A farmer's perspective on strategic fertiliser management

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Abstract: *This paper is a case study about a farmer's perspective of fertiliser inputs in a grazing system on the Monaro of NSW.*

Key words: investment, target, phosphorus, sulphur, production variation

Introduction

After starting a farm business in 2002 where any investment in fertiliser was going to be a winner, a change of direction was required by 2010. Soil tests were showing that most paddocks had reached their target for critical nutrients and a more precise use of fertiliser was required. The timing was fortuitous as it aligned with the release of the '5 Easy Steps P Tool' and the start of the Monaro Farming Systems 'Soils Club'.

Farm description

- 1630 ha located 65 km south of Cooma on the Monaro.
- Height above sea level, 750–950 m.
- Spring, summer dominant rainfall with an annual average of 525 mm and a standard deviation of 141 mm.
- Three soil types, basalt, granite and shale. There is as much variation in the fertility within these soil types as there is between them.
- 66% of the property has an introduced perennial being combinations of phalaris, cocksfoot and lucerne; 33% native pasture.
- 10,000 Merino sheep and a fluctuating number of cattle.

Objectives

The business objective was to transition the fertiliser input and stocking rate from whatever the cash flow could handle, to a targeted input to meet the budgeted stocking rate.

In 2002 the average soil test was showing sulphur (S) at 2–4 mg/kg ((KCl40 method) and phosphorous (Colwell P) at 10–15 mg/kg with moderate to low Phosphorus Buffering Index (PBI). All other components of the soil tests were indicating a significant response could be attained by lifting P and S. With limited capital the strategy was to identify zones of the farm that could deliver the fastest return on investment with capital applications and then move to the next zone. Targets for soil fertility were 65 to 95% of potential depending on the zone. Stocking rate increases were based on maintaining 30 to 40% grass utilisation.

Calculations on how to achieve the required soil fertility were done by taking one soil test from the zone being targeted, estimating annual removal and tie up, then applying rates that would achieve the target S and P level in three years.

Farm zones were established by grouping similar soil types with similar pastures on similar topography. The area of these zones ranged from 300 to 500 ha and had an estimated 400% production variation within them. This was a rough and ready method but the advice I was given was: 'when starting from a low base, don't get too caught up in the detail.'

By 2010 soil tests were showing paddocks within the zones were at, past or just short of the targets. This is when the detail needed to be increased.

Implementation

With the increase in detail came the need to increase my knowledge and this was done with decision support tools, farm records and a like-minded producer group.

Grassgro™ was used to strategically analyse the importance of balancing fertiliser inputs with farm profitability. This has been a very important tool to explore the whole farm impact of any one decision, be it fertiliser or anything else. Without Grassgro™ I find it

difficult to translate the 'back of the envelope calculations' into the impact a decision has on the farm system.

The 5 Easy Steps P Tool is an excellent programme for setting and matching fertility to stocking targets. In my previous 12 years as a farmer I had never been asked the question: 'what percentage of potential would you like to be stocking this paddock at?'. There are many reasons why I hadn't targeted every paddock to be performing at 95% of potential and yet every agronomist I had spoken with assumed this to be the case.

Monaro Farming Systems has a sub group called 'Soils Club', which has been instrumental for me to hone the theory and gain a better understanding of what works for other farmers. It is a group of 40-plus farm businesses on the Monaro who collect soil tests once a year in a two week window so that they can be submitted as a bulk sample. This gives the group the power to analyse paddock, farm or district scale information. Another important part of being in this group has been the structure and discipline it has provided around the soil testing process. It has meant I have set up monitor paddocks that get tested every year, I test at the same time every year and I am doing more testing than I might have otherwise done.

Results

As this is not a replicated trial nor does it have a control, the result should be taken as observations.

The farm has doubled its carrying capacity and tripled profitability from 2002 until now. I put a lot of this down to fertiliser but there are other influences such as introduced pasture, more watering points, improved genetics, improved infrastructure, etc.

I am of the opinion that 80% of the profits coming from fertiliser are attributed to the 2002–10 period where the plan was all about getting it roughly right. The further 20% has come from the detail of aligning soil potential with stocking rate at a paddock scale. This has been through reduced input in some paddocks and increased input in others.

Another observation is that the pasture is faster to respond at the break in season, more water efficient and more resilient to extreme conditions. This doesn't help in a severe drought but it does help bridge the gap when the normal dry spells occur.

Conclusion

For my farm system fertiliser and grass utilisation are the number one profit drivers. For this reason I feel it deserves detailed attention and I am keen to explore variable rate spreading within a paddock. The hard part is proving to be the cost of identifying the parts of the paddock that will economically respond to more input and those that are getting too much. Watch this space.

References

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