South Island g RURAL GUARDIAN

JANUARY 2023 EDITION

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METHANE SHEEP



SMART CROPS P16-17



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've never believed in the premise that people are friendlier in the countryside, but I think I have changed my mind.

Over Easter, as an old boiler, I headed south on my motorbike intending to take in some back roads.

But things didn't go to plan and I ended up at 7.30 am on a rainy morning with my bike downed in a flooded creek on the lonely Hakataramea Saddle. Unable to get it upright (I know! I'm hopeless!) all I could do was wait for a passer-by. An hour went past before a young high country farmer rolled up in his Hilux and proceeded to strip down to his undies to help me get the bike out of



The lonely Upper Hakataramea Valley. PHOTO: PAT DEAVOLL.

the creek bed.

Back on track, I headed down the Hakataramea Valley, only to be brought up short by a puncture. Unable to fix it (I know! I'm hopeless!) I walked to the nearest farm and asked if anyone could help. A second high country farmer spent the next hour mending the tyre and seeing me on my way.

Later in the day I crept over Dansey's Pass, soaking wet, in the dark, very aware that with both tent and sleeping bag

drowned from the mornings dunking, I would have to find somewhere to stay.

Some farmers were sitting on the veranda of the Danseys Pass pub. When I explained my predicament they whipped out their cell phones and rang up and down the Maniototo until I had somewhere to sleep and directions on how to get there.

Three times in a day, I'd relied on the good will of high country farmers to get me out of a fix.

Would I have received this generosity in the city?

I think we urbanites are more protective of our time. And the population density affects our expectations of privacy - we want more of it. We are less willing to become involved in the protracted, less willing to connect with a stranger.

Lonely places like the Hakataramea tend to have a more homogeneous population. Any given person you meet is likely to be similar- a farmer. Everyone knows everyone else because there aren't that many people to know. This lends itself to conviviality.

I've always thought of myself as pretty selfsufficient, and Easter weekend was for me an exercise in graciously accepting help when I needed it (I know! I'm hopeless!). But also a window into a high country community that was unstinting in its willingness to help me out.

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A wee bit of nassella history

My late father, a farm boy, took up farming on the Weka Plains in 1935.

He was soon to discover that two scourges of the landscape were taking over - rabbits and nassella tussock.

Government funded control for these became the norm-after all it was in the national interest as both pests were limiting production.

But by the mid-1950's treasury "boffins" deemed the rabbit to be under control and cut the funding.

At the same, time nassella tussock was receiving government funding as crippled farms were taken over by the Lands & Survey (now Landcorp) and millions was spent on spraying and cultivation which returned thousands of acres back to productivity.

I'd become chairman of Scargill-Omihi YFC when the then Minister of Lands & Forest decided to annex the coast-facing, fertile loess soils of Teviotdale into pine. It was obvious to those who'd grown up with nassella that such a move would ensure a nucleus of seed would be maintained and so it turned out to be. For a time logs were carted with

seed in their bark and the felled areas quickly sprouted a new crop.

So thanks to the brains in treasury who cut off the money supply thinking both nassella and rabbits were "under control" we still have both costing millions.

Then came the big change of the Rogernomics period, subsidies were cut and the local bodies and RMA instituted user pays.

Nassella is still cropping up all over North Canterbury.

I started grubbing nassella after school as soon as I was big enough to swing a grubber.

And I grubbed some "nazzies" the other day and have seen them seeding in the Waipara River.

Hurunui Nassella Liason Committee's Hyde and Gibb! Stick to your guns! Go further -demand public funding! - John McCaskey

Riding through the Molesworth

Heaps of good content in Guardian Rural edition (November) thank you. In particular I loved your bike ride story of the Molesworth road ride.

I have recently got into backcountry riding on a simple adventure bike and loving it. We did the road by motorcycle January 2021.

Good on you, I enjoyed your apt descriptions of a beautiful piece of New Zealand right at our doorstep. Thank you. - Mark Saunders

Price of grain

I am writing to you with some concerns over the content in the arable article in the November edition.

I note that you have mentioned that pricing for grain anything over \$400 per tonne in this current environment is sound.

I was concerned about that comment, considering that with today's growing costs and that the free market for wheat has had to be at \$640 per tonne on farm this year.

Now bearing in mind that all our input costs are still rising, I can't see why it would be acceptable to think \$400 per tonne is sound?

 Ian Letham Editor: I must apologize for the error. The on-farm price for wheat should have read \$650 a tonne. Again, apologies.



and nassella way back in the 1930's. Today these still remain a battle PHOTO: JOHN MCCASKEY for farmers.



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Forestry conversion a 'hammer blow' for New Zealand farmers



Most New Zealanders like the Government's approach of planting as a way out of climate change but want limits on fossil fuel emitters planting exotic trees on good farmland.

Research by Federated Farmers (Feds) and Beef + Lamb New Zealand (B+LNZ) found over 50 per cent of Kiwis were in favour of a limit on the amount of fossil fuel emissions that can be offset with new pine forests. Meanwhile, almost twothirds of Kiwis oppose overseas companies buying up New Zealand farms to offset their emissions.

The latest B+LNZ Stock Number Survey shows farmers can deal with droughts, processing delays, and COVID-19, but afforestation is



Research shows that 61 percent of people support planting native forests over pine trees.

a constant worry.

And the report shows the extent of farmland being converted to forestry is having a negative effect on rural communities.

B+LNZ economic service chief economist Andrew Burtt

says that while the increase in farm sales into forestry was yet to lead to a reduction in stock numbers, it could happen soon.

"There is usually a lag between farm sale and plantings, and planting is slowed down by the lack of seedlings and people to plant them," he says.

The findings of the Curia research coincide with the release of a new report by Orme & Associates, commissioned by B+LNZ, which shows more than 52,000ha of land was purchased by forestry interests in 2021, a 36 per cent increase on the previous two years, and up from 7,000ha in 2017.

This is far more than the 25,000ha a year of exotics that the Climate Change Commission had said was needed to achieve New Zealand's climate change objectives.

Of the 175,000ha of land bought for forestry over the last five years, about 134,500ha of this is farmland suitable for sheep and beef.

If 100 percent of this land was planted in trees, B+LNZ says it would lead to the demise of around one million stock units, an annual farm production loss of \$170 million and a production loss of \$540 million from 2017 to 2022.

A further 44 percent of value is added from processing which at 2021-22 export prices equates to a loss of \$245 million annually and \$775 million from planting from 2017 to 2022.

Continued on P6

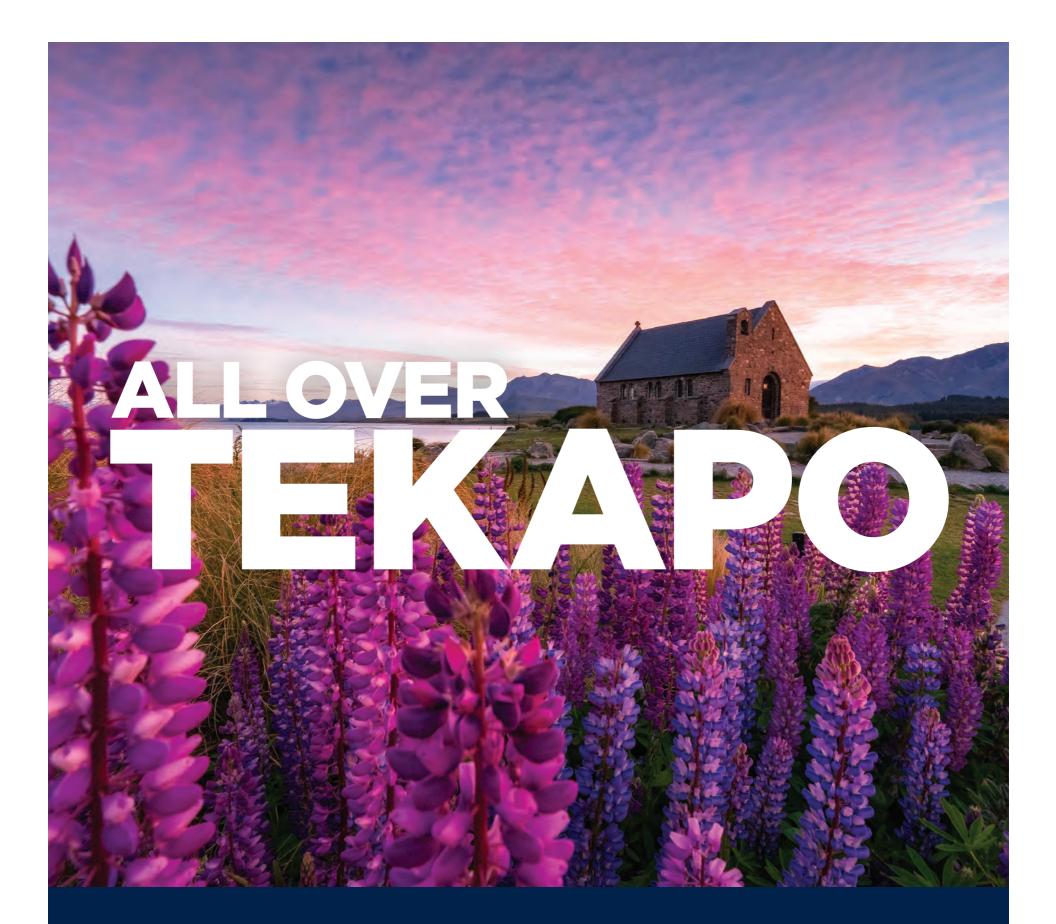






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G Farming

From P4

"We have been tracking farm sales and we're alarmed at the scale, pace, and style of land use change across the country," says Sam McIvor, chief executive of B+LNZ.

"In 2017, only 7,000 hectares of sheep and beef farmland was sold to convert into forestry, so the jump to 52,000 hectares in 2021 is a 'hammer blow' for our farmers and our sector.

"B+LNZ agrees with the switch to forestry within farms. It can provide a win-win in helping New Zealand meet its climate change obligations while helping food production, and making sure of ongoing export revenue.

"However, the scale of change is far greater than what is needed, and the Climate Change Commission agrees with us on this one. It will have long-term effects on rural communities and the wider New Zealand economy."

The Curia research also shows that 61 per cent of people support more planting of native forests over pine trees – this is something



The Orme report reveals carbon-only farming was the major reason for an increase in farm sales.

B+LNZ is pushing for. It is part of a better recognition of sequestration under the Government's proposals for pricing agricultural emissions and would help the melding of trees on farms.

Feds national president Andrew Hoggard says that

given the rate at which the carbon price is rising, Feds and B+LNZ are calling for policy changes including limits to be placed on forestry offsetting within the Emissions Trading Scheme (ETS).

"New Zealand is the only country in the world that



The scale of change is far in excess of what is needed: B+LNZ

allows 100 per cent offsetting of fossil fuel emissions within the ETS

"The European Union only allows 10 percent and California eight percent. Clearly, the New Zealand Government hasn't woken up to this fact," says Hoggard.

"B+LNZ and Feds also want to explore changes to the Overseas Investment Office, limits on whole farms being converted into pine trees going into the permanent category of the ETS and changes to the Resource Management Act."

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The Orme report shows carbon-only farming (that is, trees not intended for harvest) was the major reason for the increase in farm sales.

The research also found that good farmland was being bought for forestry. Land Use Class (LUC) classes 2-5 (land highly productive for pastoral or horticultural farming) has grown from 9.5 percent of farm buys from 2017-2019 to 15.5 percent of buys from 2020-2022.

While more than 50 percent of these conversions took place on LUC 6 land, this land was still productive for sheep and beef.

Only 21 per cent of conversions took place on high erosion-prone land, with more than 78 percent of the purchases happening on low or medium erosion-prone land between 2020-2022.

"We're calling on the Government to work with us to find options before the effects on New Zealand's food production and on its rural communities becomes worse," says McIvor.

However the New Zealand

sheep and beef sector is very encouraged by the Government's announcement last month about sequestration as part of an agricultural emissions pricing package, says Andrew Morrison, chairman of B+LNZ.

"The Government has listened to industry groups and farmers' feedback and recognised the importance of all genuine sequestration being recognised from 2025, particularly for sheep and beef farmers, he says.

"While there are details to work through, we understand there is a willingness to work on the basis of what was originally proposed by the agriculture sector on sequestration while the ETS is expanded and improved, which we welcome.

"The devil, however, will be in the detail. This is such an important issue to our farmers that we have to get it right.

"Our farmers have told us that if they are going to face a price on their emissions, then they need to get proper recognition for that sequestration on their farms



Of the 175,000ha of land purchased for afforestation over the last five years, about 134,500ha is suitable for sheep and beef. PHOTOS: SUPPLIED

from day one."

For many extensive farmers, sequestration is the only tool they have available to mitigate the impact of emissions pricing, says Morrison. "It was good to hear the Prime Minister reaffirm that. We will be working hard on behalf of our farmers over the coming weeks to get the best outcome for the sector on this and the other remaining elements of the agricultural pricing proposal."







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g Farming

Canterbury Farmers' Forum omits soil emissions reduction



he NZIAHS Canterbury Farmers Forum, held at Lincoln University on October 26 missed the mark, according to soil scientist John Baker, pioneer of the low-disturbance, no tillage revolution for farming in New Zealand.

"What bothered me was that emissions reduction in soil wasn't even discussed at the field day," Baker said.

"That was absolutely staggering and made me wonder 'what's going on with the organisers' agendas' that soil could be left out of it."

It seems as though the government is fixated on planting pine trees to halt emissions but nobody on tractable land wants to do this, he said.

"No farmer who grows crops

or livestock wants trees. This is the reaction I am getting and I can understand this but what staggers me is that farmers don't understand the huge amount of emissions that come from cultivating the soil.

"If you cultivate one hectare of soil you emit about the same amount of carbon equivalents as 1200 cows standing on that hectare belching for a day."

So everybody is worried about the emissions coming from animals but no one is worrying about the soil- it is the biggest emitter, Baker said.

About 20 per cent of all the CO2 in the atmosphere comes from the world ploughing the soil to feed itself. That's a heck of a lot!

Baker told field day organisers he wouldn't come all the way down to Canterbury (from Fielding) for the conference but would submit a written question to the panel. He did this, mentioning that about 9.5 million tonnes of CO2 goes into the atmosphere from one million hectares of cultivated land reseeded in New



Everybody is worried about the emissions coming from animals but not about the soil. PHOTO: SUPPLIED

Zealand each year – but his question never came up.

"This was very disappointing," he said, as he was listening to the event online.

Talking to other soil scientists they couldn't believe that the issue was never brought up, Baker said.

"Regenerative agriculture is all about getting the soil biology going - carbon is stored in three

places in the world- in the oceans, in the soil and in the animals and plants that grow on the soil.

"If we banned the plough and everyone did low disturbance low tillage - we would mitigate something like 24 per cent of emissions from farming.

"And yet nobody seems to be giving this any traction."

Baker said he went down to parliament and spent time with James Shaw (when he was in opposition) and told him about the soil issue "but when he got into government as Minister for Climate Change he didn't want to know.

"This was disheartening. "So I'm am staggered that if you hold a field day in Canterbury, the heart of ploughing, in Mid-November, why soil doesn't get mentioned?"



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Is the agricultural sector united?

No matter where you stand on He Waka Eke Noa (HWEN), either for it or vehemently against it, I think everyone can agree the plan was a political stroke of genius from the Labour Government.

In October of 2019 Agriculture Minister Damien O'Connor and Climate Change Minister James Shaw announced that the government would enter a five-year partnership with primary sector organisations and Maori to develop a system that would incentivize farmers to measure, manage and reduce greenhouse gas emissions.

The formation of this partnership, HWEN, was celebrated by the farming sector and roundly mocked by environmentalists for the same reason; it allows farmers to remain outside the emissions trading scheme for five years while the scheme was developed and possibly indefinitely if the partnership was successful.

This was the first clever part of the government's strategy, placing responsibility for devising a way to charge farmers for emissions at the feet of farmers themselves. If the partnership failed to deliver then agriculture would simply be rolled into the ETS and the blame would lie squarely with farmers.

The second, perhaps unintended effect of HWEN was to starkly divide the farming sector. On one side there were the industry bodies like DairyNZ and Beef & Lamb who, along with many farmers, took the pragmatic view that charges were coming and HWEN was the lesser of the two evils. This group of people set about making HWEN as fit for purpose as they possibly could, a huge undertaking given the tight time frames and opposition from within the sector.

On the other side were farmers who either felt no charges should be levied at all, or that the HWEN concept was too deeply flawed to ever be equitable or even workable. This side had their cause championed by Groundswell, the farmer protest movement born out of opposition to poorly thought out government policy on winter grazing in Southland.

These two factors combined brought about the third element, the bit which elevated the plan from simply good politics; the National Party were neatly painted into a corner with regard to agricultural climate policy. National, who fully committed to the government's emissions targets including net zero by 2050, couldn't be seen publicly siding with Groundswell, and nor could they undermine the HWEN process which had been largely embraced by their traditional voter base.

Then the unexpected happened. The HWEN partnership presented the government with a well thought out, finely balanced proposal which was signed off by all the parties involved, including the Ministry for Primary Industries and the Ministry for the Environment.

The government, under pressure from Treasury who hated the concept from the start, decided to tweak the proposal before putting it out for public consultation. What the government calls minor tweaks are seen by the partnership as changes that derail the whole finely balanced system, rendering it almost useless.

As a consequence the agricultural sector is united once more, this time as a unified voice against the government who are seen as reneging on their end of the deal.

In the meantime the National party have been handed a get out of jail free card, their policy is now to accept HWEN as originally presented.

After five years of hard work and careful strategising, what seemed like a stroke of political genius is now looking more like yet another self-inflicted wound on the Labour Party.





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South Suffolk club milestone



The Southern South Suffolk Breed Club celebrated a milestone last Thursday when four member of the club were awarded life memberships.

Trevor and Doris McCall, Jim Berney and Stewart Sinclair received the award from club committee member Bryan Brice at the Ashburton Show Grounds.

Trevor and Doris McCall's Myola Stud started in 1978, bought from Mereoak Farm. Later ewes were added into the flock from the Spring Creek Stud.

Trevor McCall said the rise of the Myola Stud was due to an infamous ram after it won the ram hogget class at the Invercargill Royal Show in 1978.

Myola went on to be one of the leading studs of the south suffolk breed, evident by the number of studs that Myola rams appeared in. One of the McCalls' greatest achievements was winning the Meat and Wool Cup at a Royal Event Show at Gore in 1997 with a home breed ram Myola 98/12, described as one of the best south suffolk rams ever bred.

Jim Berney began breeding south suffolk's in 1973, founding the Craig Annat Stud at HinaHina, Owaka. Over the following 50 years Berney had a massive involvement in the south suffolk breed, not only in breeding and farming, but in the administration of the breed at local, regional and national levels.

He was a great supporter of A&P shows. There would hardly be a show that he had missed in the southern region. He would always have a ute and trailer of sheep present at the venues. Much success with prizes and ribbons had been achieved over the years.

Stewart Sinclair's Inver stud was started in 1972 with the purchase of 10 ewes from Frank Amos. Over the years many other ewes were purchased mainly from dispersal sales. These ewes added to the already impressive Inver South Suffolk stud.

Very quickly Inver sheep were prominent in shows throughout



From left, Bryan Brice of the Southern South Suffolk Breed Club, and lifetime members Stuart Sinclair, Jim Berney, and Trevor and Doris McCaw. PHOTO: ASHBURTON GUARDIAN.

the South Island and the rams and ewes were being sold at the North Island stud ewe and ram fair at Feilding and at the Canterbury stud ram fair in Christchurch. Sinclair was proactive at buying top sires and the Inver Stud became dominant throughout a large number of south suffolk flocks throughout the country.

The south Suffolk breed first appeared in New Zealand during the 1930s in response to an overseas demand for leaner meat. It became a registered breed in 1955 and was increasingly being used as a terminal sire for prime lamb production. Its high-yielding carcase made it ideal for further processing. The down wool was used for fine apparels and hand knitting yarns.

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Negative impact on growth that can occur when too much irrigation is applied to young fodder beet seedlings. The dry land area of the paddock (in background of inset picture) outside the coverage of the centre pivot irrigator is nearing canopy closure while the crop under pivot has developed much slower in comparison.

It has been a colder, wetter spring for many parts of the country this season meaning that evapotranspiration (ET) rates have been relatively low in addition to receiving more natural rainfall. Careful attention needs to be paid during establishment to ensure fodder beet paddocks do not become saturated or waterlogged which can cause plant damage and cost inefficiency. The severity will vary depending on the texture and drainage ability of the soil.

A study conducted by Foundation of Arable Research (FAR) in 2016, in conjunction with Plant and Food Research, found that the greatest total DM yield was achieved by fully replacing ET on a weekly basis. By fully irrigating crops and minimising the cumulative effects of soil water deficit the highest yielding and most profitable crops were achieved. (Source: Arable Extra, Issue 120, 'Fodder beet response to timing and frequency of irrigation').

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¹² **9** Farming

Investment in 'methane-busting' sheep a breakthrough



n a world first, all New Zealand sheep farmers will now be able to breed animals that emit less methane.

Last month Beef + Lamb New Zealand (B+LNZ) welcomed an investment by the Government in a low-methane sheep genetics project to give more farmers access to animals to help reduce the production of methane from their farms.

The \$4.2 million low methane sheep programme, backed by a bunch of organisations including B+LNZ and Ministry for Primary Industries (MPI), will use genetic selection to speed up the mix of low methane sheep among commercial farmers and reduce greenhouse gas emissions from the New Zealand flock.

"The carbon footprint of

New Zealand sheep meat is already world-leading; however we want to give farmers the chance to keep going ahead and genetics is the way to make this happen," says Sam McIvor, chief executive of B+LNZ.

"Genetic selection for low methane sheep is the only technology that New Zealand farmers can use to reduce onfarm emissions."

This project offers every sheep farmer the chance for low methane genetics, helps them understand the genetic advantages of their flock for low methane traits and lets them be rewarded for breeding toward lower methane genetics, McIvor says.

'We know some farmers are anxious about how they can reduce their on-farm emissions; this project makes this technology available to many more farmers in the next few years."

Mark Aspin, senior adviser, greenhouse gases and environmental research at B+LNZ, says the low methane traits of rams used in sheep flocks will count in on-farm



The low methane credentials of rams used will be counted in farm greenhouse gas (GHG) calculators.

greenhouse gas (GHG) calculators with the aim for these reductions to be included in the country's national GHG inventory.

B+LNZ's nProve breeding

values system will also be boosted to allow commercial farmers to track the rams entering their flock and see the genetic gain they are making. A growing number of rams

with a low methane breeding value will be available to commercial farmers across the main breeding groups in the next three years and beyond, says Aspin.



Globally, New Zealand has led the way in developing genetics to reduce methane, having already grown the ability to genetically select for lower methane emissions in sheep following a ten-year collaboration between B+LNZ, the Pastoral Greenhouse Gas Research Consortium (PGGRC), the New Zealand Agricultural Greenhouse Gas Research Centre (NZAGRC) and AgResearch.

In 2019, methane selection was begun with a number of leading sheep breeding

flocks through a PGGRCfunded programme supporting B+LNZ Genetics' nProve and AgResearch service.

In the pilot rollout, leading breeders with genotyped flocks were invited to have their flock phenotype (an observable trait) measured using portable accumulation chambers (PAC), which travelled across the country and measured the flocks on farm. These chambers come on an AgResearchoperated trailer. Sheep spend 50 minutes in the chambers,

where their gas emissions are measured. This happens twice, at a 14-day interval. The information is then used to calculate the methane breeding value. Around 15,000 sheep have been measured on farm for methane emissions.

A breeding value for methane emissions was launched in November 2019 and was the result of a 10-year breeding programme funded by the PGGRC and the NZÅGRC. Breeding value (BV) is a

term used to select important

traits that ram breeders want to bolster in their flock (e.g. low methane-producing animals). Ram breeders wanting to follow the methane breeding value will need to measure a portion of their flock using a PAC.

Aspin says the breeding value takes advantage of the fact individual sheep vary in their levels of methane emission and these differences are passed on to the next generation.

"Launching the methane breeding value gives New Zealand's sheep sector a tool to help lower agricultural greenhouse gases. This is significant. Up until now, the only option available to farmers wanting to lower their greenhouse gas emissions was to improve their overall farming efficiency."

Although progress through breeding can be slow – around one per cent per year, assuming a breeder was selecting only for methane – it is cumulative and has no negative impact on productivity.

Continued on P14



The carbon footprint of New Zealand sheep meat is up there; but farmers need tools to progress this and genetics is the key.



At least 5,000 phenotypes will be collected every year, using Portable Accumulation Chamber (PAC) trailers.



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¹⁴ **9** Farming

From P13

Aspin says it is important to note that the biggest influence on methane emissions is the amount of feed an animal eats.

"By breeding sheep that produce less methane per mouthful eaten, the influence of these sheep on the national flock's methane production becomes compounding."

AgResearch scientist Suzanne Rowe has been leading the research programme and says for the past ten years, they have been running two closed flocks side-by-side; a low methaneemitting flock and a high methane-emitting flock.

Each flock consisted of 100 composite ewes (identified as either low or high emitting through the central progeny test programme) and the management of each flock had been identical.

Rowe says on average, they have identified an 11 per cent per unit of feed eaten difference in methane emissions between the two flocks, but most importantly, it appears there is no difference in the health, productivity or profitability between low or high-emitting sheep.

"We are seeing more lean growth, carcass yield and wool production in the low methane sheep without any negative trade-offs."

This breeding programme, which confirmed that methane emissions were heritable, allowed for the establishment of



Launching the methane breeding value gives New Zealand's sheep sector a practical tool to help lower agricultural greenhouse gases. PHOTOS: SUPPLIED

the breeding value for the trait.

Stud breeders have been taking on board the opportunity to measure the methane emissions in their stud animals through AgResearch's PAC's. Breeders pay for the first measurement and PGGRC funds the second. Aspin is encouraging stud

breeders to take the opportunity to have their rams measured and to start making use of the breeding value.

"This will help the economic impact calculation that's needed to confirm the benefit of methane selection. "We provided a cost offset for a limited time (mid-2021) to encourage all breeders to try this out, and find out where their flock might rank for methane," Aspin says.



The Team at GDC wish all their clients and suppliers a Safe and Happy Christmas.

To give all our staff a well earned break, we will be closed from: Midday Thursday 22nd December and Reopen again on Monday 9th January.

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Drone sprayers – being adopted by farmers worldwide



Many people recognize drones as essential tools in agriculture, capturing timely aerial data that increase farm output. However, agriculturists use drone sprayers in daily operations, gathering vital information on crop health and assisting in developing accurate Normalized Difference Vegetation Index (NDVI) and RGB images.

An essential component of contemporary farming is the use of agrochemicals. It's a delicate balancing act that calls for quickness, caution, and accuracy. Farmers constantly struggle with introducing the proper chemicals in the appropriate amounts, at the correct times, and in the right places.

A concentration that is too great in one area might increase expenditures unnecessarily

and lower the quality of the produce. An engagement that is too low exposes crops and reduces production. Farmers worldwide are adopting the most recent technologies to disperse chemicals precisely, uniformly, and effectively.

Agriculture drone spraying often results in lower costs for applying agrochemicals, whether through labourintensive manual labour or hired machinery, lower exposure to chemicals, and occasionally higher crop yields.

Transporting a sizable amount of liquid differs considerably from transporting cameras, sensors, and other standard shipments on a crop spraying drone. Farm drone sprayer engineers had to consider the momentum of the liquid as it sloshed around the tank throughout the operation to create a reliable and precise flight control system.

The fact that the liquid's momentum continually varies as it leaves the tank to create room for more oxygen makes this technical problem more difficult.

The capacity to accurately

automate the spread of agrochemicals is a significant step toward digitizing agriculture and more intelligent farming. The technology may disperse pesticides, fruit production worldwide, and animal feed.

It should come as no surprise that Japanese paddocks are some of the most sophisticated in the world, given the nation's image as a technological innovator. Drone influence across the board was emphasized by the Tokyo University of Science research.

Spraying drones have become very popular in recent years to deliver pesticides. From 2016 and 2018, the number of hectares sprayed by drones in Japan increased 45-fold, and there were well over 1500 registered UAVs used for agricultural spraying, up from 227 in 2016.

Japan's deployment of spraying drones isn't just another instance of a nation being innovative. In Japan, small-scale farming enterprises are widespread due to the country's relatively limited landmass and aging, dwindling population, which means less



Agriculture drone spraying often results in lower costs for applying agrochemicals.

affordable labour is available to perform agricultural duties.

Agriculture still requires a lot of labour and time, despite the use of intelligent technology in several aspects of the industry. Nevertheless, most farming operations areas are now much simpler and more time-effective thanks to drone technology.

Drone agricultural spraying may still be a new practice, but it is gaining popularity. The agriculture industry has been slow to employ drones for crop spraying because of their inaccessibility and strict local ordinances. However, as more nations, including China, the US, and the EU, loosen up their drone laws, crop-spraying drones will be used more frequently.

There are numerous advantages to using drones for spraying crops, but one of the most significant is that they will prove to be a safe and secure way to apply chemicals. One or two persons may operate a drone for efficient crop spraying. Because of automated spray application and autonomous flight modes, it is significantly safer and necessitates less manual labour. The ability to spray crops in locations that are inaccessible by land is another advantage of deploying drones for agricultural spraying.

Farmers and agronomists can publish prescription maps with the help of photogrammetry software to ensure that the drones only spray areas that must be treated.



Drone agricultural spraying may still be a new practice, but it is gaining popularity. PHOTOS: SUPPLIED



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HARVESTING FEATURE

Smart crops will be needed by 2030 to feed the world

↑limate change and Upopulation growth will drive the need for 'smart' crops to meet food demands, according to GlobalData.

¹⁶ **[9]** Farming

The leading data and analytics company notes that the huge amount of data that would be needed to ensure the highest crop efficiency will

lead to greater automation in farming by 2030.

Fourth agricultural revolution brings automated, self-regulating crops by 2030

GlobalData's latest report, 'Tech in 2030 — Thematic Research', predicts that 2030's farms will become 'smart', driven by the need to produce

more food on less land. To maximise yield, farms will need to collect and monitor huge amounts of data from their crops and livestock. For example, to grow wheat in a paddock effectively, growth rate, nutritional content, fluid intake, and soil quality should be recorded, and collected via

numerous sensors. This data will be fed into agriculture technology platforms, which combine Internet of Things (IoT) and automation in order for the crops to self-regulate.

Rachel Foster Jones at GlobalData, says, "Multiple issues are currently putting pressure on agriculture: climate change is

threatening capacity, population growth is accelerating, the amount of available land is reducing, and labour shortages are worsening. Agriculture technology will promise a muchneeded solution."

Smart greenhouses already on the rise; smart greenhouse jobs triple in a year



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FARMING

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Agricultural drones are unmanned aerial vehicles used in agriculture for yield optimization and monitoring.

GlobalData's report highlights that we are already seeing growth in agricultural technology. Hiring for smart greenhouse-related roles has more than tripled from 2021.

Foster Jones says, "Investment in smart greenhouses is only going to increase as the challenges facing the

agricultural sector calls for more automation. As automation increases, farmers will be hired more and more for their technical expertise and data processing skills, as well as their knowledge of the agricultural process. Current young farmers should start up skilling now to give themselves an edge."

Agricultural drones already seeing rapid innovation

GlobalData's report also reveals that the agricultural drone industry is the fastestgrowing among the non-military drone segments, in terms of the number of patents. Agricultural drone related patents have experienced a 14-fold increase

between 2015 and 2021.

By the 2030's farms will become 'smart', driven by the need to produce more food on less land.

Foster Jones says, "Currently, drones conduct imaging and monitoring tasks for farms. However, there is rapid innovation in this area. Modular-based innovation will mean that drones will be able to undertake advanced crop spraying

and terrain monitoring by 2030. The labour crisis and skills shortage will bolster agriculture drone demand, as they will be able to undertake time-consuming tasks."

PHOTOS: SUPPLIED

Agricultural drones are unmanned aerial vehicles used in agriculture for yield optimization and monitoring.

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9 Farming **EFFLUENT FEATURE**

Optimising effluent use on farm

With the changing landscape of New Zealand farming, it's more important than ever that dairy farmers have all their processes in order, to meet the high standards that define the primary sector.

Nutrient management is a key area and it has now become a precise process, so that pasture and animal response is optimised, soil health is maintained, and waste is minimised. Productive, sustainable farms with a light environmental footprint is the goal.

Part of the nutrient management process is making sure farm dairy effluent (FDE) is handled properly for the farm system and within approved rules.

Effluent has historically been viewed as a waste product to get rid of, but in fact it is a valuable source of nutrients. It is now commonplace to spread FDE on to land, using designated blocks for application. Those blocks are included in nutrient budgets that model potential losses to the environment, based on the area receiving the effluent.

Over recent years, researchers have also shown that FDE can be well-utilised on cropping paddocks that are part of the



Effluent has historically been viewed as a waste product to get rid of, but in fact it is a valuable source of PHOTOS: SUPPLIED nutrients.

dairy platform. Paddocks which have a long history of effluent application may have a large bank of nutrients in the soil which have yet to be utilised.

Dairy effluent, depending on its treatment, can be particularly high in nitrogen and potassium which makes it an ideal fertiliser for maize crops for instance.

Deep-rooting crops, such as maize, can mop-up the stored nutrients in effluent paddocks, thus recycling these valuable nutrients to other parts of the farm when fed-out and

therefore reducing potential leaching losses.

It is important to understand that the nutrients in effluent applied to land tend to be in a slow-release form, with only 50 per cent of the nitrogen and phosphorous available in the first year of application. For this reason, it is likely that in repeatedly-cropped paddocks, additional fertilizer nutrients will be needed for some crops.

Farmers may have limited insight on the nutrient composition of effluent being applied, which can change

through the season, depending on the type of feed in the cow diet and also the time of year. Testing dairy effluent's nutrient composition is a crucial step to optimise effluent use, and should be done a few times per year due to these seasonal variances. Effluent testing should be seen as an important part of nutrient management along with soil and pasture testing. The more nutrients that can remain on-farm, the more value will be retained by the farmer and the better it will be for the environment.

Unless the effluent is measured for its nutrient content, the application rates of nitrogen can only be calculated using assumptions of the effluent composition. This may lead to over application of nutrients, resulting in non-compliance and potential environmental risk.Effluent test results can be reported for dry matter percentage and the total nutrients of nitrogen, potassium, phosphorus, calcium, magnesium and sodium.

For crop soils, an additional test request for the more readily plant-available forms of nitrogen (NH4-N and NO3-N) is recommended. This can be important, because as identified the nutrient-release rate from FDE can be variable. Effluent test results can be used in conjunction with soil tests to guide fertiliser decisions with the help of certified nutrient advisors. For instance, whether fertiliser can be withheld from the effluent block, or how much additional fertiliser may be needed for targeted crop yields.

Analysis of farm dairy effluent makes sense for multiple reasons: from a nutrient resource point of view and as a means of keeping nutrient-loading rates within regional regulatory frameworks.



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²⁰ **9** Dairy Focus

Better reflecting a herd's future genetic gain

Updates to animal evaluation (AE) were made in December by DairyNZ to give farmers more confidence in the data, and better reflect their individual herds.

Two key changes were made. The first will help New Zealand Animal Evaluation Limited (NZAEL) identify what proportion of a holstein-friesian animal is made up of holstein or friesian.

The second change better reflects today's milking lengths by allowing herd testing data collected up to 305 days of milk to be included in the animal evaluation.

These changes are an example of how NZAEL is committed to ensuring the data that is captured in the Dairy Industry Good Animal Database (DIGAD), informing its animal evaluation, is accurate and provides meaningful insights for farmers.

"Quality data going into the DIGAD is really important. Farmers need to have confidence that the data that they use to make their breeding and culling decisions is the best it can be. Our team compares every AE run to those before it and identifies areas for improvement," says manager of NZAEL, Andrew Fear.

"That's how the change to breed proportion for holstein and friesian has been implemented. From December, NZAEL will now be able to identify the proportion of holstein and friesian in an individual holstein-friesian animal for the purpose of animal evaluation."

There are a number of differences between holstien and friesian animals and so it is important to understand the breed proportion in any individual holstein-friesian animal as part of the AE process, Fear says.

"The new formula is expected to be more accurate as it recognises variations between animals and is based on individual herds. Farmers can expect more stability and accuracy in their herd."

The update to days-in-milk to include all data collected

up to 305 days of lactation is a change that better reflects today's milking practices, he says. Many herds have extended the length of their lactation beyond 270 days and were missing that data being included. Fear says that it was time to make the change to better reflect this for farmers. "The cut off of *9*70 days

"The cut-off of 270 days was historical but we knew this wasn't an accurate reflection of today's milking days. From December any animal who is herd tested up to 305 days of lactation, that data will now count towards its evaluation.

"Farmers who have been herd testing beyond 270 days have been missing out on the inclusion of that valuable herd testing data attributed to their animals because of cut-off. Allowing this extra data means we will have more accurate breeding worth."

The changes are small, but with more accurate data available, farmers can feel more confident when making breeding decisions for the next season.

Fear encourages farmers to use the tools available to them from NZAEL including the Bull Search and Bull Team Builder as well as working closely with their AB provider.

- By DairyNZ

PHOTO: SUPPLIED



NZAEL will now be able to identify more easily the make-up of a holstein-friesian animal.



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Planning ensures herds are set up for summer

Plan herd feed requirements now, lock in good prices and secure supply as dry summer looms.

With forecasters predicting a hot, dry summer across most of New Zealand, dairy farmers are being urged to have a well-prepared feed plan to support their herds when the big dry hits.

High pressure systems driven by La Niña conditions are bringing with them New Zealand's hotter summers and 2022/23 is expected to be one of the hottest.

GrainCorp feeds general manager Daniel Calcanei says so far it has been a slow start to the season for many dairy farmers, but some herds are in fact tracking ahead of last year's production, showing how good feed planning can pay dividends.

"Pasture seem to have come away now. Although in most regions it's not great quality and lacking in sugars and energy, which may continue to become more challenging as the hot weather hits," he says.

"While supplementary feed availability is looking good, internationally logistics are still proving challenging and recent flooding in Australia may have some impact on supply of Australian-sourced products.

"Farmers should be looking at summer feed options now, to secure reasonable prices, on the back of a stronger New Zealand dollar. This will also help protect them from any shortages if demand lifts and there are any issues with shipments."

Laura Pattie is a technical expert in animal health and nutrition with GrainCorp. She says all herds have requirements for protein and energy to support lactation and farmers should be thinking about what supplements they need to support this over summer.

"Supplements can complement the diet to improve feed conversion efficiency. It

It has been a slow start to the season for many dairy farmers, but some herds are in fact tracking ahead of last year's production, showing how good feed planning can pay dividends. is important for farmers to

consider the overall diet and what the missing gap is or nutrient they are trying to fill.

"For example, if they are feeding maize silage or grains, they may need more protein but if they have a diet already high in green forages like chicory, they may need more starchbased supplements.

"In a simplified scenario, if a farm has sufficient feed but has a protein shortage in the diet, the best solution would likely be the feed that is more economic in terms of dollars per kilogram of protein.

"If a farm has a feed deficit and needs more total feed and protein in the system, then a supplement that is most economic per unit of energy and protein could be a good fit."

In summer, heat stress is a challenge. Summer pastures high in fibre (NDF) generate more heat during digestion increasing the heat loading on the cow. Lower fibre concentrates could help manage this challenge.

Additives such as molasses,

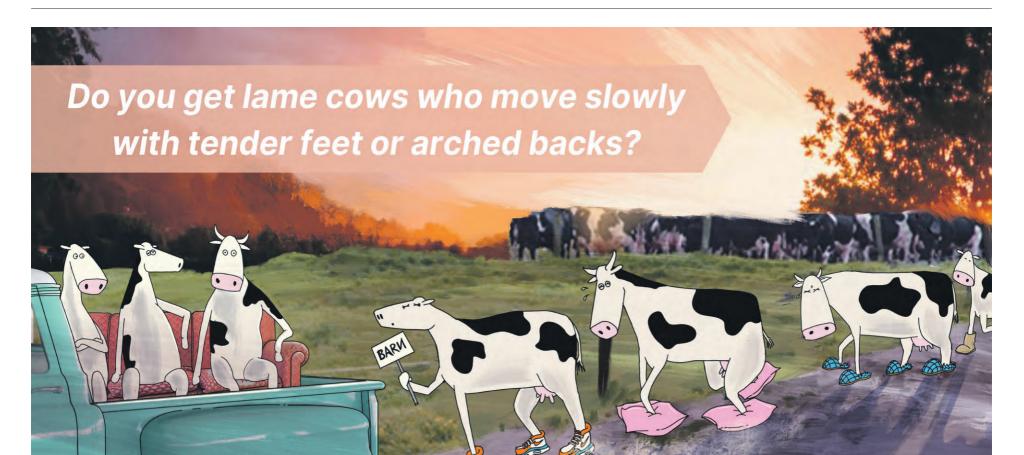
salt, toxin binders, and quality concentrates could all help manage heat stress and support cows' dry matter intake and fibre digestion.

PHOTO: SUPPLIED

"Good access to water and shade are also important strategies for managing heat stress over the summer months," says Pattie.

"Alongside supplement options, I also encourage farmers to keep doing the basics well with managing pasture quality.

"A bit of planning now can make sure herds are well set up for the summer.'





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22 **9** Dairy Focus

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LIVESTOCK

DairyNZ explores results from FVI trial

DairyNZ recently wrapped up a four-year Forage Value Index (FVI) validation trial, producing some unexpected results.

To help farmers choose the best-performing ryegrass cultivars for their region, DairyNZ began developing the FVI in 2012. The online tool used a five-star rating system for cultivars, with ratings based on dry matter yield performance data from small plot trials, and the estimated economic value of additional feed grown.

DairyNZ senior scientist Wendy Griffiths said that, since 2018, DairyNZ had tested the FVI under realistic farm conditions to see how farm system results stacked up against predictions. The tests compare low-FVI (1- and 2-star) and high-FVI (4- and 5-star) perennial ryegrasses (diploid, common endophyte).

The Waikato trial site experienced dry summers, with January and February rainfall at about half of the 30-year average. This affected pasture growth and persistence, so the additional days in milk predicted from the high-FVI group did not occur. However, this did not appear to be the only factor at play.

DairyNZ was confident the FVI approach, similar to the National Breeding Objective for animals, was the appropriate model to support plant breeding efforts and inform farmers about superior plant genetics in ryegrass cultivars.

"As soon as possible, we'll share new knowledge with farmers so they can continue to make informed ryegrass cultivar selections. We're continually reviewing and updating the FVI, and the results of this review will also feed into further improvements to the FVI," said Griffiths.

Watch this space for further updates.

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Winter grazing consent burden frustrates farmers



ederated Farmers' national F board member Colin Hurst admits frustration is a factor with winter grazing requirements.

Hurst, who is Federated Farmers' winter grazing spokesperson and an arable farmer in South Canterbury, said in a press release, it was clear that farmers should carry out winter grazing in a responsible manner. And in no way were farmers being encouraged to break the law by refusing to get winter grazing consents.

"But when pathways are limited and full of roadblocks, farmers simply become frustrated," he said.

For the last two years, the Government had promised that farmers wanting to undertake winter grazing would have three pathways available to them: a permitted activity pathway, a certified farm plan pathway, and a resource consent pathway.

"Despite these promises, the alternative farm plan pathway is not available and is not expected to be ready for some time," said Hurst.

Beef+LambNZ's environment policy manager, Heather McKay, said that although B+LNZ was disappointed at the Government's response, now that the regulations were in place it was important farmers understood what a permitted activity was and when they might need to apply for a resource consent

McKay said the activities the intensive winter grazing regulations covered included the area of crop permitted, the proximity of crops to waterways, the re-establishment of vegetation after livestock had finished grazing, pugging, and the protection of critical source areas and slope.

"The slope regulation is one farmers need to consider as winter forage crops can only be established without consent, on



The slope regulation is one farmers need to consider as winter forage crops can only be established without a consent, on land that is 10 degrees or less. PHOTO: SUPPLIED

land that is 10 degrees or less, determined by measuring the slope over 20 metres," she said.

Foundation for Arable Research (FAR) said farmers should continue with their planning and planting for next season while they identify how their activity fits within the regulations. They should also be planning how to become compliant.

Hurst said the regulations left thousands of farmers requiring a resource consent to comply

with rules. Federated Farmers had called for the regulations to be delayed until the farm plan pathway was available to farmers to avoid the consent burden on councils and farmers.

At an Invercargill public meeting organised by Southland Federated Farmers, some of the elected representatives took a personal stance that they would not be applying for winter grazing consents as they considered them to be a waste of time and money.

"This is a clear indication of sheer desperation, and only necessary because the Government has failed to deliver the promised alternative farm plan pathway," said Hurst.

The government had estimated that 10,000 farmers would need to get a resource consent to undertake winter grazing. That estimate was also consistent with council and industry estimates. Conservatively estimated, the average cost of a consent was \$2000.



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24 **9** Dairy Focus

Father and son win big on the night



shburton father and Ason, Phillip and Paul Everest are the new National Ambassadors for Sustainable Farming and Growing and the recipients of the Gordon Stephenson Trophy.

The announcement was made on the 25 November at the National Sustainability Showcase at Te Pae in Christchurch.

The Everest family run Flemington Farm in Ashburton where they've expanded the 255ha property into a sustainable dairy and beef farm. They were named the 2022 Regional Supreme winners in the Canterbury Ballance Farm Environment awards back in July this year.

Having owned Flemington Farm since 1989, they introduced dairy into the mix in 2010 and currently milk 750 cows on a predominantly pasture-based system.



Phillip and Paul Everest have developed a sustainable dairy and beef farm that balances the needs of people, animals, economics and the environment. PHOTO: SUP PHOTO: SUPPLIED

The Everest's have developed a sustainable dairy and beef farm that balances the needs of people, animals, economics, and the environment. Their 'giveit-a-go' attitude has resulted in the implementation of new strategies to successfully reduce greenhouse gas emissions and nitrogen loss.

"Phillip and Paul combined their experience and energy to provide clear and informative responses addressing the problems facing their business and those of our primary

sector," said the national judging panel.

'Their understanding of their current GHG emissions and metrics was impressive stepping through their calculations around various scenarios and demonstrating

a clear understanding of their requirements and options to address this. Climate change is accepted as mainstream."

www.guardianonline.co.nz

The Everest's aimed to have one person in the shed each milking, to minimise water use, and to treat effluent as fertiliser. Another focus has been to create a good working and home environment for their employees, resulting in a stable workforce that enjoys training and development opportunities

A large part of the reason for their regional win was the Everest's connection with the local community. They are involved in several catchments and district initiatives largely focused on improving the environment.

Chair of the national judging panel, Dianne Kidd said: "For us the Everest families demonstrated their broad and deep understanding of agri-business in New Zealand through agile and wellinformed responses to our questions. This included an open and considered view of what they envision their farm system may look like in 5 - 10years."

"We are confident they will be excellent ambassadors for the NZFET.



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* Picture shows standard crush with some of the optional extra

- Faster recovery from lameness can save thousands in lost revenue.



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Thanking all our customers who have supported us throughout 2022.

Our on call service is here for you 24/7 over the holiday period. Our office hours are as follows:

Friday 23rd December 7.30am - 4.00pm

Monday 26th - Tuesday 27th December CLOSED

Wednesday 28th - Friday 30th December 7.30am - 4.00pm

Monday 2nd - Tuesday 3rd January CLOSED

Wednesday 4th - Friday 6th January 7.30am - 4.00pm

Monday 9th January 7.30am - 5.00pm (back to normal hours)

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26 **9** Dairy Focus

Halter teams up with MINDA

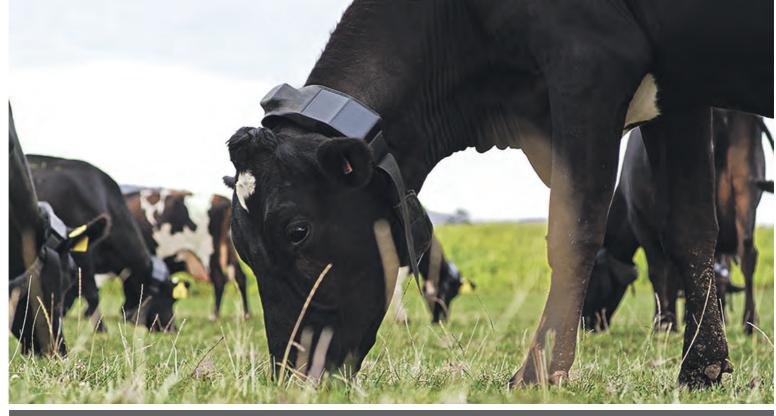
Halter and LIC have announced an integration partnership that will streamline key features within the Halter app, saving farmers even more time.

From December, the Halter platform will send highly accurate heat alerts to MINDA, LIC's cloud-based herd management system, allowing farmers to automatically draft on-heat cows with their drafting gates.

In addition, Halter farmers will gain access to MINDA data, including calving date, mating sire ID and body condition score, providing them with an overall picture of herd performance, health and fertility to help them make more informed decisions on farm.

Halter CEO Craig Piggott says the integration is indicative not only of Halter's rapid pace of innovation but also of the company's flexibility and commitment to farmers' needs.

"From day one, our goal has been to make farmers' working lives better. Integrating Halter into MINDA is something farmers have asked for, and we've responded. It's a perfect example of how Halter helps. Our integration simplifies the admin so farmers can get on with more important jobs."



Halter collars are leased per-cow subscription - based on the features farmers require.

LIC chief executive David Chin says this latest integration is the perfect use of MINDA and welcomes Halter to its growing suite of tech partners. "LIC is all about farm

efficiency. MINDA removes

double-handling of data, and our app ensures farmers have the information to support their business, freeing farmers to use their time optimally on critical tasks. We respect Halter's work and innovation and welcome them to the MINDA community." Craig says the integration is an important step in the tech company's evolution. He looks forward to continuing to foster relationships with partners who share a vision to support

farming communities.

"We are on a path to an ecosystem where we connect partners to farmers to help drive business success. This LIC integration is the beginning of that journey."









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Where is farming going in next year?

THECOUNTRY

COMIMENT: Over-reach in regulation and host of changes indicate we're in for a bumpy ride,



writes Andrew Hoggard

Andrew

Hoggard is

Federated

Farmers

national

president

eading into an election year, farmers are facing "interesting times" to say the least.

It is unprecedented the amount of regulation farmers are dealing with. Just in the water space alone there have been environmental policies which affect on-farm operations ranging from winter grazing to wetlands and water supplies.

Winter grazing is an increasing source of frustration for farmers.

For the past two years, the Government has promised that farmers wanting to undertake winter grazing would have three pathways available to them – a Permitted Activity Pathway, a Certified Farm Plan Pathway, and a Resource Consent Pathway.

Despite these promises, the alternative farm plan pathway is not available and is not expected to be ready for some time. This leaves thousands of farmers requiring a resource consent to comply with the rules.

We're also dealing with the National Environmental Standard Sources of Human Drinking Water (NES-DW). This would impose restrictions on activities around all water supplies such as bores.

We support clean drinking water, but the changes proposed to the NES-

DW are an over-reach.

It should be left to farmers to ensure that water sources are free from contaminants rather than regulated at the national level.

Also in the mix is the Government's Three Waters, which will affect drinking water, wastewater, and stormwater. These services would be passed out of the control of district and city councils to four multiregional publicly owned water entities. District and city councils are set to lose a big chunk of their asset base – plus hits to their spending and revenue.

We have written in opposition to the Water Services Entities Bill, which will establish the four entities. Our submission was strongly opposed to the bill, expressing concern about the costs of the reforms not stacking up, loss of local decision-making and control over local services.

It has become apparent that these proposals will have a massive effect on many farmers such as the need for a fair proportion of farmers to get a resource consent for agrichemical application at \$40,000 to \$60,000 per application.

He Waka Eke Noa

Federated Farmers has been actively involved in the He Waka Eke Noa (HWEN) policy development process for more than two years. We, with industry and the Government, wanted to implement a framework by 2025 to reduce agricultural greenhouse gas emissions and build the agriculture sector's resilience to climate change.

However, a huge concern for the future of our members is the Government's rehash of the HWEN proposal released in October. The plan aims to reduce sheep and beef farming in New Zealand by 20 per cent and dairy farming by 5 per cent to achieve an unscientific national greenhouse gas (GHG) target. We're extremely concerned this will lead to more farmland disappearing under pine trees.

The Government's rehashed plan to reduce on-farm GHG emissions throws out the two-and-a-half years of work the industry did to come up with a solution, supposedly all that time in a 'partnership' with the Government to achieve a workable solution which would not reduce food production.

Federated Farmers does not support the Government's pricing agricultural emissions proposal. It only supports the pricing of emissions in NZ if such an agricultural emissions pricing mechanism is based on:

A scientific target for methane, based on no additional warming (that is being zero carbon equivalent) by 2050;

■ Incentivising viable mitigation options that are available to New

Farmers are
concernedZealand farmers;about carbon
farms, whereIn oo emissions leakage or reductions
in food production occur.productive land
is convertedForestry
Farmers are also concerned about

productive land is converted into forestry. Photo / NZME is converted Far

Farmers are also concerned about carbon farms, where productive land is converted into forestry. Of the 175,000ha of land purchased for afforestation over the past five years, about 134,500ha is grassland suitable

for planting in forestry. Beef + Lamb New Zealand has been tracking whole farm sales data on a regular basis. Scarily enough, 52,000 hectares was sold in 2021 with the intention to convert into forestry.

The rate at which the carbon price is expected to continue to rise, we are calling for urgent policy changes including limits to be placed on forestry offsetting within the Emissions Trading Scheme (ETS).

New Zealand is currently the only country in the world to allow 100 per cent offsetting of fossil fuel emissions within the ETS.

With all this change, we're in for a bumpy ride now and into 2023.

Make property fire-safe for summer dry

Kem Ormond

It is part of summer life in New Zealand, as we watch our green hills become parched and brown.

The one thing we have a lot to be grateful for is our rural fire brigades, comprising of local volunteers who give up their time to train and attend fires, accidents, and emergencies.

One such service, which has served its community for over 50 years is the Maraekakaho volunteer fire brigade in Hawke's Bay. Sixteen volunteer firefighters, five of them women, cover from Bridge Pa to Raukawa, south to Tikokino and up to Kereru.

Their occupations range from





Firefighters use a portable 50001 dam.

tractors, trucks, and other farm machinery such as baling equipment, but not so many structure fires. They also deal with road accidents and their Fire and Emergency Ute is used to attend medical callouts as well.

While attending accidents and medical emergencies is all part of the they also deal with flo school talks on fire safety, participate in the local market days by building public awareness and are actively involved in the community. This gives a sense of reassurance to a community, especially when something happens those effects everyone. I will always remember having to ring for an ambulance when I was living in the country, only to see the fire truck come through the gate, they were local and had the shortest distance to travel and it made me think how lucky rural communities are to have these volunteers. One thing that must be remembered is that while some volunteers are self-employed, some are able to be part of a rural fire team because of the generosity of their employers. Regular training will see the team come up with a scenario and they work out how to deal with the situation and what is needed to fight a fictional fire.

Their latest fundraiser has been for a defibrillator which is now housed on the wall at the Fire Service shed. Already 20 locals have attended a course on how to use it and as there was so much interest, they are planning to run another course in the near future.



farmers, agricultural contractors, grape growers, home-kill butcher, a vet nurse, two nurses, engineer, and his wife, just to name a few. Everyone brings with them their own skill sets which complement each other. The hardest struggle is getting volunteers who live and work in the area during the day.

I talked to Ian Quinn from the Marekakaho rural fire brigade and asked him, what volunteers get out of volunteering for their local rural fire brigade? "It gives you a real sense of satisfaction when you're able to help people out in their time of need, he said. "The training and support that we get from each other and from Fire and Emergency is great – a lot of those skills and experience help even outside the time spent with the fire brigade or responding to incidents. It's also a great way to connect with others in rural communities, which are often spread out." **Maraekakaho volunteer fire brigade in action.**

When it comes to emergency vehicles, we are not talking the red fire trucks we see racing down the main street, we are talking a 4WD drive single cab, yellow rural fire truck.

They can cover most rugged terrain and can also carry a portable 5000-litre dam (similar to a backyard swimming pool in other words) portable pump, hand tools, and 1800-litre water on board. This is one grunty machine!

Summer brings mostly vegetation fires, and this sometimes includes

They have also ordered five new mannequins for training purposes which will involve the community.

With summer on the way, remember to keep that grass short, avoid build-up of potential fuel for fires in the immediate vicinity of your house (leaves and other dead vegetation, firewood, and the like) and be aware of the risk of starting fires when using machinery (do those jobs in the cooler hours of the day).

If anyone is interested in talking with their local rural fire brigade, they can get in touch directly (many have Facebook pages and phone numbers listed) or search for "Volunteering at FENZ".



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Success with farm succession crucial

FAMILY SUCCESSION: Passing the farm on to the next generation takes planning, writes **Kem Ormond**

mplementing farm succession needs to be carefully thought out because it involves not only the family member or members who are going take over the running of the family farm, but it needs to be transparent for all family members. When a farm succession is handled well, it often opens the way to the development of a successful multi-generational farming business that is able to not only support the existing farm owners and the incoming children but also provide assistance to non-farming family. The balancing act can be a little bit

difficult at times, but good communication among all parties involved and good advice from trusted advisers such as your lawyer, accountant, bank manager or fam adviser, can help avoid a breakdown in family relationships.

A succession plan is critical for the continuation and sustainability of a family farming enterprise and ensure a smooth transition within the family. This is often an ongoing process and one that will not be completed overnight.

Prior to the 2000s, completing a farm succession used to be like a run in the park ... not a walk, but it was



relatively stress-free, and this was due to an average farm income coupled with modest land values at the time. Plus, it was a time when family members chose to seek other business or job opportunities elsewhere.

A significant rise in farm values over the past 20 years has led to farm successions becoming a great deal trickier. It means the child who is taking over the farm will need to take on a much greater level of debt to pay out parents and siblings.

This can result in the non-farming siblings feeling that they are missing

out or having to wait a much longer time to receive an inheritance. This in turn puts pressure on the parents feeling the inability to be able to treat their children equally and fair and in turn causing parents to procrastinate in the planning for farm succession. It really is a snowball effect.

Implementing a

succession plan

Photo / Getty Images

is critical.

This has made the average age of a farmer retiring much later, with some deciding the succession plan is just too hard and the preferred option is to sell up.

In my area alone, I know of many faming families dealing with a lot more stress relating to climate The child who is taking over the farm will need to take on a much greater level of debt to pay out parents and siblings.

change, farm costs and difficulty in finding the right farm labour. Dealing with farm succession is just another added stress, when all they really want to do is grab a book, a fishing rod and go fishing!

The transfer of family wealth from one generation to the next can be a challenge and that is where a law practice that has partners who have a significant focus on succession planning can play a huge role in assisting you in achieving and implementing your farm succession plan.

An objective and independent person can guide you through the process and present everyone else's options and inspirations, which will help the family understand the process better.

Ideally, an outcome that will leave all family members knowing where they stand will help ensure family properties continue to be passed down to the next generation.

FARM SUCCESSION PLANNING EXPERTS

Farm succession can be a difficult issue for farming families to discuss but you should start that conversation sooner rather than later. Your family farm involves many aspects of business law, including succession planning.

At Race Douglas Burke we are experts in business law, asset protection and succession planning and have acted for generations of farming families.



Do you have a family farm succession plan?

You can never have that conversation too early - perhaps Christmas is the time to start those discussions?

L-R Michael Nidd, Consultant; Analise Cowie, Solicitor; Julie Mander, Associate; Chris Burke, Director

For expert advice on farm succession planning contact Race Douglas Burke – lawyers@rdblaw.nz www.racedouglasburke.nz – 03 477 3947

RACEDOUGLASBURKE



A Fieldays like no other

ieldays 2022 was always going to be a Fieldays like no other. Besides the obvious slapping on sunscreen instead of scarves, jandals instead of Redbands, and ice creams replacing hot soup - it also came at a time when farmers were pretty much under the pump. Cows still needed to be milked, grass to be mown and

antlers to be velveted. But still so many made the journey there and the effort paid off.

Yes, numbers were down, but engagement was up.

Feedback from exhibitors reflected this as well – with many saying the lower attendance meant they got to have more meaningful connection with their customers, rather than rushed conversations.

Instead of spending hours in line for food or the loo, people were spending more time catching up with friends, neighbours, colleagues and newly-made acquaintances.

More time investigating the newest innovations in farming technology, rather than battling through the throngs. Driving in and out was a breeze, leaving more time for shopping and less time fuming in line trying to get in or out of the carparks. But, in our minds, the biggest upside of a summer event came in the form of being able to sneak through the gate one afternoon, to hold a charity golf fundraiser at neighbouring Tieke Golf Estate.

> Thanks to the generosity of farmers and exhibitors alike, we raised over \$10,000 for the IHC Calf and Rural Scheme - an awesome result.

Fieldays won't be held again in the first week of summer, but we're so glad we were there for this one.

Let's do it all again in six and a half months!





















Jamie Mackay and Rowena Duncum broadcast The Country radio show on Newstalk ZB, Gold Sport and Hokonui Monday to Friday 12-1pm. Also streamed on iHeart Radio and on demand at thecountry.co.nz



A point of service difference

BOATING: Image Boats is a success story with a range of high-quality services

> ased in Invercargill "Image Boats Ltd" has grown from humble beginnings into a major player in the alloy boat industry.

> What started in 2000 as a vision by managing director Dean Wilkes, has grown from a backyard one-man band into the success story they are today.

Highly personalised

The point of difference with Image Boats, is that every boat that Image Boats produces, is custom made to be highly personalised to the specific requirements of each customer. With over 190 builds behind them now, they know the formula is right!

Image Boats offers everything for your boat under one roof:

Complete design and build services

■ Full customisation of our designs to your exact requirements

Complete, entirely in-house service

Custom built boat trailers to transport your vessel

Trusted team of contractors

With a trusted team of contractors which include an auto electrician,



painter, upholsterer, cabinet maker and plumber, these specialised people take care of all the details and deliver exacting standards, so a quality product is assured.

They take care of all the details so you can focus on finding the perfect fishing locations and the fish!

Client relationships

Working closely throughout the design and build process, enables Dean to build a special relationship with his clients constructing a custom boat that reflects the client's wants and needs. The lines of communication are open throughout every stage of the build through email, photos, phone calls and meetings. As a customer, it is reassuring

knowing your boat is in good hands.

A big investment needs a good guarantee

You are making a big investment when you have a boat built, so knowing that Image Boats proven hull designs carry a six-year warranty as your guarantee of quality and are stable for even the roughest of seas – as tested and proven time and time again on the notorious Foveaux Strait! They will be hard to be beaten on ride, quality or value for money.

Come and check them out

To see an Image Boat up close, watch for them as they take their annual Christmas tour around the South Island – a Wilkes Family Tradition for the past 19 years where all six members live onboard for a month. Not only is it a great family holiday, but it also shows the versatility of a boat being able to comfortably house a large family for a month. The dates and locations are advertised as the 8.5m "Demonstrator" model is available for viewing and test drives.

Check out their travel blog

A great way to see the performance of their boats is by watching their Facebook page as it expands into a travel blog over this period as many followers are interested in the areas visited and the historical detail, great fishing spots and ideas for their own family vacations.

Dean, Stacey, and the team know that the boats they build are not only floating holiday homes as well as the perfect fishing platform, but they are also often a lifelong dream come true. Comfort and safety go hand in hand at Image Boats. If you want to see your dreams become a reality, don't hesitate to contact them today."

On a final note

At the recent DHL Export Awards 2022, Image Boats was thrilled to be selected for the Business Export Mentorship Programme. Image Boats is excited to begin showcasing their custom made 6-11m alloy boats to the world!



With more than 190 builds behind them now, the team at Image Boats know they've got the formula right!

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- Full customisation of our designs to your exact requirements
- Custom-built boat trailers to transport your vessel
- Boating supplies and equipment



Image Boats will

turn your dream

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113 McKays Road Rakaia, Mid Canterbury





22 Hazelburn Road Pleasant Point, South Canterbury



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Property Brokers success continues to be underpinned by yet another outstanding rural sector performance.



Last month we spoke to the fact that South Island rural real estate spring sales (August to October) were back 44% on the same time last year, which we attributed to rising farm interest rates impacting buyer purchasing decisions. While none of that story has gotten any easier, particularly given the most recent OCR increase, our Property Brokers Country South Island sales performance over October and November is significantly up on the same time last year, with 26 farm sales for \$66m across all farm types.

Importantly, nobody here is claiming victory; we will claim the depth of our buyers, both regionally and nationally, and our ability and experience at getting parties to the table. No matter the headwinds in any rural market, there are always willing buyers and willing sellers; farmers and growers are pragmatic, particularly if they have all the relevant information in front of them.

So why do some buyers choose to step up while others step back, we attribute a lot of that sentiment to all the negative chat in the market on just about anything to do with our primary sector. The reality is very different when you look at the contribution agriculture makes to New Zealand; export revenues are still forecast to increase for all sectors, up 4% to \$55 billion by 2023.

The latest MPI Situation and Outlook Report for December 2022, highlights the value our primary sector is making to NZ Inc. Food and fibre sector export revenue grew by 11% to \$53 billion in the year to 30 June 2022, due to a sharp increase in prices for most sectors. The food and fibre sector has continued to perform well despite domestic and international challenges.

Export revenue is again forecast to increase by 4% to a record high of \$55 billion in 2022/23. This figure has been revised upwards from the previous forecast primarily due to the sector's work in the market and a steep fall in the New Zealand dollar (NZD).

So going against much of the rhetoric directed at our Dairy and Sheep and Beef sectors, here as some real numbers on the current MPI forecast to 30 June 2023.

- 1. Our Dairy sector export contribution is forecast to equal \$23.3 billion by 30 June 2023, up \$6.7 billion from 2018
- 2. Meat and Wool exports are forecast to equal \$12.4b by 30 June 2023, up \$2.8b from 2018

While much is made of our forestry sector, including recent government announcements to double earnings by 2030, the last six years of forestry export receipts have been flat at best (\$6b+).

Our pastoral farmers have sound economic reasons to back their industry, the sector has defied all the naysayers since the 1980s, and this next decade will be the same. If this year's forecast is achieved, our primary sector contribution will be up 15% for the last two seasons combined, led by pastoral farmers. While innovation and adaptation remain central to the sector's future, including accurately monitoring the contribution to the carbon footprint, there might also come a day when consumers share that responsibility, too, as many of the discretionary things we consume have little to do with food and shelter. You only need to look at the ever-increasing size of NZ's airport car parks to get a measure of that.

Conrad Wilkshire, GM Rural for Property Brokers Ltd conrad@pb.co.nz

Food and fibre sector export revenue 2018 - 2024 Year to 30 June, NZ\$ million

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	Actual					Forecast	
Sector	2018	2019	2020	2021	2022	2023	2024
Dairy	16,655	18,107	20,135	19,093	21,998	23,310	22,980
Meat and wool	9,542	10,176	10,678	10,391	12,310	12,380	12,110
Forestry	6,382	6,883	5,539	6,531	6,578	6,590	6,230
Horticulture	5,392	6,134	6,555	6,622	6,782	7,090	7,660
Seafood	1,777	1,963	1,855	1,772	1,919	1,990	2,020
Arable	243	236	290	260	252	265	285
Processed food and other products*	2,709	2,854	3,006	3,112	3,226	3,330	3,060
Total export value	42,700	46,355	48,058	47,780	53,065	54,955	54,345
Year-on-year % change	12%	9%	4%	-1%	11%	4%	-1%

* Includes live animals, honey and processed food. Totals in the table may not add up due to rounding. Percentages in the table are rounded to the nearest whole percent. Actuals for 2021 may differ from previous SOPI due to revisions from Stats NZ. Source: Stats NZ and MPI.

(a) Table created and provided by the Ministry for Primary Industries sourced from Situation and Outlook for Primary Industries (SOPI) December 2022 - www.mpi.govt.nz Attribution 3.0 New Zealand (CC BY 3.0 NZ) creativecommons.org/licenses/by/3.0/nz

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Top technology tips when buying a new combine harvester



The combine harvester is possibly one of the most important inventions in the agricultural industry, helping farmers save serious time and labour costs. However, due to the sheer size and complex technology, combines do not come cheap. Depending on the machine, the purchase price can easily exceed half a million NZ dollars. So it's not an investment to take lightly.

If you're in the market to purchase a combine harvester, it's crucial to know what to look for.

First of all, what are you expecting out of your harvester?

- a timely harvest,
- maximum grain in the bin,
- an optimal throughput,
- harvested products of the best quality

• harvest undertaken with the least amount of losses, and

• an economical and reliable operation. Modern grain harvesting machines operating in New Zealand are mainly rotary or hybrid-rotary machines.

In the 'good old days' of walkertype machines with tangential-feed cylinders, combine capacity was practically dependent on and measured or rated by cylinder and walker width.

That all changed when axial flow 'rotary' designs came on the scene after 1977 and these have eclipsed cylinder machines.

Nowadays, combine capacity is largely dictated by engine power and cleaning shoe area.

As a rule of thumb, the higher the power, the higher the class. For example, Case IH's Axial Flow 6130, which offers 320hp, falls under Class Six, while Claas' Lexion 750 with 442hp sits under Class Nine.

However, the guidelines in combine classification often change. More often than not, manufacturers create their

own classes when they produce a machine outside a specified class.

Hence, combine class ratings may be decided more by marketing intelligence than by engineering features. Combines offered today in New Zealand range from Class Six to Class 10.

Given the time pressures at harvest, it's critical that the machine be reliable. This means choosing a brand with the best product back-up and dealer performance.

Think well-known, tried-and-tested brands such as John Deere, New Holland, and Case IH, which have a wide network of dealers, meaning back-up and parts won't be a problem.

A simple but very important rule to remember is: a combine's capacity should never be more than the gathering head can digest.

Some might think the head is not a processor but consider this example: in some conditions, a stripper head can thresh out more than half the grain right at the front. Since the stripper head captures only the ears, crop characteristics are critical for its performance.

Many latest combine harvester models have automatic in-cab adjustment of various settings such as concave clearance and shoe openings to match the pre-selected crop.

Broken grain doesn't make it up into the grain tank so yield is reduced. Some models even have grain-damage sensors, which are usually based on video camera frame-grab assessment.

The greater the straw break-up by the processor, the heavier the load in the cleaning shoe, which leads to shoe losses over the back. Modern machines have grain-loss monitors, but be aware these only measure relative loss.

Modern combine harvester designs have 'hungry boards' to hold a maximum amount of grain, up to 14,100 litres (400 bushels), in the tank before unloading. Ideally, the boards should be capable of being closed to protect the load in a rain event.

What do you plan to do with the waste from your harvesting operation? The answer will dictate what you should check for at the back of the harvester.



Modern grain harvesting machines operating in New Zealand are predominantly rotary or hybrid-rotary machines.

Most modern machines nowadays offer a wide range of residue management options. Whether you want the waste to be spread wide or into windrows, a push of a button does it for you.

For anyone who's been in a modern combine harvester's operator station, you can agree it looks more like an aircraft cockpit than a harvester cab.

There are even sophisticated autosteering and monitoring systems built in to ensure farmers get maximum harvesting efficiency without doing much at all.

One important factor to consider is whether you'll feel comfortable sitting in this confined space for hours on end!

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Don't look past a job in rural contracting

) ural contracting provides **K**a great variety of seasonal and permanent roles, from weed spraying and crop drilling to operating and servicing complex machinery such as combine harvesters and those that produce sileage.

³⁴ **G** Farming

Entry-level work roles include driving tractors, mowers, and sprayers as well as machinery maintenance. There are opportunities to move up to operating larger more sophisticated machinery such as balers, combine harvesters and similar agricultural machinery. Types of jobs in rural contracting Tractor driver Salary: \$41,000-\$48,000 per year

Connect a variety of equipment and operate it safely on the road, across paddocks, and on undulating terrain. Tractor driving requires some prior knowledge or basic training either at a starter course or on-site. **Complex machinery operator** Salary: \$48,000-\$80,000 per year

Requires good technical skills: operating a combine harvester or foraging machine is like being at the controls of a spaceship. These are highly technical machines with several computers, touch screens, and joysticks to control the variety of operations the machine has to perform.

Mechanical support **Salary:** \$62,000-\$73,000 per year

Machinery is key to rural contracting and it needs to function properly. People who can perform regular maintenance and repairs are important, particularly as service centres are often some distance away. Agri-chemical applicator Salary: \$52,000-\$65,000 per year

Spraying crops to remove pests and encourage growth is an important job in agriculture. Training in the safe use of agri-chemicals, protective equipment, and the various types of applicators (from backpacks to large spraying rigs) is available through formal NZQA training and Growsafe



Operating a combine harvester is like being at the controls of a spaceship.

accreditation.

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It is the voice of its members - and of the rural communities it serves.

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- monitoring of central and

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- ✤ lobbying and advocacy for better outcomes for the sector.
- $\boldsymbol{\diamond}$ training and career information and access to programs designed to grow better contractors.
- ✤ access to preferred supplier arrangements. \bullet assurance that rural
 - contractors are connected to

other kindred associations.

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- ✤ help in gaining approval to import skilled machinery operators.
- monitoring of chemical spray requirements.
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charitable-grants/ The aim of this grant is to offer

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Water management in the OECD -where are we at?



Water management is a major political issue in many countries and agriculture plays a huge role in this area.

Population growth, urbanisation, and rising demand for food increase pressure on water resources. Yet the availability of water is at risk due to climate change, which in turn has resulted in a frequency of extreme water events such as droughts and floods. Agriculture is affected by these events because it relies heavily on water and, in most countries, constitutes the largest sector in terms of water use.

All OECD countries have developed institutions and laws governing water access, allocation, and pricing, as well as a set of policy strategies and instruments to address

broad water management goals covering water resources, its quality, and ecosystems protection.

Agricultural water resource management covers a wide range of agricultural systems and climatic conditions across OECD countries. In many countries, rain-fed agriculture dominates, but in areas susceptible to variable precipitation or water deficits, irrigation is used to supplement periodic shortfalls. In arid areas, crop production may be largely dependent on irrigation.

Irrigation water draws mainly on fresh surface water and groundwater, and to a lesser extent on recycled wastewater and desalinated water. The proportions by which these water sources are used vary across countries.

The degree of water stress, an indicator reflecting water resources availability, varies a great deal among OECD countries from very low (e.g. Canada, Latvia, New Zealand, Slovak Republic, Sweden) to high levels (e.g. Israel, Italy, Korea, Spain, Belgium),



In most countries, agriculture constitutes the largest sector in terms of water use.

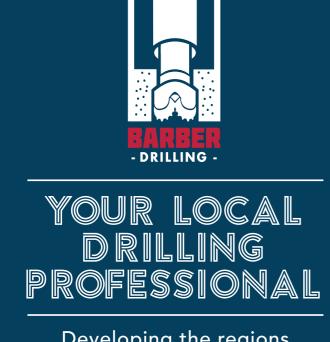
reflecting the diversity of conditions in terms of water withdrawals and resources in the OECD area.

National water stress refers to the intensity of freshwater

use, which is measured as the ratio of total freshwater abstractions to total renewable water resources in the country. A ratio below 10 per cent is typically considered to be low

water stress; moderate when between 10 per cent and 20 per cent; medium-high when between 20 per cent and 40 per cent; and high when above 40 per cent.

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The water stress indicator has trended slightly downwards in the majority of OECD countries since 2005 due to reductions in total water abstraction. Decreases in water stress are more notable for several countries with medium and high initial levels of water stress – Israel (7 per centage points), Korea (1 per centage points), Belgium (2 per centage points) – and for countries with moderate water stress such as France and Germany (both 2 per centage points). Agriculture significantly contributes to national water stress in several OECD countries, particularly those with a relatively large irrigated sector.

Since 2005, agricultural water abstraction has declined in about two-thirds of OECD countries, and agricultural water abstraction in the OECD area declined by 0.4 per cent annually. The stronger declines are observed in Australia (-9.4 per cent), France (-7.8 per cent), United Kingdom (-5.4 per cent), United States (-1.9 per cent), and Greece (-1.4 per cent).

By contrast, agricultural water abstraction increased by about 1 per cent or more in New Zealand, Turkey and Mexico, while countries such as Germany and the Czech Republic had large increases, 13.6 per cent and 8.5 per cent,



The availability of water resources is increasingly at risk due to climate change.

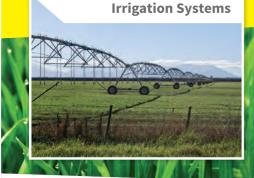
respectively.

While agricultural water use is decreasing, the share of agricultural water abstraction from groundwater continues to increase in several OECD countries particularly in France, Germany, Greece, and the Netherlands. This increasing pressure on groundwater resources is due primarily to the scarcity and instability of surface water resources.

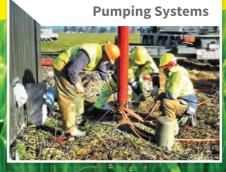
In the longer term, factors such as higher food demand due to demographic and income growth, as well as a higher occurrence of extreme weather events propelled by climate change are likely to put more pressure on this resource, which in turn would affect the future resilience of agriculture to respond to water-supply shortfalls.

This problem is accentuated in several countries due to the relative weakness of groundwater regulations; groundwater is also more difficult to measure and monitor in practice than surface water. As indicated in OECD, better groundwater management policy combining regulatory instruments and economic and collective action is needed to overcome water stress challenges in agriculture.

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IRRIGATION FEATURE

38 **9 Farming** IRR

A quiet revolution in irrigation offers key to recovery

Building back better means building greener, recognizing the interconnections between people and our shared environment.

The coronavirus (COVID-19) pandemic has changed how we interact, not just with each other, but also with the planet. The worldwide disruption of the status quo has prompted a ubiquitous question: when this crisis is really over, how can we build back better?

The economic fallout has been immense, with consequences for poverty and welfare, particularly in developing countries. Conservative estimates suggest that the economic contraction has pushed 48 million to 135 million people into poverty worldwide. The World Food Programme warned of a potential doubling of acute food insecurity in low- and middleincome countries in 2022.

For agriculture, which is at the nexus of livelihoods, environment, and global food security, this question has farreaching implications. Around 65 per cent of poor working adults make a living through agriculture, while the sector alone accounts for 70 per cent of freshwater withdrawals worldwide.

In this context, what does it mean to build back better?

In developing countries, income shocks have severely affected farmers and informal workers in rural areas, and households are net buyers of agricultural produce. In the short term, recovery means safeguarding local food access and food security by ensuring the functioning of value chains and promoting the production and availability of diversified, safe, and nutritious food for all.

In the medium to long term, recovery will mean investing in climate-smart solutions that increase resilience to shocks for farmers and food systems. The pandemic has also exposed critical weaknesses



A revolution already underway is farmer-led irrigation development. PHOTO: SUPPLIED

in the resilience of the natural systems underpinning agriculture, wrought by decades of deforestation, soil degradation, water and soil mismanagement, biodiversity loss, and climate change. Building back better means, in part, building back greener, recognizing the interconnections between people and our shared environment. A revolution already underway: farmer-led irrigation development Scaling up and accelerating farmer-led irrigation development (FLID) is one avenue that holds significant potential for securing livelihoods and supporting early recovery for the most vulnerable. In the longer term, it can also help safeguard domestic food security and strengthen farmers' ability to recover from shocks and adapt to a changing environment.

FLID complements yet stands in contrast to the large-scale public schemes that dominated irrigation development throughout the 20th century. Those tended to be centralized bureaucracies, with watersupply operations controlled or overseen by a central or local government authority.

FLID is an evolution in the other direction, filling the gaps where large-scale operations haven't reached. Comprising smallholders and medium-scale



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farmers, FLID allows farmers to improve their water use for agriculture by bringing in or developing locally appropriate technologies, investment strategies, and market linkages. It's not just a typology, but a process - one in which farmers, either on their own or in groups, but often in cooperation with outside partners, develop irrigation solutions tailored to their needs and priorities.

Despite being minimally acknowledged and accounted for in official registries of irrigation infrastructure, and despite receiving little or no formal support, FLID is already a large and fast-growing part of the irrigation footprint in Africa, Asia, Europe, Latin America, and the United States. It creates a direct pathway for helping millions of farmers who live in poverty and need immediate support. In the recovery from COVID-19, it also offers higher economic returns alongside quicker turnaround times as compared to large-scale models for delivery of irrigation.

Removing barriers to financing, enabling access to technology and markets, building capacity, and knowledge transfer are powerful ways to accelerate FLID. This can provide ondemand and more reliable irrigation water at a time when rural livelihoods are already

threatened by conflicts, climate shocks, desert locust outbreaks, and economic distress -all compounded by COVID-19 hazards.

How FLID can support pandemic recovery

COVID-19 triggered a cascade of job losses, with many urban dwellers returning to rural areas where farming offered one of the few opportunities to increase food security and household income. Every intervention to mitigate pandemic impacts is important, but those with quick returns even more so. Given that FLID is already growing, there's potential to quickly intensify and expand its footprint by building on this momentum. FLID interventions – with a focus on promoting knowledge exchange, driving technological innovation, and facilitating financing and value-chain linkages - are relatively lowcost per hectare compared with large-scale irrigation investments. This can help generate more rural jobs and access to food at a time when these are most needed.

Farmers' own investments hold high potential to increase incomes both for themselves and others in irrigated value chains. Irrigated production also generally ensures stable and increased availability of locally grown food, in particular vegetables and leafy greens on

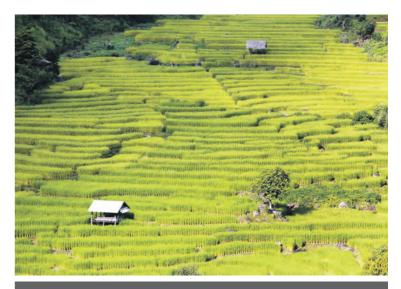
the local and regional market, thus improving nutrition not just for farm families but communities in general. With COVID-19 putting diets at risk through illness, income losses, and disruption of health and nutrition services as well as local supply chains, access to healthy food is more important than ever.

The short-term benefits from FLID – strengthening self-reliance and building connections across supply chains, improving the sustainability of local food systems, promoting job creation, increasing rural prosperity, and strengthening local water stewardship - all help mitigate the impacts of future shocks. Irrigated agriculture is, on average, at least twice as productive per unit of land as rain fed agriculture, thus improving resource efficiency and allowing intensified production. This contributes to agriculture-led economic growth, which is two to four times more effective at reducing poverty and food insecurity than growth in other sectors.

As we ask "how to build back better," there's value in building on what has proved successful in the past. Through FLID, farmers across the world have shown that they are best placed to develop local solutions to their challenges.



The short-term benefits from FLID all help mitigate the impacts of future shocks.



FLID complements yet stands in contrast to the large-scale public schemes that dominated irrigation development throughout the 20th century.



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Autonomous tractor technology will help feed the world

griculture is the most Aimportant industry on earth. With the global population passing the eightbillion mark, the demand for crops and livestock will soon be higher than ever, and feeding the world will need constant innovation. Tools and technologies need to continually improve, so that more people can be fed as efficiently as possible.

Against this backdrop arrives the autonomous tractor. This is the next evolution of a machine that is critical to feeding the world. From 2022 to 2025, the tractor market is predicted to increase at a compound annual growth rate of 4.59 percent. Alongside this growth, an increasing number of machines will be overseen by operators who are remote, rather than sat in the cab.

The History of Tractors: From Traditional to Autonomous:

Looking back, we can see that the invention of the tractor ushered in an extraordinary period of innovation.

Agriculture - like any other



An increasing number of machines will be overseen by operators PHOTOS: SUPPLIED who are remote, rather than sat in the cab.

industrial category - is being reshaped by the possibilities of automation and machine intelligence.

Disruption always comes with its trade-offs, but there is no doubt that automation has brought a host of positive benefits to agriculture. For instance, the world is experiencing a severe

talent shortage, with the agricultural business feeling the consequences. Fortunately, autonomous farming vehicles allow farms to do more with less. Even if they're short on human labour, farm operators can continue to operate at the level they need to. In addition, through autonomous farming

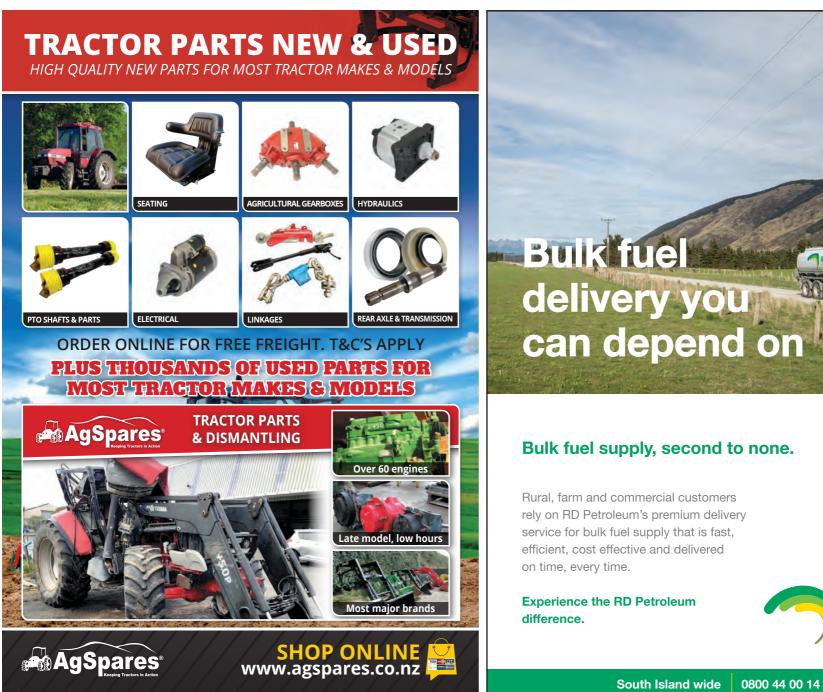


Autonomous farming vehicles allow farms to do more with less...

practices, agile crews can free up skilled workers to focus on core activities such as seasonal planning, equipment maintenance, and production management - while letting AI handle the repetitive, physical tasks. Moreover, autonomous farm tractors can operate in the dark, meaning longer agricultural working hours

year-round.

Agricultural automation allows for the production of fresher, faster, and more sustainable produce. Unlike people, machines can run for longer periods of time - they don't need to eat, or sleep - and they have a reduced margin for error. This means that production is faster and the





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profit return is steadier. Furthermore, while automation increases productivity, yield, and output rate, it does not raise consumer costs because machines require less upkeep than a human workforce.

Autonomous tractors have been designed to process and calculate their own position and speed, and to avoid obstacles in the paddock such as humans, animals etc. Tractors without drivers can be fully autonomous or monitored remotely. Typically, a single operator will oversee a fleet from a remote (but nearby) location.

Autonomous farm tractors are equipped with integrated systems, computers, and processors. These connections transform electrical impulses into a controller or CPU to enable the tractor to perform. Each tractor is equipped with its own set of interconnected capabilities and failsafe emergency systems.

For navigation, tractors are equipped with GPS-enabled cameras, radars, and lighters. A sensor suite with two lighters, a camera set, and a side robotic camera are mounted on the tractor. These are used to navigate and monitor the environment, and the data they absorb is fed into the main system. Operators control the tractor – or multiple tractors – from afar. A live video from the tractor-mounted cameras is fed to a central viewing, allowing the operator to observe the tractor(s) in operation.

This viewing centre provides access to the tractor's diagnostics, tuning control tools, tractor cedars, and diagnostics. That information is used by the tractor to calculate the

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course and check with the GPS to ensure that it is on track and that the tilling activities are flawless. With this information in hand, the user can regulate the speed and implementation. The terminal also has a receipts and diagnostics dashboard and displays engine load and fuel level.

One of the most significant impacts of automation in agriculture is gains in efficiency and accuracy. This is absolutely true in the case of the tractor. Fully autonomous farm tractors can till and plant seeds with pinpoint accuracy. This results in better farming precision, which leads to greater yields (and financial returns). Because so many of the tasks are automated, ancillary advantages are generated – such as more efficient fertilizer distribution, decreased fuel waste, and lower production costs.

The cutting-edge tractor sensors used by autonomous farm tractors collect information regarding soil conditions and crop health. They also collect all harvest data prior to and after cropping. Through the data collected by autonomous tractors in agriculture settings of every kind, small and large farms can generate new insights and strategies.

Savvy farmers now recognize the importance of automation in agriculture. Farming equipment, like other human inventions, was designed to solve a problem – but it has always innovated in line with broader technological developments. Traditional farming equipment needs a technological boost to meet agricultural needs, as the world's population grows and food demand rises.



Savvy farmers now recognize the importance of automation in agriculture.



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FARM MACHINERY FEATURE

Which fuel will come after diesel for agriculture use?



ractors and other agricultural machines generally rely on diesel, but it's hoped that greener alternatives to fossil fuels will help farmers to reduce their impact on the environment, while also potentially saving on costs.

Over the next few years, it's expected a number of different fuel systems will be trialed on farms. These will each have their own strengths and considerations for implementation. It's likely that there will also be hybrid systems that aim to offer the best of both worlds as the technology matures.

Tractor manufacturers are working hard to create alternatives to diesel-powered machines. One solution could

be to use methane, the main ingredient in natural gas, which can be burned to use as fuel. This can be much greener than standard diesel if it's derived from renewable sources.

In fact, methane is already being used today. New Holland developed the world's first 100 per cent methane-powered production tractor and is starting full scale production.

Critics, on the other hand, point out that methane is highly flammable and hard to store. Methane isn't just a fuel, but also a potent greenhouse gas that contributes to climate change, if it enters the atmosphere which could happen through fuel tank leaks or it could escape when re-fuelling.

Manufacturers including John Deere are developing tractors that use batteries and motors in place of pumps and engines. John Deere has developed tractors and a prototype that is powered by an electric cable.

Although technology is constantly improving, electric battery-powered agricultural machinery is currently limited



Tractor manufacturers are working hard to create alternatives to diesel-powered machines. PHOTO: SUPPLIED

by the energy density of batteries versus traditional fuels.

Hydrogen, a green fuel whose sole by-product is steam, is also an option. One benefit of hydrogen combustion vehicles is that they use similar technology to existing petrol/diesel systems. The fuel is also robust and cost-effective, and it could be integrated into all forms of the powertrain.

On the other hand, critics say that hydrogen isn't as efficient

as fully electric systems. This is because it's expensive and a lack of infrastructure makes it challenging and costly to store and transport.

A wide range of modern vehicles, generators, construction machinery, and industrial power systems may be able to use hydrotreated vegetable oil (HVO) fuel as a replacement to diesel.

HVO's raw material is a mixture of vegetable oils

and waste fats which are hydrotreated to create a biobased hydrocarbon renewable diesel. HVO reduces air pollution without costly engine modifications, what's more, it's zero sulfur and zero aromatic status makes it an attractive high-quality alternative. Additional cost savings can also be made as there are reduced maintenance costs too. So give these alternatives

some thought!

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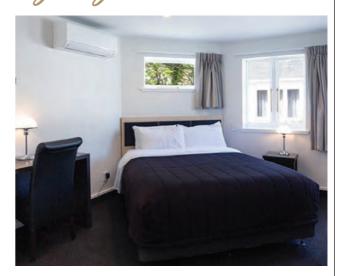
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