

MANAGING HIGH MOISTURE

Maximising winter stocking rate by high-moisture pasture utilisation is a key driver for annual profit

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Maximising your pasture utilisation over winter is a key driver for high annual production

Winter pasture growth rates in most areas are slow, which makes it challenging to carry enough stock through this period while still having sufficient livestock numbers to utilise spring growth and dry feed over summer and autumn. Supplementing with starch and effective fibre when pastures are new and in their vegetative state allows farmers to significantly increase stocking rates and generally carry more stock year-round, increasing total annual production.

Winter pasture presents two main issues. Firstly, pasture growth rates in most areas slow during winter, making it difficult to carry enough stock through this period while still having sufficient livestock numbers to utilise spring growth and dry pasture over summer and autumn.

Secondly, the low NDF (*Neutral Detergent Fibre*) content in pasture means it breaks down quickly in the rumen, and a large proportion of the pasture can pass through before the microbial population has fully utilised the nutrients.

Because of these issues, supporting the rumen with the correct supplementary feeds can significantly improve pasture utilisation, stocking rates, and annual farm production. The benefits can be particularly high for mixed enterprises that allocate areas of the property to crop production during winter and then utilise crop residues during summer and autumn.

Mixed cropping/grazing enterprises stand to gain the most from balancing high moisture pastures

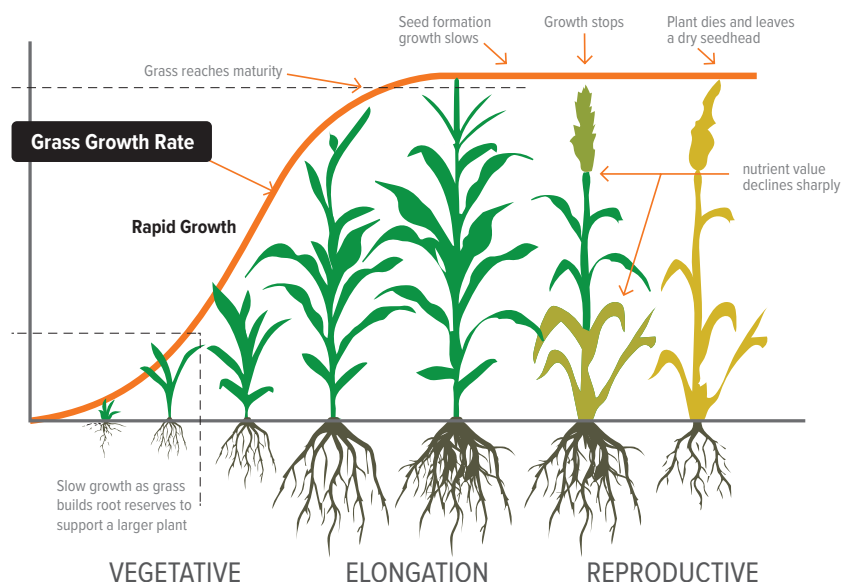
In most supplementary feeding applications, the production benefits are realised during the feeding period. In the application of managing high-moisture pastures, there are benefits from achieving higher pasture utilisation; however, the majority of the benefits from running more livestock during winter are realised later. These benefits occur when the additional maternal stock produce more offspring, or when more stock can be carried through to utilise spring and summer pasture growth before being marketed.

The majority of the benefits from balancing high-moisture pastures are received in the period after feeding

Limitations of high moisture pastures

Plants in the vegetative phase have a high moisture content.

Managing high moisture pastures occurs when the pasture is in the vegetative state.



Limiting factors of grasses at this time:

- **High-moisture pastures are often poorly digested.** These pastures typically contain low dry matter and low NDF (*Neutral Detergent Fibre/total fibre*). This increases the rumen turnover rate and allows for greater intake; however, because the rate of passage is much faster, less time is available for microbes to digest the feed, and nutrients can escape adequate fermentation in the rumen.
- **Livestock may also struggle to meet their nutritional requirements.** High-moisture pasture can limit the amount of dry matter livestock are able to consume, which is especially important for pregnant and lactating animals. In addition, the rumen requires a fibre mat for proper function.
- **The low fibre content means pasture is not retained in the rumen for long periods.** Promoting a fibre mat - the section in the rumen located below the gases and above the liquid layer - is essential to ensure feed is retained in the rumen and utilised effectively by rumen microbes. Slowing the rate of passage also improves rumen pH and supports better rumen health.
- **The amount of microbial protein flowing to the intestines depends on the availability of energy in the rumen.** If there is insufficient energy, particularly fermentable carbohydrates such as starch, the soluble protein in pasture is wasted in the rumen, which can negatively impact production.
- **A lack of effective fibre in the diet also reduces saliva production.** This leads to inadequate buffering, lowers rumen pH, and can contribute to sub-acute acidosis and deterioration of microbial populations.

The faeces of livestock can provide indirect evidence of a lack of fibre in the diet

Faeces rating systems can provide a useful guide when managing high-moisture pastures and assessing whether livestock are receiving adequate effective fibre. It is important to note that sheep and cattle use opposite scoring scales. In sheep, a score of 1 represents very dry, hard pellets and a score of 5 represents watery scour, whereas in cattle, a score of 1 represents very watery diarrhoea and a score of 5 represents very dry, firm manure.

The sheep and cattle faeces scores shown below demonstrate how manure consistency can indicate rumen function and pasture utilisation. Softer, more liquid manure can indicate that feed is moving too quickly through the rumen, reducing nutrient extraction and increasing wasted feed. Supporting livestock on high-moisture pastures with adequate starch and effective fibre can help maintain healthier rumen function and more desirable manure scores. In general, sheep scores around 2–3 and cattle scores around 3 are considered indicative of good nutrient utilisation under lush pasture conditions.

Sheep Manure Score:

MANURE SCORE 5	MANURE SCORE 4	MANURE SCORE 3	MANURE SCORE 2	MANURE SCORE 1
				
WATERY SCOUR Severe Protein Excess/ Parasites or Acidosis Risk	SOFT PAT Lush Pasture or High Protein/ Poor Rumen Digestion	SOFT CLUMPED PELLETS Ideal Energy, Protein & Fibre/ Good Rumen Fermentation	FIRM PELLETS Limited Nutrient Density / Stable Rumen Function	VERY DRY HARD PELLETS Low Quality or Dry Feed / Slow Rumen Passage

Cow Manure Score:

MANURE SCORE 1	MANURE SCORE 2	MANURE SCORE 3	MANURE SCORE 4	MANURE SCORE 5
				
VERY WATERY Severe Digestive Upset / Rumen Dysfunction	LOOSE & RUNNY PAT High Protein or Lush Pasture / Functional Digestion	IDEAL SOFT PAT Optimal Digestion & Nutrient Absorption / Stable Rumen Function	THICK FIRM PAT High Fibre or Lower Digestibility / Reduced Feed Efficiency	DRY & STACKED Dehydration / Insufficient Intake

Thin and watery manure is a lost opportunity to extract nutrients from pasture

The best feed to manage high moisture pasture

Plants in the vegetative phase have a high moisture content and high soluble protein.

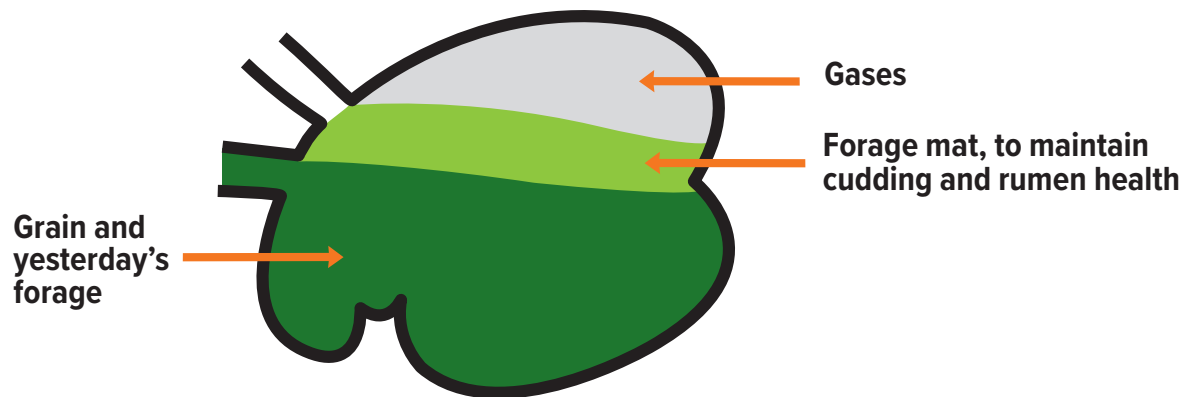
Two types of feed are needed to balance the diet:

1. **A source of fibre** — this improves rumen function and slows the passage of feed through the rumen.
2. **A source of starch** — supplementing with fermentable carbohydrates allows rumen microbes to convert more soluble protein into ammonia and then into microbial protein that can be utilised by the animal.

Common supplementary feeds include:

- Straw, hay and silage for the source of fibre
- Pellets, barley, wheat or oats for the source of starch.

The rumen contents



Classes of livestock to provide a high return on investment

Managing high-moisture pastures in livestock that cannot meet their nutrient requirements from pasture alone provides the highest return on investment. Commonly, these are pregnant and lactating animals. However, supporting all classes of stock so their rumen can digest pasture more efficiently will result in more pasture being available across the farm.

Estimating the reduction in pasture consumption and increased stocking rate

We ran several on-farm experiments that measured pasture consumption when a group of stock were supplemented to manage high-moisture pasture. You can see these trials on the Advantage Feeders website.

- **Wyeth** - stocking rate increased by 50% in winter.
- **Laidlaw** - stocking rate increased by 85% in winter.
- **Veale** - stocking rate increased by 50% in spring.

Added profitability of running a higher stocking rate

Calculating the additional profit generated from higher stocking rates is complex, as increased livestock numbers also increase costs and the outcome varies depending on the balance of cropping and livestock production. Benefits include:

- Increased production in spring and summer from running higher stocking rates
- Increased milk production in maternal animals, improving offspring survival and growth rates
- Fewer issues during late pregnancy, lambing/calving, and early lactation, leading to improved maternal survival rates.

After adding additional costs of running 50% higher stocking rates, the extra stocking rate can often double profit/Ha

The period for feeding livestock to complement dry feed

Commencement

For managing high-moisture pastures, this supplementary feeding period commonly commences approximately three weeks after the break of season, when pasture is short and actively growing but not yet at sufficient levels for livestock to meet their requirements.

Completion

This occurs when dietary fibre levels increase to the point where pasture growth exceeds the nutrient intake of the livestock.

This generally happens at the start of the spring flush, as plants enter the elongation phase.

Note: In the later stages of this supplementation period, when pasture growth is outpacing consumption, forage alone may achieve the benefits of improving rumen function without the added cost of a starch-based feed. However, if livestock have high production goals, such as most weaned animals, a starch-based feed can help manage excess ammonia in the rumen and support higher growth rates. See our “Managing Excess Protein Information Sheet”.

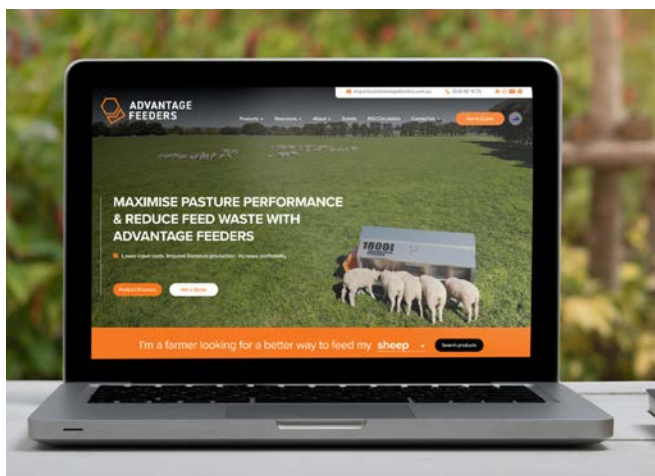
The cost of the alternative to managing high moisture pastures is running stock in confinement or sacrifice paddocks

The benefit of higher stocking rates grazing pasture should be compared against the alternative of confinement feeding. Calculating the cost of confinement feeding is complex. Livestock require a wide range of energy, protein, minerals, and vitamins depending on whether the objective is weight gain, maintenance, or weight loss. Other factors include the pregnancy status of the animal and the quality and availability of paddock feed. Consult a livestock nutritionist or farm consultant for expert advice.

Note that confinement feeding may not be a practical alternative for maternal stock in late pregnancy, during lambing/calving, or during lactation.

Energy is often the limiting factor in a diet. Energy requirements for livestock can be found at the following links:

- www.lifetimewool.com.au/tools/dryfeedbud.html
- futurebeef.com.au/resources/nutrient-requirements/



Calculating the difference in feed costs from managing with high-moisture pasture with supplementation compared to confinement feeding
advantagefeeders.com

Formula to work out cost of energy:

$$\text{Daily cost of feed/head} = \frac{\text{Price (per tonne as fed)}}{\text{Energy density (MJ/kg of dry matter)}} \times \frac{\text{Dry matter (\%)}}{1000}$$

Examples for a range of feeds:

1. A sample of barley is **\$330** delivered, it has **12.5MJ / kg of DM** and the feed is **90% DM**.
The price of energy is \$330 / 12.5MJ / kgDM / 90% / 1000 = \$0.0293 per MJ
2. A sample of cereal hay is **\$300** delivered, it has **10MJ / kg of DM** and the feed is **88% DM**.
The price of energy is \$300 / 10.0MJ / kgDM / 88% / 1000 = \$0.0341 per MJ
3. A sample of straw is **\$120** delivered, it has **6MJ/kg of DM** and the feed is **90% DM**.
The price of energy is \$120 / 6.0MJ / kgDM / 90% / 1000 = \$0.0222 per MJ

In these examples, cereal straw has the lowest cost of energy.

Formula to work out cost of energy:

$$\text{Daily cost of feed/head} = \frac{\text{Price MJ}}{\text{MJ}} \times \text{Daily energy requirement}$$

Examples for a range of feeds:

1. A 60kg (large frame) ewe needs approximately 12.9MJ of energy at 100 days of pregnancy. At \$0.03 / MJ, this is a supplement cost of \$0.39 / day.
The costs of ordering, storage and feeding it out are likely to add 15% so the total cost is \$0.45 / head / day
2. A 550kg cow, holding condition needs about 64MJ of energy in the last third of pregnancy. At \$0.03 / MJ, this is a supplement cost of \$1.92 / head / day.
The costs of ordering, storage and feeding it out are likely to add 15% so the total cost is \$2.21 / head / day

The recommended supplementary feeding amount

A common understanding among farmers is that when stock have sloppy faeces, fibre should be added to the diet. However, there is limited scientific research linking the amount of fibre and fermentable carbohydrates required to supplement different pastures, based on digestibility (*how quickly they break down*) and moisture levels.

In addition, there is a wide variation in the quantity required depending on whether the objective is for livestock to gain weight, maintain weight, or lose weight. Other factors include the animal's pregnancy status, as well as the quality and availability of paddock feed. Consult a livestock nutritionist or farm consultant for advice on the appropriate type and quantity of supplementary feed.

Common concentrate supplement amounts:

- Weaned sheep: 100-200g/day
- Mature sheep: 200-400g/day
- Weaned cattle: 1-2kg/day
- Mature cattle: 2-4kg/day

Common forage supplement amounts:

- Weaned sheep: 50-100g/day
- Mature sheep: 100-200g/day
- Weaned cattle: 0.5-1.0kg/day
- Mature cattle: 1.0-2.0kg/day

Stock per feeder in this application

200 sheep per grain feeder, Sliding Gates Hay Feeder, or Extended Cradle Hay Feeder is recommended.

50 cattle per grain feeder, Sliding Gates Hay Feeder, or Extended Tray Hay Feeder is recommended.

Like all applications, stocking rates per feeder can be increased, but this increases the risk of uneven consumption due to greater competition for trough space. This increased risk requires closer oversight and management to identify potential uneven feed intake.

Controlling the ration to achieve a small daily intake

Forage component of the supplement

Hay feeders have no physical restraint mechanism over consumption and relies on the NDF (*Neutral Detergent Fibre*) of the forage to limit intake.

In practice, if hay is being fed and consumption is more than desired, a higher NDF feed, such as straw may be able to be substituted to achieve lower intake and lower cost while still providing the fibre component of the diet.

Concentrate component of the supplement

There are a number of factors that influence the minimum consumption achieved with the 3-way restriction system. For this application, the most important two factors are:

- **Size of the feed ration.** The smaller the feed particle size, the more restricted the 3-way restriction system can be set while allowing an unimpeded feed flow. Please note that any trash in a sample can impede its flow.
- **Quantity of feed on offer.** Without full rumen fill, stock will visit the feeder more regularly and need to achieve rumen fill from the contents of the feeder. When stock are offered ad-lib forage with the recommended stock per feeder, they will have adequate rumen fill.

Suggested minimum rations of different feeds

	Cereal grains (clean sample)	4mm pellets	6mm pellets
Mature sheep	250	400	600
Weaned sheep	150	250	350
Mature cattle	2000	3500	5000
Weaned cattle	1000	1750	2500

Suggested minimum rations of different feeds

Experiment rations with different feeds and stock

- The Wyeth experiment controlled 4-500kg steers to 1kg/day of barley
- The Laidlaw experiment controlled ewes to 300g/day of oats
- The Veale experiment controlled ewes to 300g/day of wheat

Educating untrained livestock to grain feeders

Cereal grains are frequently used in this supplementary feeding application. If livestock are not sufficiently trained to the feeder and gorge on the supplement, this can lead to acidosis and, in severe cases, be fatal.

Acidosis issues can be avoided by providing untrained livestock with a safe feed, such as high-fibre pellets, in an ad-lib setting to encourage and reinforce feeding behaviour at the feeder. Once feeding behaviour is consistent, the ration can be transitioned to a cereal grain ration. While this process adds some cost, it has consistently delivered strong results with minimal cost overall and reduced risk of rumen upsets.

For the full explanation, please refer to the Advantage Feeders User Manual.



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