



2023

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AN OUTLOOK FOR THE
AGRIFOOD SECTOR



MAP OF AG



FOREWORD

Richard Vecqueray, CEO

This time last year I wrote that we remained in the grip of the Covid-19 pandemic and noted the relentlessness of the challenges it had brought.

A year on, while the medical ravages of Covid-19 seem to have somewhat abated – thanks to the wonders of vaccine science – the pandemic’s legacy is being played out in numerous ways, not least the aftershocks rippling through global supply chains.

Nothing stands still, and as if to add insult to injury, Putin’s war with Ukraine has ‘doubled down’ on the global headwinds we were already facing.

A war anywhere is bad for the world, but this one, with a country whose market-influencing supply of wheat to global markets has been hugely disrupted, alongside an exposure of the fragility of Europe’s reliance on Russian energy, has projected us into an economic and social crisis, the like of which we have not seen in a long time.

Against this backdrop, one might have expected private sector commitment to potentially discretionary expenditure on projects relating to sustainability to have come under severe pressure. But if the past 12 months is anything to go by, the businesses we support with access to data and expertise for net zero measurement have become more serious about their initiatives rather than less.

Indeed, in the past year those businesses have moved forwards from announcing targets – the aspiration – to actioning how they are going to get there. This has been incredibly exciting, since our role has been to help them navigate not only the

technological but also cultural challenges that go with accessing and using farm data.

It is almost inevitable that over the coming year many firms will be scrutinising costs closely and putting pressure on department heads to make savings. But the mood music would suggest that rowing back on central themes such as sustainability is not likely.

That said, our customers will expect increasingly smart ways of doing things that leverage data and do so at scale. Thankfully that is why we exist as a business. As you’ll see in the pages that follow, we are leveraging our *Pure Farming* suite of technology to help farmers manage and control their data, and to allow the businesses they supply to work in complementary ways towards increasingly sustainable production.

That is how it should be. From New Zealand, Australia, and the UK, we have a growing array of examples of farmers and the agrifood chain working together to understand greenhouse gas emissions and explore strategies to make productivity improvements which – almost always – go hand in hand with improving sustainability. And as our founder, Forbes Elworthy points out in his piece on inflation, the next 10 years could be a golden decade for farm returns and land values.

So, while the outlook for the next 12 months may not fill many with a great deal of cheer, there continues to be a great deal going on to be excited about. We should all celebrate and extol the many successes in our industry at a time when good news is in short supply. ■

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FARMER DATA HOLDS KEY TO WEETABIX SUSTAINABILITY DRIVE

UK food manufacturer has committed to be a carbon net zero business by 2050, and its 'Weetabix Growers Group' will play a significant role. So how is it helping them to achieve these goals? **Olivia Cooper** reports



Breakfast cereal maker Weetabix sources over 100,000t of wheat a year from British farmers. While the company is taking steps to reduce its own direct carbon emissions, it is also looking further afield, in the arable field, because over 60% of its carbon footprint comes from its supply chain – known as Scope 3 emissions.

That's why the company is collaborating with its dedicated Weetabix Growers Group first to help them identify what their emissions are, and then, to find out how to reduce them.

"All of the wheat for Weetabix original is grown within 50 miles of the factory, with a dedicated group of 120 growers," explains Peter Chandley, head of quality and food

safety. "We started the growers group over 12 years ago – to collaborate with our merchants and growers on food safety and sustainability."

The Weetabix Growers Group has worked collectively on a wheat standard that covers quality, food safety and sustainability called "The Weetabix Protocol" which is updated annually. The growers group meets regularly and has an annual conference to share knowledge and progress on initiatives.

Four years ago, Weetabix published its sustainability strategy. The strategy is made up of four workstreams, or pillars, with one pillar focusing on sustainable ingredients. Having had an early emphasis on the sourcing

of materials such as palm oil and cocoa, Weetabix turned its attention to wheat.

But where to start? Working with the European Food and Farming Partnerships (EFFP), Peter's first step was to measure a baseline. He considered the various elements of sustainability, such as water quality and biodiversity, before settling on carbon emissions and nitrogen use efficiency (NUE) as the measure. "Creating a single focus can be far more effective, and if we tackle that, everything else should follow."

EFFP suggested Map of Ag was engaged to gather robust data, and Weetabix introduced the firm to its growers group a year ago. The farmers were understandably sceptical and had lots of questions, but Map of Ag's head of sustainability, Hugh Martineau, won their confidence, Mr Chandley says. "We wanted knowledgeable people to ensure a two-way relationship. We didn't want to just ask for our growers' data. We wanted to give something back."

Following a successful pilot with three growers, Map of Ag then worked with an additional 14 growers - who produce 40% of Weetabix's protocol wheat - to measure their carbon footprints and NUE. "We get as much information as we can from their farm management software – if they don't use software then we can collect it online," says Mr Martineau. "This includes all inputs, such as fertiliser, sprays, and field operations, as well as outputs such as wheat yields and quality.

Using the Cool Farm Tool, the data is processed into a carbon footprint and NUE figure. The platform shows growers what their total emissions are, their emissions intensity per tonne of wheat produced, and their NUE – how much nitrogen is transferred into the harvested product. "Nitrogen is responsible for 70-80% of all greenhouse gas (GHG) emissions from wheat production," Mr Martineau explains. "NUE is a very meaningful figure which gives an idea of the potential wastage in the system."

The group's GHG emissions were significantly below the previous estimates which used secondary data, averaging 221kg of CO2e per tonne of wheat – although that could be in part due to the favourable weather for the 2022 harvest. "Our growers had significantly higher nitrogen use efficiency than the national standard, too, which is great news," says Mr Chandley. However, it will be important to repeat the survey every year, to build a robust dataset and reflect the impact of different weather and climate conditions. "We would like to work with 25-30 growers this year which will give them the opportunity to benchmark their performance anonymously against everyone else, as well as year on year."



"Our farmers are great people to work with and it's exciting to see them making a difference" - Peter Chandley



Neither Map of Ag or Weetabix wants to be prescriptive about how growers should reduce their emissions – instead, they want to collaborate with them, their merchants, and other advisers to help identify the best approach for their farm.

Data is the key. A small number of the growers group are going to work with Map of Ag to look at how to keep measuring emissions and carbon sequestration and get a whole-farm picture. They can then share their expertise and experience with other growers. “There will be hurdles, but our growers are great people to work with and it’s exciting to see them making a difference.” says Mr Chandley.

Map of Ag will test other carbon footprinting tools to compare against the Cool Farm Tool and is now helping the pioneer group of growers to understand where their emissions come from, so they can tackle them. This year, 32% of their emissions came from nitrogen

fertiliser production and 45% from its in-field application. “It’s very clear we need to reduce fossil fuel-derived products like nitrogen fertiliser,” says Mr Martineau. “We also need to use it as efficiently as possible.”

The company will now be looking at measuring and improving carbon sequestration in the soil, through methods such as minimum tillage, cover crops and organic manures. “We want to understand what’s happening in the soil,” Mr Martineau adds. “The primary objective of improving soil organic matter is to boost NUE – sequestration is just an added bonus. Given all the different soil types and farming systems, there is no one size fits all – we are using the data to help farmers know where to focus their attention and figure out what is right for them.” ■



BECOMING THE SOLUTION NOT THE PROBLEM



In October 2021, Northern Ireland agriculture and environment minister, Edwin Poots, announced the setting up of the world’s first scheme to baseline every field, tree and hedge at a regional level.

John Gilliland explains

The Soil Nutrient Health Scheme is a public investment of £45m over four years. Designed to give farmers better information about their own farms, it is hoped this will empower them to make better quality management decisions, ultimately leading to positive improvements in both efficiency and environmental challenges.

The vision for such an ambitious scheme was laid out in the 2016 Sustainable Agriculture Land Management Strategy (SALMS) for Northern Ireland. Created by a public-private partnership through a diverse expert working group commissioned by the then Department of Agriculture & Rural Development (DARD), the strategy was presented to the minister having already secured key buy-in from NI Environment Link and the Ulster Farmers’ Union.

Based on the premise that if you can’t measure, you will never be able to manage, the expert working group recommended the whole of NI’s landscape be baselined, at individual farm and field levels. The resulting new information would then be given to farmers and land managers, to allow them to deliver on a collection of efficiency and environmental challenges.

In 2014, only 18% of NI soils were at optimal fertility. Average grass utilisation was only 5.1t of dry matter per hectare, per year. Sixty-two percent of water bodies were failing good water status (80% of phosphate entered water courses over the top of the land during extreme rainfall). And 32% of all GHGs came from agriculture.

The concept of digitally measuring and managing, at both the field and landscape level, was initially explored by Belfast-based livestock nutrition and research company, Devenish, in 2014. Three digital surveys, aerial LiDAR, ortho imaging and soil sampling were carried out at their beef and sheep research farm, The Lands at Dowth.

The results were collated and graphically displayed as maps on a combined GIS platform which allowed subsequent systems-based analysis to be carried out to determine accurately soil fertility and carbon stocks, quantities and qualities of above-ground biomass and habitats, and routes of overland flow of water during extreme rainfall.

The SALMS expert working group built on this Devenish experience and recommended this should not only be carried out across the whole of NI, but that it should be repeated every five years so that change, at both the field and landscape level, could be measured, reported and verified (MRV) with integrity.

The SALMS report was well received but deemed to be very ambitious. Compromise was reached. Using Exceptional Emergency Aid from the EU Commission, three river catchments were selected in 2018 to pilot the recommendations to see if farmers and land managers would improve their practices and whether key objectives such as improving water quality could be achieved.

Commissioned by DARD's successor department DAERA, the Agrifood and Biosciences Institute (AFBI) led the three pilots. One thousand and ninety-one farms covering 41,644ha joined the pilots - 73% of all the farmers in the catchments. Precision soil sampling, aerial LiDAR surveys and water sampling were all carried out with the results presented to participating farmers.

Training was offered with an uptake rate of 50%. In 2020, one-on-one interviews and behaviour change surveys were carried out and found that upwards of 80% of the participating farmers were changing their behaviour in key areas. In 2021, the phosphate levels in Upper River Bann dropped significantly for the first time, verifying the observed behaviour changes with a tangible improvement in water quality.

With the success of the pilots, DAERA decided to build the business case to extend the scope right across NI, resulting in minister Poots' announcement in October 2021.

Northern Ireland is not big. At roughly 880,000ha it is small enough to fit inside Yorkshire. But scaling up from the 41,644ha used in the pilots

is a huge logistical exercise, not just in carrying out the surveys, but in managing, handling, interpreting and communicating all the data and results.

A decision was taken to spread this over four years, by creating four distinct geographic zones, taking one zone each year. The scheme would be voluntary, but if a farmer chooses not to participate, they would be limited in what future funding schemes they can apply for, once the Common Agricultural Policy payments came to an end.

“At the heart of this success has been the principle of talking with farmers and not talking at farmers”



In May 2022, the minister opened the application process for zone one, which was subsequently closed at the end of August. Take-up was slow at the start. A public-private liaison group was set up, with the minister, NGOs, the Ulster Farmers' Union and supply companies all engaging. By the time applications closed, an extraordinary 92% of all eligible farmers had applied.

At the heart of this success has been the principle of talking with farmers and not talking at farmers. They told us they wanted to change but had no idea where they were on their journey. They wanted good, credible independent information about their own land, not their neighbours'.

With training they are now learning how to interpret the data, use it in their decision making to drive the efficiency in their business, and minimise waste and enhance their profitability.

They understand this process will be repeated in five years' time and that they will be informed accurately of their change.

In return, soils, habitats, water are robustly baselined for the first time, through one process, working to one common framework and procedure, and overseen independently.

In five years, when this is repeated, the NI agrifood industry will be the first place in the world to be able to inform consumers, with integrity, of their journey of positive change. NI farmers and land managers are passionate this will allow them to better position their product for sale and that it will secure them a better return from the marketplace.

At the same time, the process will restore their self-esteem, knowing they are not just the problem, but that they are very much the solution. ■

- Prof. John Gilliland OBE is the former chair of the Sustainable Agriculture Land Management Strategy expert working group



FARMLAND'S DECADE?

Farmland values may double over the next 10 years, while residential and commercial property may end the period at the same values they are today, argues Map of Ag founder, **Forbes Elworthy**



“We prefer our economic leaders to be pragmatic, rather than slaves to some dead economist”

Farm profits tend to rise strongly in times of inflation. And increasing profitability is leading to steady increases in land values.

While capital growth has been 6.3% per annum in the past two years, farm revenues in my own family farming business in New Zealand have grown 12% a year since 2020. In this time, costs have increased at below five percent, enabling increased cash distributions; we are targeting 6.5% this year (see table).

Craigmore Farming Partnership	2021 Financial Year	2022 Financial Year	2023 Target
Distribution	3.5%	5.6%	6.5%
Capital Appreciation	6.3%	6.3%	TBD
Total Return (June Year-end)	9.8%	11.9%	>10%

Total returns of over 10% per year on farmland have been well ahead of residential real estate and equities in NZ which have been flat to down for two years.

But won't rising interest rates also become a brake on farmland values?

Leverage on farmland averages 25% in New Zealand and 16% in the US (noting they have similar interest cover since dollar yields of US farmland are lower). Because of these low levels of debt, changes in interest rates are not the main driver of land prices. When NZ interest rates halved between 2014 and 2020 pastoral land prices remained stable because farm produce prices were not increasing.

In sum, it is agricultural returns that are the determinant of land prices, not interest rates.

So what next for farmland?

Finance buffs understand anything increasing in value at a rate of 7.5% compound, doubles every 10 years. If farmgate inflation averages five percent over this decade and productivity and factor efficiency gains contribute 2.5% further EBIT growth, then farmland values should, subject to lags, capitalise into a doubling of prices over the same period.

In fact, farmland returns may out-perform inflation. Climate change and de-globalisation (for example frictions relating to Ukraine) are putting many agri commodities in tight supply.

By contrast, marginal buyers of residential and commercial property typically use leverage. This means yields of urban property correlate with interest rates, such that prices rise as interest rates fall, and vice versa. Thus, in most western countries interest rates halved and, as a result, property prices doubled between 2010 and 2020.

As you'd expect in a time of inflation, rents are now rising in many urban property markets. It is reasonable to assume they may continue to grow over a decade in which inflation averages five percent.

In this scenario, borrower interest rates may rise from lows of two percent to between six and eight percent. Indeed, interest rates on new mortgages have already risen from three percent to over six percent in the US, UK and NZ. In this context percentage cash yields from urban property should approximately double.

If property yields double this would roughly offset gains from rental growth. So prices of residential and commercial property may end the decade approximately where they began.

Since at least 2009, economic policy makers have attempted (and in local terms succeeded) in addressing each new crisis as it comes along with government, and especially monetary, largess.

There is in the west no longer a constituency for sound money. We now prefer our economic leaders to be pragmatic and innovative, rather than slaves to some dead economist.

In this context it is reasonable to assume, given the choice between a risk of inflation and political unpopularity, western governments will continue to spend more and tax less than they should. Policies of the western countries are becoming more Italian, and less Teutonic.

The Bank of England's resumption of quantitative easing in the last week of September 2022, exactly at the time they had announced they would commence quantitative tightening, illustrates the challenges faced by central banks as well as governments as they navigate each crisis.

In this political and policy context I don't think it is unreasonable to assume inflation may average five percent, or higher, as countries lurch from crisis to crisis, over the course of this decade.

So, if farm commodity prices rise five percent a year, and other gains drive a further 2.5% growth, and if land prices track farm EBIT returns, then it is self-evident farmland values will double. Indeed, in some markets agri land is already up 30 to 40%. ■

This could indeed be farmland's decade.

- Forbes Elworthy is Map of Ag's founder, forbes.elworthy@mapof.ag

AGTECH DOWN UNDER HITTING ITS STRIDES

Map of Ag's Scott McKinnon gives a personal view of the progress and future of digital technology in the Australian ag sector



Agtech is not new in the Australian agriculture industry. For the past forty years farmers have been slowly digitising the farm.

It started with the adoption of computerised systems where the return on investment was very clear. When accountants moved away from paper-based accounting, producers could save thousands of dollars in processing fees if they could share a disk of accounts instead.

By contrast, productivity software technology has seen slower adoption and scattered uptake.

I have been following and been a part of the Australian agtech landscape for a similar amount of time. In the late 80s I wrote a thesis at UNE on the 'Personal Computer as a Farm Management Tool'.

At the time, we had only just got a PC lab at Uni, so it was new technology. When everyone else was doing work on diseases, economics, and fertility, I chose computers. Why? I could see the end game or what I thought was the end game: An expert system where any producer could propose a problem and using the collective computerised knowledge all the experts in ag science and business, give them an answer. Yes, I had seen Space Odyssey 2001!

Jumping forward 30 years to 2018 I presented at the Australian Ag Institute - Brave New World conference. My topic was 'Digital Farming: Where we are and where we are going?'. I recounted my thesis as part of the opener and picked three trends in that report that had played out.

First, PCs as a farm management tool would take some time to be adopted due to the fact that there were no digital natives (as we call them now) and the learning curve was huge. Let's not talk about the actual cost at the time!

Second, I predicted voice control would be a great aid for the industry. Well, it has been for hands-free calling and Googling stuff when you are on a tractor - Hey Siri!

Third, that expert systems would make a producer's daily farm decisions much easier. We are not quite there yet.

From an Australian agtech perspective I highlighted the major hurdles that we were experiencing in terms of 'Where are we going?'. In other words, where would the drive for producer adoption of agtech at scale come from?

I suggested regulation to some extent would help. Digital natives on farm would increase the pace. And productivity improvement tools would become more useful.

However, the largest demand would come from the value chain which would act as the catalyst as the provider of finance, insurance, marketing, processing and importantly access to end consumers. The value chain outside the farm gate would demand information about the farming operations and the products leaving the farm.

Fast forward only a short time later to 2022 and that value chain call to action has been triggered. The last three industry events I have been to have focused on environmental and social accounting (ESA) from farm operations. Just like the farm accounting Rol of decades ago driving the digitisation of farm finances, ESA will drive the need for the full digitisation of the farm.

Three recent developments in the Australian agtech landscape I believe will enable and accelerate this evolution.

First is Internet of things (IoT) devices. With the scale-up of IoT devices in other industries the benefit to the agri sector is that environmental monitoring systems such as weather stations are now fully connected, more cost effective and more readily available.

There has also been an expansion of suppliers in the market with more and more hardware and sensor



options available. This is clearly demonstrated by two recent state government agriculture IoT programmes. The Victorian Government Agricultural IoT trial programme of a couple of years ago had only 12 IoT suppliers. Now only a few years later, and the NSW DPI Farms of the Future programme for 2023 has nearly 50.

Communication technology has advanced with cost-effective availability of satellite, cellular NB-IoT and farm-wide WiFi. This has enabled connectivity options in most situations in any location on the farm. The options for producers have increased exponentially and passively capturing vast amounts of farm data will now become second nature for producers.

The second area is the advent of cloud computing and web portals that have allowed Farm Management Systems (FMS) to evolve rapidly and globalise.

Home-grown systems have been able to scale up with access to overseas markets, while international business has had the same opportunity in Australia. This is particularly evident when you review the latest Aus Agritech Ecosystem map with literally hundreds of businesses providing both broad and specialist services.

But with competition comes innovation and differentiation. The latest round of FMS development means systems are more connected and portable, no more sitting at a computer screen late at night. They are

becoming interoperable, connecting to farm machinery, IoT sensors and allowing multiple users.

They are also becoming integrated. Now they connect with other programs and systems so developers no longer need to build everything into their own solution and can partner with other technology that delivers the functionality they don't have. Our own *Pure Farming* platform (see page 12) is a foundational part of this integration evolution.

Third, is the vastly increased capability and capacity in modelling and knowledge. This is where my vision of expert systems comes alive. In agricultural science we have had models for most productive systems for decades. They are quite complex and accurate. But they require large amounts of data and have had limited widespread uptake on farm to date.

But now by combining IoT sensor data, cost-effective remote sensing, publicly sourced data and FMS information, along with a sprinkle of machine learning and AI, we are almost there.

Australia has a bright future in the agtech space. Digitising the farm is happening at an accelerating rate. There is a clear need, the right drivers, a high level of market capability and a passion to help producers adopt technology to make it as easy as possible for them to make the transition. ■

- Scott McKinnon is Map of Ag's National Business Development Manager for Australia scott.mckinnon@mapof.ag



Chief Technology Officer **Andrew Cooke** explains the background and key features of Map of Ag's new data platform and what it delivers for producers and agrifood businesses

Connecting farm, orchard and winery data with advisors and the supply chain up- and down-stream of the farm gate to support easier compliance, sustainability progress, product differentiation, deeper insights and better advice is the purpose of Map of Ag's new *Pure Farming* platform.

Launched in the past six months, the technology builds on several years' experience of working with a number of predecessor incarnations.

Pure Farming is a sector-specific example of an "Integration Platform as a Service", or IPaaS for short. All integration platforms

focus on allowing data to flow between databases, or between organisations. Some focus on specific types of data - for example documents and spreadsheets, or orders and invoices. Others, such as *Pure Farming*, focus on a specific sector - in our case agriculture and agrifood supply chains.

The "platform as a service" moniker suggests two key attributes: As a "platform", *Pure Farming* connects multiple businesses - in this case connecting farmers and growers with their advisors, supply chains and customers, and the software tools they use. Examples might include farmers connecting data to support supply chain claims such as

net zero emissions, or a farmer or grower being able to re-use their farm map seamlessly across different software tools.

“As a Service” means that the most important components of *Pure Farming* are delivered over the internet, in this case from servers hosted in Amazon Web Services (AWS), and that organisations which use data (software companies or advisors and supply chains) “pay as they go” for software access, avoiding large upfront capital investment.

The *Pure Farming* platform is developed to be a cloud-native service running on AWS. This means it is hugely scalable, able to ingest, translate, and permission large quantities of data from multiple sources. The AWS platform also provides resilience and strong security to protect the data we manage.

Structuring and cleansing data

Agricultural data has always been somewhat challenging.

Formats for invoices and packing slips have been well-defined (with a few variations) for many years. Challenges in those sectors have mainly been around categorisation and identifiers such as business numbers. Integration platforms that focus on sharing documents have been able to work with well-known file types such as Word or Excel and avoid focusing too much on what is inside them.

In contrast, making any sense of agricultural data requires a strong understanding of farms,

orchards, crops, and livestock. Legacy farm and industry applications have collected data in a wide variety of formats and were not designed to provide data for reuse in other applications.

Government-mandated databases typically focused on a single legislative requirement, resulting in datasets that were disconnected from other parts of the farming lifecycle.

Our work on *Pure Farming* brings together more than 20 years of agricultural know-how in each area of our business, serving different sectors including horticulture, arable, dairy, sheep, and beef cattle. Some of our internal experts have been internationally recognised for their contributions to industry bodies and standards organisations. We have focused that expertise on sourcing, structuring, and cleansing data through *Pure Farming*.

So when a software developer accesses *Pure Farming*'s application programming interface (API), or an advisor or supply chain customer extracts data, they find that regardless of its source, it has been converted to common, standards-based data structures so they can readily interpret and use the information.

The data translation process inside *Pure Farming* also uses our expertise (and increasingly, automated tools) to check for incorrect data values, and to re-code hand-entered variety, medicine, and agrochemical names to consistent formal names. This makes data easier to analyse, and brings

benefits to farmers, advisors, and software vendors alike.

There is more to do here. We continue to advocate for the use of standards in the agricultural and horticultural industries we serve, and to contribute to their development. We then commit to making use of those standards as we extend *Pure Farming*.

Putting farmers in control

Any company that develops software or creates internal databases must decide how it will treat the data that ends up in those systems – data that almost always comes from farmers and the tools or devices they use. There are undoubtedly good arguments why some organisations must treat farmer data as their own – but our long experience in the industry has led us away from that position.

Farm data that passes through *Pure Farming* doesn't belong to us (Map of Ag), but to the originators of that data – most often the farmer or grower themselves. It's our responsibility to handle that data with care, and to put those producers in control of their own data.

When developing *Pure Farming*, our technology team put a lot of effort into security: ensuring our systems were “well architected” and liaising with specialists at Amazon Web Services. Data passing through the platform is handled using a “least privilege” model, which ensures no person or organisation can access the data without

a specific grant of access by a farmer. We've invested in achieving ISO 27001:2013 certification to ensure our systems and processes support that security.

When an advisor, supplier, or supply chain partner (what we refer to as a data consumer) wants to use data from a farmer they know, there's a workflow that provides the farmer with an invitation to connect that data. The farmer can review the purpose and terms of use and decide whether they want to share any data. If they decide to proceed, there's a second step where the farmer chooses the sources of that data and authorises *Pure Farming* to connect to those systems.

A similar process applies when a farmer is using a third-party software system which lets them connect data from other sources using *Pure Farming*.

If the relationship ends or the farmer later changes their mind, they can revisit *Pure Farming* to review and disconnect their data – putting them firmly in control. ■

More information on *Pure Farming* can be found at <https://purefarming.com>

- Andrew Cooke is Map of Ag's Chief Technology Officer and Managing Director of Rezare Systems, andrew.cooke@rezare.com



“We continue to advocate for the use of standards in the agricultural and horticultural industries we serve, and to contribute to their development. We then commit to making use of those standards as we extend *Pure Farming*”

FRONT-FOOTING THE ENVIRONMENTAL CHALLENGE

Adapting New Zealand agriculture to deal with the pressures of climate change represents both threat and opportunity, as Susan Kilsby explains



New Zealand's primary sector is well respected around the world for its pasture-based free-range production systems which are well liked for a host of reasons, not least animal welfare. But in recent decades it has become clear that the unintended negative externalities of our farming practices such as nitrate runoff or methane emissions have created a situation that needs addressing in the context of the global push for sustainability.

In recent years, farming in NZ has been rapidly evolving towards more sustainable approaches. Our farmers are used to responding to market signals, having operated in a free market economy, which has provided no subsidies or direct support for agriculture since the 1980s.

The move to more sustainable production systems is an ongoing evolution. Meeting consumer expectations by aligning production practices with consumer values is the major driver of change. And now, more than ever, those values have become inextricably linked with understanding the impact agriculture has on our natural environment.

Farmers are guardians of the land and have long understood the value of looking after it. Any negative effects on the environment from farming have been unintentional and as we understand more about the impact of how we farm, then mitigations and changes are being applied.

Measuring that impact is not simple but the technology required to do so is becoming more accessible and is steadily being implemented. Regulations designed to limit nutrient or greenhouse gas emissions are becoming common. Measurement is being achieved using field sampling or modelled outputs to compare farm practices and to estimate environmental externalities. Adoption of 'best practices' is another tool being used to lower the environmental impact of farming.

National minimal standards have been developed and the implementation of these standards is typically managed at the regional level. Within NZ there are 11 regional councils and six unitary councils which ultimately regulate and manage activities within a set geographical region. At present, regulations to protect the environment vary considerably from region to region but the common trend is that farming practices are becoming much more regulated.

Greenhouse gas emissions in NZ are administered at the national level. New Zealand's emissions trading scheme (ETS) covers the surrender obligations of just over 50% of emissions. The scheme currently applies to most sectors except agriculture which is due to join in 2025, unless an alternative scheme can be developed.

“New Zealand exporters need to seek out the environmentally conscious consumers and ensure they are fully aware of what we have to offer”

Industry and government are working collectively, in a partnership known as He Waka Eke Noa, to develop a way to price agriculture emissions which predominantly relate to methane emissions from ruminants. The NZ government is expected to pass legislation in early 2023 as to how agricultural emissions will be priced and managed with the scheme expected to be implemented in 2025.

The regulatory changes are viewed as a threat by many farmers, primarily due to the increased administrative burden, impact on freedom to farm, and reduced profits. These are all very real concerns. New Zealand's agricultural sector is grappling with the fast pace of change.

Modelling emissions at the farm level requires farm businesses to collate data which they may not currently hold such as weights of livestock traded in the store market, as these stock tend to be sold on a per head basis.

But there is a win from collecting this data from the greater opportunity to measure farm performance. This will be particularly useful for NZ's sheep and beef farms, many of which have limited access to performance data, relative to their dairy colleagues.

There is a wide range of profit between sheep and beef farms, with the more profitable enterprises tending to have access to more physical and financial data. Dairy farms generally have much more farm performance data to hand as a result of being more intensive operations, having access to daily milk production data, and most farms measuring and recording all inputs including pasture production.

Despite the concerns, pricing agricultural emissions provides an opportunity for NZ's agriculture sector to further enhance its green credentials. Consumers across the globe have become much more conscious of the impact their purchasing decisions are having on the environment. Some are changing their consumption habits including reducing their intake of meat and milk. But at the same time the world's population is growing and most consumers want to regularly consume animal proteins.

The opportunity for NZ is capturing the value of our enhanced environmental credentials. The way we farm appeals to many consumers. But many are not aware of how the beef, lamb and dairy products they consume are produced as this level of information is not always available to consumers.

The big challenge for NZ agriculture is to realise the opportunity of being a world leader in pricing agricultural emissions. There is great opportunity to improve returns to NZ farmers if the information about our production systems makes its way down the supply chain to consumers or companies whose values align with these credentials.

New Zealand exporters need to seek out the environmentally conscious consumers and ensure they are fully aware of what we have to offer. ■

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