IMPROVE YOUR BUSINESS USING NUTRIENT BUDGETING

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The pressure to improve nutrient management

There are increasing pressures from inside and outside the industry to improve nutrient management practice. The primary reasons are:

- Fertiliser is the third largest cost on our dairy farms/kgMS (Economic Survey of New Zealand Dairy Farmers 2003-04) behind wages and feed. We need to ensure we only use what we need
- There is an increasing public perception that fertiliser equals pollution
- The Dairying and Clean Streams Accord has a performance target for 100% of dairy farms to have systems to manage nutrient inputs and outputs by 2007. The dairy industry policy on fertiliser use is to use fertilisers in a way that will not cause harmful environmental effects
- Maintaining water quality and protecting stream life under intensifying land use is a key focus of regional councils.

What's in it for me?

It provides an opportunity to:

- Save money on fertiliser expenditure
- Improve your understanding of impacts of feed inputs and effluent outputs on the nutrient balance in the farm
- Identify directions where changes in nutrient inputs/outputs are required.

Where do nutrient budgets fit?

Best nutrient practice involves a series of steps to calculate nutrient requirements for the farm. This includes:

- Farm nutrient status (use soil and herbage testing)
- Relevant farm data including fertiliser history and farm productivity goals
- The optimal soil nutrient status for your farm
- Tracking inputs or outputs from the farm (**nutrient budget**)
- Calculating nutrient requirements and a fertiliser programme based on your **nutrient budget**.

Once you have a nutrient programme in place, built on the above steps, nutrient efficiency should be high with minimal losses from the farm system.

What does a nutrient budget look like?

Nutrient budgets are like any budget you might have done, for example financial budgets. They allow you to plan ahead and see what is coming in and going out of your account (dollars or nutrients).

Why bother?

Good reasons include:

- Save money
- Show how efficiently nutrients are being used
- Show what affect changes in farm inputs will have on nutrient capture and loss
- Predict the fate of nutrients
- Check the efficiency of fertiliser usage
- Indicate sustainability and potential environmental effects
- Act as a quality assurance tool for Regional Councils
- Help you make better decisions, leading to improved efficiency, increased profitability and long term sustainability.

Table 1: A nutrient budget accounts for nutrient inputs and outputs from the farm

Nutrient Inputs	Nutrient Outputs
Fertiliser	Products – milk, wool, meat
Purchased supplementary feed	Transfer to non-productive areas
Clover N fixation and rainfall	Leaching/runoff losses to waterways
Effluent	Gaseous N loss
Irrigation	Immobilisation – nutrients retained in the soil
Release from the soil	

I want to do one - who can help?

For help to do a nutrient budget you could contact your fertiliser representative, regional council, or consultant to work through the process with you. Or you can undertake your own nutrient budget using a tool such as the Overseer® computing software: www.agresearch.co.nz/overseerweb.

What info do I require to do a full nutrient budget?

Farm and block information

- Area (ha)
- Slope
- Soil type
- Soil drainage
- Distance to coast
- Rainfall and irrigation (mm/year)

Soil test and fertiliser information

- Soil Nutrient status (from soil tests) – Olsen P, K, Mg, S and Na
- Rate of nutrients or fertiliser for current 12 months

Farm system information

- Production
- Pasture development status – Clover N

Farm management information

- Nutrients imported in supplementary feed or taken off farm
- Dairy effluent management
- Stocking rate and animal type
- Winter management practices e.g. stock grazed off or not.

What info will I get and what do the results mean?

Table 2 uses a simple example to illustrate the results of a P and K Nutrient Budget for a farm:

- 120ha, 34 ha of which gets effluent
- Stocked at 3.7 cows/ha, producing 1600 kgMS/ha
- Buy in 180 t pasture silage
- 900mm of irrigation.

Table 2: Example of P and K Nutrient Budget results

Inputs	**(kg P/ha/yr)**	**(kg K/ha/yr) (Effluent Block only)**
Fertiliser	60	50
Effluent added	0	145
Atmospheric	0	1
Irrigation	1	14
Slow Release	3	6
Supplements	4	38
Outputs		
Product	22	28
Transfer	5	53
Supplements removed	0	0
Atmospheric	0	0
Leaching and runoff	0	25
Immobilisation/absorption	21	0
Change in soil nutrient balance	**19**	**148**

The change in soil nutrient balance will indicate if inputs of nutrients are less than outputs, thereby leading to a decline in soil nutrient status. Conversely, they can indicate where excessive inputs result in nutrient surplus and give an estimate of potential losses to the environment.

In this example there will be **money saved** on P by only applying 40 kg of P/ha/yr instead of 60 kg P/ha/yr. 222 kg/ha less super @ $175/tonne thereby saving $39/ha. On 80 ha this equals $3,354.

In the effluent block example, it does not require any K. You **can save** $41/ha on 34 ha, thus saving $1,394. Another way to reduce K is to take silage from this area.

What's in it for me?

If you have a nutrient budget done for you, you will get a table illustrating all the inputs and outputs to the farm for the different nutrients. The change in the inorganic soil pool (soil nutrient balance) will be calculated for each element. The provider should explain what the figures mean and what can be changed to minimise losses. A nutrient budget is not a fertiliser recommendation and should not be used, to decide your fertiliser requirements. You require additional information including soil nutrient status, economic aspects and production goals for a fertiliser recommendation. The recommendation will also cover the most suited fertiliser products and timing of application.

How do I apply this to my system?

The results will allow you to address a number of different aspects of your farm system, which will lead to improved efficiencies, financial benefits and reduced environmental impacts. It can include:

- Checking your fertiliser programme and allowing you to utilise optimum fertiliser blends to meet your N, P, K and S requirements.
- Reviewing your N policy to ensure there are reduced losses from your farming system. This needs to be carried out in conjunction with feed planning e.g. a Feed Budget
- Deciding on the area required to spread effluent on
- Reviewing the budget for fertiliser spending
- Defining the optimal nutrient status for your farm and system
- Looking at alternatives. What if I:
    - increase productivity
    - put on more or less fertiliser
    - change supplement inputs
    - graze stock off farm
    - use or change crops?

What ongoing activities should I do?

Nutrient budgets should not be used in isolation but become an integral part of your nutrient planning. You need to use them in conjunction with other tools and information. Animal nutrition and feed management all impact on your utilisation of, and requirements for, nutrients. So, going forward, you need to develop a nutrient management plan for your farm which takes into account these other factors and fits in with the goals for your farm business.

Summary

There are strong drivers for improving the way nutrients are managed on dairy farms. These are:

- Efficiency of nutrient use and cost
- Clean Streams Accord and dairy industry environmental policies
- Regional councils focusing on the protection of the wider environment.

Tools like nutrient budgets are an excellent way to track inputs and outputs from a farm system. Be mindful that they are decision **support** tools only. A nutrient budget is more than a piece of paper and, along with the other fertiliser decision making tools and processes, will allow you to identify under or overuse of nutrients. The potential savings to your farm business and reduced losses from the farm will pay dividends to you and the wider community.

For further information please contact your local fertiliser representative, regional council or mike.bramley@dexcel.co.nz.