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Decarbonisation strategies for agribusiness

A sector in transition

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1 Executive summary

Australia's path to decarbonisation isn't a choice—it's a necessity. For farmers, this shift is inevitable, and embracing it now will make the road ahead far smoother.

In recent years, Australia's agriculture sector has faced increasing pressures to reduce carbon emissions. Farmers find themselves caught between a rock and a hard place as climate change erodes already volatile profit margins while the market demands reductions in the sector's high emissions.

The reality is that these pressures are not going away; in fact, they will only intensify as the world moves past climate targets and more governments commit to achieving net-zero emissions.

Undertaking this transition is no easy task. The sector must navigate the delicate balance of increasing its resilience to climate change while also reducing emissions, all without further squeezing profits for farmers or jeopardising the food supply for the millions who rely on our exports.

However, there is hope. Globally, we can learn from examples of countries that have successfully reduced emissions while maintaining agricultural productivity. Integrated land-use approaches that harmonise food production with environmental outcomes offer a promising path forward.

This transformation will not be easy, but as time goes on and the impacts of climate change escalate, the challenge will only grow.

Fortunately, Australian farmers are known for their grit and have never been afraid of a little hard work.



Ross Paterson
National Leader, Agribusiness
RSM Australia

Climate change poses significant challenges to food production and economic stability, but it also offers opportunities for innovation and adaptation.

2 Industry overview

Agriculture is vital for life. Farmers grow our food and provide materials for clothing and furniture. The sector is also important economically, with agricultural exports reaching a record $80.4 bn in 2022–23. However, the agriculture sector also makes a significant contribution to our national greenhouse gas emissions.

Key facts about the Agricultural industry in Australia

55% **of Australian land (426 million hectares) is used for agricultural purposes**



Australia exports **70%** of our total agricultural production overseas

75 million people beyond our borders rely on Australian ***food exports***



2.7% **of value-added GDP**



184,000 agribusinesses in Australia in 2025

74% **of Australian water consumption**



12–17% *of Australian greenhouse gas emissions since 2005.*
80% *of those emissions are methane, primarily from cattle and sheep.*

Unpredictable weather and agricultural resilience

As climate change reshapes global weather patterns, farmers around the world face unprecedented challenges. Increasing temperatures are leading to extreme weather events, from devastating floods to severe droughts. Regions that were once deemed low-risk for wildfires, such as parts of Canada, are now grappling with catastrophic blazes. In Australia, the impact of these climatic shifts has been stark. The ABC reported that flooding in 2022 devastated crops, leading to losses of $273m in crop damages and an additional $67m in pasture losses across the Central West and Riverina regions of New South Wales[1].

The ripple effects of these disasters extend beyond individual farms, disrupting supply chains and inflating prices.

The Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) estimates that changes in seasonal conditions have resulted in a staggering **23%** **reduction in annual profits for farmers from 2001 to 2020.**

[1] www.abc.net.au/news/2023-04-29/nsw-farmers-grappling-with-flood-crisis-hopes-for-winter-crop/102240454



In 2023, Fiona Davis from Farmers for Climate Action spoke about the broader impact of the 2022 floods, saying,

"In the last 12 months, we have seen floods wipe out key supply chains and crops, resulting in us paying $11 for lettuce. So, while we will have enough food, getting that to people is difficult[2]."

A balancing act

This raises a broader concern, as global food prices are projected to increase annually by up to 3.2% over the next decade.

The CSIRO's State of the Climate report highlights the dramatic shift in Australia's climate, noting that temperatures have been trending upward each decade since 1950. The report also states that Australia has experienced "a significant increase in dangerous fire weather days across most regions over the last 75 years[3]."

Australian agribusinesses are caught in a balancing act. They must produce affordable food while remaining profitable in an environment where climate-induced challenges threaten crop yields and seasonal reliability.

As crop productivity declines, there will be more shortages across the supply chain, including grocers and supermarkets in regional communities in Australia. Consumers, already feeling the effects of inflation and a higher cost of living, will bear the brunt of these highly inflated costs.

A path forward

Climate change poses significant challenges to food production and economic stability, but it also offers opportunities for innovation and adaptation.

Decarbonisation strategies are a smart choice for agribusinesses faced with these challenges. By adopting sustainable practices, agribusinesses can:

Lower operational costs
Enhance operational efficiency
Broaden revenue streams
Comply with supply chain regulations
Stand out in a competitive global market

As extreme weather events and supply chain stresses increase, agribusiness must adapt. This presents an opportunity to lead the way in creating change. By addressing these issues now, you can help ensure your business remains economically viable while also contributing to global food security.

The sector must navigate the delicate balance of increasing its resilience to climate change while also reducing emissions.

[2] www.agriculture.gov.au/abares/products/insights/snapshot-of-australian-agriculture

[3] www.csiro.au/en/research/environmental-impacts/climate-change/state-of-the-climate/australias-changing-climate

3 Trends and drivers

Decarbonisation has become a pressing issue for Australian farmers due to a combination of climate risks, market pressures, and government policies aimed at reducing greenhouse gas emissions.

Agriculture is both a contributor to and a victim of climate change, making emissions reduction a critical challenge for the sector.

One of the main drivers of decarbonisation in Australian agriculture is the increasing impact of climate change on farming operations. Rising temperatures, changing rainfall patterns, and more frequent extreme weather events—such as droughts, floods, and bushfires—are affecting crop yields, livestock productivity, and overall farm viability. Reducing emissions and improving carbon sequestration through sustainable practices can help mitigate these risks and enhance the resilience of farms.

In addition to climate-related challenges, market pressures are pushing farmers to address their carbon footprint. Large retailers, food processors, and export markets are setting sustainability targets and demanding lower-emission products. International trading partners and consumers are increasingly looking for proof that agricultural products are produced with minimal environmental impact, making carbon footprint reduction a competitive advantage for Australian farmers.

Government policies and commitments to net-zero emissions by 2050 have also placed agriculture in the spotlight. While the sector is not yet subject to mandatory emissions reduction targets, policies such as the Australian Carbon Credit Unit (ACCU) Scheme and incentives for climate-smart farming are encouraging farmers to transition to lower-carbon practices. Future regulations may impose stricter requirements, making proactive decarbonisation efforts essential for staying ahead of policy changes.

Finally, economic opportunities in carbon markets provide a potential benefit to farmers who engage in decarbonisation efforts. Programs that reward carbon sequestration and emissions reductions—such as selling carbon credits—offer a way to diversify income while contributing to national climate goals. However, challenges such as high upfront costs, long-term commitments, and concerns over land competition must be carefully navigated.

As a result, decarbonisation is no longer just an environmental issue but a practical and economic concern for Australian farmers, shaping the future of how food and fibre are produced.

Mandatory climate reporting — why it matters to agriculture

In January 2025, the Australian government introduced the first stage of mandatory climate reporting for businesses as part of the commitment to net zero targets. Entities meeting the asset or revenue thresholds and those who provide National Greenhouse and Energy Reporting Scheme (NGER) reports will be in the first groups (groups one) required to report.

Primarily, this will impact large public companies, financial institutions and businesses in high-impact sectors. However, in some instances, it may also trigger large privately owned agribusinesses such as beef processing and cattle stations.

These businesses will be subject to these new disclosure rules requiring them to report on their greenhouse gas emissions, decarbonisation strategies, and climate-related risks and opportunities.

For large agribusinesses falling into the group 2 phase. However, there is also pressure for smaller businesses falling outside the reporting thresholds to decarbonise. These businesses are part of the supply chain for larger entities and, therefore, contribute to the Scope 3 emissions of the larger business.

Sustainability reporting can involve a period of transition for agribusinesses, "And it's not just climate; it's governance, it's around governance policies and board charters." Jacob Elkhishin, National Head of ESG and Climate Services at RSM, explains.

"So, agribusinesses are going to need to expand in terms of people, processes and systems to meet some of those reporting requirements. And then post reporting, they will need to develop strategies around mitigating the impact of climate change and have strategies around decarbonisation."

Elkhishin goes on to explain, "The reporting mandates will have an impact on all businesses in the value chain, regardless of size. This can be challenging for smaller agribusinesses who will need to provide data around their greenhouse gas emissions for large retail chains, such as Coles and Woolworths, and even the mid-sized retailers, who they supply products to."

Market demand for sustainable products

Consumer preferences are rapidly changing, making sustainability a key market driver. Around the world, buyers are actively seeking products that align with environmental and ethical values, such as sustainably sourced seafood, organic produce, and recycled packaging.

Addressing the changes and welcoming this shift not only helps businesses meet regulatory standards but also opens the door to exciting opportunities in both premium and emerging markets.

What is driving the demand? Several factors are influencing the growing demand for sustainable products. These include:

Consumer awareness

Today's consumers value transparency, ethical sourcing and low environmental impact. Research shows that 67% of Australian consumers consider sustainability when purchasing[4], with younger demographics leading this trend. The demand for transparency is evidenced by the growing popularity of certifications like Carbon Neutral and Marine Stewardship Council (MSC), which serve as trusted indicators of sustainability.

Corporate commitments

Major supermarket chains and food service companies are setting ambitious sustainability targets. For example, Woolworths and Coles, have set targets to achieve net zero emissions by 2050, a commitment that creates a flow-on effect throughout their supply chains. Coles Chief Operations & Sustainability Officer Matt Swindells stated: "We understand that we need to reduce our own emissions as well as those that occur in our supply chain, and we are looking forward to working alongside our suppliers to help them set their own targets and reduce emissions."[5]

International market access

Sustainability credentials are increasingly a requirement for international trade. The European Union and other international regulations mean Australian agribusinesses need strong environmental credentials to maintain market access. Similarly, Japan's growing appetite for traceable, sustainably sourced seafood highlights[6] the premium consumers place on verified practices.

Brand value and reputation

Companies that demonstrate a genuine commitment to sustainability can build stronger brand loyalty and strengthen their reputation. This positive impact on a brand's value is particularly important as consumers become more environmentally conscious.

Financial drivers

Financial institutions increasingly consider climate impact in lending decisions. Businesses with strong sustainability practices often access better financing terms. Additionally, large food manufacturers and retailers are setting strict supplier requirements around emissions reduction, making these standards essential for maintaining valuable contracts.

Market opportunity

Early adopters who can demonstrate genuine environmental credentials and transparent supply chains can strengthen their resilience, enhance brand reputation and capture new revenue streams through premium pricing. As the global economy moves toward net zero, sustainability is essential for staying competitive in domestic and international markets.

[4] lens.monash.edu/@business-economy/2023/08/16/1386034/sustainability-attitudes-and-behaviours-of-australian-shoppers

[5] www.colesgroup.com.au/news/2023/media-releases/?page=coles-to-partner-with-suppliers-to-set-emission-reduction-targets-by-2027

[6] link.springer.com/article/10.1007/s13280-024-02122-4



What you need to know about carbon on your farm

Carbon emissions in agriculture are difficult to abate

Reducing carbon emissions in agriculture is particularly challenging because many of the sector's emissions are tied to biological processes that are harder to control than industrial emissions. Unlike energy or transport, where emissions can be cut by switching to renewables or electrification, farming involves complex natural cycles that are not as easily altered.

One major difficulty lies in ***soil and land management***. Practices like ploughing and fertilisation release carbon stored in the soil and produce nitrous oxide, a potent greenhouse gas. While regenerative practices such as no-till farming and cover cropping can help sequester carbon, their effectiveness varies depending on soil type, climate, and land use.

Livestock emissions are one of the most complex aspects of agricultural emissions.. Ruminant animals, such as cows and sheep, naturally produce methane through digestion, and there is currently no simple way to eliminate this without drastically reducing herd sizes. While feed additives and breeding for lower-methane animals show promise, these solutions are still being developed and are not yet widely adopted.

Manure management further complicates emissions reduction. Storing and spreading manure releases both methane and nitrous oxide and while anaerobic digesters can capture some of these gases, they require significant investment and infrastructure.

Energy use on farms, particularly in machinery, irrigation, and heating, presents another difficulty. While electrification and renewable energy can reduce emissions, many farms are located in rural areas with limited grid access, making these transitions costly and logistically complex.

Despite these challenges, innovations in technology, improved farming practices, and supportive policies are gradually making it easier for agriculture to reduce its carbon footprint while maintaining food production and profitability.



In agriculture, staying ahead of the curve is key to future-proofing your business against inevitable change.

4 Decarbonisation strategies for agribusiness

Decarbonisation for primary producers

Decarbonisation is a journey. It involves reducing, sequestering, and avoiding the creation of greenhouse emissions — with the goal of reaching a carbon neutral or net zero status.

But before considering reducing emissions, the first step is to measure the business's emissions or activity to calculate a carbon footprint. This provides a strong starting point and ensures that any emissions reductions can be accurately measured.

Once a baseline is established, this will yield insights into high-intensity emissions sources and enable you to identify easy wins — some emissions are harder to reduce than others. The business can compensate for any remaining emissions through sequestering carbon on their farm, or purchasing offsets if necessary. The process is repeated, usually every year.

While measuring emissions is complicated, it is a necessary step for businesses in the agricultural sector to begin to decarbonise their activities.

Strategic operational changes to reduce emissions

In the agriculture industry, it pays to be ahead of the curve, particularly when it comes to future-proofing your business against change you know is coming. That might involve ensuring you have adequate shelter for your livestock before the storm season, or proactively changing your business operations ahead of incoming regulatory change.

Making changes to the way a business operates is the most effective method of decarbonisation because it directly reduces emissions at their source and can often offer financial benefits. From a business perspective, this approach has a greater impact than carbon offsetting, providing both ecological and economic benefits.

Beyond environmental considerations, agribusinesses can significantly reduce operational costs by making sustainable changes, particularly in energy consumption and land management.

A key consideration for agribusinesses thinking about operational changes is that carbon reduction is a long-term approach. Often it requires a business to transition from practices used for generations to new, innovative methods. Emerging evidence demonstrates these methods not only reduce emissions but can improve soil quality, mitigate erosion and salinity, and produce healthier yields and livestock.

Low-emission fuel

Agricultural machinery, including crop harvesters, tractors, generators and transport vehicles, are essential for business operations. However, fossil-based petrol and diesel are a significant source of emissions and increase the carbon footprint of a business. One alternative is to switch to low-emission or renewable energy fuels such as bio-diesel or solar.

In remote areas with no connection to electricity on the grid, diesel generators would normally be used to pump water from aquifers to feed livestock or water crops. A cost-effective and emission-friendly solution is to use solar panels to power the pump. This not only reduces emissions, but provides long-term financial benefits. The initial investment in solar panels may be recovered through reduced fuel costs and elimination of diesel transportation expenses.

Regenerative agriculture employs methods that restore the land by improving organic soil matter, returning carbon to the soil, and enhancing water retention. This approach increases productivity and leads to healthier crops with greater yields.

Examples of regenerative practices include diversifying crops, rotating livestock paddocks, minimising soil disturbance through zero tillage, and using biochar, manure, and compost to replenish nutrients. By managing land in this manner, we can retain water in the landscape, improve soil health, store carbon, and improve biodiversity.

Natural capital accounting

For generations our farmers have been the stewards of the land, caring for Australia's natural environment. Our environment is essential for our quality of life, providing clean air, fresh water, food, and fibre.

Natural capital accounting (NCA) integrates economic and environmental data to assess changes in ecosystems and their impacts on well-being and the economy. Primarily, it tries to measure the quality of an environment and describe it in simple terms such as financially or through a numerical value. Simplistically, it can be thought of as measuring biodiversity.

NCA calculates the stocks and flows of natural resources in ecosystems, helping farmers demonstrate the benefits of good land management. It supports pathways toward net-zero emissions, trading among farming groups, and accessing carbon reduction incentives like the ACCU Scheme. Additionally, it allows farmers to secure premium prices for their products and tap into biodiversity crediting programs.

Australian organisation, Accounting for Nature[7] has developed a framework that can be used by landowners to measure the environmental assets of project areas or an entire property.

The condition of the assets is measured over time, and shows proof that the landowner is managing their practices. The scope and methods of the audits vary and can include native vegetation, soil and water, birds, koalas and other wildlife.

Certified Environment Accounts give credibility to sustainability claims and can be used to support grant applications, product labelling on food and fibre products and more. While the audits and measurements alone can be valuable for landowners when providing potential investors and can add additional value to an ACCU project.

Seeing the potential of natural capital programs to assist farmers NAB have invested in natural capital research through Farming For the Future (FftF).

Josie Zilm, Agribusiness Executive at NAB, discusses the outcomes of the research so far.

"NAB has partnered with research and change program Farming for the Future to help farmers understand how different types of natural capital can contribute to improved farm business performance. Analysis indicates natural capital is positively correlated with production efficiency, gross margin and earnings before interest and tax (EBIT). NAB hopes to empower all farmers with the knowledge and resources necessary to make informed and strategic decisions about their natural capital investments to achieve greater productivity and profitability."

Finding solutions from farmers overseas

Across the world farmers are addressing the challenge of land management and climate mitigation with innovative solutions, providing valuable insights for Australia's transition.

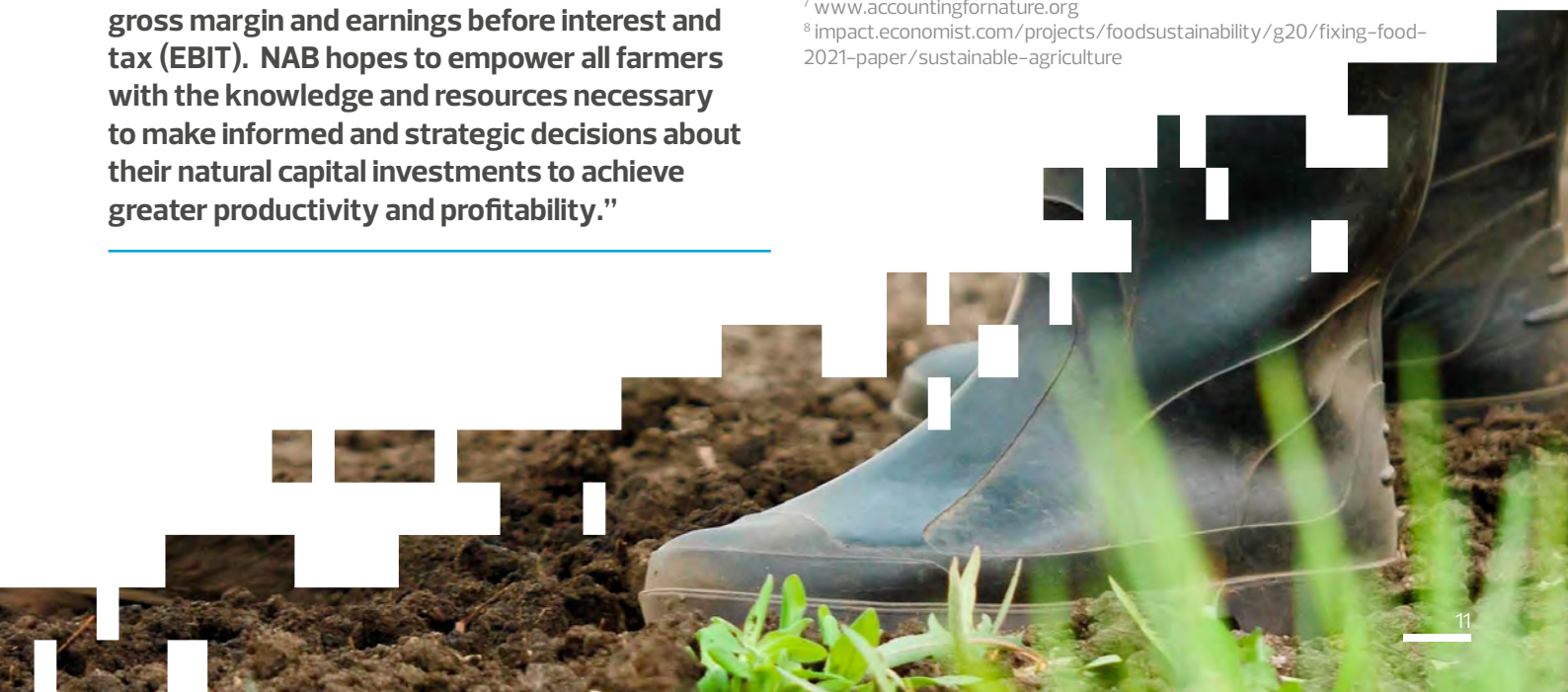
Indonesia has a Nationally Determined Contribution (NDC) under the Paris Agreement that specifically addresses the agricultural sector, alongside industry targets. The government aims to reduce greenhouse gas emissions by 29% by 2030, targeting a decrease in agriculture-related CO2 emissions from 119.66m tonnes to 110.39m tonnes[8]. Key strategies include using low-emission crops (covering 926,000 hectares by 2030), improving water management, slowing land-use changes, and better manure and cattle feed management.

Brazil's Low Carbon Agriculture (ABC) Plan aims to restore 30 million hectares of degraded pastures by 2030, increase the area under zero tillage and reduce greenhouse gas emissions. The program offers low-interest loans to farmers adopting sustainable agriculture methods like no-till farming, restoring degraded pastures, and integrating crops with livestock.

In Europe, Denmark has led the way in sustainable agriculture by employing crop rotations, cover crops, and integrating livestock with crop production to enhance soil health. Farmers return crop residues to nourish the land, and the country's investment in agricultural research and education has strengthened its agricultural sector for both domestic needs and global exports.

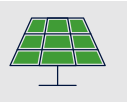
Similarly, Spanish farmers prioritise soil health in their olive groves and vineyards through agroforestry, which combines trees with crops. This practice reduces soil erosion, boosts biodiversity, improves soil fertility, and optimises water usage.

[7] www.accountingfornature.org
[8] impact.economist.com/projects/foodsustainability/g20/fixing-food-2021-paper/sustainable-agriculture



Sourcing energy from nature

Agribusinesses have a lot to gain from switching to renewable energy sources to generate and store their own power. This would reduce or remove their reliance on the grid or fuel-operated generators and reduce energy costs.



Solar

Once expensive to purchase and install, the cost of renewable energy to consumers has reduced over the past decade. For the second year in a row, the cost of large-scale photovoltaic (PV) solar has fallen by 8% and battery costs have fallen by 20%[9].

Landowners can make dual use of grazing paddocks by installing solar panels. The panels are large enough and high enough off the ground to provide shade for the animals in what are often tree-less paddocks. An additional benefit is the grass, when protected by the panels, will be more abundant for the grazing animals.



Wind

Wind turbines are another option for landowners to generate their own clean energy. They require minimal land so they don't interfere with agricultural land used for crops and grazing animals. It is also a popular way to pump bore water on rural properties.



Hydro

Hydropower is one of the most important sources of renewable energy across the world, and we have large-scale hydropower plants here in Australia which provide power to the grid to ease the pressure of peak energy times. In 2022, hydropower made up around a fifth of Australia's clean electricity generation.

A recent study by UNSW[10] found irrigation dams on farms can be connected to generate hydroenergy. Researchers identified micro-pumped hydro energy storage systems could be installed without undertaking costly reservoir construction. The storage systems can be valuable in supporting the uptake of renewable power systems in Australian rural communities.

Lead author of the study, Dr Nicholas Gilmore stated,

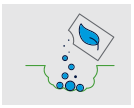
"That's thousands of households that could potentially increase their solar usage, saving money on their energy bills and reducing their carbon footprint."



Energy efficiency

Food manufacturing relies heavily on energy for various production processes, including operating equipment, machinery, heating water, and running refrigeration and cooling systems. Large warehouses also require energy for lighting and temperature control to ensure a comfortable environment for staff. When energy tariffs are high, the cost of this energy consumption can become significant. Moreover, frequent breakdowns and the need for repairs can increase maintenance costs and reduce production output.

By strategically managing energy consumption, agrifood businesses can make substantial savings. One straightforward approach is to turn off equipment when it is not in use. Additionally, being diligent in replacing unreliable equipment and upgrading old machines with newer technology can enhance efficiency, lower costs, and maximise profits.



Land management practices

Fertilisers can enhance crop growth and yield, while pesticides help protect crops from insects and other pests. However, the use of fertilisers and pesticides comes at a cost. The purchase, delivery, and application of these products can strain resources. And while they may initially boost productivity, their use can have detrimental effects on the land. Chemicals, such as nitrates and microplastics found in these products, can deplete soil nutrients.

These pollutants can also leach into the ground, contaminating sources of fresh water and aquifers. This compromises the availability of clean drinking water for both livestock and human consumption, placing additional strain on already limited resources for remote farmers.

Effective land management and the adoption of regenerative agriculture practices can positively impact production and aid in your decarbonisation journey.

Regenerative agriculture employs methods that restore the land by improving organic soil matter, returning carbon to the soil, and enhancing water retention. This approach increases productivity and leads to healthier crops with greater yields.

Examples of regenerative practices include diversifying crops, rotating livestock paddocks, minimising soil disturbance through zero tillage, and using biochar, manure, and compost to replenish nutrients. By managing land in this manner, we can retain water in the landscape, improve soil health, store carbon, and improve biodiversity.

[9] www.csiro.au/en/news/All/News/2024/December/GenCost-2024-25-Draft-Report-released-for-consultation
[10] www.unsw.edu.au/newsroom/news/2023/09/farm-dams-can-be-converted-into-renewable-energy-storage-systems

Reducing the methane of livestock

Australian livestock is a valuable commodity, bringing in **$11.3bn in beef and veal exports and a further $4.7bn in sheep and goat meat in 2022–23**[11].

But methane produced by our sheep and cattle is responsible for about 10% of Australia's annual greenhouse gas emissions. Methane is a naturally occurring gas, however it accelerates global warming faster than the other greenhouse gases so by keeping the amounts produced down we can mitigate emissions and prevent further damage to our environment.

Studies have found that introducing alternative feed to livestock can reduce the methane they produce. Australia has been leading the way with research and investment into anti-methanogenic livestock feedstock supplements.

One feed alternative for beef and dairy cattle with significant benefits is FutureFeed – made from red seaweed (Asparagopsis) – which is harvested and produced here in Australia and under licence of the IP in the US, New Zealand, Canada and Europe.

FutureFeed[12], developed by CSIRO, has found feedstock supplements containing Asparagopsis can reduce the methane emissions of livestock by 80% for beef and 44% for dairy[13]. There is also potential to substitute grass and hay with the feedstock when there are shortages during times of drought.

Innovation and technology

Technological advancements are transforming agriculture in exciting ways, enabling farmers to enhance productivity while reducing their environmental impact. Importantly, these technologies help in addressing both economic and sustainability challenges.

With the help of advanced sensors, drone monitoring, and precision farming tools, farmers can make informed, data-driven decisions that significantly improve both productivity and sustainability. Additionally, technologies such as artificial intelligence are streamlining food and beverage production, making processes more efficient.

Australia is at the forefront of global agricultural innovation, particularly in developing solutions for challenging climates. Our innovations are helping emerging economies such as Africa with hot and dry landscapes and Asian nations with tropical and sub-tropical climates to overcome the challenges and build cost-effective solutions to reduce emissions.

The Australian Government's 2024–25 budget allocated $4.4m to agricultural innovation and research through the Department of Agriculture, Fisheries and Forestry (DAFF). This investment signals a strong commitment to supporting technological advancements in agriculture as we transition to a net zero economy.

[11] www.mla.com.au/about-mla/the-red-meat-industry
[12] www.future-feed.com
[13] www.csiro.au/en/news/All/News/2022/June/Asparagopsis-now-commercially-available-to-beef-producers

Carbon offsets for agribusiness manufacturers

Offsetting, by purchasing carbon credits to compensate for emissions created is an alternative 'quick win' for businesses.

"While the obvious strategy is to decarbonise, the process isn't quick. In a lot of cases, businesses are going to need to offset in order to meet their internal targets." Jacob Elkhishin, National Head of ESG and Climate Services at RSM.

However, we are faced with the situation where there are not enough ACCUs available for the compliance market in Australia, nor are there enough offsets globally to account for the amount of carbon greenhouse gas emissions that have been created and continue to be created globally.

This shortage in carbon offsets presents an opportunity for landholders to start carbon sequestration projects such as reforestation. Eligible projects can earn ACCUs under the Australian Government ACCU Scheme by avoiding, reducing, or storing greenhouse gases.

Each ACCU represents one tonne of carbon dioxide equivalent (tCO2e) emission reductions and can be sold or traded to help businesses offset their emissions. Projects must meet three criteria: newness (not started), additionality (not in response to mandatory obligations), and compliance with methodology and audit requirements.

The integrity of Australian carbon credits is recognised internationally.[14] Projects may include reforestation and energy efficiency, providing landowners with an additional income stream while helping to combat climate change.

[14] chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://carbonmarketinstitute.org/app/uploads/2022/04/Explainer-Integrity-in-Australias-Carbon-Market.pdf

Leasing land

With the scarcity of ACCUs in the market, and fluctuating prices, large companies with compliance requirements will often look to develop and manage their own offset projects "as a way of hedging the pricing around ACCUs over the long term and provide a bit of stability." says Tim Pittaway, Partner, Risk Advisory Services at RSM.

Reforestation and renewable energy projects require large areas of land to create enough offsets for large companies to compensate for emissions, so they will approach land holders in regional areas, creating an opportunity for farmers to sell or lease the land.

Leasing land can provide a considerable amount of income for landholders with non-arable land that would otherwise go unused. But when the land is viable for agriculture, questions have been raised around whether the land can be used for agriculture again.

"Farmers have expressed concerns that they aren't sure, what happens to the turbines, the infrastructure, who cleans up the solar panels when the lease comes to an end? It's an additional cost for the farmer." RSM Australia's Economist Devika Shivadekar explains.

However, like anything, it is important to have contract terms clearly stating the responsibilities of each party for clean-up and disposal of once the project and lease has ended.

Australia is at the forefront of global agricultural innovation, particularly in developing solutions for challenging climates.

5 Financial benefits and other incentives to decarbonise

There can be some resistance to change from agribusinesses and a hesitancy to invest in change when there is an element of risk involved – no tangible outcomes.

RSM advisors have spoken with several agribusiness owners who are sitting on the fence and waiting to see what happens. And then there are businesses that are adopting more quickly and taking the opportunity to decarbonise their business to stay ahead in a competitive market.

"Adopting sustainability initiatives early, such as processes around decarbonisation and doing things in a more sustainable way will make businesses potentially more attractive in the market." Elkhishin adds.

Conversely, the administration involved in starting a carbon project and the investment needed to change operational methods that have been around for decades can be both daunting and expensive.

However, specific assistance to ease the burden is available – lenders look favourably on businesses making steps to decarbonise and have loans specifically for these businesses.

"Our green loans provide discounted rates for sustainability-related investments such as renewable energy, water infrastructure, and carbon projects. Then there's sustainability-linked finance that ties discounted pricing to the achievement of specific sustainability KPIs negotiated with the customer."

NAB also offers a range of loans especially for agribusinesses. "One of the ways NAB is supporting the transition of the agricultural sector is to provide finance for the investments necessary to reduce emissions, adapt and build resilience and be supply-chain ready." Josie Zilm, Agribusiness Executive at NAB, explains.

"Agribusiness green loans are designed for use on eligible activities which support climate adaptation, resilience and emissions reduction."[15]

"Investment in more sustainable practices supported by NAB Green Finance for Agribusiness may help to reduce business costs such as energy, fertiliser and water costs. Such investments may also build resilience and mitigate risk from climate related events, enhance business productivity and support sustainable farming claims that may strengthen engagement with the supply chain."

Grants

Government grants are another way for agribusinesses to fund sustainability initiatives in their operations. Typically, grant funding comes in the form of cash with the expectation that the applicant matches the funding, sharing the costs with government. Alternative models exist such as no interest, no recourse loans.

Recent examples of grant programs include the Federal Government's Climate-Smart Agriculture Program, funded by the Natural Heritage Trust, which is supporting the agriculture sector in addressing climate challenges through $302.1 million over five years.

This program aims to enhance agricultural productivity and sustainability by assisting farmers in adopting climate-smart practices, harnessing carbon and biodiversity incentives, and implementing sustainable resource management.

Funding is available for partnerships and innovation grants to develop climate-smart technologies and new sustainable practices, and capacity building grants to help farmers access sustainable agriculture methods.

[15] www.nab.com.au/business/loans-and-finance/agribusiness-loans/green-finance-agri

The Federal Government is also providing grants funded by its $5 bn Future Drought Fund. $80 m from the Fund has been split equally between two grants program. The Long-term Trials of Drought Resilient Farming Practices Program funds projects that investigate innovative farming techniques through science-based long-term trials, building drought and climate resilience for Australian farmers. Projects that focus on achieving and measuring transformational change and impact at landscape scale are supported by the Resilient Landscapes Program.

An example of no interest, no recourse loans is through Western Australia's Carbon Farming and Land Restoration Fund which offers loans for soil carbon and revegetation projects. Funding is paid upfront and repaid over a 10-year period through the ACCUs generated by the project. Historically, Queensland has provided similar funding via its $500m Land Restoration Fund.

"It's an ever changing and evolving landscape driven by the election and budgetary cycles at both the federal and state levels. Competition is fierce with only the top 5–10 per cent of applications awarded funding. Success will be enjoyed by those that can craft a compelling, fact-based narrative around their project to demonstrate strong alignment to government objectives. Having an expert in your corner throughout the grant life-cycle to help you to stay across funding opportunities and prepare compelling applications is vital," Edward Day, Senior Manager — Government Grants at RSM Australia explains.

Government grants are another way for agribusinesses to fund sustainability initiatives in their operations.

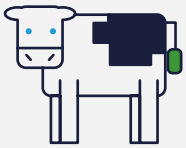


What about carbon farming?

Carbon farming is one of the most talked about decarbonisation mechanisms in both the agriculture industry, and Australia wide. There are also a lot of misconceptions around how it works and the impacts for farmers and agribusinesses.

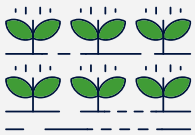
The Australian Carbon Credit Unit (ACCU) Scheme is a government-backed initiative that incentivises landholders, farmers, and businesses to reduce greenhouse gas emissions or increase carbon sequestration. It is a key part of Australia's efforts to decarbonise industries, including agriculture, by creating a market for carbon credits. Under the ACCU program, participants earn ACCUs for projects that either reduce emissions (by cutting methane, nitrous oxide, or carbon dioxide emissions through improved practices), or sequester carbon (by capturing and storing carbon in soils, vegetation, or other long-term sinks). Under the program, each ACCU represents one tonne of CO_2-equivalent (tCO_2-e) reduced or stored and can be sold to The Australian Government under the ACCU Scheme, businesses seeking to offset their emissions as part of voluntary carbon markets, or retained by the project manager to offset their own carbon emissions.

Key types of carbon offsetting projects in Australia



Livestock management

- Animal effluent management and waste treatment
- Beef cattle herd management



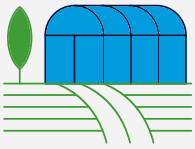
Vegetation

- Plantation Forestry
- Reforestation and afforestation
- Avoided clearing of native forestry
- Savanna fire management – sequestration and emissions avoidance



Soil

- Estimating sequestration of carbon in soil using default values
- Estimating soil organic carbon sequestration via measurement and models



Other

- Switching fertilisers for irrigating cotton
- Tidal restoration of blue carbon ecosystems

Benefits and challenges of carbon farming projects for primary producers

Participating in the ACCU Scheme can provide farmers with a valuable new revenue stream by allowing them to generate and sell carbon credits. By adopting carbon farming methods such as soil carbon sequestration or reforestation, farmers can improve long-term soil health, water retention, and biodiversity, leading to more resilient and productive agricultural systems. Many of these practices also enhance farm sustainability by reducing reliance on synthetic inputs and improving overall efficiency. Additionally, involvement in carbon markets positions farmers as leaders in climate-smart agriculture, helping them future-proof their businesses against evolving environmental regulations and market expectations.

Despite its benefits, the ACCU Scheme comes with challenges that farmers must consider before participating. One of the biggest hurdles is the verification and monitoring process, which requires strict adherence to measurement and reporting guidelines to ensure emissions reductions are credible and long-lasting.

Market price volatility is another concern, as the value of ACCUs fluctuates based on demand from government and private sector buyers, making revenue from carbon credits uncertain. Additionally, carbon farming projects require long-term commitment, often spanning decades, to maintain carbon storage and ensure emissions reductions persist.

This long-term commitment creates a complex issue for farmers in land competition.

Balancing carbon sequestration goals with the need to maintain productive farmland is a critical consideration for farmers looking to participate in the program.

Tim Pittaway, Partner, Risk Advisory Services at RSM – who is also a registered greenhouse and energy auditor – sees the opportunity of carbon projects for property owners.

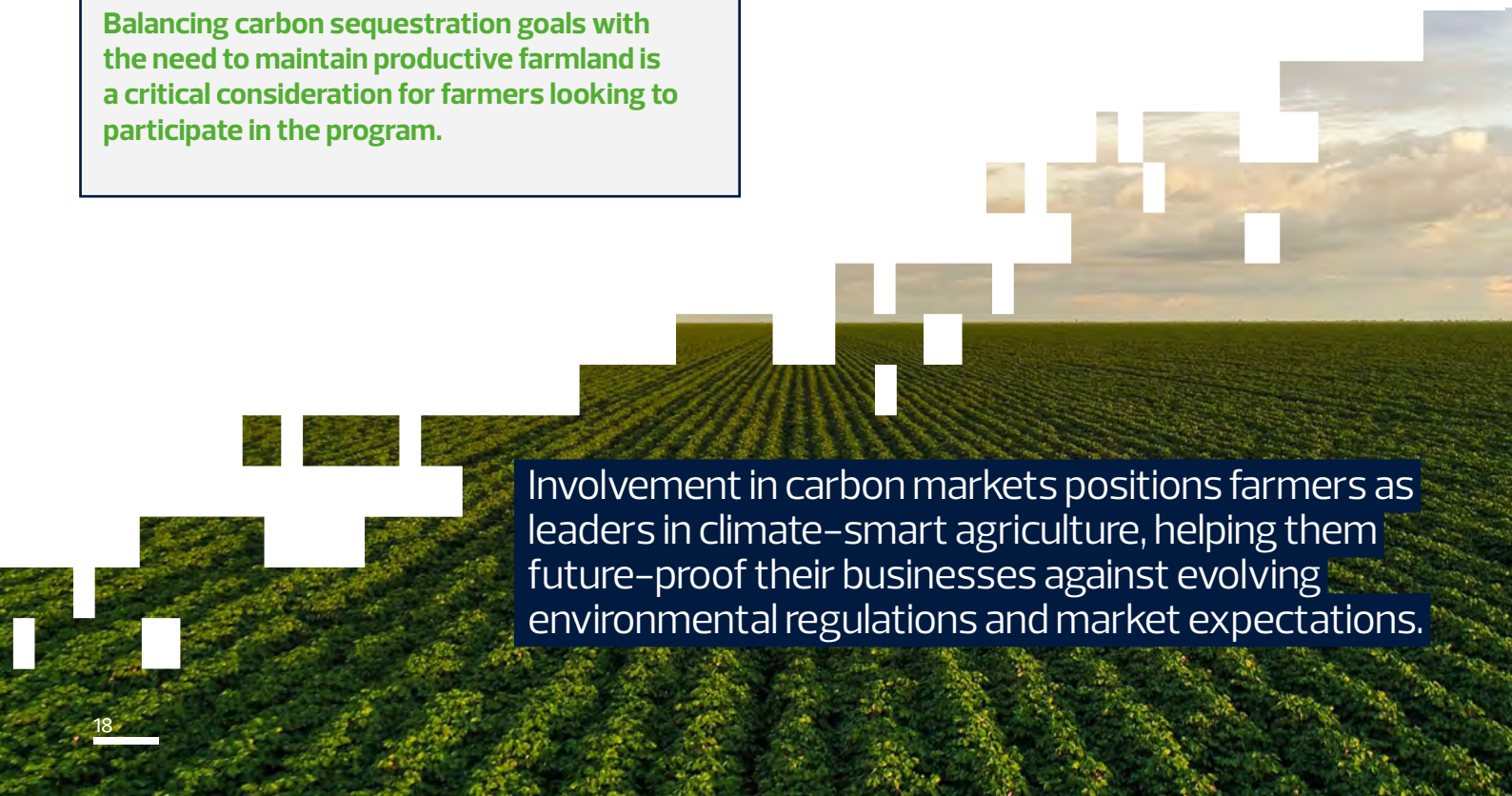
"If they've got cattle or sheep, they might need to de-stock to some degree and then replace that income with income from selling ACCUs."

Pittaway and his team work closely with agents such as Climate Friendly who develop these projects with landowners and pastoral businesses.

"For a soil carbon project, you might be changing the way that you're cropping or rotating herds or whatever, and yeah, about like five years or something to see a change and to start being able to generate ACCUs."

One challenge for landholders is the set-up of ACCU projects. They need to be formally registered with the Clean Energy Regulator (CER), and the application process can take time. And in order to meet newness requirements no soil management or planting can take place before the project has been approved.

However, there can be a silver lining as Pittaway suggests, "Even if a project doesn't end up getting registered for ACCUs, the main thing is that they have made changes to the way the property is managed, and the benefits will outweigh the effort. In the case of a soil carbon project by adopting regenerative farming practices, they reduce chemical use."



Carbon offsets and reductions for agribusiness manufacturers

"While the obvious strategy is to decarbonise, the process isn't quick. In a lot of cases, businesses are going to need to offset in order to meet their internal targets." Jacob Elkhishin, National Head of ESG and Climate Services at RSM.

But, we are faced with the situation where there are not enough ACCUs available for the compliance market in Australia, nor are there enough offsets globally to account for the amount of carbon greenhouse gas emissions that have been created and continue to be created globally. This shortage in carbon offsets presents an opportunity for landholders to start carbon sequestration projects such as reforestation. Eligible projects can earn ACCUs under the Australian Government ACCU Scheme by avoiding, reducing, or storing greenhouse gases.

Agribusiness manufacturers play a significant role in the food and agriculture supply chain, contributing to emissions through energy-intensive processes such as raw material processing, transportation, packaging, and waste management. Given the sector's reliance on fossil fuels, carbon-intensive fertilisers, and large-scale logistics, carbon offsets offer a strategic tool to help manufacturers mitigate their environmental impact while transitioning towards lower-carbon operations.

For manufacturers, carbon offsets can serve as an interim measure while they work to decarbonise core operations, as well as a 'last resort' to offset emissions that can't be removed. By investing in projects that remove or reduce carbon emissions elsewhere, manufacturers can balance their carbon footprint and move closer to carbon neutrality or net-zero targets. Additionally, carbon offsets can enhance corporate sustainability credentials, meet regulatory requirements, and align with consumer and investor expectations for climate responsibility.

Types of carbon offsets

Carbon offsets come in various forms beyond just reducing tonnes of carbon, including nature-based solutions like reforestation, technology-driven approaches such as carbon capture, and energy-focused initiatives that improve efficiency and drive sustainable investment.

Nature-based solutions

Nature-based offsets are often chosen by businesses looking for cost-effective, scalable solutions with broad environmental benefits. These can allow businesses to purchase carbon offsets that support biodiversity and overall environmental outcomes. Nature-based solutions include projects like Reforestation and Afforestation projects (such as tree plantings), Soil Carbon Sequestration, and Wetland and Peatland Restoration.

These type of offsets have a strong record in removing carbon from the atmosphere and providing genuine offsets, and so are often prioritised by businesses looking to purchase offsets.

Technology-based solutions

Technology-driven offsets may be preferred by companies seeking to invest in new technology, diversify their business, or simply find immediate and measurable carbon reductions. While many of these are in their infancy and not yet available as offsets in Australia, early awareness can help businesses stay at the forefront of this space These offsets are often linked to innovation and industrial advancements such as:

Methane Capture from Livestock Waste, where biodigesters that convert manure into biogas are used to reduce methane emissions.

Biochar Production: While Biochar projects are in their infancy, the industry is showing significant promise in reducing emissions. Funding projects that convert agricultural waste into biochar, a carbon-rich material that improves soil quality while locking in carbon, may support emissions reductions.

Carbon Capture and Storage (CCS) which refers to technologies that capture CO_2 emissions from industrial processes and store them underground. It should be noted that CCS projects are unproven at commercial scale and any investor or offset purchaser should consider CCS projects carefully before going ahead.

Energy management and investment

Businesses aiming to transition toward low-carbon energy sources often opt for renewable energy offsets, which help displace fossil fuel-based power generation. This may take the form of Solar and Wind Energy Projects, Biomass and Bioenergy Solutions, or more simply Energy Efficiency Initiatives reduce energy consumption and emissions.

The choice of offset type depends on factors such as cost, scalability, additional environmental benefits, and alignment with corporate sustainability goals. A diversified approach, combining multiple offset strategies, can enhance impact and resilience against market fluctuations.



Case study

From Paddock to Profit: How Karinella Farm is turning soil health into carbon credits

Ian Clarke, a farmer from Goomalling, WA, has been running Karinella Farms since the 1970s. Over the years, he has witnessed how chemical-intensive farming practices have degraded soil health. Determined to reverse this trend and seeing an opportunity to create lasting change, Clarke partnered with LawrieCo and AgriProve in 2022 to establish a broadacre soil carbon project.

"It's relatively new. As far as I know, there's only one other broadacre farmer in Western Australia, aside from me, who's had a carbon audit with the Clean Energy Regulator," he notes.

Six individual carbon projects cover approximately half of the property, allowing Clarke to sequester carbon through regenerative farming practices alongside traditional high-production farming. By adopting rotational grazing and mixed species cropping practices, Clarke aims to improve soil biology while generating Australian Carbon Credit Units (ACCUs).

"It's all about photosynthesis," Clarke explains. "The plants use sunlight and water to grow, but as a by-product, they sequester carbon back into the soil. The idea is to build carbon stocks above the baseline levels we've established, and that's where the credits come in."

The process begins with determining a baseline for the project, with soil samples taken at varying depths and assessed for carbon levels. Satellite imagery then monitors changes in soil carbon over time by tracking plant health and chlorophyll levels. These monitoring systems help determine when to return to the project site and reassess the carbon levels. Clarke has already seen tangible results. "In two years, we've taken 2,439 tonnes of carbon out of the atmosphere and put it back into the soil," he says. This achievement equates to over 8,500 ACCUs, with credits valued at approximately $37 each. While financial gains are significant, Clarke emphasises the additional benefits: "Building soil carbon helps the land hold water better and the soil become more resilient. And it's been noticeable, we're far better off in the dry seasons."

However, transitioning to a carbon farming model wasn't without challenges. Clarke faced scepticism, particularly from banks concerned about the perceived impact of a 25-year carbon project on land values. "They worried it would devalue the farm or limit its saleability," Clarke explains. He also stresses the importance of managing risks, such as the potential need to repay the credits if the carbon levels in your soil go down. "AgriProve has an insurance policy for that, but it's something you've got to manage carefully," he advises.

For Clarke, the project is a natural extension of his commitment to soil health, something he's been passionate about since returning to the family farm in 1973. "When I started farming, the soil was healthier — it didn't have all the acidity from fertilisers or the damage from farm chemicals. What we're doing now is about finding a balance between high-production agriculture and regenerating the land." One of the most exciting aspects for Clarke is how carbon farming introduces a new revenue stream for farmers. "It's like having another crop, but with fewer input costs," he says. He notes the importance of accounting firms like RSM in advising farmers through carbon projects. "They've been invaluable in understanding the financial and regulatory side of things, which makes a huge difference."

Clarke is confident that soil carbon projects will become more widespread. "Farmers are interested in what we're doing, and there's already a shift in how people talk. It's been a big learning curve but also an opportunity to do something good for the land and future generations. Nature's been doing this far longer than us, and we're just starting to catch up." Clarke's journey is a testament to the potential of regenerative agriculture and carbon farming. "I just wish I was 30 years younger. There's so much we can do, and it feels good knowing we're heading in the right direction."





Left: Ian and Callum Clarke in front of the farm's boomspray which is being used to spray digest fungi and nutrition onto the wheat stubble residue to sequest the carbon from the stubble into the soil.

Right: Callum Clarke with the farm's sheep dogs Ben and Elsa, with the wheat crop above the ground. Under the wheat crop, carbon credits have been credited.

Photos taken from the same paddock in the same location registered as a carbon project.

6 Challenges to overcome

The global agricultural sector is facing challenges of population growth, climate change, and evolving geopolitical dynamics. By 2050, global food demand is projected to increase by more than 50% and nearly 70% for animal-based foods[16], placing immense pressure on agricultural systems. As a major agricultural exporter, Australia's response to these challenges will have significant global implications.

Australia's agricultural sector is crucial in global food security, producing food for around 75 million people in domestic and international markets. In the 2022-23 financial year, Australia experienced a record high of $80.4b in agricultural, fisheries and forestry exports. Key markets include ASEAN nations, Japan, Indonesia, and China, with China accounting for $17b in trade[17].

With 70% of total agricultural production exported, this concentration presents both opportunities and vulnerabilities[18]. However, climate change poses significant challenges to Australia's export-driven model.

International trade dynamics add another layer of complexity, especially in light of the new US government's trade tariffs, which will impact the food supply chain worldwide. Trade tariffs and shifting diplomatic relationships can rapidly alter export opportunities, forcing agricultural businesses to develop more adaptive and diversified strategies.

Although Australia won't be directly affected as we export very little agricultural produce to the US, it could cause a reduction in exports of fresh produce, food and beverages to other countries. The main concern for Australia's agribusinesses is our strong demand for agricultural produce from China. The US tariffs could further weaken China's economy, potentially reducing demand for Australian agricultural produce and halting trade.

As RSM Economist, Devika Shivadekar, notes, "Australia's agricultural exports, although diversified to a certain extent, are not enough to offset China's demand."

This market concentration, combined with climate volatility, creates a complex risk environment for Australian producers who rely on export income to maintain soil quality and sustainable farming practices.

Competition for land use

Land use competition is intensifying globally as nations contend with food security, renewable energy expansion and climate mitigation goals. The World Resources Institute projects that by 2050, we'll need nearly 600 million hectares of additional agricultural land to meet food demand while simultaneously requiring vast areas for carbon sequestration and renewable energy infrastructure[19].

Eurostat data[20] shows that agricultural land in the European Union decreased by 5.3% between 2012-2022 due to urbanisation and renewable energy projects, prompting new policies for integrated land use including mandatory agrivoltaic designs for large-scale solar installations. The scale of the land needed for carbon dioxide removal is significant. A Land Gap Report[21] estimates approximately one billion hectares of land is required to meet global climate pledges in full. **Of this total, 470-490 million hectares require the use of reforestation and afforestation, and a further 440-570 million hectares require the restoration of ecosystems and degraded lands.**

Implications for farmers

While this happens at the global level, ultimately, it is farmers who are making decisions on how they utilise their land. As pressure to decarbonise mounts and government support and grants are available to support reducing carbon emissions, but it is important that primary producers are informed on how these can affect their farms and their businesses.

Carbon offset programs allow farmers to earn financial compensation by adopting practices that capture or reduce carbon emissions, such as planting trees, restoring wetlands, or enhancing soil carbon sequestration.

[16] www.wri.org/research/creating-sustainable-food-future
[17] www.agriculture.gov.au/about/news/overview-aff-exports-2022-23
[18] www.dfat.gov.au/about-us/publications/trade-investment/trade-at-a-glance/trade-at-a-glance-2015/agriculture-and-food-trade
[19] www.wri.org/research/creating-sustainable-food-future
[20] ec.europa.eu/eurostat/web/products-eurostat-news/w/DDN-20230403-2
[21] landgap.org/2023/update

While these initiatives can provide an additional revenue stream, they also create difficult trade-offs between maximising carbon storage and maintaining food production. Farmers must weigh the economic benefits of participating in carbon offset markets against the potential risks of reduced agricultural output and long-term changes to land use.

One of the main dilemmas farmers face is whether to allocate land for carbon sequestration projects or continue using it for food production. Programs that promote afforestation or reforestation often require land to be taken out of farming, particularly for fast-growing tree plantations that act as carbon sinks. While this can provide long-term financial returns through carbon credits, it may reduce the amount of land available for crops and livestock. This shift can be particularly concerning in regions where food security is already a challenge, as less farmland means lower food production and potentially higher prices. Additionally, once land is committed to carbon sequestration projects, contractual obligations may limit a farmer's ability to return it to agricultural use, making these decisions even more complex.

Another major consideration is soil carbon sequestration, which involves practices such as no-till farming, cover cropping, and agroforestry. Unlike afforestation, these methods allow farmers to maintain agricultural production while still capturing carbon. However, the financial incentives for soil-based carbon sequestration are often lower and less predictable than those for forestry-based offsets. Measuring and verifying soil carbon storage can also be complex and costly, making it difficult for smaller farms to participate. As a result, farmers must evaluate whether the potential income from carbon credits justifies the changes required in their farming practices, particularly if these adjustments lead to lower short-term yields or increased labour and input costs.

Livestock farmers also face difficult decisions regarding carbon offset programs. Since methane emissions from cattle are a significant source of agricultural greenhouse gases, some programs incentivise reducing herd sizes or implementing methane-reducing technologies, such as feed additives. However, cutting livestock numbers directly impacts meat and dairy production, which could lead to economic losses if carbon credit payments do not fully compensate for reduced output. For many farmers, particularly those in regions where livestock is a primary income source, participating in offset programs may not be financially viable unless there are strong support mechanisms in place.

Ultimately, carbon offset programs force farmers to make strategic decisions about how they balance environmental sustainability with economic survival. While these programs can provide financial incentives to adopt low-emission practices, they also introduce uncertainty and trade-offs that must be carefully managed. Policymakers and carbon market designers need to ensure that offset initiatives are structured in a way that supports both climate goals and food security, offering flexible options that allow farmers to integrate carbon sequestration without significantly compromising food production. By aligning incentives with practical and scalable solutions, carbon offset programs can contribute to decarbonisation while still enabling farmers to meet the growing global demand for food.

Policymakers and carbon market designers need to ensure that offset initiatives are structured in a way that supports both climate goals and food security.

7 Key considerations

With over half of Australia's land dedicated to agriculture, strategic land use optimisation is crucial as the sector transitions to low-carbon practices. Population growth will increase demand for food production land, while climate mitigation goals require space for carbon sequestration projects.

Dual-purpose land-use strategies offer potential solutions. Examples include integrating solar farms with agricultural production and implementing regenerative farming practices that simultaneously produce food and sequester carbon.

There has been a steady interest in ACCUs since the Scheme started, The Clean Energy Regulator received 500 applications for new ACCU projects in 2023-24, with over half of the ACCUs issued being environmental plantings and regenerative agriculture[22]. While these projects demonstrate the sector's growing role in emissions reduction, they also highlight the challenge of balancing carbon storage with food production.

Research by the Australian Farm Institute emphasises that while carbon farming offers income diversification, careful planning is essential to prevent the permanent loss of prime farming land[23].

"There is going to be competition for agricultural land wherever it is located", says Ross Paterson, RSM's National Agribusiness Leader.

The key going forward is recognising there is a place for everyone, but we need to be thoughtful about how we make it work. We don't want to see Australia's food bowl shrink because land is being taken over for projects like solar panels, restricting access for grazing or other agricultural uses. This would lock out the land's significant production potential for cattle, sheep, or other livestock and limit it solely to power generation. It seems counterproductive if we end up in a situation where agriculture is crowded out in favour of renewable energy generation."

Carbon sequestration methods vary in their effectiveness and permanence. A CSIRO assessment of *Australia's carbon sequestration potential*[24] indicates that Australian agricultural soils can lose stored carbon quickly during droughts or with management changes. While forest-based storage offers greater stability, it requires ongoing protection from fires, pests and climate impacts.

The Food and Agriculture Organisation has also warned that mismanaged competition for land could reduce global food production capacity by up to 8% by 2050[25].

For individual farmers, these pressures translate into complex business decisions. Each hectare must work harder to deliver both productivity and environmental outcomes.

There is a direct alignment between productivity increases and reducing emissions, Paterson explains. "If you can drive up your productivity, if you can turn up more kilos per hectare, if you can grow more tons of wheat per hectare, whatever it might be from a farming perspective, then that's actually going to be reducing your emissions."

For Australia's agricultural sector, these considerations highlight the need for:

- Robust measurement and verification systems for carbon sequestration
- Clear legal frameworks for long-term land management obligations
- Risk management strategies for natural disasters and climate impacts
- Integrated planning approaches that optimise land use across multiple objectives
- Policy mechanisms that protect prime agricultural land while supporting emissions reduction efforts

Success in managing these competing land use demands requires a balanced approach that protects both agricultural productivity and environmental outcomes. By implementing robust frameworks and encouraging innovative land use solutions, Australia's agricultural sector can maintain its crucial role in global food security while contributing to climate change mitigation. The key lies in developing flexible, integrated approaches that support both current farming needs and future sustainability goals.

[22] cer.gov.au/document/annual-report-2023-24
[23] www.farminstitute.org.au/wp-content/uploads/2023/12/Ag2050_LAND-USE_Discussion-Paper_DEC-2023.pdf
[24] www.csiro.au/en/research/environmental-impacts/emissions/carbon-dioxide-removal/carbon-sequestration-potential
[25] www.who.int/publications/m/item/the-state-of-food-security-and-nutrition-in-the-world-2024



Make critical decisions with confidence

8 Conclusion

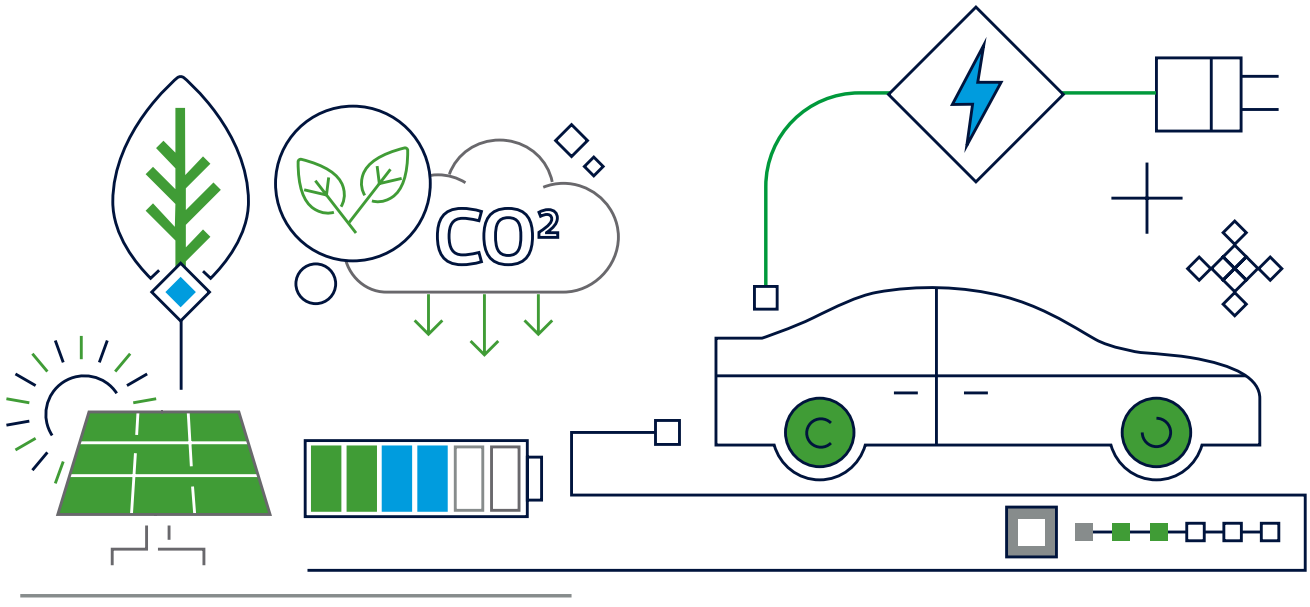
The transition to low-carbon agriculture demands a strategic approach that involves all agribusinesses prioritising operational improvements over carbon offsets. While offset projects do play a role in the sector's emissions reduction strategy, evidence suggests sustainable success comes from fundamental changes to agricultural practices and systems.

Experience shows that effective decarbonisation in agribusiness begins with operational improvements. These include adopting regenerative farming practices, implementing water-efficient systems and optimising resource use. Such changes deliver both emissions reduction and enhanced business resilience.

Previous offset projects in the agricultural sector demonstrate both opportunities and limitations. While the Clean Energy Regulator reports significant uptake of land-based ACCU projects, challenges around permanence and agricultural productivity highlight the need for careful planning. Experience shows that successful projects integrate carbon storage with maintained or improved agricultural production.

A phased approach to decarbonisation will be necessary for agribusinesses. Initially targeting quick wins and planning for major operational changes and integrated offset projects that take longer to benefit from.

Success requires viewing decarbonisation not as a compliance exercise but as a fundamental business transformation. By prioritising operational improvements and treating offsets as supplementary tools, Australian agriculture can maintain its crucial role in global food security while contributing to climate change mitigation.



9 Demystifying terminology – quick reference guide

Term	Meaning
Australian Carbon Credit Units (ACCUs)	Australian Carbon Credit Units (ACCUs) are also known as carbon credits. These carbon offsets are tradable certificates that represent the reduction or removal of one tonne of carbon dioxide equivalent emissions. ACCUs can be sold for income or surrendered to reduce your own carbon footprint. It is important to note that not all carbon farming is the same as earning ACCUs. A farmer or land manager might decide to do carbon farming activities: ▪ To earn ACCUs they can sell to generate income. ▪ To reduce their carbon footprint. ▪ To get a lower-interest sustainability loan from a financier. ▪ To meet requirements from their supply chain.
Carbon emissions	The term 'carbon emissions' generally refers to the release of greenhouse gases like CO_2, CH_4, and N_2O, which contribute to global warming, with their impact measured against carbon dioxide. One tonne of carbon emissions may include many gases, but is communicated as carbon emissions for ease.
Carbon Intensity	The amount of carbon emissions produced per unit of output, such as per kilogram of food or per hectare of farmland.
'Carbon neutral' and 'net zero emissions'	The terms 'carbon neutral' and 'net zero emissions' are commonly used to describe taking action to reduce GHG emissions and increase carbon storage and taking other steps, such as the use of offsets, to balance the remaining emissions. Carbon neutrality is commonly described in terms of balancing all GHG emissions and carbon storage. It is sometimes described only in terms of carbon dioxide rather than all GHGs. Net zero is commonly described as taking steps to reduce all GHG emissions as much as possible and to use carbon storage to balance remaining emissions.
Enteric Fermentation	The digestive process in ruminants that produces methane as a byproduct.
Scope 1, 2, and 3 Emissions	Categories used to classify carbon emissions: ▪ Scope 1 – Direct emissions from owned or controlled sources (e.g., farm machinery, livestock). ▪ Scope 2 – Indirect emissions from purchased electricity or energy. ▪ Scope 3 – Indirect emissions from the supply chain, such as fertiliser production and product transportation.



Success requires viewing decarbonisation not as a compliance exercise but as a fundamental business transformation.

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ACKNOWLEDGEMENTS

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