Dairy Australia

FEED PLANNING

Feed conversion efficiency

A KEY MEASURE OF FEEDING SYSTEM PERFORMANCE ON YOUR FARM

With feed costs such a large proportion of variable and total costs on a dairy farm, it is important to measure the efficiency with which feed is converted into milk. Feed Conversion Efficiency (FCE) is a key measure of feeding system efficiency on a dairy farm, impacting on feed cost/unit of milk and milk operating profit. FCE is also an important factor impacting on a farm's greenhouse gas emissions.

FCE should always be used in conjunction with other farm physical performance measures, and financial performance measures such as annual milk operating profit and return on assets.

FCE is expressed in terms of the amount of milk produced per kilogram of feed given to your herd. FCE can be measured for the milking herd on an annual basis, or seasonally within each year.

$$\text{Annual Milker FCE} = \frac{\text{kgs milk produced/cow/year}}{\text{kgs Pasture + kgs Fodder + kgs Grain + kgs Other feeds fed/cow/year}}$$

Targets for the five main feeding systems

Grains2Milk recommends a series of achievable annual FCE targets for milking cows for the 5 different feeding systems, expressed in terms of grams of milksolids or kilograms milk per kilogram of feed dry matter.

Annual milker feed conversion targets (including a 60-day dry period), expressed in grams MS/kg feed DM (top) and kg milk/kg feed DM (bottom).

	Grams MS/kg feed DM	
Feeding system	**Achievable target**	**Take action if less than**
Pasture + forages + Low grain in bail	75	68
Pasture + forages + Low grain in bail	90	83
Pasture + PMR +/- grain in bail	100	92
Hybrid system	105	98
Total mixed ration (Zero grazing)	120	109

	Kg Milk/kg feed DM	
Feeding system	**Achievable target**	**Take action if less than**
Pasture + forages + Low grain in bail	1.0	0.9
Pasture + forages + Mod-High grain in bail	1.2	1.1
Pasture + PMR +/- grain in bail	1.3	1.2
Hybrid system	1.4	1.3
Total mixed ration (Zero grazing)	1.6	1.45

These targets are achievable in well-managed systems, with minimal wastage, good quality feed, minimal feed gaps and good rumen function throughout the year.

Higher FCE's are possible using feeding systems 3, 4 and 5 because they enable higher daily feed intakes to be achieved, provide greater control over feed quality and feed wastage, and allow a more stable and efficient rumen to be maintained. Higher FCE's using feeding systems 3, 4 and 5 systems are essential, given the higher capital and operating costs associated with them.

Measuring FCE on your farm

The 'Pasture Consumption and Feed Conversion Efficiency Calculator' developed by DPI Victoria with support from Dairy Australia provides the Australian dairy industry with a robust, scientifically sound method for calculating annual pasture removal and milker feed conversion efficiency (FCE) on your farm. You must register an account and/or login to use this calculator. **dairypastureconsumptioncalculator.com.au/help**

Strategies to optimise FCE

General aims to optimise FCE across all five main feeding systems are:

- optimise total daily feed intake
- maintain high feed quality
- maintain good rumen function
- minimise feed gaps throughout the year
- minimise feed wastage
- minimise energy losses.

Strategies to optimise FCE can be considered as a set of building blocks, starting with feeding system 1, and building up to feeding system 5.

Strategies for each feeding system

Feeding system 1

Pasture + other forages + low grain/conc. feeding in bail:

- Select suitable pasture species/cultivars and grow pasture to farm's potential (as dependent on climate, soil fertility, water, nitrogen etc.)
- Use appropriate stocking rate to manage pastures effectively
- Optimise pasture intakes (high pasture allowances, high digestibility for as much of the year as possible)
- Use grain and other supplements to alleviate seasonal feed gaps and extend lactations
- Provide adequate effective fibre in the diet at all times to promote chewing and saliva production
- Minimise energy losses eg. from excessive walking, excessive body condition changes during year
- Manage heat stress effectively in hot weather to minimise the decrease in daily feed intake and increase in energy required for maintenance.

Feeding system 2

Pasture + other forages + mod. - high grain/conc. feeding in bail As per system 1 (with lower pasture allowances) plus:

- Greater focus on adequate effective fibre in the diet to promote chewing and saliva production
- Gradual changes to grain feeding rates (an individual cow ID feeding system in the dairy assists with this)
- Use rumen modifiers, buffers, neutralising agents, probiotics
- Transition feeding program before calving
- Protein and mineral supplements
- Minimise feed wastage (especially fodder) +/- consider
- Use slower fermenting grains such as corn with wheat/barley
- 3 times a day milking (especially if using high grain feeding rates)

Feeding system 3

Pasture + PMR +/- grain/conc. feeding in bail.
As per system 2 plus:

- Greater focus on:
  - quality of fodder, grain and other supplements (used in PMR)
  - formulation of a nutritionally balanced diet (pasture plus PMR)
- Correct additions and processing of feed ingredients in mixer wagon
- Incorporate most of grain in PMR rather than feed in the bail

- Sequence PMR feeds carefully each day (1X or 2X) with grazing and bail feeding to optimise intakes and maintain rumen as stable as possible
- Manage feed-pad well:
  - Adequate feed space and access to drinking water
  - Fresh, highly palatable feed at all times
  - Feed sorting and wastage minimised.

Feeding system 4

Hybrid system (Grazed pasture for < 9 months per year + PMR on feed pad +/- grain/conc. in bail):

- Correct timing and a smooth, gradual transition:
  - From pasture plus supplements to full Total Mixed Ration (TMR) in late spring
  - From TMR back to pasture plus supplements in Autumn

Feeding system 5

TMR system (Zero grazing. Cows housed and fed TMR)
As per system 3 plus:

- Greater attention to:
  - diet formulation, with more focus on amino acids and minerals, and possible use of fat supplements
  - keeping feed as fresh as possible (1 versus 2 mixes per day)
- Push feed up to cows several times per day
- Other strategies to promote high daily feed intakes and minimise feed wastage

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FOR FURTHER INFORMATION

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