Section

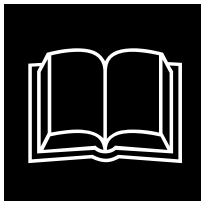
9

9. Complying with the Code of Practice for Nutrient Management and Market Requirements

9.1 Using the Code in the Field

Introduction

The aim of the Code of Practice for Nutrient Management is to ensure that where fertilisers are applied, they are used safely, responsibly, and in a way that avoids, remedies or mitigates any adverse environmental effects. In this part of the course there is a practical session in which you will be assessing the fertiliser practices of a dairy farm. The following paper has been provided in this section to give you background information about the Code of Practice for Nutrient Management.



Recommended Reading

Sneath, G. and Furness, H., 2007. Role of the 'Code of Practice for Nutrient Management' in Sustainable Farming. In: *Designing Sustainable Farms: Critical Aspects of Soil and Water Management.* (Eds L.D.Currie and L.J.Yates). Occassional report No. 20. Fertiliser and Lime Research Centre, Massey University, Palmerston North. Pp 475-481.

ROLE OF THE 'CODE OF PRACTICE FOR NUTRIENT MANAGEMENT' IN SUSTAINABLE FARMING

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Abstract

New Zealand is not alone in its drive for sustainable farming systems, but it is in a favourable position to lead the way in using innovative tools and bridging the gap between prescriptive regulatory controls and providing farmers with a flexible approach to manage their production systems.

The Code of Practice for Fertiliser Use was first introduced in the 1990's to provide a non-prescriptive, site specific framework to help agricultural producers to meet their obligations under the Resource Management Act (RMA) yet retain the flexibility to follow best management practices for improved efficiency. The success of the Code of Practice for Fertiliser Use is demonstrated through acceptance by regulatory authorities and most importantly by its incorporation into a range of primary producers' quality assurance programmes.

The Code of Practice for Fertiliser Use focuses on best management practices to improve efficiency and reduce nutrient 'losses' as they apply to whole farming systems. It is designed to be a 'living' evolving document.

An update in 2002, introduced new addenda and information on environmental and production issues which had gained higher prominence over the preceding years.

A current major revision introduces greater acknowledgement of nutrients from sources other than fertiliser, with a greater emphasis on nutrient budgets and nutrient management plans for land management units and whole farm systems. New templates, information and guidance for the management of wider sources of nutrient provide a valuable resource for land users, nutrient advisors, farm consultants, policy analysts and planners. It also takes account of water quality and climate change initiatives.

Sustainable agriculture requires economic, social and environmental viability of farming systems operating now and well into the future. The Code of Practice for Nutrient Management provides a non-prescriptive, site specific and well structured framework of information, templates and guidance. With improvements in documentation and monitoring requirements and based on current science it is designed to provide land users with the means to ensure nutrient use efficiency and satisfy community environmental expectations, while at the same time giving

regulators and markets ongoing confidence in the uptake and use of best management systems for agricultural production.

Introduction

The trend towards more intensive agricultural systems is a world wide phenomenon, and New Zealand is not alone in its drive for sustainable farming systems. New Zealand is perhaps unique amongst the so called 'developed' world, in relation to its economic dependence on agriculture, with 65 % of it export earning and 20% of its GDP derived from agriculture and forestry (MAF, 2005). The imperative to succeed with sustainable farming systems places New Zealand in a strong position on the world scene to lead by example.

Indeed, New Zealand has been on the road towards sustainable farming for many years now, each year building on new developments to progress the advances made during the year before.

Developing Nutrient Management in New Zealand

The steps and progress in developing nutrient management tools in New Zealand has been covered an earlier paper (Sneath and Furness, 2006), however 'flexibility' has been central to the development of industry tools for nutrient management; permitting site specific business decisions based on the whole farm systems utilising sound New Zealand centred science to achieve the desired environmental outcomes.

The Resource Management Act 1991 (RMA), the main piece of legislation that sets out how we should manage our environment, provides a point of difference for New Zealand agriculture in comparison to international schemes. Many overseas schemes focus on strict limits to inputs, using financial compensation packages as an incentive and to offset the financial impact of reduced agricultural productivity. In comparison, Section 17 of the RMA stipulates that every person has a duty to avoid, remedy or mitigate any adverse effect on the environment arising from any activity, whether or not that activity is in accordance with a rule in a plan or a resource consent. The RMA focuses on effects of activities rather than the activities themselves.

The Resource Management Act is implemented by Regional and District Councils and Unitary Authorities, by means of rules within a plan or by resource consent. Currently the application of fertiliser to land remains a permitted activity, provided specific conditions are met.

The Code of Practice for Fertiliser Use

The Code of Practice of Fertiliser Use was introduced by the Fertiliser Industry in the 1990's to help agricultural producers meet their obligations under the RMA, yet

retain the flexibility to follow best management practices for improved efficiency. A 'prescriptive' approach is typically one based on regulating inputs, and as such, would readily fit legal frameworks; but would also impose limitations on the flexibility of farming systems and options for site specific solutions to the environmental effects of agricultural production activities. For these reasons, the Fertiliser Code of Practice utilises instead, a 'participatory' approach. It provides a non prescriptive, site specific framework for best management practices which target the environmental effects of farming systems. The flexibility of this effects based (output) approach encourages efficient agricultural production.

The structure of the Code was designed in three main segments.

- **Fertiliser Practice –** addresses all aspects of fertiliser use, providing a legalistic approach required by the regulatory authorities.
- **User Guide –** provides land managers with practical advice and guidance specific to individual production situations.
- **Fact Sheets –** provide further information on sustainability and production capabilities as identified in the User Guide.

The record keeping and structure of the Code was designed to provide Regional Councils, (as the main authorities responsible for implementing the RMA) sufficient confidence that farmers have the tools and resources to manage fertiliser use responsibly and achieve the desired environmental outcomes.

The success of the Code of Practice for Fertiliser Use is demonstrated through its acceptance by regulatory authorities with its incorporation into the majority of regional plans. Adoption of the best management practices and guidelines contained within the Code is one pathway by which farmers demonstrate fertiliser application to land meets the requirements of a permitted activity. Demonstration of 'Best Management Practice' is also a requirement of many commercial marketing schemes, seeking responsible, sustainable land management. The Code's incorporation into a range of primary producers' quality assurance programmes contributes significantly to retaining market access.

Further successful application of the Code includes its integration into fertiliser recommendations, particularly through OVERSEER® Nutrient Budgets 2, a nutrient budgeting model specifically developed for New Zealand farming systems and widely used by fertiliser advisors and consultants. Both the OVERSEER® model and the Code are also integrated into the courses for "Sustainable Nutrient Management in New Zealand Agriculture," at the intermediate and advanced level, which on successful completion of exams administered by Massey University, provide a 'Certificate of Completion' as a recognised university qualification.

Based on sound science, the Code provides an authoritative representation of tools and best management practices which offer the farmer effective environmental

solutions which can be adapted to individual farming situations. The underlying success of the Code can be attributed to the practical advice on fertiliser and its applications which ensures efficient fertiliser use. Adoption of the Code not only reduces environmental impacts but helps make farming businesses more profitable.

Review of the Code

The Code of Practice for Fertiliser Use continues to evolve in concert with changing demands. Introduced in the late 1990's it underwent a review in 2002. The basic approach and format remained unchanged, with additional information addressing developments in a range of areas including ;

- Nutrient Budgets
- Nutrient Management Plans
- Spreading Technologies and Developments
- Fertiliser Contaminants
- Nitrate Management
- Greenhouse Gas Issues

In 2007 the issues highlighted above have not abated; indeed both science and the economic drivers across the globe continue to develop and change, resulting in new circumstances and different farming systems. In recognition of the important role it plays in responsible nutrient management in farming systems, the Code of Practice has undergone a third and this time major review, which also brings about change to its title.

The Code of Practice For Nutrient Management- with Emphasis on Fertiliser Use

Consultation on the review was sought from representatives from a wide range of interested parties; including farmer organisations, rural professionals and consultants, fertiliser spreading organisations, forestry organisations, researchers, environmental interest groups and central and regional governments.

Considerations for the review of the Code of Practice have been conducted against an escalation of background issues, such as:

- Intensification in land use
- Increased fertiliser consumption
- Water quality concerns
- Climate change issues
- Marketing signals

- Public expectations

Against this background the 2007 revision of the Code of Practice incorporates a much wider acknowledgement of nutrient sources in addition to those directly from fertiliser. It provides detailed emphasis on nutrient budgets and the process for developing nutrient management plans within the much broader context of the whole farm management system.

While the Code of Practice for Nutrient Management is developed specifically as a tool for nutrient advisors designing site specific, sustainable farming systems it also presents a valuable guide to land managers who want to know more about nutrient planning and best management practices for their own production circumstances. It is designed for the development, monitoring and modification of farm nutrient plans to ensure economic, social and environmental goals continue to be met.

To achieve these aims, it provides background information on legal requirements (i.e. the RMA), and a framework for nutrient management within the context of market requirements, farming inputs / outputs and adverse environmental impacts. Five guiding principles of the Code are:

- Effective process
- Ease of use
- Legal and Industry compliance
- Risk awareness
- Continuous improvement

These principles specify the underlying philosophies which enable land managers to use the Code to efficiently and effectively manage nutrients in their production system and achieve their stated goals.

A stepwise process (Figure1) leads the user though the objectives and processes of nutrient planning, which requires the identification and collection of specific information such as the personal and code objectives, financial and farm production objectives. Identifying individual land management units within the farming system is recommended to ensure that risks and opportunities that occur on land units with different management choices are each addressed for their individual merits. Identifying the risks which might arise from nutrient management choices and assessing their significance may, however, require advice and support from many different professional and advisory services which are available to the land manager.

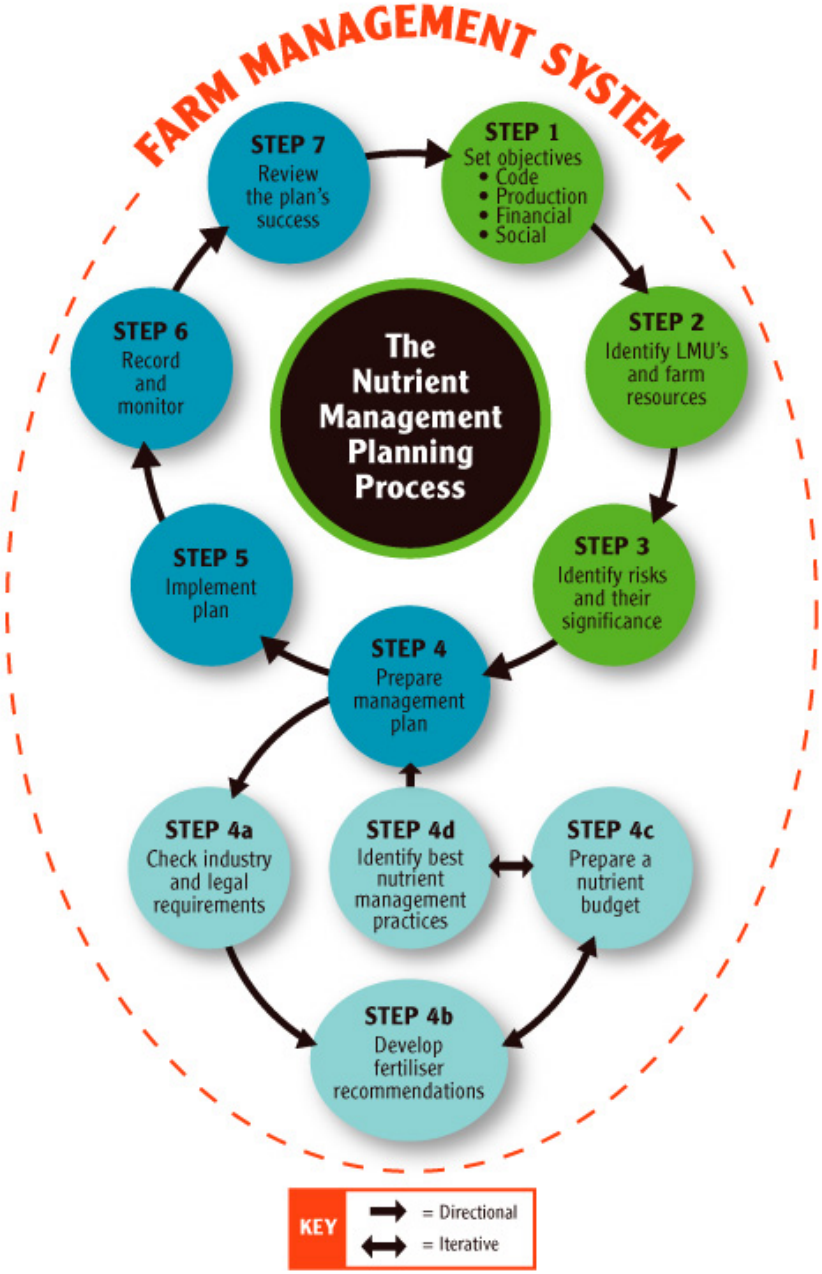


Figure 1 : Stepwise representation of the processes in preparing and implementing a Nutrient Management Plan.

Information on goals and objectives, land management units and risks are compiled to produce an initial farm nutrient plan 'outline' before developing fertiliser recommendations, and nutrient budgets. This second stage of processes is iterative, as evaluation of fertiliser recommendations using nutrient budgets under different scenarios gives rise to further modification and refinements in the planning process. Industry and legal requirements are clearly an important consideration for each scenario considered, and best management practices are identified and incorporated into the refined Nutrient Management Plan.

The dynamic nature of agricultural systems means that changes in the practical 'on farm' circumstances will dictate that Nutrient Management Plans may require modification or adaptation during the implementation phase. For this reason the Code of Practice for Nutrient Management requires a record of the actual practices implemented, using appropriate record keeping at the time of the operation. Monitoring and recording the outcomes of the Nutrient Management Plan permits a timely review of those outcomes measured against documented goals and objectives.

Within the Code guides to 'Best Management Practices', remedial actions for specific environmental risks are tabled to provide clear examples of recommendations for responsible fertiliser use. Disciplines specifically addressed by the code include;

- Fertiliser handling
- Fertiliser use
- Fertiliser application

To encourage a consistent and reliable approach by practitioners, a Nutrient Management Template for recording details of the components identified in the nutrient planning process is provided within the document.

Self assessment and management guides are included for recording, monitoring and assessing the personal, economic and environmental outcomes as an essential aspect of the review process detailed under The Code of Practice for Nutrient Management.

In Summary

The revised Code introduces greater acknowledgement of nutrients from sources other than fertiliser and along with best management practices based on current science, places greater emphasis on nutrient budgets and nutrient management plans for land management units and whole farm systems. New templates, information and guidance for the management of wider sources of nutrients provide a valuable resource for land users, nutrient advisors, farm consultants, policy analysts and planners.

The underlying principles along with the systems, processes and documentation described in detail in the Code provides for efficient use of fertiliser and other

nutrient resources, while promoting recognition of the responsibilities and due care required under the RMA, as land managers undertake the necessary production activities involved in running a profitable business.

Adoption of the recommendations and practices contained in the 'The Code of Practice for Nutrient Management –with Emphasis on Fertiliser Use' helps land managers, nutrient advisors, farm consultants, policy analysts, planners and the public have confidence in the nutrient management practices implemented by New Zealand's primary production sector.

The Fertiliser Industry is proud of the substantial investment committed to the development of 'The Code of Practice for Nutrient Management –with Emphasis on Fertiliser Use' recognising the very important role it has to play in the drive to '*Designing Sustainable Farms*' for economic, social and environmental viability of farming systems operating now and well into the future.

References

MAF (June 2005) New Zealand Agriculture, Forestry and Horticulture-In Brief ISBN: 0-478-07875-7 http://www.maf.govt.nz/mafnet/rural-nz/agriculture-forestry-horticulture-in-brief/2005/index.htm

Sneath, G., Furness, H. (2006) 'Progress in developing and implementing nutrient management tools and systems for New Zealand agriculture.' Occasional Report No.19, Fertiliser and Lime Research Centre, Massey University, Palmerston North, pp 221 - 230

9.2 Global Standards for Sustainable Agriculture

Introduction

The main driving forces behind sustainable nutrient management of New Zealand's agricultural land have come from changes in legislation (Resource Management Act, 1991) and changes in consumer expectations and market access. The RMA requires the sustainable management of agricultural land, which is enforced by regional regulatory authorities. Also, controlling authorities in importing and exporting countries have become more accountable for the standards administered in their country.

The GLOBALGAP Example

A development relating to the setting of environmental codes of practice or "best practice" standards that influence New Zealand's primary sector is the development of GLOBALGAP (Good Agricultural Practice). GLOBALGAP was formally known as Euro-Retailer Produce Working Group (EUREP) GAP which was established in 1997.

GLOBALGAP is a private sector body that sets voluntary standards for the certification of agricultural products around the globe. The aim is to establish one standard for Good Agricultural Practice with different product applications capable of fitting to the whole of global agriculture. It is a pre-farm-gate standard, which means that the certificate covers the process of the certified product from farm inputs and all the farming activities until the product leaves the farm.

GLOBALGAP is a business-to-business label and is therefore not directly visible to consumers. Certification is carried out by more than 100 independent and accredited certification bodies in more than 80 countries. It is open to all producers worldwide.

GLOBALGAP includes annual inspections of the producers and additional unannounced inspections. It consists of a set of normative documents that cover the General Regulations, the Control Points and Compliance Criteria and the Checklist. These documents can be found at http://www.globalgap.org.

The New Zealand version, New Zealand GAP (http://www.newzealandgap.co.nz/) is integrated into and benchmarked against GLOBALGAP. New Zealand GAP comes under the auspices of industry groups such as Horticulture New Zealand. Other similar approved supplier assurance schemes are also likely to come under New Zealand GAP and subsequently GLOBALGAP, for example AsureQuality (http://www.asurequality.com/).

A standardised formal system of record keeping by farmers and growers is essential for meeting GLOBALGAP compliance criteria. In relation to sustainable nutrient management, The Code of Practice for Nutrient Management and the Fertmark/Spreadmark programmes (Section 9.3) are examples of initiatives that will assist New Zealand farmers and growers with record keeping and with compliance to certification systems.

9.3 Quality Assurance Programmes for Fertiliser and Fertiliser Spreading

Introduction

Fertiliser quality and consistency, and the accuracy of fertiliser placement, during application, are important components of sustainable nutrient management. In 1992, New Zealand Federated Farmers formed the Fertiliser Quality Council to develop the Fertmark programme, to provide farmers and growers with an assurance of the quality of fertilisers sold in New Zealand.

Around the same time as Fertmark was established, the NZ Groundspread Fertilisers Association established the current Spreadmark programme. Its purpose was to ensure that the trucks used to spread fertiliser were properly calibrated. The New Zealand Fertiliser Quality Council (NZFQC) was incorporated in 2001, combining both the Fertmark and Spreadmark initiatives. This merger means that the same Fertiliser Quality Council now governs these two programmes. It is also intended that there will be further convergence of the Fertmark and Spreadmark programmes with the Code of Practice for Nutrient Management. Information about NZFQC, including details on both Fertmark and Spreadmark can be found on their website (http://www.fertqual.co.nz).

Fertmark

The Code of Practice for the Sale of Fertiliser in New Zealand (The Fertmark Code of Practice) can be downloaded from the website:

http://www.fertqual.co.nz/files/downloads/fertmarkcodeofpractice.pdf

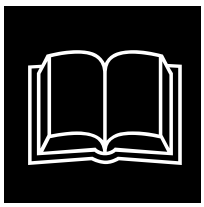
Spreadmark

The Spreadmark programme was established by the NZ Groundspread Fertilisers Association in 1994. It was subsequently incorporated into the assurance schemes administered by Fertiliser Quality Council that includes representation from Federated Farmers, the NZGFA, NZAAA, FertResearch and NZIPM.

The Spreadmark scheme is a fertiliser placement quality assurance programme. It has as its objective the placement of fertilisers in locations where they can be of the most agricultural benefit and the least environmental harm. The scheme will register spreading companies provided they have certified spreading machinery, trained operators and an appropriate quality management system which ensures that farmer/grower outcomes are met and environmental sustainability is protected. Overall systems will be subject to an independent audit to ensure that both farmers/growers and Regional Councils can have confidence in the programme.

The Spreadmark code of practice can be downloaded from the following web page:
http://www.fertqual.co.nz/files/downloads/spreadmarkcodeofpractice.pdf

The following reading has been provided for you with background information on the development and role of the Spreadmark programme.



Recommended Reading

Wood, P., 2001. Fertiliser Placement Quality Assurance: The New Spreadmark Programme. In: *Precision tools for improving land management.* (Eds L.D. Currie and P. Loganathan). Occasional report No. 14. Fertilizer and Lime Research Centre, Massey University, Palmerston North. pp 115-118.

FERTILISER PLACEMENT QUALITY ASSURANCE: THE NEW SPREADMARK PROGRAMME

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Opening

This is a conference about precision tools for agriculture. In support of that worthy purpose, this paper about the precision placement of fertilisers and the new Spreadmark scheme that is intended to encourage and recognize the precision placement of fertiliser.

The first part of this paper deals with the nature of the problem of fertiliser misplacement. In the second part I will talk about what farmers, the fertiliser spreading industry and those associated with them are proposing to do about it.

It is difficult to estimate the financial impact of poor fertiliser placement. There is surprisingly little published information. What is published has assumptions that can be criticised for being either conservative or generous. However, based on what information there is, and UK information on the impact on their wheat crop, I estimate that sub-optimal fertiliser placement causes New Zealand farmers and growers to forgo revenue of at least $55 million, and probably more than $100 million, every year. In addition, poor placement of fertiliser causes unnecessary environmental contamination.

Incidentally, Federated Farmers has chosen this forum as the first place to publicly describe what is proposed.

Later in this paper I will describe what the industry, acting together, propose to do. It is the intention of what is proposed that fertiliser spreading should not limit the potential return of farmers and growers. This is the key idea in this paper.

Background

Farmers and growers have good reasons to seek a reasonable degree of precision in the placement of the more than two million tonnes of fertiliser that they buy for their pastures and crops each year. They also have a strong interest in the quality and consistency of the fertilisers themselves.

In 1993 Federated Farmers decided to address the issue of farmer/grower confidence in fertiliser quality by creating the Fertmark programme. This is a quality assurance programme owned and staffed by Federated Farmers but governed by a Council consisting substantially of farmer and grower representatives and fertiliser manufacturers. From the beginning it was a collaborative venture and now involves almost all of the fertiliser companies, both large and small. The Fertmark programme has made a significant difference and will continue to do so.

Around the same time as Fertmark was established, the NZ Groundspread Fertilisers Association established the current Spreadmark programme. Its purpose was to ensure that the trucks used to spread fertiliser were properly calibrated. It is intended to expand this programme and to integrate it with the Fertmark programme. This is the change that I will detail later. It will result in the two programmes being governed by the same, yet to be established, Fertiliser Quality Council. This Council will oversee both programmes and will be involved in further developments and improvements in the future.

The next stages will see a further convergence of the Fertmark and Spreadmark programmes with the Code of Practice for Fertiliser Use. Regional Councils may also become interested in this fertiliser placement programme as a means of ensuring that their environmental objectives are met.

This brief background was intended to give some context to the new Spreadmark programme and how it fits in the scheme of things.

Losses due to uneven fertiliser placement

As already noted, I suggest that farmers and growers in New Zealand have their revenues adversely affected by at least $55 million, and probably more than $100 million, each year from the poor placement of fertilisers. There is no doubt that they are, so far, largely unaware of the extent of these losses. The possible exception to this is with vegetable growers who seem to be more aware. This low general

awareness is probably because this loss is mostly represented by unrealised potential income.

To my knowledge, and that of the people I have spoken to, there has so far been no publicly available estimate of the losses to New Zealand farmers and growers caused by uneven fertiliser placement. I was interested to note a 1985 UK report suggesting losses in their winter wheat crop alone to be between £10 and 20 million per annum.

The revenue losses due to poor fertiliser placement are avoidable and significant. Fertiliser misplacement causes losses in crops due to yield effects, crop unevenness effects and quality effects.

Using information from some privately funded work by staff from Lincoln Ventures, AgResearch and Agriculture New Zealand we estimated the revenue losses due to yield reductions caused by various degrees of unevenness of fertiliser application. This work covered the impact of some nutrients only and then only for yield effects. Given the likely scale of the impact of poor fertiliser placement there is no doubt that further work needs to be done on this matter.

When fertiliser is applied unevenly it is obvious that some is over-applied and some is under-applied. When fertiliser is under-applied there are crop yield and other implications. When excessive fertiliser is applied there is increased leaching loss (particularly with N) and plant utilisation declines. The decline in plant utilisation efficiency is due to the non-linear agronomic response of most crops to increasing rates of application of nutrients. This is greater with some crops and for some nutrients.

As well as increased leaching losses and yield losses, uneven fertiliser placement causes crop variability and unevenness of maturation. In seed crops unevenness of maturation causes harvesting and storage problems. In grains there can be problems of uneven protein levels and other attributes. In vegetables, uneven fertiliser application may cause unevenness in size which may cause increased harvest costs or problems in the market.

Fertiliser spreading or placement is a practice that, by its very nature, is to some degree inherently uneven. One must bear in mind in any consideration of it that there must be a pragmatic balance between what is physically practicable with existing equipment and what is desirable for agricultural production and the environment. Perfection is not possible.

In order to establish the financial effect of poor fertiliser spreading it is important to estimate both current performance levels and best practice. The difference between these two performance levels allows the preventable loss to farmers and growers to be estimated. Rus Horrell reports that the results of Spreadmark testing show that, for the vehicles tested anyway, the average spreading CV was 20.4% for contract fertiliser

spreaders. Given that a minority of vehicles are tested and that the ones tested are probably better than average, the CV of the national spreader fleet is estimated to be around 30%. This estimate can be compared with the range of CVs found by the Spreadmark programme of between 10% and 80%.

The question then arises as to what is an achievable best practice. Based on existing NZ best practice, and on what is achieved in the UK, it is suggested that a CV of 10%, or close to it, could be regarded as best practice for NZ conditions.

The factors that cause uneven spreading are numerous and will be addressed, as far as is practicable, in the expanded Spreadmark programme. It must be remembered that not all of these factors are within the control of the fertiliser spreader operator. Factors such as the use of appropriate fertiliser products and fertiliser mixes that are actually spreadable can also have a significant effect on the CV.

Recognising all of these factors, if fertiliser is not applied evenly a spatial variability in the nutrient levels of the soil will be produced – in effect bands of nutrients that are higher or lower than the average. In pastoral farming there is evidence to show that there is some nutrient redistribution via dung and urine. Partly because of the animal redistribution effect the adverse yield effects of uneven fertiliser spreading have a lower impact on pastoral farming.

Overall, when these limited factors are taken into account, the calculable annual loss due to poor fertiliser spreading is close to $55 million. This does not include yield reductions due to other nutrients, losses due to uneven maturation nor losses from pasture crops due to the loss of effect from nitrogen applied as a strategic accelerant.

If all of the losses are taken into account the total revenue forgone due to uneven fertiliser application could reach as high as $100 million per annum. As noted before, these estimates of revenue potential are rough but are large and deserve further investigation.

The new Spreadmark scheme

The current Spreadmark scheme is a good vehicle calibration programme that was always intended to be expanded. The new Spreadmark scheme is, in fact, a fertiliser placement quality assurance programme. Its objective is the placement of fertilisers in locations where they can be of the most agronomic benefit and the least environmental harm.

The new scheme will register fertiliser spreading companies. It will do this if they have certified spreading machinery, trained operators and an appropriate quality management system. This system is to be focused on ensuring that farmer and grower outcomes are met and environmental sustainability is protected. Overall systems will be subject to an independent audit to ensure that both farmers and growers and Regional Councils can have confidence in the programme.

The precision placement of fertilisers requires a number of factors to be in place. It depends on the careful integration of operator skills, vehicle evaluation and access to, and use of, appropriate fertilisers. It is the integration of these factors that is at the heart of the new Spreadmark scheme.

Registration in the scheme will be voluntary but the scheme has been designed and will be operated and promoted in such a way as to encourage all operators to become involved.

There is no doubt that the proper placement of fertiliser is of considerable agronomic benefit to farmers and growers and will help protect the environment from the undesirable side effects of poor fertiliser spreading practices.

Summary

The fertiliser spreading industry, the fertiliser companies and Federated Farmers recognize the agronomic and environmental importance of the quality and precision placement of fertilisers. The development of the Fertmark scheme and the further development of the Spreadmark scheme are evidence of this.

In conclusion, it is important to note that when fertiliser is placed precisely an important and significant limitation on the potential return from crops is removed.