritionally balanced 30-litre diet of five feed ingredients – cereal hay, wheat, canola meal, PKE and full fat soya bean. Assuming a milk price of 43¢/L, this 30L diet works out like this:

1. Work out milk income: \$13/cow/day
2. Work out purchased feed cost: \$8.50/cow/day
3. Calculate Milk Income less Purchased Feed Cost: \$13 less \$8.50 equals \$4.50/cow/day.

An example 30-litre diet, comprised of:				
8 kg per cow \$2.40 per cow	7.5 kg per cow \$3.35 per cow	2 kg per cow \$0.90 per cow	2.5 kg per cow \$0.75 per cow	2 kg per cow \$1.10 per cow
Cereal hay \$300/tonne 	Wheat \$450/tonne 	Canola meal \$450/tonne 	PKE \$300/tonne 	Full-fat soya bean \$550/tonne

So, in this particular example, the Milk Income less Purchased Feed Cost for the 30-litre diet is \$4.50/cow/day.

Now let's compare this with the Milk Income less Purchased Feed Costs for diets based on the same milk price and varying amounts of the same five ingredients to meet cow requirements for 20 and 25 litres/day.

As you can see in this example, there is a smaller amount left over at these lower milk production levels to cover operating, finance and capital costs.

Time to get the pencil out.
Milk Income less Purchased Feed Cost helps to decide the most profitable diet.
The higher the better.

Milk production per cow per day	Milk income per cow (assuming same fat and protein %s)	Purchased feed cost per cow/day	Milk Income less Purchased Feed Cost per cow/day
30 litres	\$13	\$8.50	\$4.50
25 litres	\$10.75	\$7.30	\$3.45
20 litres	\$8.60	\$6.15	\$2.45

General principles

The diet is only one part of your feeding system. Make sure it works within the constraints of your operation.

- Pasture first
 - Determine pasture availability first then work backwards to develop the diet. It is still the cheapest source of feed and can be a fantastic source of protein in a high production diet.
 - Do the sums on watering perennial pasture if you grow less than 1.5 tonne dry matter/megalitre. 1 megalitre sold may purchase 3 tonnes of extra dry matter.
- Feed Conversion Efficiency (F.C.E.)
 - Cows that are well grown and in good body condition will make better use of the feed on offer.
 - Cows that are being fed for higher production and cows in early lactation will also do so.
 - The range in feed conversion efficiency is between about 1.0 kg milk produced per kg of dry matter fed up to 1.5 kg milk produced per kg of dry matter fed. Aim for your cows to produce towards 1.5 kg milk/kg DM.
- Maximise feed intake / minimise wastage
 - By maximising feed intake for higher production and minimising waste, you will achieve a higher Milk Income less Purchased Feed Cost.
- Peak and hold
 - Build your peak as high as possible and then avoid letting cows slip in production - hesitation in full feeding will result in cows rapidly losing production and feed conversion efficiency- this can be hard to recover.

Quick checks

Diets can end up costing a fortune if you don't pay attention to the details. Focus on these quick checks:

- Are the cows eating the diet? Palatability can be improved by mixing more tasty ingredients. Liquids can help carry and mix powdered ingredients, reducing feeding losses and feed sorting issues. Using water in a mixer wagon is an option.
- Watch the tail end of the herd after milking for signs



Not sure?
Ask your
adviser

- Tailor diets
 - You can feed one diet to the entire herd but energy, protein and mineral requirements change throughout the lactation. Think about tailoring diets for different groups. Remember, someone has to prepare the multiple mixes!
- Use what you can handle
 - Only use the ingredients that your mixing equipment can handle. Being able to safely and effectively mix together long, fibrous feeds and smaller particle size feeds and additives in diets can improve rumen function and cow performance but will require a higher investment.
- Feed little and often
 - Cows can consume a dry or partially dry diet much more quickly than they can graze pasture. However, to maintain rumen stability, give each day's allocation of feed in 2-3 meals several hours apart.

Using existing equipment will save money, but this may limit your choice of feed ingredients you can safely and effectively use.

of health problems. Pay particular attention to your first calvers as they may be the first to show signs that something is wrong.

- Who's doing the mixing? Measurement and calculation errors can be costly.
- Don't forget the calves and yearling heifers. Are they meeting your target daily growth rate? If not, change their diet.

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