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## CLIENT ALERT: NITROGEN CHALLENGES 2021

The current state of the fertiliser market is impacting dairy and beef businesses adversely. While markets for both milk and beef are currently relatively strong and both have a positive outlook, there is continued uncertainty more broadly in both the nitrogen and phosphorus market as we move towards the new year and into 2022. We have been widely discussing this issue already with clients as most are now at a key changeover point seasonally. The combination of both domestic and international factors that dictate fertiliser price and availability continue to deteriorate. Both supply and price of key fertiliser inputs are likely to experience considerable volatility for the foreseeable future. Below are some key points to consider:

### 1. **At what point are responses to additional nitrogen not profitable?**

The answer to this will be dictated by:

- a. Nitrogen(N) use efficiency- how many kg of additional DM are generated by additional N input and what impact on quality parameters does this have (such as increasing protein levels in forages in a market where the costs of bought-in sources of protein are also high)
- b. The cost of nitrogen inputs such as urea
- c. The cost of purchased-feed alternatives

Table 1 below sets out the costs of additional dry matter across different nitrogen costs and different nitrogen use efficiencies. Different crops and pastures will respond with different nitrogen use efficiency at different times of year so it is important that when predicting responses, these factors are kept in mind. For example, ryegrass that is still leafy and non-reproductive with good plant density, overall soil health and soil moisture may still be responding at >20kg DM/kg of nitrogen applied whereas short season annual ryegrass that is going to seed may now be slipping in responsiveness to below 10kg DM/kg of N applied.

Table 1 also demonstrates that the cost per kg of additional dry matter is highly responsive to nitrogen use efficiency. It also shows the cost per unit dry matter where an alternate feed source may be worthy of consideration, noting that well fertilised pastures are costly to replicate with purchased alternatives. Cereal hay is not nutritionally equivalent to well fertilised vegetative ryegrass!

**Table 1: Cost of additional forage dry matter at different urea prices and different rates of nitrogen use efficiency**

urea 46%N \$/TONNE	kg DM (utilised)/KG N \$/kg N	5 \$/tonne DM	10 \$/tonne DM	15 \$/tonne DM	20 \$/tonne DM	25 \$/tonne DM	30 \$/tonne DM
\$1,100	\$2.39	\$478	\$239	\$159	\$120	\$96	\$80
\$1,300	\$2.83	\$565	\$283	\$188	\$141	\$113	\$94
\$1,500	\$3.26	\$652	\$326	\$217	\$163	\$130	\$109
\$1,700	\$3.70	\$739	\$370	\$246	\$185	\$148	\$123
\$1,900	\$4.13	\$826	\$413	\$275	\$207	\$165	\$138
\$2,000	\$4.74	\$948	\$474	\$316	\$237	\$190	\$158

High- efficiency zone

Most importantly, the table demonstrate that even at prices approaching \$2000 a tonne for urea, if you are operating at upper end of the N use efficiency curve, nitrogen boosted pastures and crops can still provide one of the lowest cost forage (and protein) alternatives.

## 2. So, what are the drivers of high Nitrogen use efficiency?

Ensuring that the following steps are taken will optimise nitrogen use efficiency not only representing best economic outcome but also best environmental, emissions and sustainability outcomes as well.

- a. Apply nitrogen early in the crop/pasture growth cycle at the time when the plant needs it most
- b. Apply with moisture where possible but avoid waterlogging. If irrigating, water in immediately after application
- c. Apply with calibrated equipment with even spreading
- d. Apply to plants that should be growing vegetatively at the time of year that nitrogen is being used. Late season perennial and Italian ryegrass should still be highly response to nitrogen, dormant kikuyu or annual rye that has gone to seed less so.
- e. Apply to high plant density pastures
- f. Allow pastures to grow to express nitrogen use efficiency- at least 2-2.5 leaves in ryegrass at this time of year
- g. In high legume density pastures back off N rates and let the clover do some of the work
- h. Ensure other soil nutrients are not limiting. This is a critical time to be updating soil tests so you can correct where needed and “mine” where there is surplus.

Other sources of nitrogen should not be overlooked either. This is a great time to ensure your dairy effluent is being well distributed. Dairy solids and other manures such as poultry manures can be sourced and utilised in summer cropping. (Don't forget botulism vaccination if using poultry manure). They can also be a great source of other costly nutrients (P and K) as well as trace minerals and organic matter.

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Critically, if growing summer crops, it is important not to scrimp on nitrogen in particular. Be resourceful with nitrogen sources, but always ensure the full nitrogen allowance for crops such as maize silage is catered for. Remember maize silage will need around 12 kgs of N per tonne of dry matter removed- it is extremely nitrogen use efficient but other attention to agronomic detail is critical to achieve this. An increase in urea cost of \$600 a tonne will only increase the cost of dry matter by \$12.50 per tonne if 500kg of urea is applied and 24 tonnes of DM/ha is utilised.

### **3. Looking over the horizon what else should we be considering?**

- a. Close communication with fertiliser suppliers is critical. In farming systems utilising substantial urea or other fertiliser inputs, try and secure your needs well ahead and have these on farm. In some cases short-medium term contracts could be considered and higher base inventory levels of fertiliser can be a useful risk management tool.
- b. Phosphorus fertilisers are likely to be an issue for planting now and next year as supply out of China is being constrained. Soil test now so you know where P may not be needed at planting and consider securing P sources for planting ASAP and storing these securely. Don't forget the role of manures that can be a valuable source of P as well as N and K.
- c. Consider autumn plantings next year with higher legume inclusions. Annual clovers such as shaftal, other persians, berseem, sub, crimson, arrowleaf and balansa can all make valuable contributions to pastures producing high quality fodder, requiring lower nitrogen input rates and fixing nitrogen for use by companion species. If using legumes, ensure soil macro and micronutrient levels support both good legume growth and rhizobial function. Critically, all legume seed should be inoculated with appropriate strains of rhizobia.
- d. Review the viability and risk of summer cropping. When the compounded issues around fertiliser costs, risks of flooding and harvest issues in a La Nina, realities of silage losses from shrinkage and feedout-wastage are considered, this may not be the ideal year to look at growing maize silage for the first time! Other less risky or nitrogen hungry summer crops, use of purchased feed alternatives, and extending the rye grass season if appropriate cultivars are in place; with earlier sowing of winter forages, can all be considered as part of a nitrogen risk management strategy.

There are many pieces to the nitrogen puzzle to consider when making fertiliser and cropping decisions this year. The situation in each dairy or beef production business will be very different so please contact your Scibus consultant to discuss any of this in more detail!

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Disclaimer: This information is privileged between Scibus and our clients. The advice pertains to your farm and the accuracy depends on advice received from the client and reasonable assumptions made by Scibus. Our advice is often interdependent, that is often several aspects of management need to be changed for advice to be truly effective. This advice should not be extended or applied to other circumstances.