



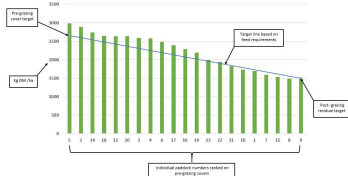

# Facing Our Future Guide to Reducing N Fertiliser Use

Thursday 9<sup>th</sup> July 2020

# N Fertiliser Reduction Options




## Pasture Management

Good pasture management can improve utilisation of fertilisation and support the establishment and persistence of N-fixing clover.

	Description	Benefits	Limitations	Ideal for	Effort Required
<b>Pasture Monitoring</b> 	Monitor and measure pasture availability and need to proactively make decisions.	<ul style="list-style-type: none"> <li>Optimise use of pasture on property</li> <li>Optimise pasture response to fertiliser</li> <li>Avoid feed surplus and shortages</li> <li>Less ‘surprises’ to manage during the season</li> </ul>	<ul style="list-style-type: none"> <li>Can be higher labour demand</li> <li>Some training may be required</li> </ul>	Pastures	<b>Moderate</b>
<b>Clover</b> 	Managing pastures and soil fertility of support the establishment and persistence of N fixing species, such as clover.	<ul style="list-style-type: none"> <li>Reduced fertiliser costs</li> </ul>	<ul style="list-style-type: none"> <li>Can be more challenging to manage rounds (i.e. a transition required)</li> <li>Can have lower persistence</li> </ul>	Pastures	<b>Moderate</b>

## Spreading Options


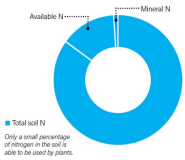


Liquid N Fertiliser is nitrogen fertiliser in a liquid form. Liquid N can either be mixed from granular fertiliser on site or delivered in a premixed form and then either applied through conventional or precision spraying equipment, or as fertigation. N fertiliser needs can be reduced by reducing volatilisation, improving precision and maintaining even applications at very low rates.

Spreading Options	Description	Benefits	Limitations	Ideal for	Effort Required
<b>Liquid N Fertiliser</b> 	<p>Liquid N is urea dissolved in water, which is sprayed to land using conventional equipment.</p> <p>The Liquid N mixture can be bulk mixed on site or purchased from the plant and carted.</p>	<ul style="list-style-type: none"> <li>Better utilisation of N by plant</li> <li>Can reduce volatilisation</li> <li>Even and precise spread</li> <li>Overcomes product quality issues</li> <li>Suitable for low application rates</li> <li>Suitable for precision application technology</li> </ul>	<ul style="list-style-type: none"> <li>High cartage cost (when purchased from plant)</li> <li>Potentially higher application costs than conventional spreading</li> <li>Leaf scold at higher fertiliser/water rates and in hotter conditions</li> </ul>	All farms	<b>Low</b>
<b>Fertigation</b> 	<p>Fertigation is the practice of adding liquid fertiliser to irrigation water and distributing it through the irrigation system.</p> <p>Fertiliser is applied “little and often” at rates of 0.6-1 kg N/ha per day at each irrigation event.</p>	<ul style="list-style-type: none"> <li>Reduced spreading costs</li> <li>Better utilisation of N by plant</li> <li>Can reduce volatilisation</li> <li>Suitable for low application rates</li> </ul>	<ul style="list-style-type: none"> <li>High initial installation cost, depending on existing infrastructure</li> <li>Backflow prevention devices may be needed and regularly tested</li> <li>Operator needs a high level of engagement</li> <li>High cartage cost (when purchased from plant)</li> </ul>	All farms with suitable equipment	<b>Moderate</b>
<b>Variable Rate Sensors</b> 	Variable rate sensors can scan the “greenness” of crops and pastures and adjust fertiliser applications in real time. Fertiliser usage can be reduced by avoiding camping areas and taking consideration of in-paddock nutrient transfer.	<ul style="list-style-type: none"> <li>Proven method in arable systems</li> <li>Precise applications</li> <li>Fertiliser application is targeted to minimise waste</li> <li>Liquid or solid urea can be used</li> </ul>	<ul style="list-style-type: none"> <li>Technology still to be confirmed for use in pastures</li> <li>The factor causing a difference in canopy greenness may not always be nitrogen (e.g. available water)</li> </ul>	All farms	<b>High</b>

## Soils Management


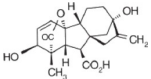
Optimising soil fertility and structure can improve pasture response to N fertiliser, reducing the amount needed. Knowing the amount of nitrogen and other key nutrients in your soils is essential to maximise the utilisation of the nitrogen fertiliser applied. Ensuring soils have a suitable balance of micro and macro nutrients can also promote N fixation from clover.





Soil Fertility Options	Description	Benefits	Limitations	Ideal for	Effort Required
<b>Soil Sampling</b> 	Soil fertility can vary significantly within a paddock due to differences in soil type, land use history, irrigation, topography, fencing and fertiliser management. Regular and extensive soil sampling can identify trends in soil fertility and target fertiliser plans to ensure plant needs are precisely met.	<ul style="list-style-type: none"> <li>Fertiliser plans consider all nutrients required by plants</li> <li>Reduce fertiliser costs</li> <li>Better yields and production per unit of fertiliser applied</li> </ul>	<ul style="list-style-type: none"> <li>Can be expensive</li> </ul>	All farms, particularly if production is inconsistent between paddocks	<b>Low</b>
<b>Soil N Test</b> 	N tests measures the amount of nitrogen in the soil in order to maximise its utilisation before adding further nitrogen fertiliser.	<ul style="list-style-type: none"> <li>Provides more confidence N is available in the soil</li> <li>Can better optimise and target N fertiliser requirements</li> </ul>	<ul style="list-style-type: none"> <li>Precise sampling conditions required</li> <li>Results only a guide to support decisions</li> </ul>	Crops	<b>Moderate</b>
<b>Regenerative Farming System</b> 	The Regenerative Farming system focus' on building and maintaining soil fertility and structure, increasing organic matter and supporting soil biological health. A key feature is the promotion of plant and animal diversity, high covers and minimum tillage.	<ul style="list-style-type: none"> <li>Reduces cost of production</li> <li>N use can be reduced by encouraging legumes and nitrogen fixing bacteria</li> <li>Improves N use efficiency</li> <li>Increasing soil carbon and root mass in your soil</li> <li>Lower carbon footprint</li> <li>Reduces soil erosion</li> <li>Reduces disease and insect pressure</li> <li>Reduces synthetic inputs</li> <li>Can improve animal health</li> </ul>	<ul style="list-style-type: none"> <li>Transitioning can take time</li> <li>Potential reduction in productivity</li> <li>High level of understanding and education by operator and staff</li> </ul>	All farms	<b>High</b>
<b>Albrecht-Kinsey (biological) System</b> 	The Albrecht-Kinsey system of soil fertility uses a scientific nutrient programme to balance the soil's major cations (Ca, Mg, K & Na), anions (P and S) and trace elements for an improved soil structure, more active soil biology and promotion of N fixation by legumes.	<ul style="list-style-type: none"> <li>N use can be reduced by encouraging legumes and nitrogen fixing bacteria</li> <li>Improves N use efficiency</li> <li>Increasing soil carbon and root mass in your soil</li> <li>Reduces soil erosion</li> <li>Can improve animal health</li> </ul>	<ul style="list-style-type: none"> <li>Can be expensive to implement if existing soil nutrient levels are low</li> <li>Requires a high level of engagement</li> </ul>	All farms	<b>High</b>

## Alternative N Fertilisers

Alternative N fertilisers can be used in certain circumstances to replace or enhance the uptake of urea.

Options	Description	Benefits	Limitations	Ideal for	Effort Required
<b>Slow Release N products</b> 	Urea can be coated with a polymer or enzymes which slow the availability of mineral N in the soil, retaining N in the soil for longer and increasing plant uptake.	<ul style="list-style-type: none"> <li>Slow release fertiliser, greater utilisation by the plant</li> <li>Less sensitive to soil and climate conditions.</li> <li>Reduce costs by eliminating the need for additional applications</li> </ul>	<ul style="list-style-type: none"> <li>More expensive than conventional urea</li> </ul>	All farms	<b>Low</b>
<b>Gibberelic Acid</b> 	Gibberelic Acid is a growth hormone naturally produced by plants and fungi applied to improve plant uptake of N when pasture growth rates are low (spring/autumn).	<ul style="list-style-type: none"> <li>Brings feed forward</li> <li>Can increase pasture production in Spring/Autumn</li> <li>Supports clover production</li> </ul>	<ul style="list-style-type: none"> <li>Growth response may vary</li> </ul>	Pasture	<b>Low</b>

Options	Description	Benefits	Limitations	Ideal for	Effort Required
<b>Organic N Fertilisers</b> 	Manure and compost products provide an alternative to traditional fertilisers.	<ul style="list-style-type: none"> <li>• Additional organic matter</li> <li>• Excellent for improving soil structure</li> <li>• Provide a range of other micro and macro nutrients</li> </ul>	<ul style="list-style-type: none"> <li>• Limited supply and the heavy vehicle component to application</li> <li>• Can have inconsistent N value in product</li> <li>• High carbon content can reduce pasture response</li> </ul>	All farms	<b>Moderate</b>
<b>Dairy Shed Effluent</b> 	Targeted application of dairy shed effluent and solids can reduce the fertiliser requirements of the disposal areas.	<ul style="list-style-type: none"> <li>• Recycling fertiliser produced on site</li> <li>• Low cost</li> <li>• Reduces fertiliser costs</li> <li>• Infrastructure generally existing</li> </ul>	<ul style="list-style-type: none"> <li>• Pasture response not possible with some effluent systems</li> <li>• Heavy effluent application can make grass unpalatable</li> </ul>	Dairy Farms	<b>Low</b>

### Matters To Consider

- How much N Fertiliser do I use?
- What is my N Fertiliser use Efficiency?
- How much time can I reasonably put into this?
- What is my production per kg N fertiliser used?

*Am I getting bang for my N buck?*

***Special Thanks to our Sponsors and all those who have assisted us with the preparation of this handout.***