Members of the FAR Board

STEVEN BIEREMA (Chair)
021 755 198

VAL MCMILLAN
021 730 583

STEVE WILKINS
027 437 5209

PAUL MACKINTOSH
027 446 3166

GUY WIGLEY
027 603 3821

LIAM MARTIN
Associate Director

JOHN CARADUS
Appointed Member

ROBYN DYNES
Appointed Member

MIKE HEDLEY
Appointed Member

Foundation for Arable Research
PO Box 23133, Hornby, Christchurch 8441
Phone: 64 3 345 5783 Fax: 64 3 341 7061
Follow FAR: www.far.org.nz

ADDING VALUE TO THE BUSINESS OF CROPPING

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From the Ground Up™

ADDING VALUE TO THE BUSINESS OF CROPPING

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ARIA Arable Research In Action 2025

Chertsey Arable Site
26 November

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FAR Board Vacancies

Four grower Director positions are coming vacant on the FAR Board from 1 January 2026.

Nominations close Friday 10 October 2025.

For information about the nomination process contact Chair of the FAR Nominations and Remunerations Committee, Hew Dalrymple. Hew@waitatapia.co.nz; 027 450 9462

Changes and efficiencies

Good things take time... especially when they involve change; and even more so when that change involves Acts of Parliament. So, two years after the last referendum, and several consultations later, FAR finally has a new Constitution which addresses issues raised by levy payers and meets the best practice process requirements of the amended Incorporated Societies Act.

Most of the changes are in the fine print, and don’t affect what we do, or how we do it. However, some, linked to grower representation have had quite an impact on election and appointment processes for our regional Arable Research Groups (ARGs) as well as the FAR Board and Members’ Council. The new Constitution is available for viewing in the About Us section of the FAR website.

Other changes are underway within FAR too. In recent months we have introduced a new research project management system that will streamline trial planning, results gathering and storage and ultimately, analysis and reporting. On top of that we have a new financial system, which automatically links to Annual Returns and levy payments. While the initial learning curves have been steep, the efficiencies are already becoming apparent.

We’re also investigating if, when and how to integrate generative artificial intelligence (gen AI) tools into the business. We already have Ask FARAI active on our website, and by the end of September, the same tool will be available as an app on your phone.

We’ve also launched our new digital strategy. Digital tools are getting ‘smarter’ and cheaper, providing us with new options for communicating news and information to growers.

In the regions, our team of regional facilitators, most of whom were appointed late last year, are hard at work developing and delivering field days, workshops and other events. It’s been great to see them connecting with other levy groups such as Hort NZ, Dairy NZ and Beef+Lamb. Most arable systems are in fact ‘mixed’ systems and working with these groups is a practical approach to supporting the many levy payers we have in common.

All of this work is aimed at making FAR more efficient in order to deliver more value to levy payers. We know our levy income is hard earned and we’re working hard to ensure we’re providing the most value possible in return.

Anna.Heslop@far.org.nz

A word from the CEO

"I'm delighted to have the opportunity to come to FAR and work in support of arable farmers."

It's a great pleasure to sit down and write my first CEO column for 'From the Ground Up'.

Prior to starting on 1 July, I was able to spend four weeks working alongside Alison Stewart, getting to know the FAR business and meeting some arable farmers. A big thanks to Alison, the FAR Board, FAR staff, growers and the broader arable industry for the warm welcome I have received.

My background prior to FAR has been spent in the food and fibre sector, with my early career in Australia and almost 25 years in New Zealand. Coming to FAR marks a return to research, development and extension, the focus early in my career where I was teaching, researching and working alongside industry at the University of Tasmania. Since then I have worked across private sector research and development for The New Zealand Merino Company and industry good at Beef + Lamb New Zealand. The last nine years were spent as a partner in a small food and fibre focused consulting practice, Primary Purpose, working across most of New Zealand's food and fibre sectors for private sector, industry good, and government clients.

As I write this, I'm about halfway through a round of meetings with FAR's seven Arable Research Groups (ARGs). These ARGs are regionally based and bring together about 15 arable farmers and other stakeholders in each region. A sincere thanks to ARG members for their work and support, and to all those growers and arable industry members who provide support to FAR in so many different ways.

ARGs provide input into FAR's research programmes, and supported by regional facilitators in each region, they also help guide FAR's extension and regional delivery. A key message from growers so far has been the poor profitability of the sector and the tough weather conditions being experienced in some regions through winter.

These challenges are in contrast to the current positive mood of the livestock sectors and are well recognised within FAR. FAR's recent conference drew together a range of speakers from FAR and beyond to focus on opportunities to support better returns from arable farming. The conference theme was "Show me the money!", reflecting the organisation's research, development and extension work targeted at improved profitability. One of the great things about joining FAR has been seeing how focused FAR's Board and staff are on delivering grower benefit through their work.

In addition to the meetings with ARGs, I'm also getting out and about to meet with key contacts in the arable industry, other industry groups and service providers, and government. It has been pleasing to see how well respected FAR is as a sector organisation, and there is a strong basis for working closely with others to help make farmer investment via FAR go as far as possible.

However, these discussions have also shown that there is further opportunity to raise the profile of the arable sector and highlight its deep connections to New Zealand's other food and fibre sectors through lamb finishing and dairy grazing and the production of numerous horticultural and process crops. The grains the sector produces also play a key role as feed inputs for the livestock industries, and seeds enable the pastures that drive the export power of the livestock sector and the ability to supply healthy vegetables to all of New Zealand. The arable sector is a significant 'export enabler' and helps provide food domestically. FAR, alongside other groups, will be working to lift the sector's profile and understanding.

I'm delighted to have the opportunity to come to FAR and work in support of arable farmers. I recognise the difficult times many are facing and FAR will work however it can to support improved financial viability and more confidence in the sector. I look forward to meeting many of you in the coming weeks and months.

Scott Champion
CEO

A word from the Chair

The arable sector is at a pivotal moment—facing both significant challenges and exciting opportunities. As Chair of FAR, I've seen firsthand the resilience, ingenuity, and dedication of growers, researchers, and industry partners. This has underscored the critical importance of collaboration and visionary leadership.

From climate variability to shifting world markets and increased costs, the pressures on arable farming are intensifying. Our sector continues to respond with agility and purpose. We hope that FAR's investments in research, extension and (limited) advocacy are providing growers with tools and insights that will help them adapt and thrive.

We must also confront the economic realities. Low market opportunities, low prices, and rising input costs are straining the viability of many arable operations. These challenges demand urgent attention from both industry and government.

In this environment, innovation and resilience are essential. We must remain open-minded and proactive in exploring ways to boost productivity and efficiency. Embracing new ideas and technologies will be key to navigating a pressured market and securing a sustainable future.

One of the most complex and consequential issues we face is the future role of genetic technologies. Commercial use of these technologies is not currently permitted in New Zealand; however, the government has signalled a willingness to revisit the regulatory framework. This presents both an opportunity and a responsibility for our sector to engage in a clear-eyed, objective conversation about what these technologies could mean for growers, consumers, and the land.

FAR recognises the need to be prepared. Globally, countries are adopting gene editing and advanced breeding tools to improve crop resilience, reduce chemical inputs, and respond to climate pressures. We need to carefully consider if and how these new tools could help New Zealand to remain competitive and sustainable.

What's needed now is not advocacy, but inquiry. We must ask the hard questions:

- What are the agronomic benefits and risks?
- How do we ensure cultural and consumer concerns are respected?
- What safeguards and governance structures would be required?

FAR is committed to facilitating this discussion with integrity and transparency. Our role is to bring growers, scientists, policymakers, and communities together to explore the pros and cons, to listen as much as we speak, and to ensure that any future steps are grounded in evidence and trust.

This is not just about technology. It's about leadership. And it's about recognising that the world is moving on. If we want to shape the future of arable farming in New Zealand, we must be willing to engage - *from the ground up.*

Looking ahead, FAR will continue to champion evidence-based decision-making, foster innovation, and support the long-term sustainability of our sector. I invite everybody to join us in this journey; to ask bold questions, share insights, and help shape a future that works for all.

Together, we can ensure that arable farming in New Zealand remains resilient, competitive, and deeply connected to the land and communities we serve.

Steven Bierema
Chair

Highlighting New Zealand grown grains

Most New Zealanders are unaware that when they buy bread from the supermarket it is more likely to be made from imported, rather than domestically-grown milling wheat. This is despite New Zealand arable growers producing some of the world's best quality grain.

To make it easier for consumers to identify and seek out food and drink products made from domestically-grown grain, a new "New Zealand Grown Grains" logo will soon start appearing in bakeries and on shop shelves.

The certification trademark for products made with New Zealand-grown grains is the initiative of growers via FAR, in collaboration with Eat New Zealand which promotes locally-sourced food.

FAR general manager of business operations Ivan Lawrie says the certification trademark will start appearing on packaging and advertising over the next few months, with interest already shown by bakers as well as makers of breakfast cereal and plant-based milk. The trademark not only applies to milling wheat, but also other grains such as oats and barley.

FAR owns the trademark which became available under license from July 1 for companies that meet its specifications. It will be launched officially in October.

Eat NZ chief executive Angela Clifford says the campaign "is a unique opportunity for farmers to join with bakers, chefs and consumers using their grains and seeds, to tell a compelling story about what makes New Zealand-grown arable foods so wonderful. From the quality to the connection to our land, from food security to social license, we all win when our farmers and those eating the food they grow, work together."

The initiative is part of a wider industry campaign which has been underway for about five years, to make New Zealand more self-sufficient in the growing of milling wheat, used to make bread. Despite the arable industry's reputation for quality product, at least three-quarters of the bread sold in New Zealand is made from imported grain, primarily from Australia, Ivan Lawrie says.

Growers are keen to expand production and maintain a strong industry, but infrastructure remains a major hurdle. While most cereal production is in the South Island, it is expensive to transport this grain to where most consumers live, in the North Island. "It costs less to transport grain from Australia to the North Island than across Cook Strait from the main growing region of Canterbury."

In terms of consumer preference, market research showed that 50 per cent of bread purchasers are prepared to pay up to 20 cents extra for a loaf guaranteed to be made from New Zealand-grown grain. A smaller group would pay up to 50 cents extra.

"Although the grain component may represent only a small share of a final product's total cost, even a modest rise in demand can have significant long-term effects, encouraging investment by plant breeders, traders and processors and helping to maintain a diverse and resilient portfolio of cropping options for New Zealand growers," Ivan Lawrie says.

When the price of a loaf of bread is broken down, the wheat raw ingredient only represents 25 to 30 cents, or 10-12 per cent and milling 12 to 15 cents, or 4-5 per cent. Eighty per cent of the price covers baking, logistics, packaging, retailing and taxes.

Other research commissioned by FAR and Eat NZ has debunked industry myths questioning the suitability of New Zealand grown wheat for baking. An independent analysis compared the performance of Australian wheat grades most often imported into New Zealand with domestically-grown wheat in terms of the baking properties of the flour. "This highlighted the superior performance of New Zealand milling wheat compared with imported Australian grain. It is not only better than the Australian product, but as good as Canadian, which is rated as the international standard."

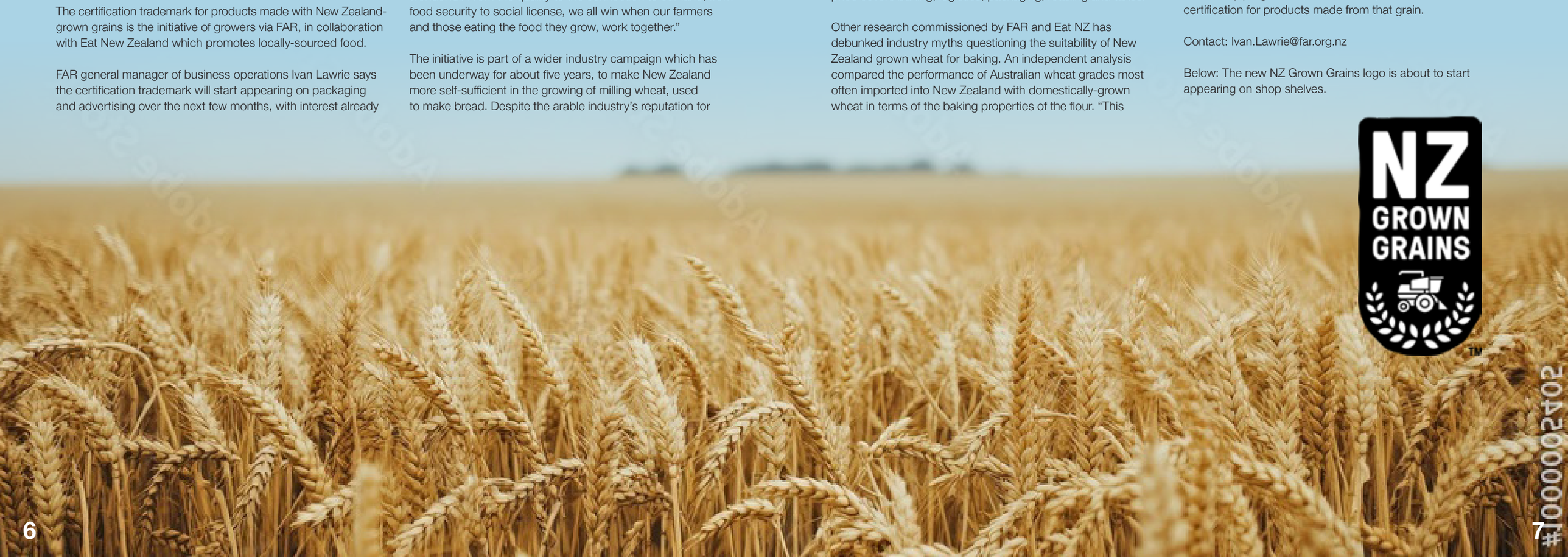
> *"A unique opportunity for farmers to join with bakers, chefs and consumers using their grains and seeds, to tell a compelling story about what makes New Zealand-grown arable foods so wonderful."*

In terms of greenhouse gas emissions, an analysis showed that one kilogram of flour, milled in New Zealand from local wheat, has a lower carbon footprint than one kilogram of flour milled using Australian wheat at the same mill, Ivan Lawrie says.

New Zealand grain growers are already certified through a United Wheatgrowers' QAgrainz quality assurance and traceability programme, but until now, there has been no certification for products made from that grain.

Contact: Ivan.Lawrie@far.org.nz

Below: The new NZ Grown Grains logo is about to start appearing on shop shelves.



FAR technology manager Chris Smith wins the PINZ Technology Innovation Award flanked by FAR communications manager Anna Heslop and former chief executive Dame Alison Stewart.

Combine harvester workshops win innovation award

A FAR initiative taking a closer look at the efficiency of a key piece of machinery for arable farmers – their combine harvesters – has been recognised at the Primary Industry NZ (PINZ) Awards.

Instigated by FAR's technology manager Chris Smith, the combine workshops are saving growers valuable time and money during the critical harvest period as well as reducing potential yield and profit losses.

The combine workshops won the PINZ Technology Innovation Award.

While many assumed that arable farmers and their machinery dealers already knew everything about successfully running combine harvesters, FAR funded an independent team of experts from Australia and Canada to visit and take a fresh look. For the last two seasons these experts have carried out grower workshops prior to harvest and then returned to visit individual growers on their farms during harvest to check how adjustments are performing in the field.

Adjustments made to combines led to some instant harvesting gains and cost savings including reduced crop losses, faster harvesting speeds, lower diesel consumption, reduced horsepower and better harvest samples, Chris Smith says.

"One grower took 70 hours off his combining and another reduced fuel consumption by 30 per cent as well as producing a clean sample. Another farmer increased his harvesting capacity in barley from 20 hectares to 30 hectares a day.

"Some farms were already doing well and it was confirmation for them that they are running their combines efficiently."

The combine specialists, led by Peter Broley of Primary Sales Australia, each concentrate on particular brands with Kassie van der Westhuizen advising on John Deere, Brett Asphar on Case and Claas and Murray Skayman, from Canada, on New Holland and Case. Each expert has 20-30 years of experience with the brand companies, dealerships and as independent consultants.

As combines cost $500 to $1000 an hour to run, including diesel, finance and depreciation, any increase in efficiency and throughput saves money.

The workshops show the importance of growers measuring and monitoring potential grain and seed losses and fine-tuning settings to mitigate these.

"Growers have only one opportunity to harvest a crop. Once it is gone out the back of the harvester it is too late," Chris Smith says.

Another round of combine workshops is planned for the coming season.

Cut the Crop at home

FAR's podcast series has a new home base. After five years of recording at the CountryWide studio in Tai Tapu, we now have a pop-up studio in our Templeton office.

FAR communication manager Anna Heslop says the shift makes the recording process less time consuming and more flexible.

"The new studio has been made possible by the introduction of new technology by our podcast tech-team at CountryWide. Their new recording platform means we host our guests at Templeton while the tech team looks on from the Tai Tapu studio. We had our first session in August and it went really smoothly. The technology also speeds up the podcast editing process, so it's a great improvement all around."

Cut the Crop is a core feature of FAR's digital communication strategy, which is focused on finding faster and more cost effective ways to deliver information to growers. The strategy also includes a YouTube channel and Ask FARAI, FAR's ground-breaking website information tool.

"Ask FARAI went live on the website in August 2024, and by September 2025, it will be accessible via What's App, making it even easier to use."

Contact: Anna.Heslop@far.org.nz

Using soil N is not "mining" the soil

Maize growers are not at risk of "mining" nutrients if they utilise nitrogen naturally-available in the soil. In fact, it will save them money, says FAR's senior researcher Dirk Wallace.

Fertiliser makes up to 37 per cent of maize input costs, so it makes both economic and environmental sense to measure and utilise nitrogen (N) that is naturally available in the soil.

"Maize needs N, and it needs lots of it. We don't want to risk leaving profit in the field, but we need to think more about where we get the N from."

Soil N supply is the natural process of nitrogen in the soil becoming available for plant uptake.

"Some growers worry that if they utilise soil nitrogen, they will "mine" the soil, depleting nutrient reserves for subsequent crops, but this is not the case."

Some growers worry that if they utilise soil nitrogen, they will "mine" the soil, depleting nutrient reserves for subsequent crops, but this is not the case. This applies to all crops, not just maize.

"Soil N supply is a biological system just like crop growth, if the conditions are good for crops to be doing well then your soil will be supplying more nitrogen. So, if it's warm and wet, your soil will be full of biological activity and if it's cold or dry things will slow down."

By measuring soil N and including this when making decisions on applied N inputs to meet crop requirements, farmers are not only saving money but also making environmental gains, Dirk Wallace says.

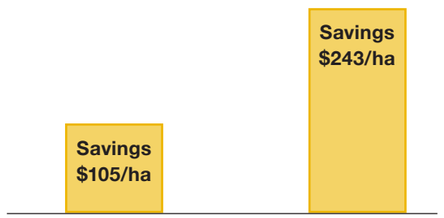
Soil N supply is made up of two parts. Firstly, Mineral N is a snap shot of what you've got under your boots at any one time. In addition, more N will become available over the growing season. As the soil gets warmer you'll get more N.

A test called the Potentially Mineralisable Test is available to estimate how much N your soil is likely to produce on a monthly basis. By adding the two soil test results together, growers will get an estimate of the amount of N the soil is likely to supply for their crop.

FAR has been gathering information on these different decisions at its Waikato research site at Tamahere for the last four maize seasons. The system is a maize silage rotation with winter annual ryegrass. The production in its fertilised plots is 22-25 t DM/ha from silage and about 4 t DM/ha from ryegrass.

The research calculated the total amount of N the crop would require, based on yield estimates, then compared three approaches to supplying that total: i) applying the total rate; ii) only applying the difference between total N required and available soil mineral N, and iii) considering both soil mineral N and PMN and only applying the difference between that figure and the total N requirement.

There was no difference in yield between the three approaches, however, savings of $243/ha were made by reducing applied N and utilising both soil mineral N and N available through the growing season. Savings were $105/ha when only the soil mineral N was taken into account. All soil tests were done to 30 cm in September prior to planting maize.



"By factoring in how much nitrogen is being released from the soil, you can often reduce the amount of fertiliser needed. This not only saves money - it also lowers emissions tied to fertiliser production and transport ."

"Importantly we are reducing the amount of N left behind when we account for soil N supply. This reduces the risk of N loss over winter, something that is more important in summer grain-winter fallow systems.

FAR is not suggesting farmers rely solely on soil organic matter to supply all their nitrogen, Dirk Wallace says. "What we're focused on is good nitrogen management—that means using fertiliser alongside what the soil is already providing.

"Mineralisation—the natural breakdown of organic matter that releases plant-available N—isn't like biological nitrogen fixation. It can't be turned off, and it happens regardless of how much fertiliser you apply. Making use of that soil N is not mining—it's smart management.

"By factoring in how much nitrogen is being released from the soil, you can often reduce the amount of fertiliser needed. This not only saves money—it also lowers emissions tied to fertiliser production and transport. That means a lower footprint for the feed you grow, which is good for the climate and for your position in the market, especially as the dairy sector looks to cut its own emissions profile," Dirk Wallace says.

Growers often ask where does that N come from?

"There's a lot of nitrogen in soil; we just don't often measure the non-plant available stuff. At Tamahere it has been calculated that there is 10 tonne N/ha to 30 cm depth. Mineralisation is accounting for 150 kg N/ha, equivalent to an average 1.5% of N removal from winter and summer crops from 2021-2024." Each year a crop is grown it will return N via the roots and stover.

Contact Dirk.Wallace@far.org.nz

Attention to detail can increase maize yield


FAR maize researcher Rene van Tilburg.

Growers wanting to increase maize grain and silage yields and profits should focus on seedbed preparation, planter set-up and crop monitoring, says FAR maize researcher Rene van Tilburg.

Average maize yields in New Zealand are 12 tonne/ha for grain and 21 t/ha for silage. In comparison, record yields have been up to 23.4 t/ha for maize (Pioneer Cup results) and up to 30 t/ha for silage.

“To improve their averages, growers need to monitor and manage potential yield and profit robbers; particularly poor and uneven establishment, inefficient nutrition, water stress and pests.

“Weather is obviously a significant contributor to yield, and while it cannot be controlled, taking temperature, rainfall forecasts and sunshine hours into account when making crop management decisions will contribute to efficient systems and maximum profits in any given season.”

The common themes amongst yield recordholders around the world are effort around seedbed preparation, planter setup and crop monitoring. “For example, world record holder (United States grower) David Hula says that 65 per cent of the yield potential is done when the planter leaves the field.”

Perfect establishment is considered to be one where all plants emerge within 12 to 24 hours of each other, depending on the prevailing temperature at the time.

“As growers, your job is to quite literally dig for the reason any seed is slow to emerge, or does not emerge at all. After emergence is complete, dig in the gaps and look for misses caused by pests such as cutworm, wireworm and Argentine stem weevil. These are one-off losses, with remaining plants likely to go on to reach their potential.”

However, says Rene, unevenness of germination can be more problematic. It may be because of poor seed to soil contact, poor soil structure, dry conditions, variable planting depth, side wall compaction and a smeared seed trench. “Maize plants will not ‘grow out’ of these problems; they will rob yield right up to harvest.”

Understanding soil fertility and the interactions of different nutrients is also important. Oversupply of NPK (nitrogen, phosphorus and potassium) is not the path to success and phosphorus application without consideration to other nutrients, particularly zinc, can depress yields, Rene Van Tilburg says.

“Soil test regularly; smaller grids are better than large ones. While there are different methods of trace element testing, choose one and stick with it.”

Consider regular tissue testing from V6. “Get expert advice on results. A deficiency or excess can have knock-on effects on other nutrients leading to misleading conclusions.

“Record all inputs, weather conditions, soil and leaf test results, along with yield, every year. This database will allow you to observe how any seasonal differences in weather or inputs have impacted on yield. If you are making changes to your system, only change one thing at a time... this will allow you to understand its impact. It’s a long game.”

Contact: Rene.vanTilburg@far.org.nz

Maize biosecurity levy concludes

Growers, maize seed companies and maize seed merchants no longer have to pay the maize biosecurity levy for transactions conducted after 1st July 2025. From that date, the Seed and Grain Readiness and Response (SGRR) Maize Biosecurity Levy was set to zero.

The maize biosecurity levy was activated on 1st April 2024 to fund the arable sector’s share of costs associated with the 2022 fall armyworm (FAW) incursion. “We are pleased to report that this targeted biosecurity levy has now met its funding objective and is no longer required. We thank all contributors for their support during this response,” says SGRR chair Ivan Lawrie.

After FAW was first detected in New Zealand in March 2022, an initial biosecurity response included surveillance and research to better understand the maize pest, its spread, and potential impacts.

In April 2023, Biosecurity New Zealand and sector partners agreed to close the FAW response as the pest was widespread in the North Island and repeated incursions via wind from Australia were likely.

FAR now leads a long-term management programme for FAW.

Meanwhile, the Arable Crops Biosecurity Levy remains active following incursions of the invasive weed black-grass. This levy is still required to meet obligations under current biosecurity responses, Ivan Lawrie says.

In the 2025 financial year, SGRR paid the first instalment of its cost-share contribution for the 2021 black-grass incursion. The second and final payment is expected before the end of the 2025/26 financial year.

“In addition, as many of you will be aware, a new black-grass response commenced in May 2025. Costs for this response are ongoing and not yet finalised.” The current Arable Crops Biosecurity Levy will be used to meet SGRR’s share of costs as they arise under its obligations through the Government Industry Agreement for Biosecurity Readiness and Response (GIA).

The Arable Crops Biosecurity Levy will remain set at a rate of 0.1% on all harvested seed or grain (except maize) – shared equally between growers (0.05%) and merchant or processor (0.05%).

Seed + Grain Readiness & Response

Seed and Grain Readiness and Response Incorporated (SGRR) is the biosecurity entity for the arable sector. It was established in 2020 by partners Federated Farmers Arable Industry Group, United Wheat Growers, Foundation for Arable Research, New Zealand Flour Millers’ Association and New Zealand Grain and Seed Trade Association.

“SGRR remains committed to representing the arable industry in biosecurity readiness and response. We will continue to provide timely updates on the use of levy funds and progress of our response activities,” Ivan Lawrie says.

The Biosecurity (Response—Arable Crops Levy) Order 2023 levy can be viewed on the Government New Zealand Legislation website Biosecurity (Response—Arable Crops Levy) Order 2023 (SL 2023/78) Contents – New Zealand Legislation.

Precision ag: making cents of the tech

James Venning, South Australian grower.

Land prices are driving South Australian grower James Venning to invest more in precision agriculture to optimise production on his Yorke Peninsula property.

He says farm prices have become unsustainable in South Australia, rising from $4000/hectare in 2006 to $17,300 in 2020 and $22,500/ha now. This is for land with an average yield of 4.5 tonnes/ha of wheat, 4t barley, 1.5t lentils and 2.5t canola.

"When you add in the rising costs of production it makes economic sense to do more with less and fix what we have, rather than expanding," he told FAR's "Show me the money" conference at Lincoln University.

James is able to spread the precision ag costs over his 5000ha Barunga Grains property near Bute, which grows wheat, barley, lentils and canola.

At Barunga Grains, rainfall averages 400 mm, with 70 per cent in the growing season, although tallies were significantly down this year. The property has a dune swale landscape, with sand and loam-type soils ranging from pH 4.5 to 7.5. "We are almost growing hydroponically," James says. Constraints are compaction, non-wetting sands, high pH (nutrient lockup), and low pH (reduced rooting depth, particularly for lentils).

He has some firm guidelines for decision making around new, high-value technologies or tools, noting they must make economic sense and solve a problem. "Don't do it because of ego or because the neighbours did."

A general rule is for a new technology or tool to return at least a 10 per cent benefit. "So, if you spend $300,000, you need to get a return of $30,000."

> *"A general rule is for a new technology or tool to return at least a 10 per cent benefit. "So, if you spend $300,000, you need to get a return of $30,000."*

James' precision agriculture journey started with phosphorus fertiliser, as this is the largest input cost in his business. "The phosphorus spend makes up 50 per cent, so it makes economic sense to apply this accurately."

The higher the pH, the less efficient the phosphorus use, so he set up trials to ground truth and zoned paddocks for pH. He now relies on pH and satellite MDVI vegetation index imagery for decision-making on variable rate.

In the first year he saved a road-train load of MAP (Monoammonium phosphate) worth $90,000. Since then application rates have been slowly lifted to avoid reducing yields.

As lentils are his highest gross margin crop, these also justify an investment in technology, James says. He has built a production map using satellite imagery from previous lentil crops, the combine yield map and soil type maps. Seeding rates now range from 60 kg/ha on sands to 25 kg/ha on heavy loams. The cost of the technology is less than $1/ha, which only requires 1kg/ha more in yield to pay for.

As he is in a low rainfall region, he uses soil moisture probes to decide on the best timing for nitrogen applications.

A protein monitor in the combine enables him to target a protein range of 10.5 to 11.5 per cent in milling wheat where the best returns are made. This has given him confidence to cut nitrogen rates on loam soils and increase them on sands.

In terms of camera-based technology, James says he is watching this space. "The biggest problem is the cost of the technology. This can be $60,000 a year in paying back the cost of the tech, finance and subscription costs." At current numbers, he would need to be spraying more than 9000ha/year green on brown to break even.

"If you want to improve performance you first need to measure it and then analyse it. Adoption of precision ag technology requires an improvement in performance or reduced cost."

James' key messages for anyone considering investing in precision agriculture are:

1. Start with a problem not a solution.
2. Make a plan:
   a. Where do you want to be in five years, how will you get there?
   b. What needs to be done now?
3. Keep it simple.
4. Give variable rate a go.
5. Don't let the search for perfect prevent you from reaching good.
6. Data is currency. Data collected now can be used in future.

While agtech doesn't usually have the critical mass to deliver intuitive apps for free (or low cost), there are apps out there that work really well for farm businesses. These include Life360, a tracking app which is useful for harvest logistics. Google Maps drops pins in paddocks, which can be revisited very easily when returning to a specific spot, while Onenote can be used for sharing work planning amongst staff and storing data and records. Google Sheets is similar, but for storing of data rich information. This can be shared with others on an individual spreadsheet basis. James uses this for tracking grain contracts and it means he can make decisions without having to go back to the office and for recording combine settings.

As well as the day to day running of Barunga Grains, James Venning chairs his local grower group Northern Sustainable Soils, is a board member of the Hart Field Site Group and is a grower director of Grain Producers South Australia. He was a 2022 finalist in the Australian Young Farmer of the Year award and also received the award for excellence in technology.

Diversification pays bills

United Kingdom arable farmer and entrepreneur Olly “Blogs” Harrison’s online presence helps to fund his agricultural machinery obsession.

United Kingdom farmer, entrepreneur and accidental YouTube star, Olly “Blogs” Harrison says that diversification has been the key to him expanding his business.

Filming farming videos for YouTube started off as a bit of fun and a way to communicate with a wider audience during the Covid lockdown, but has now become a useful revenue stream for the arable farmer and agricultural contractor.

After several months growing an on-line audience he set up a monetised channel. The first morning he woke up to find he had earned £1.52 in advertising revenue and this continued to increase each day.

“It was like wow, free money, as I was making the videos anyway,” he told the FAR conference via video link.

His online presence now helps to fund his agricultural machinery obsession, with the money used to pay the monthly hire purchase payments on a self-propelled sprayer. He also bought some classic tractors to make the videos more interesting.

Having an online presence has also helped to gather support for farming issues, notably the UK Labour government’s proposal to impose an inheritance tax of 20 per cent for agricultural property assets over £1 million. This led to 45,000 farmers protesting, shutting down central London.

“YouTube has allowed me to expand my farm and to have a bigger voice when it comes to getting people together and lobbying the government,” Olly says.

Leaving school at 16 having struggled with dyslexia, Olly’s farm has grown from 70 hectares to 600 hectares. His farming business has 14 different income streams including dog walking fields, sunflower mazes and office and holiday rentals.

While turnover is split 50-50 between on and off-farm activities, he says 100 per cent of the profit comes from diversification.

“UK agriculture is in a difficult space, particularly the cereal sector. With the cost of land, fertiliser and chemicals, the economics of cereals don’t add up. So, we’ve either got to sell it better, or do something else.”

Olly farms 324ha of wheat, 120ha of barley, 60ha of spring beans, 24 of oilseed rape and 50ha of grass. At 400ha, his biggest crop is grown for bird food, for which the government pays £642 a hectare, under its Sustainable Farm Initiative (SFI). “This is propping up the farm for three years.

“Some farmers have stopped growing commercial crops, are using contractors and just relying on the SFI for income. They have basically retired. Government and the wider population need to be more aware of the importance of being self-sufficient in food production. Growing flowers and planting trees isn’t going to feed the nation.”

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Farming on the outskirts of Liverpool, Olly has taken advantage of being on the urban fringe, turning farm buildings into office space and holiday rentals and charging £10 an hour for people to walk dogs in a field.

All south-facing sheds have solar panels, meaning he is self-sufficient in power with some electricity being sold back to the grid. Tree waste provided by arborists and gardeners is used in a bio-mass boiler used to dry grain.

A small animal hotel was a cheap conversion of an existing building on the farm. “While there are a lot of accommodation facilities for cats and dogs, no one was specialising in small animals like rabbits, hamsters and guinea pigs.” One person paid £2000 for their pigeon to be housed while they travelled for six months.

The popularity of Olly’s YouTube channel also led to a spin-off business following requests for clothing merchandise. A neighbour now makes and sells branded hoodie sweatshirts on his behalf, generating a turnover of £100,000 a year.

He also grows a sunflower maze, with half the proceeds going to charity and started an annual Christmas convoy of decorated tractors into Liverpool. He promised himself that by the age of 40 he’d own a brand new combine harvester and having achieved that he drove his Claas Lexion combine the length of the UK for charity. He says that together, these activities help to reduce the urban-rural divide, with people more engaged and less negative about agriculture.

Olly “Blogs” Harrison drove his combine harvester the length of the United Kingdom for charity.

Top students

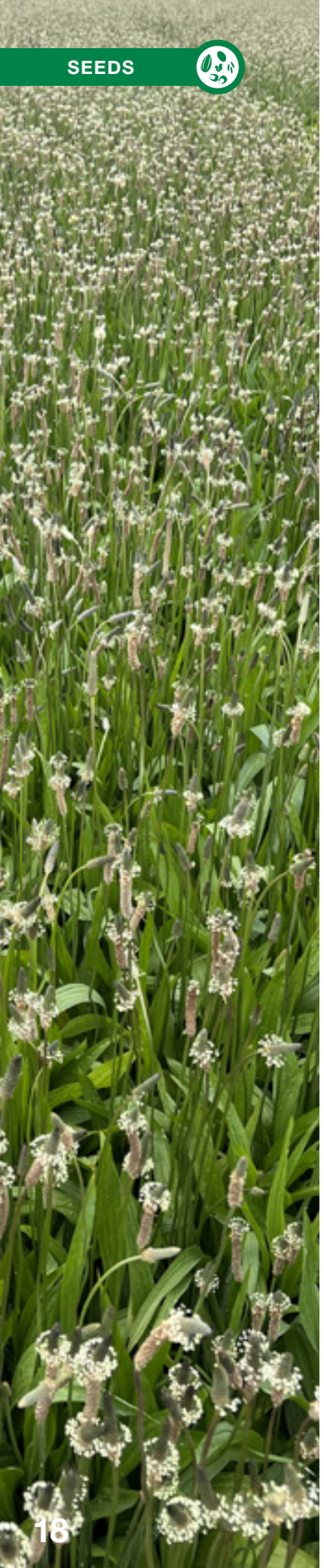
Amelia Ridgen (right) is the winner of a FAR sponsored award for top student on Lincoln University’s PLSC320 Crop Science course. She is pictured with the examiner of the paper and course lecturer Dr Mariana Andreucci.

Amelia is in her third year of a BAg. Sci. at Lincoln and has worked as a summer student at FAR. She is currently spending a semester abroad for six months at Wageningen University and Research in The Netherlands.

“When I get back in 2026, I plan to do an honours project in plant science to finish off my degree. Coming from a mixed arable farm at Greendale, central Canterbury, I have always been interested in plant science and agronomy and am excited to continue my studies in agriculture,” Amelia says.

Another student Troy LeQuesne won the award for top second year diploma student doing the PLS071 - Annual Crops course.

Troy is from South Taranaki, where his parents farm. Troy says he is interested in pursuing a farming career, “which is how I found myself at Lincoln University studying agriculture. I’m very happy to receive the FAR prize this year and appreciate all involved.”



Optimising nitrogen supply for profitable plantain seed production

Production of plantain (*Plantago lanceolata*) seed is largely driven by demand from the forage sector, both domestically and internationally, for the establishment of new pastures.

Nitrogen (N) is the largest input cost in plantain seed production. Therefore, it is important to supply N at a rate that maximises yield but limits cost to ensure a profitable return on investment. Optimising N supply also supports environmental stewardship, reducing the risk of losses of nitrate to groundwater or ammonia (NH_3) volatilisation.

There is currently limited independent evidence to guide plantain seed producers on the optimal N supply for their crops. To address this knowledge gap, FAR has conducted three-years of trials to identify the optimum rate of N supply to plantain seed crops grown under irrigation. Three trials were established: one in a second-year 'Agritonic' crop during the 2020/21 season at the FAR Kowhai site, and two in commercial 'Boston' seed paddocks in Southbridge during the 2021/22 and 2023/24 growing seasons. Prior to trial establishment, soil mineral N was quantified to a depth of 50 cm to establish total available nitrogen. Synthetic fertiliser N was applied at rates ranging from 0-270 kg N/ha in spring to determine the optimal N required to maximise yield without oversupplying N.

At harvest, the total biomass from each nitrogen treatment was measured, and the nitrogen content of both grain and straw was analysed to determine overall nitrogen uptake. Seed head density was measured to assess how total N influenced reproductive output. Seed yield was subsequently quantified at each site by harvesting individual plots with a small-plot combine and converting yields to tonnes per hectare.

To enable comparison between seasons, data from each year was expressed as a percentage relative to the three-year mean yield (1813 kg/ha; figures 1 and 2).

As total nitrogen (fertiliser plus soil N) increased, so did plantain seed yield until a breakpoint was reached at 152 kg N/ha (Figure 1). Beyond this rate, no further increase in seed yield was observed. A similar response occurred for seed head density, with a breakpoint at 164 kg N/ha (data not shown), after which seed head numbers plateaued.

At the Southbridge 2021/22 site (Trial 2), no significant response to nitrogen was observed. Soil mineral nitrogen was high at this site (over 100 kg N/ha available), explaining the lack of response to spring applied nitrogen.

Collectively, the trials showed the average biological maximum for seed yield was achieved using a total N input (soil mineral N plus applied fertiliser N) of 207 kg N/ha (Figure 2). Accounting for soil mineral nitrogen (which averaged 59 kg N/ha in these trials), the optimum applied fertiliser rate was 148 kg N/ha (Figure 2). It is important to soil test to determine N supply as it will vary. In these trials, using the 59 kg soil N/ha to calculate fertiliser requirements saved $120/ha in urea costs (based on a price of $933/t) and reduced the amount of N fertiliser susceptible to loss via waterways or volatilisation. FAR's Soil Nitrogen Supply Calculator can then help you work out the right fertiliser rate to meet target yield.

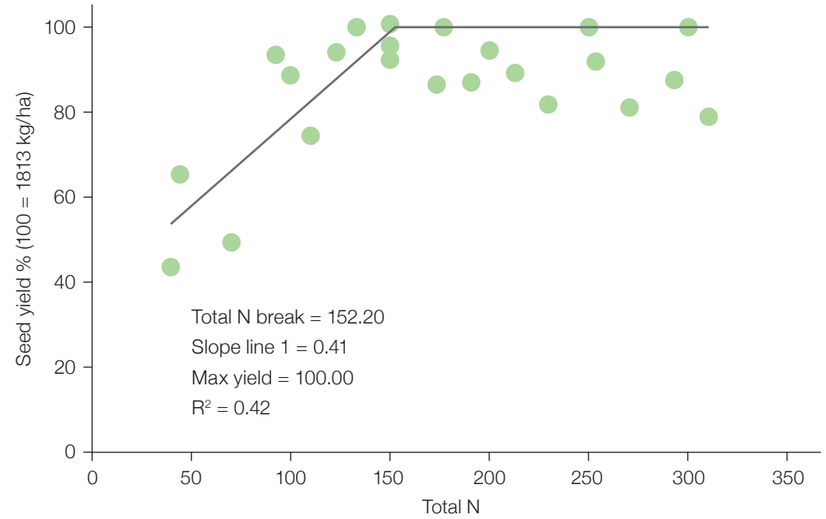


Figure 1. Response of plantain seed yield to total nitrogen (N) application. Data were from three trials in the Selwyn district undertaken in the 2020-21, 2021-22 and 2023-24 seasons. The black line indicates the "break point" for total N supply after which seed yield plateaued. Seed yields for each trial were normalised so that the maximum yield for each year equalled 100. This allowed a relative comparison between years.

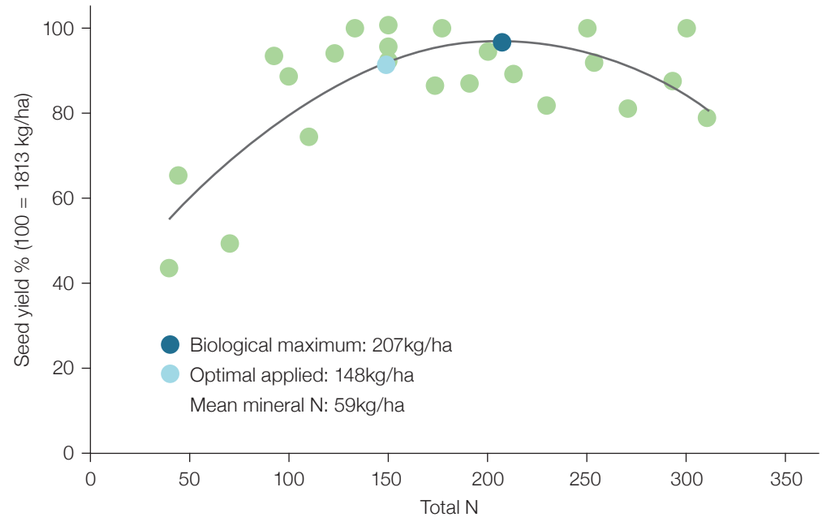


Figure 2. Relative seed yield for plantain grown using different rates of total nitrogen (N) in three trials in the Selwyn district, in the 2020-21, 2021-22 and 2023-24 seasons. The black line of "best fit" shows the point (in red) at which maximium yield was achieved Beyond this "biological maximum" seed yields declined despite additional N supply. Seed yields were normalised so that the maximum yield for each year was 100 to allow comparison between years.

Contact: Owen.Gibson@far.org.nz

Download FAR's Soil Nitrogen Supply Calculator here.