

FACTSHEET

Hill Country Futures: Fertiliser and lime strategies

October 2022

Fertiliser and lime are a significant expense on hill country farms, so it is worth taking the time to plan for their optimal use.

Key messages

- Establish a robust soil testing programme that measures trends over time.
- Knowledge of legume cover on different slopes and aspects allows you to apply nutrients and lime at variable rates and improve your operation's overall pasture production and economic returns.

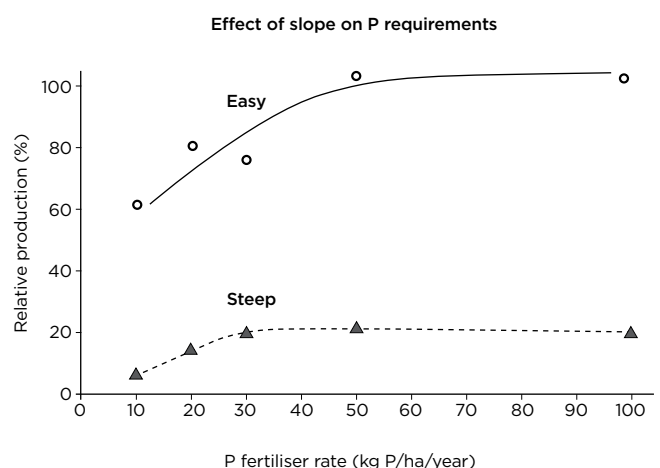
Hill country farms are characterised by a landscape with varying soils and microclimates that contribute to differences in pasture growth and composition.

Nearly all hill country farms need phosphorus (P) and sulphur (S). To optimise the use of these two nutrients:

1. Carry out a well-planned annual soil testing programme to monitor soil nutrient and pH levels. After five years, you will be able to establish a trend over time.
2. Quantify the legume content on different aspects and slopes on your farm - by observing and recording content from season to season.
3. Use a fertiliser consultant that can provide advice on nutrient requirements and take into account the variation in pasture type across your farm.
4. Use the most cost-effective fertilisers and liming materials.

Effectiveness of P: easy vs steep country

This graph from a trial at the Waipawa Research Area shows how much more pasture is grown on easy land compared with steep land. The higher yields are mainly due to higher legume content. At this site with a low initial soil Olsen P level, pasture production peaked at 50 kg P/ha/yr on easy slopes, but a much lower rate of 30 kg P/ha/yr on steep slopes. The message is: **P is much more cost-effective when applied to easy country, compared with steep country.**



Tips for the use of nitrogen in hill country

Best results occur when applying N fertiliser to actively growing pasture, therefore, apply at rates of 20-40 kgN/ha:

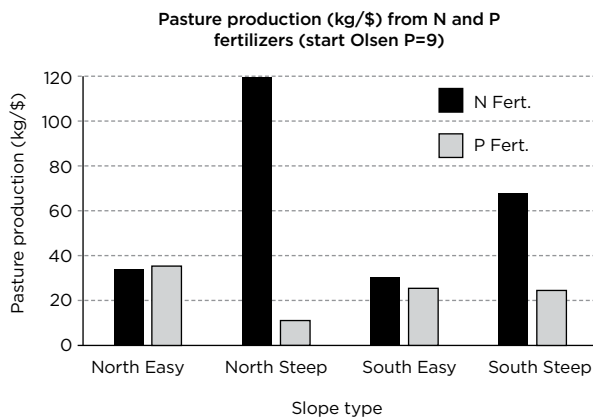
- When there is adequate moisture for growth and soil temperature is over 8 degrees C (and will remain so for the next 4-6 weeks).
- Where there is less than 10% average legume content on steep slopes and sunny aspects.
- If, you have experienced a summer/autumn dry spell and have a feed deficit going into winter.
- Or, you have experienced a wet cold winter and have a feed deficit going into late winter early spring.

Note that, the rate of N fertiliser application should be determined by the amount of extra pasture you want to grow i.e., if you want an extra 450 kg DM/ha then at a 15:1 response you should apply 30 kg N/ha.

Targeting nutrients to different aspects and slopes

Where annual rainfall is under 800 mm, research shows:

- P is more beneficial on easy and south facing slopes, and where there is more legume.
- N is more beneficial on steep and north facing slopes, if legume content is low.



Applying P and S vs lime

Where soil Olsen P levels are less than 15:

→ Prioritise P and S, ahead of lime.

Where soil Olsen P levels are greater than 20 and soil pH less than 5.5:

→ Prioritise lime.

Timing of fertiliser

If using water soluble P fertilisers (e.g., superphosphate) priority should be given to a spring application, particularly where soil Olsen P levels are low (<15 µg/ml), to target the legume with readily available P and S.

If the farm is at or near maintenance then the timing of application is less important, although in higher rainfall areas autumn application can lead to higher losses of S. Adding up to 30% of S as elemental S in autumn applications reduces winter leaching of sulphate sulphur. This will ensure there will be plant available S released from elemental S dissolution by the action of soil micro-organisms in spring. However, if possible, prioritise the spring application of fertiliser on steep hill country, where soil Olsen P levels are less than 10, so there is nutrient available for that growth season.

Conclusion

With the assistance of soil tests, observations of legume content and the appropriate advice from a fertiliser consultant, you can make your fertiliser and lime budget have a greater impact on your pasture production and bottom line. Monitoring soil nutrient levels over time is the best way to determine how to spend your fertiliser budget.

Further reading

This factsheet is part of the Hill Country Futures soil and fertiliser series. The full series can be found at www.hillcountryfutures.co.nz/resources/soil-and-fertiliser-series

“Fertiliser use on New Zealand sheep and beef farms” booklet, produced the Fertiliser Association of New Zealand booklet. Download at: www.fertiliser.org.nz/Site/resources/booklets.aspx

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