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ISSUE 30

EDITORIAL NOTE

The Fertiliser Review is designed to be a product and service guide for farmers and consultants focusing on fertilisers and related matters. This will continue to be the case. However, here at AgKnowledge we feel some matters are becoming blurred. Fertiliser and nutrient management are becoming subsumed into water quality and greenhouse gases (i.e. climate change). All of these arguments are being framed by the word **sustainability**. For this reason, this edition of the Fertiliser Review focuses on the theme of **sustainability** and offers commentary on managing water quality, climate change. We'll also discuss the efficacy of some of the new age environmentally sustainable nitrogen fertilisers.

Sustainability

The word 'sustainable' has been so abused recently that it has lost it's meaning. It is worthwhile to reconsider what it might mean. The dictionary says: " to keep from falling or sinking or failing, endure without giving way." So how does this apply to agriculture?

The RMA (1992) expresses it this way: Sustainable management means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while—

(a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and
(b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and
(c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.

Note the wording: *"managing our resources while providing for our social, economic and cultural well-being…"*

In 1994, two Canadian scientists came up with what I believe to be a more explicit, and hence more functional, definition:

Definition: Any farm management practice is sustainable if the following five criteria (goals) are achieved simultaneously:
Production – does the practice achieve the desired production goal?
Risk – does the practice reduce the risk of not achieving the production goal?
Economic – is the practice economic?
Environment – is the practice sustainable with respect to soil, water, air and other relevant resources?
Social – is the practice socially acceptable?

(Smyth A. J. and Dumanski J. 1994. Progress towards an international framework for evaluating sustainable land management. Transactions of the 15th World Congress on Soil Science. July 1994, Vol. 6a).

This definition is slightly broader than the RMA, which has only three components, but what I like about this definition (and the RMA carries the same implication) is that all five goals must be achieved *simultaneously*. This makes sense. Consider an extreme example: we could achieve all of New Zealand's environmental goals by transporting everyone to Australia. This would not however improve our economy and would come at a considerable social cost!

This balance is extremely important because it demands that environmental goals are considered in the context of production, economic and social goals. It is a powerful rebuttal to the extreme environmentalist view that environmental goals are sacrosanct and must be given priority.

While this definition is eminently practical it does have limitations – importantly no time frame is specified. This is problematic with all definitions of sustainability because the question begs: what time frame do we consider?

According to some cosmologists, the starry-starry skies which surround us, are likely to collapse into a new big-bang – the cosmos is time bound. The sun will, we are assured, run out of energy sometime – it is time bound. It is more likely than not, given its past record, that the earth will at some point in time descend into another ice age. Thus life on earth is not sustainable at these time scales. You see the problem?

Consider the green-dream - Organic or Biological farming is touted by some as the sustainable way forward. By any analysis organic farming is not sustainable in the context of the world today. Production from organic systems is about 60% of conventional systems – which 40% of the world's population is going to starve and who decides who will starve? (a real social dilemma?!) Taking this thought further, Norman Borlaug, the father of the green revolution, notes that globally we currently use about 80m tonnes of N fertiliser – this is essential to feed the world. If we went organic we would need to produce about 4b tonnes of animal manure and that this would require 6-7b cattle. Think of how much pasture this would require – land not feeding people? I do concede the point that organic farming would be appropriate only if we wished to return to the dark ages – short, miserable, hungry and disease-prone lives. Any takers?

The other difficulty with this word 'sustainability' is that we make contemporary assessments of sustainability assuming current technology. This leads to false predictions. The classic recent example was the Club of Rome's prediction in the 1960s that the world would run out of food. It did not happen mainly because of the science-driven 'green revolution' mentioned above. Examples of this abound and a good book to read on this subject is 'The Rational Optimist' by Matt Ridley.

Consider fertiliser: Providing we have energy (and remember the trend here: man power, wood power, water power, horse power, coal power, nuclear power, shale gas power…..the future?) we can make endless amounts of nitrogen. The same does not apply to the raw materials like phosphate rock, potash and sulphur. In the case of the former (see Fert Review No 9) the known existing reserves may last 5 generations. But this assumes that a) we will not find any more deposits (which we have) and b) we will develop better extraction techniques.

The point I stress is that the word 'sustainability' should be used with the utmost caution and it should be time-bound. The RMA definition of *"the reasonably foreseeable future"* is a good start. Remember this the next time you hear someone pontificating on this theme.

WATER QUALITY: Some questions you should ask your Regional Council

There should be no doubt that managing water quality is a major issue confronting agriculture – how do we minimise nutrient losses to the environment and at the same time maintain an economically viable agricultural sector?

Some context around this issue is very important to begin with. The "Land and Water Forum" has now produced 3, what I think are excellent reports, which provide some clarity as to how we grapple with this issue of water quality.

From the 2nd report we get:
"Objectives and limits will need to be set at the catchment level to reflect both the geophysical characteristic of each catchment and the values and interests of the community of each catchment."

From the 3rd report we have:
Regional Councils should ensure freshwater objectives and limits are achieved through the following steps in the regional planning process:

(a.) Identify the contaminants of concern in the catchment
(b.) Identify the total load of each contaminant of concern and all sources by way of a catchment contaminant account.
(c.) Identify the respective contributions to the load from natural background and human induced sources.
(d.) Consider temporal and spatial aspects of contaminant management.
(e.) Consider the inter-relationship between hydrology and water quality.

Putting some flesh onto this, I would emphasis that these recommendations from the Forum put the community (i.e. you) into the box seat. It is for the community to decide what water quality standards they want for their specific catchment. This is not what many Regional Councils are doing. Rather, they, and this specifically includes Horizons RC, are inclined to impose what they wish on the community. What I warm to in this community approach is that the community, when setting water quality standards, will be more likely than the Regional Councils to consider all the 5 factors which define sustainability (see earlier).

I work for a large farming operation in Canterbury. They are now confronted with the implications of the proposed Canterbury Land and Water Regional Plan (CL&WRP). They have asked me to assist them because they feel that they cannot a) fully understand the scientific and technical issues involved and b) cannot articulate the appropriate questions to ask their Regional Council. It occurs to me that many farmers are possibly in the same situation. For this reason I have prepared a set of questions, which I think every farmer should ask their local authorities when discussing this issue.

Question 1: What is the issue in my catchment?

There are 4 components to water quality: nitrogen (N), phosphorus (P), particulate matter (suspended solids) and pathogens (e.g. faecal coliforms). Catchments can be different. For some N is the factor causing the problem, for others P or sediments. It is very important to establish what the limiting factor(s) are for a given catchment. For example, if the primary cause for poor water quality in a given catchment is too much sediment then limiting the N or P loading may have little effect. In this context it is perplexing that most Regional Councils assume that N is the factor which must be controlled and hence the almost universal emphasis of reducing nitrate leaching. Why?

Take a for instance; I am informed that the factors limiting the improvement in water quality in Lake Ellesmere, are, in priority: sediments, P and N. So why the emphasis in the CL&W Plan on N? Also I am told that reducing these loadings will have very little effect on overall water quality if the macropyhte beds in the lake (which were destroyed in the Wahine storm) are not re-established (these are water-bound plants which breath oxygen into the water). In other words, all the costly efforts to reduce N leaching in this catchment may be to little avail!

There is another compelling reason to get this science right. N gets into waterways by leaching, all the other contaminants move across the surface of the soil into water bodies. Controlling surface runoff (as in riparian strips) is far cheaper than controlling N leaching. Thus the costs of intervention are heavily dependent on the cause of the poor water quality.

Question 2: Connectivity?

Consider Overseer 6. It predicts the amount of N leaching beyond the root zone. How much of this N gets into the waterbodies? The technical term is 'attenuation'. Hydrologists generally assume a figure of 50% implying that only half of the nitrate leaving the root zone gets into the waterbodies, but this is by no means a perfect science. Some of the interventions required to reduce N leaching, such as using DCD (only temporarily band it is hoped), installing feed pads and putting in herd homes, come at a cost. If I was advising a farmer I would want some sound information from the Regional Council before I recommended a major capital program.

Question 3: Cost-benefits analysis?

Under section 34 A of the RMA, Regional Councils are required to undertake an assessment of the costs and benefits of any policy they introduce. This makes sense considering the definition of sustainability (see earlier). This was, you may recall, a contentious issue in Horizon's One Plan. Some have argued that the cost-benefit work undertaken on the One Plan underestimated the real costs. Farmers need more confidence and certainty.

I emphasize the 'benefits' side of this equation. If farmers are to add costs to their businesses they need to be reassured that the interventions they adopt will indeed improve water quality. Given the vagaries referred to above, the link between farming and water quality is somewhat tenuous. The current assumption being adopted almost universally in NZ is that controlling N losses alone will solve the problem. But will it? I want some reassurance please.

Question 4: The Role of Overseer?

Overseer 6 is a first class tool for what is was designed to do. It was designed as an expert system to be used by suitably qualified people to do 'what-if' analyses. In the case of N leaching, a consultant can use Overseer to estimate the effects of different management policies/practices on N leaching on a given farm. But the predicted N leaching comes with an error term (at least 30%). Because of this it is important when using Overseer to focus on the trends – the direction in which management options reduce N leaching and NOT the absolute amount. After all a predicted leaching loss of 30 kg N/ha means the true value could be in the range 20-40 kg N/ha. It would be fatal if Regional Councils used Overseer 6 as a regulatory tool by setting rules to the effect that farmers would be penalized if the predicted N leaching from Overseer was say above 30 kg N/ha. This would lead to, I believe, endless litigation. My preferred option is that Overseer is used to do the 'what-if' analyses, from which the farmer then chooses those practices to reduce N leaching appropriate for his farm. This then is written into a Nutrient Management Plan (NMP). The 'contract' between the farmer and the Regional Council then becomes the NMP and not the Overseer output.

IS THE CLIMATE CHANGING?

Yes it is, in more ways than one: The Australian newspaper *"The Australian"* recently (Feb 2013) reported that the UN's climate change chief, Rajendra Pachauri, *"has acknowledged a 17-year pause in global temperature rises, confirmed recently by Britain's Met Office …"* According to this source, he went further:
"Dr Pachauri, the chairman of the UN's Intergovernmental Panel on Climate Change, said that open discussion about controversial science and politically incorrect views was an essential part of tackling climate change."
Also, *"Dr Pachauri said no issues should be off-limits for public discussion"* and, *"that people had the right to question the science, whatever their motivations"* and, *"People have to question these things and science only thrives on the basis of questioning,"* And, *"there was 'no doubt about it' that it was good for controversial issues to be thrashed out in the public arena".*

These are major concessions from an organisation (the IPCC) which has been frightening the living daylights out of everyone to encourage them to believe that we are doomed if we do not tackle the threat of dangerous human induced global warming and at the same time derided those, like myself, who are skeptical of this theory.

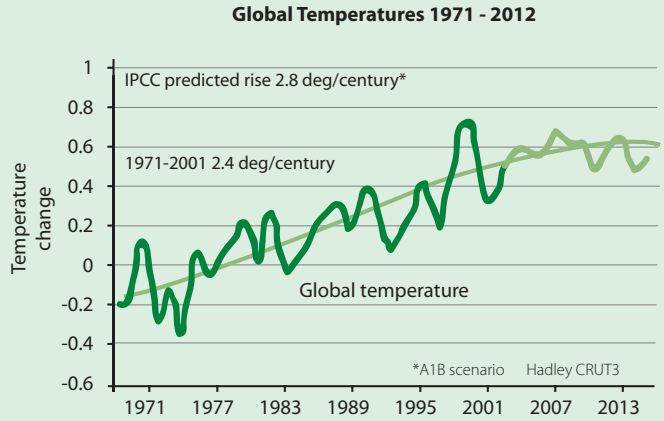
Given the above and given the importance of the issue to farming in New Zealand the Fertiliser Review is reprinting below a recent article by Bryan Leyland.

(Bryan is a founder member of the New Zealand Climate Science Coalition and an electrical engineer with expertise in computer modelling. He and his wife are part owners of a hydro station that earns windfall profits from the Emissions Trading Scheme).

What is happening to the climate?

The conference in Doha is based on a widespread belief that an increase in carbon dioxide concentrations has caused the world to warm steadily. We are constantly told that this warming will continue and it will be disastrous. Before we accept this we need to analyze the recent temperature records and the history of past climatic changes.

Reports from the Intergovernmental Panel on Climate Change (IPCC) predict a steady increase in temperature ranging from 2° to 6° per century caused by increasing concentrations of carbon dioxide and other man-made greenhouse gases. They are wrong: all 5 leading temperature records – both surface and satellite – show that temperatures over the last 16 years have been essentially constant. As the chart below shows the temperature record from the Hadley Centre in the UK shows a slight cooling over the last 10 years and an insignificant amount of warming over the last 16 years. The simplest explanation is that carbon dioxide does not cause dangerous warming. The complicated explanation is that a huge unpredicted and unknown phenomena is suppressing greenhouse gas caused warming.



CO2 driven warming must happen immediately because there is no mechanism that could delay the effect. People who believe that dangerous man-made global warming is happening claim that the lack of warming is due to a "natural effect". If the climate models the IPCC relies on were any good they would have predicted it. The IPCC have also said "... the long-term prediction of future climate states is not possible". That pretty much says it all.

It is highly probable that the climate has natural cycles and that we are just over the peak of a cycle and, as indicated by the chart, are at the beginning of a decline. Nicola Scafetta, a research scientist at Duke University in the USA, has analysed past climatic cycles and made a model based on these cycles that has accurately replicated temperature changes over the last hundred years and predicts that cooling is imminent. Don Easterbrook at Western Washington University in the USA and many other scientists have carried out similar analyses with similar results. These studies have been ignored by the IPCC.

Studies of sunspot cycles also strongly support imminent global cooling. They show that a long sunspot cycle is always followed by cooling. The last cycle lasted 12.5 years and the previous one 9.5 years. We could have about 1° of cooling over the next 10-20 years and, if history repeats itself, it would cause famine and disease.

Dr Jim Renwick and Dr David Wratt, of NIWA who are lead authors for the IPCC have corresponded with me and appear to accept that the world has not warmed for more than 10 years. It appears they do not know why the world is failing to warm as predicted by the model predictions. Jim has an "expectation" that warming will resume "within decades". Yet they still tell the government that man-made global warming is real and dangerous. Instead of simply admitting that the world has not warmed as predicted and trying to find out what is wrong with their computer-based climate models, they divert the discussion to other effects that, they claim, demonstrate warming. But if the temperature records say that temperatures are steady, global warming cannot be happening! Records also show that deaths due to extreme weather are declining, there has been little change in droughts over the past 60 years, floods are not getting worse, sea level rise has flattened off, many Himalayan glaciers are growing and coral reefs are thriving in water with temperatures and acidification levels well above predicted limits. In fact, the climate is less extreme than it was 100 years ago.

The only rational conclusion is that there is no convincing evidence supporting the hypothesis that man-made carbon dioxide causes dangerous global warming. Carbon dioxide is a beneficial gas that promotes plant growth and has reduced desertification. In spite of this, trillions of dollars have been squandered on renewable energy, emissions trading schemes and carbon trading schemes. Policies that subsidise renewable energy have substantially increased the price of electricity in many countries while the push for biofuels has increased the cost of food. The biggest impact has been in poor countries. The money would have bailed out Greece and Spain with plenty to spare or, better still, it could have been used to provide electricity and clean water for millions of people in developing countries.

Policies based on the belief that CO2 causes dangerous global warming have had huge negative affects on people and economies and have diverted attention from the real environmental and other problems faced by many people all over the world.

Postscript

Since *'The Australian'* report emerged there has been what appears to be a flurry of denial to the effect that Puchauri has been misquoted and/or he does not really believe the things he is reported to have said.

More specifically the Australian Climate Commission has released a statement (http://climatecommission.gov.au/media-releases/earth-continues-warm-strongly-despite-sceptics-claims/) saying that in effect global warming continues unabated despite the surface temperature records because all the heat is going into the oceans.

This sounds like a contrivance to me, designed to protect the theory of dangerous man induced global warming. I say this for 2 reasons:

1) for years the IPCC have been happy to rely on the surface temperature record as the evidence for global warming. Now when such evidence is inconvenient, they downplay it by claiming it is not really where the action is, and
2) they now claim that most of the global heat is stored in the oceans and that the oceans are warming. There is one small problem: the evidence (see http://wattsupwiththat.com/2013/02/25/fact-check-for-andrew-glickson-ocean-heat-has-paused-too/) suggests this may not be the case. To be perhaps a little glib; never let the facts ruin a good story!

Clarification

To ensure no misunderstanding: I am skeptical of the theory of dangerous *human induced* global warming. I accept that the earth has and will continue to go through cycles both warm and cool driven by factors other than 'man-made' CO2. We should prepare for both eventualities rather than committing ourselves at great cost to one outcome based on mans activities. (For those interested in my reasons for my skeptical view go to www.agknowledge.co.nz/publications/The Reasons Why I'm a Climate Change Sceptic)

SUSTAINABLE NITROGEN FERTILISERS

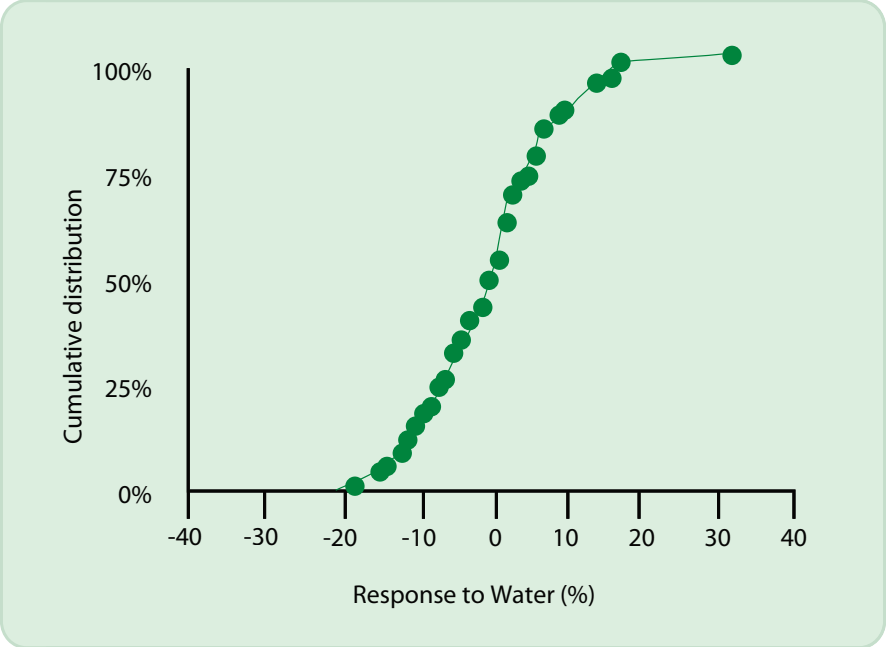
In November 2012, we (myself and co-author Dr Robert McBride) presented a paper to the NZ Grasslands Association Conference, held this year in Gore. It was entitled, *"Evaluating the Agronomic Performance of Fertiliser Products".* It was well received.

Part of the paper included an evaluation of the effects of 3, what I have called, 'new-age' nitrogen (N) products recently introduced onto the New Zealand market: EcoN, SustaiN and LessN. These products claim to either enhance pasture growth and/or reduce nutrient losses to the environment – they will, it is claimed, contribute to the sustainability of NZ agriculture.

Our paper considered only the claims made for these products in terms of pasture production, noting that if they reduce N losses to the environment one might also expect that they increase production by conserving N for plant growth. Based on the available evidence we concluded that none of these products work as claimed. Here is why. (Some readers may like to read my earlier views and predictions about these products – see Fertiliser Review 15,22,23,24,28).

In the last Fertiliser Review (No 29) I introduced the use of *'cumulative distribution functions'* to test whether products are effective or otherwise. This works when a product has been tested on many sites. The response of the product (in our case on pasture production) is measured and the percentage responses (control versus product) are arranged from the highest to the lowest. If a product is truly effective most of the responses will be

positive but there will be a range reflecting the background variation ('noise') in pasture growth. If a product is not effective the responses will be distributed around zero with about half being positive and half negative, and once again the range will reflect the background noise. An example is given below (see figure) for a series of trials in which the effect of a trivially small amount of water (224 l/ha) on crop production was measured. We can summarize this graph by saying the mean response was -0.6% with a range -22% to + 32% and a confidence interval of 2.3%. The fact that the 'responses' are equally distributed around zero, about 50% above and 50% below, is evidence that this treatment (water at 225 l/ha) is ineffective as expected.



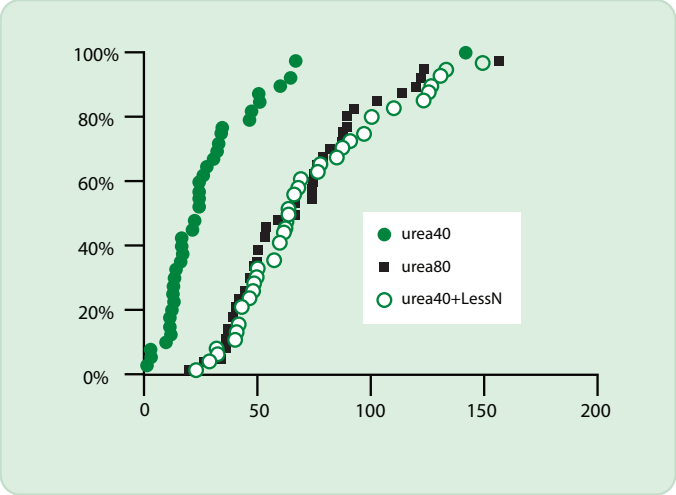
The table below summarises the relevant data for water (as discussed), EcoN, Sustain and liquid seaweed products. By way of contrast the results for the proprietary gibberellic acid (ProGibb) is included.

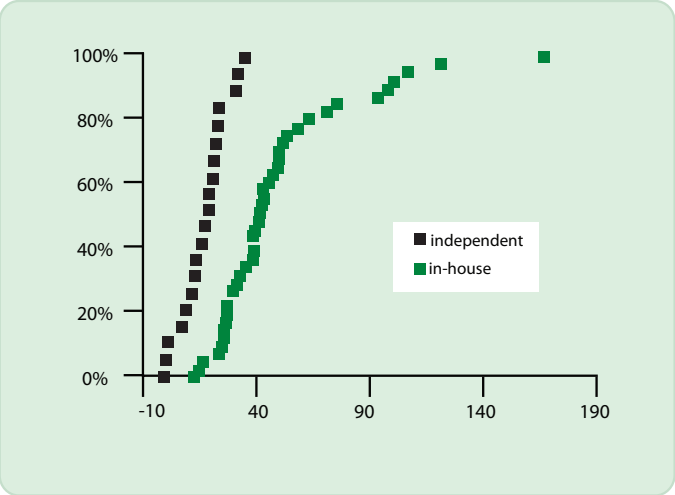
Product	No. of Trials	Mean Response %	Range of Responses	Confidence Interval
Water	28	-0.6	-22 to +32%	2.3
Liquid seaweeds	543	1.5	-40 to +60%	0.9
EcoN	28	2.0	-17 to +17%	2.0
SustaiN	16	4	-25 to +53%	7.0
ProGibb	34	36	+12 to +63%	5

Some explanatory notes are required:

1) For all but ProGibb, the measured 'responses' are approximately equally distributed around a mean that is close to zero, suggesting that they have little effect on crop production.
2) The trials included above for EcoN are those in which the product was applied as recommended to the farmer. That is to say they are not from small plot or lysimeter trials.
3) The average response to SustaiN is about 4% - this is consistent with the small losses of N by volatilisation from urea, when urea is used at the normal rates on temperate pastures (i.e about 50 kg urea/ha per application). It is possible that if urea is applied at rates of > 100 kg urea/ha, especially on hot humid days, N volatilisation may be higher. This is in my view the proper role for SustaiN.

The results with the product LessN are problematic. The distribution of responses (see figure) suggest, when taken at face value, that urea applied at 40 kg urea/ha with LessN is as effective as urea applied alone at 80 kg urea per ha. However, there appears to be a bias in the sets of trials – the responses to urea 40 + LessN, over urea alone, appear to be biased in favour of the in-house trials (see figure below). I do not know at this stage the source of this bias. More importantly, it is my view that the trial design used in these experiments does not permit a conclusion that LessN reduces the need for urea by 50%. As I write, I am in discussion with the manufacturer as to the meaning of these results and I have told them that, if convinced on the basis of the evidence, I will change my current view about this product. More on that when more data comes to hand.





Some concluding remarks are demanded. It seems to me that all 3 products have been put onto the market before the necessary robust science was completed. Everyone loses – initially the farmer who is encouraged to make bad fertiliser choices and ultimately the company's whose integrity is called into question. Sadly 2 of these products come from farmer-owned cooperatives – what were they trying to achieve at the expense of their owners?

IS NITROGEN A POLLUTANT? A DIFFERENT PERSPECTIVE

In the last issue of the Fertiliser Review I introduced my colleague, Dr Robert McBride who works for agKnowledge out of Gore. He hails from America, and I have come to respect, but not always agree, with the different perspectives he brings to some issues. Here is his American perspective on our struggles with managing nitrate leaching.

Nitrogen: The Red Headed Step Child by Dr Robert McBride

Several months ago I was having dinner with a group of dairy farmers. The conversation turned to the environment and one of the farmers stated that it was imperative that the genetics of both cattle and feeds be changed to lower their N content.

This struck me as a curious turn of events considering that since the dawn of agriculture many thousands of years ago humans have been on a life and death quest for N. Now that N is available in seemingly limitless quantities these farmers felt the most pressing issue they faced was an over abundance.

I asked them; 1) what was wrong with N? and 2) what made them think they had too much? They could not come up with anything specific but stated that they were constantly told this was the case. I had to agree that there seems to be an anti-N frenzy from all sectors; so let's examine these two questions:

What is wrong with nitrogen?
From a biological standpoint there is nothing wrong with N and, in fact it is needed by every plant and animal in great quantities; unfortunately almost universally N is limited because it tends to revert back to a gas (air is 78% N). This is why, for example, when N is applied to pasture there is always a growth response.

What about drinking water?
As with most things, too much can be harmful. Excessive nitrate-N in drinking water can cause health problems for small babies, however it should be noted that even at levels deemed unsafe the ill effects are exceedingly rare in babies and nonexistent in adults. Typically less than 1% of an adults nitrate intake comes from drinking water, the rest coming from vegetables and cured meats. Nitrate poisoning is more common in livestock, but again feed is the usual culprit, not water.

What about algae?
As was stated above, most biological systems including lakes and rivers are N limited and therefore more N means more growth, and what grows in water is algae. Fish farmers routinely add nitrogen to their ponds to encourage algae growth. I was once told by a fish farmer that he wanted his ponds *"to look like pea soup,"* algae being to many fish, as clover is to sheep.

There are of course several downsides to algae; 'pea soup' water does not look very nice, people do not seem anxious to swim in it, and there are algae's that produce toxins. Toxic algae are rare but appear somewhat common because warnings are posted in recreation areas whenever there is an algae present of a type that could potentially be toxic. The environmental factors that lead to toxic algae growth are complex and not well understood, but there is no direct correlation with N.

The greatest environmental concern with N in surface waters does indeed involve algae, and that is eutrophication. With high concentrations of algae living

in a water body comes large amounts of dead algae. The organisms responsible for the decomposition and breakdown of the dead algae use oxygen out of the water and over time the oxygen levels can become so low that the water will no longer support other aquatic animals. As a bit of trivia, under low oxygen (anaerobic) conditions the organisms will use N instead of oxygen to break down the dead algae and the N will then be lost as a gas.

Algae growth does not, however, inevitably lead to eutrophication; along with the environmental conditions that lead to massive algae growth, other factors such as slow moving warm water in a low wind environment are necessary.

How much N is too much?

The answer to this question varies wildly from one location to another; in a lake like Rotorua where water turnover is slow N and other nutrients tend to accumulate and relatively low levels in the streams and rivers entering the lake can have a disproportionately large impact. On the other hand in a fast moving, steep river such as the Rakaia it is almost inconceivable that a large accumulation of dead algae could ever occur; the river, although fairly large, is scoured out with such frequency that it supports only a modest trout population.

I have lived in areas in North America that did have serious water quality issues which were in a large part the result of agriculture. In North Carolina I was in an area of intensive confined animal production; just two counties that together were approximately half the size of the Waikato, or 1/10 the size of Canterbury produced 4 million hogs, 82.5 million broilers, 630 thousand layers, 16 million turkeys, and 55 thousand cattle. Even though half the land area was in crops huge amounts of grain were imported from the Midwest. It was estimated that the amount of nutrients brought into the state as feed grain exceeded the requirements to fertilize every field and pasture in the state. In addition to the nutrient surplus a large proportion of the confined animal agriculture was in the coastal plain which consisted of sandy soils, shallow water tables, a hot climate, and warm slow moving surface waters. Algae blooms did occur as did the resulting eutrophication. Interestingly, even under what could be looked at as a worst case scenario, fish kills were sporadic and unpredictable.

I also lived in the Chesapeake Bay watershed, an area with 16 million people and 5 million ha of agriculture including extensive confined animal production, all of which drained into North Americas largest and most ecologically diverse estuary. This was another worst case scenario with the bay being a large warm slow moving body of water with a warm climate and here again eutrophication did occur and despite many years of concentrated efforts the water quality is still in decline.

Having had these experiences I find the level of concern over N in regard to water quality in New Zealand somewhat perplexing; firstly, N and occasionally phosphorus and E. Coli are singled out while every other water quality parameter is summarily ignored. Although there are certainly some areas in New Zealand that warrant concern over water N levels, in the vast majority of the country N is not and never will be an issue. The agriculture is primarily pasture based, the climate temperate, the rainfall high, the wind relentless, and the surface waters move quickly. These environmental conditions simply do not lend themselves to either nitrate toxicity or eutrification. I recently expressed these views to a renowned professor who has spent his career working to solve nutrient issues in the Chesapeake Bay and he agreed.

So why then is there such a fracas over N?

I am not really sure; I have not seen any compelling evidence, notwithstanding some specific catchments such as Rotorua, that there is a general problem with N.

agKnowledge and The Science of Farming

To the contrary, in places like Southland where I live, virtually every dairy used to discharge all of their effluent into the nearest stream or river as did the freezing works and anyone else with a liquid waste. I would be logical to assume that even with the current intensification of agriculture the water quality has actually improved since these point sources have been eliminated.

So before dairy farmers genetically alter their cows and crops I think everyone needs to take a step back and do a bit of re-evaluation; the consequences of following the anti-N regulatory path as it is currently set out will have enormous implications for agriculture and will inevitably end up costing New Zealand billions of dollars. And what is to be gained? In most instances nothing.

FARMERS GET YOUR GRASS INTO GEAR!

Clover-based pasture is the cheapest ruminant feed on the planet. It costs about 2-3 cents to grow a kg of DM. Compare that with urea-feed pasture (10-12 cents/kg) or other supplements (>30c kg DM).
The key to a profitable pastoral operation is therefore pasture and the key to growing clover based pasture is soil fertility. Pasture nutrition and soil fertility is our speciality at agKnowledge. If your pastures are not persisting or not pulling their weight call the experts. 0800 33 73 46.

Dr. Doug Edmeades