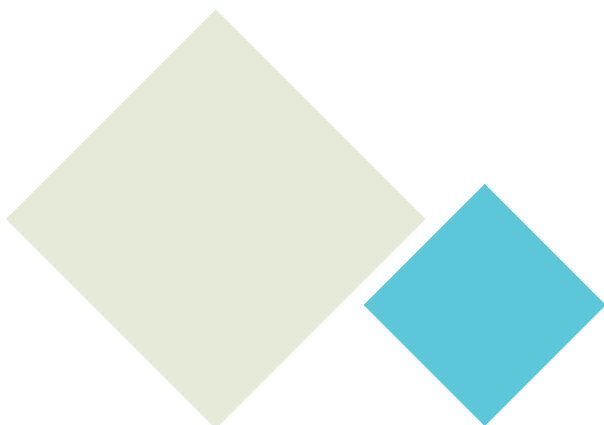




**BROADACRE
AGRICULTURE'S
OPPORTUNITY TO
LOWER EMISSIONS**



Executive **SUMMARY**

Farmers and the agriculture industry have a very important role to play in the road to achieving net zero emissions, but they need the support, evidence and practical experience to help them make the changes required. With the right tools to support decision making, farmers can make choices that will be both environmentally and economically advantageous to them.

Stakeholder feedback indicated there are strong opportunities for improving sustainability in agriculture through renewable energy development including lowering the cost of intensive food production e.g. ducks, diversified income for landholders and broadacre farmers e.g. wind and solar farms, and substantial growth in agriculture and related industries. However,

there is a gap in expertise to help farmers innovate in an area that is not their core-business, emissions reduction information, knowledge and support for farmers, advisors and influences in agriculture is limited and decision-making tools for farmers that link to existing data and financial models are not widely used.

Agriculture's opportunity PROJECT IDENTIFIED OUTCOMES

OUTCOME 1:

WSM region and farming community seen as leaders in net zero emissions agriculture.

OUTCOME 2:

Cohesive and collaborative approach to guide development of policy, research and tools.

OUTCOME 3:

Farmers have the right channel to drive the agenda rather than be dictated to.

Agriculture's opportunity

PROJECT IDENTIFIED OUTPUTS

OUTPUT 1: AN INSTRUMENT, TOOL OR APP

- Action: Understand the data farmers currently collect and how it can be used to make better business decisions. Use the data to conduct desktop analysis into soil and carbon capture and translate into a user-friendly format that helps farmers understand their opportunities.
- Action: Promote utilisation of tools and apps developed. Allowing farmers to easily see the carbon capture and cash flow relationship, will make success easier.

OUTPUT 2: AGRICULTURE MARKETABILITY OPPORTUNITY

- Action: Develop supply chain analysis to understand the opportunity/market for net zero emissions foods and ingredients, e.g. net zero flour enabling bakeries to sell zero emission bread.
- Action: Complete desktop research to understand consumer behaviour and consumer demand for zero emission products. Connect with private industry to understand what they are doing in this space.
- Action: Utilise research undertaken by universities such as CSU to highlight opportunities to entrepreneurs. Incentivise businesses that set up in the region to utilise net zero emission regional products.
- Action: Develop a net-zero or low emission agriculture product from the region as a trial, for instance the Wimmera and Mallee region is on the pathway to net zero in some production areas, and trial marketability of the output as net zero carbon.

- Action: Build on leading knowledge of market-based instruments to increase market access for regional products through net zero emission branding and marketing strategy.
- Leverage existing highly successful projects and initiatives in the region including: Australia's longest running landholder survey, longest continuous cropping trials in the world at Longerenong college through Agriculture Victoria, and the Wimmera Catchment Management Authority who is a leader in Australia for market-based instruments.

OUTPUT 3: REGIONAL AWARENESS AND BRANDING

- Action: Bring the right people, projects and organisations together to enhance awareness and collaboration of what is happening in the region around agriculture and emissions reduction.
- Action: Establish an organisation, or utilise an existing organisation, to represent farmers at a regional level in emissions and agriculture policy setting arenas.
- Action: Position and promote Western Victoria as a leader in carbon neutral and zero emissions agriculture practices to food producers and retailers. Commit marketing dollars to create a campaign to highlight region's net zero emissions achievements.

The region is well-positioned to access available project funding with a strong and well-respected agriculture industry and highly successful existing farmer education and consultation groups that are central to practice change in the agriculture industry. As a result, the region has been successful in gaining funding for the following projects which are now underway:

- Wimmera Broadacre Farming Net Zero Emissions Project
- Roadmap to Zero Grampians Agriculture Project (R2ZGAP)

The Wimmera Broadacre Farming Net Zero Emission Project and the Roadmap to Net Zero Emissions Grampians Agriculture Project contribute significantly toward achieving Output 1 and building community awareness and knowledge (part of Output 3(a)). The outcomes of these two innovative and critical projects will inform project future proposals for recommended Outputs 2 and 3.

By capitalising on the region's existing agricultural strengths and its relative advantage in rainfall and soil types, the region has the opportunity to lead in the development of economically viable, environmentally sustainable agricultural practices. Sustainable farming practice, using scientific analysis of the landscape to maximise productivity and minimise environmental impact, is key to developing resilience of both farms and communities impacted by climate variability.

Broadacre agriculture’s opportunity to LOWER EMISSIONS

BACKGROUND

The importance of agriculture to the region means that climate change will pose a particular challenge. The Victorian Government anticipates the region will experience high temperatures, more frequent and more intense downpours, and less rainfall due to climate change. Working toward net zero emissions will improve the sustainability of the Grampian’s region, its communities and lifestyle into the future.

Agriculture is the backbone of the Grampians region economy with 78% of land area in the region dedicated to agriculture and forestry.

EMISSIONS

The Grampians region has set an ambitious target of achieving zero emissions by 2050.¹ As the dominant industry in the region, agriculture is also currently the largest source of carbon emissions. The roadmap to zero identified that agriculture accounts for almost half of regional carbon emissions and is predicted to increase as a percentage of total emissions. Emissions in agriculture primarily result from animals, fertilisers and fuel.

Since the 1980’s Australian farmers and agricultural researchers have been global leaders in the development and adoption of

sustainable farming techniques. Farmers in the region are already leaders in many aspects of agricultural adaptation to climate change impacts and decline in natural capital, including adoption of no-till farming and cropping with one pass, practices that boost productivity, reduce costs and also reduce emissions by using less fuel and fertiliser. With these existing practice improvements alone, emissions from agriculture and forestry are expected to fall by 4% by 2050. There is an opportunity to achieve more in agriculture to support emissions reduction in the region.

THE WIMMERA SOUTHERN MALLEE

The agriculture, forestry and fishing industry sector makes the greatest contribution to economic output in the region including:



4,649

Jobs

\$1.3B

Economic output

1 www.gnet.org.au/roadmap-to-zero-page

2 Grampians Regional Roadmap to Zero Emissions Technical Report, 2019



OPPORTUNITIES

Agriculture is the single most powerful lever identified in the Grampians roadmap to zero to reduce regional carbon emissions. Farming practice changes offer the chance to significantly reduce emissions from agriculture and provide offsets to assist other industry sectors. Change in agricultural practices such as mosaic farming approaches and more extensive sequestration of carbon in trees and soils have the potential to contribute over half of the required reduction in emissions for the region.

POLICY

With the right policy settings in place and the right tools available, the region's farmers will see the economic benefits of implementing these changes and the region will enjoy the environmental benefits. Early and effective action in agriculture to reduce emissions is especially important because early movers will be better placed to capitalise on market opportunities arising from the transition to net zero emissions and changing government policy.

The primary local opportunities to reduce emissions from agriculture include:

- Increasing on farm vegetation and broadacre regeneration
- Boosting soil carbon
- Use of dietary supplements and/or vaccines to reduce ruminant emissions
- Reducing the use of diesel as new plant and equipment powered by battery or hydrogen come online
- Feed supplements based on red algae have the potential to reduce methane by 99% in feedlot environments, although this is less applicable in extensive grazing as used across the region.

RESPONSIVE LAND USE

Shifts in land use have a key role to play. The UN Intergovernmental Panel on Climate Change report, Climate Change and Land identified structural shifts in land use, land use shifted away from marginally productive use to permanent trees and shrubs, as a key opportunity in agriculture to reduce land sector emissions.³

Recommendations to consider shifts in land use are not intended as a threat to farming. The CSIRO and others have researched and identified opportunities to change land use in a way that reduces overall emissions and delivers productivity and environmental gains, often referred to as 'mosaic farming' or 'combination farming'. Land use is carefully allocated according to profitability, sustainability and suitability. Intensification of use of the best land supports improved output of crops, meat and wool, while land of lesser quality and along waterways and hills, is planted with trees and shrubs to sequester carbon and increase ecosystem health. Soil carbon is also boosted by switching to perennial pasture species, regenerative practices such as cover crops and rotations, using legumes, multi-species planting, addition of biochar and other organic material. This responsive land use approach would commonly result in a mosaic pattern both within an individual farm and across the region, hence the name. Researchers note the importance of balancing carbon and biodiversity considerations, i.e. maximising carbon-based plantings will not deliver the best ecological outcome.

BENEFITS

By capitalising on the region's existing agricultural strengths and its relative advantage in rainfall and soil types, the region has the opportunity to lead in the development of economically viable, environmentally sustainable agricultural practices. Sustainable farming practice, using scientific and socio-economic analysis of the landscape to maximise productivity and minimise environmental impact, is key to developing resilience of both farms and communities impacted by climate variability.



Benefits of action in reducing emissions in agriculture include:

- Improved responsiveness of the agriculture industry to zero emissions requirements and changing government policy
- Farm managers making improved environmental and financial decisions
- Environmental and economic gain through better management of soils and native vegetation
- Opportunity to utilise and encourage secondary financial carbon trading markets

³ Intergovernmental Panel on Climate Change, 2019, Climate Change and Land, An IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems

CHALLENGES

The agriculture backbone of the region offers significant potential to increase carbon drawdown and reduce carbon emissions. However, there is a gap between the existing tools and on-farm implementation that needs to be better understood and addressed through engagement and co-design of an implementation approach together with farm managers.

ECONOMIC

The Grampians roadmap to zero technical report identifies the chief barrier to land use shifts is not knowledge, it's a lack of financial incentive. There is already excellent knowledge on techniques such as shelter belt design, riparian restoration, restoration of semi-cleared land to native bush, etc, within the farming community

in the region. Shifts in land use will deliver productivity benefits (healthy ecosystems are good for crops and stock), however the case for long term investment in carbon farming must be clear to land managers before large-scale uptake will be achieved. Currently the federal emissions reduction fund includes carbon sequestration for big organisations, but little

for small to medium businesses. CSIRO research has shown that for wide-scale land use shifts to occur, financial incentives are needed beyond current land/agricultural markets. Financial incentives to change land allocation and invest in new production systems, could include carbon markets and/or land stewardship payments.

ADOPTION

For wide scale adoption of practices leading to emissions reduction to be achievable, there must be a clear, economically positive and low risk proposition for farmers. There are currently limited examples of low carbon farming on a commercial scale in Australia. Although Landcare and others have coordinated many small-scale trials, including with individual farmers. By demonstrating how carbon emission reduction models can be applied to local, large-scale farming enterprises, farmers will have more confidence to make the significant capital and time investment required to adopt low carbon emission strategies. While there have been several examples of successful small-scale trials, there is not yet a robust business model for the more complex 'mixed farming' businesses common to the region.

TOOLS

Farmers and the agriculture industry have a very important role to play in the road to achieving net zero emissions, but they need the support, evidence and practical experience to help them make the changes required. With the right tools to support decision making, farmers can make choices that will be both environmentally and economically advantageous to them, this may include identifying new revenue streams. More effective use of inputs such as chemicals, fertilisers and seed may result, and resilience to the effects of climate variability will be improved for both individual farmers, communities and the environment.

“... the consistent barrier to adaptation to climate change in agriculture is the inadequacy of information and knowledge transfer. Knowledge exchange between the expert and the practitioner needs considerable improvement in the Wimmera, to encourage adaptations that will build resilience in agriculture in the face of the predicted climate change. Information is best understood when it is up-to-date, credibly sourced, geographically relevant and thematically relevant. Above all, it must acknowledge the economic realities of farming and the practicalities of any suggested behaviour change.”⁴

4 Building Resilience in Farming and Agribusiness - Victorian Adaptation Sustainability Partnerships Literature review and gap analysis, 2014.



Stakeholder ENGAGEMENT FINDINGS

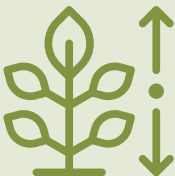
REGIONAL VOICE



“As a predominantly Ag region we should be leading in carbon capture but we don’t hear much in this space.”



“As a farming community, farmers will be adapting their farming practices for example to sequester carbon in the soil. We need workshops, field days, information sessions and networks to support this anticipated and needed change in farming practice. Especially before a carbon tax is introduced. If a carbon tax is introduced, this will favour early adopters to regenerative and carbon neutral farming practices. We need supports for farmers to be able to adapt and continue to produce in a changing unpredictable climate.”



“Our farmers have shown they can adapt. I think some sort of campaign or explanation of the challenge and how communities can be real parts of the solution is needed. Communities love to grab a challenge and fix it so if you present it in a way that is local, come up with some support to do the fixing or work out solutions - including a list of benefits that will come with making such changes - communities will run with them.”



“Instead of being a dust bowl - we could be the green desert - where we are innovating, where we are finding new value adding industries that are kind to the environment. We can be a leader in this and give new spring to the region’s step. We have space, wind and heat and have every opportunity to make our own energy we just need a plan to use it. And if this happens it might make it easier to get connected to the grid and put the spotlight on us as a region.”



“Machinery is increasing in size and fossil fuels are a big expense for the agriculture industry. Is it a realistic option to run farm machinery on electricity? Would it be produced locally? How would supply work?”



WHY SHOULD WE TAKE ACTION IN OUR REGION?

Opportunities in moving to carbon-neutral farming practices and land use:

- More intensive food production.
- Diversified income for landholders and broadacre farmers.
- Substantial growth in agriculture and related industries.

WHAT IS HOLDING OUR REGION BACK?

Barriers in moving to carbon-neutral farming practices and land use:

- A gap in expertise to help farmers innovate with a one-off project that is not their core-business. e.g. market failure in the pig industry across Australia to provide this advice meant development took longer than it should have.
- Emissions reduction information, knowledge and support for farmers, advisors and influences in agriculture.
- Decision-making tools for farmers that link to existing data and financial models.

DESIRED OUTCOMES



OUTCOME 1:
WSM region and farming community seen as leaders in net zero emissions agriculture.



OUTCOME 2:
Cohesive and collaborative approach to guide development of policy, research and tools.



OUTCOME 3:
Farmers have the right channel to drive the agenda rather than be dictated to.



ACTIONS

OUTPUT 1: An instrument, tool or app

ACTION: Understand the data farmers currently collect and how it can be used to make better business decisions. Use the data to conduct desktop analysis into soil and carbon capture and translate into a user-friendly format that helps farmers understand their opportunities.

ACTION: Promote utilisation of tools and apps developed. Allowing farmers to easily see the carbon capture and cash flow relationship, will make success easier.

OUTPUT 2: Agriculture marketability opportunity

ACTION: Develop supply chain analysis to understand the opportunity/market for net zero emissions foods and ingredients, e.g. net zero flour enabling bakeries to sell zero emission bread.

ACTION: Complete desktop research to understand consumer behaviour and consumer demand for zero emission products. Connect with private industry to understand what they are doing in this space.

ACTION: Utilise research undertaken by universities such as CSU to highlight opportunities to entrepreneurs. Incentivise businesses that set up in the region to utilise net zero emission regional products.

ACTION: Develop a net-zero or low emission agriculture product from the region as a trial, for instance the Wimmera and Mallee region is on the pathway to net zero in some production areas, and trial marketability of the output as net zero carbon.

ACTION: Build on leading knowledge of market-based instruments to increase market access for regional products through net zero emission branding and marketing strategy. Leverage existing highly successful projects and initiatives in the region including: Australia's longest running landholder survey, longest continuous cropping trials in the world at Longerenong college through Agriculture Victoria, and the Wimmera Catchment Management Authority who is a leader in Australia for market-based instruments.

OUTPUT 3: Regional awareness and branding

ACTION: Bring the right people, projects and organisations together to enhance awareness and collaboration of what is happening in the region around agriculture and emissions reduction.

ACTION: Establish an organisation, or utilise an existing organisation, to represent farmers at a regional level in emissions and agriculture policy setting arenas.

ACTION: Position and promote Western Victoria as a leader in carbon neutral and zero emissions agriculture practices to food producers and retailers. Commit marketing dollars to create a campaign to highlight region's net zero emissions achievements.

Project development **AND DELIVERY**

Demonstrating the value proposition and pathway to action for farmers is critical. The region is well-positioned to access available project funding with a strong and well-respected agriculture industry and highly successful existing farmer education and consultation groups that are central to practice change in the agriculture industry.

Key funding opportunities arose in this area early in 2021 and based on the work already completed on this project the region was well prepared to submit proposals.

As a result, the region was successful in gaining funding for the following projects:



Federal Government Smart Farm Small Grants funding for the Wimmera Broadacre Farming Net Zero Emissions Project.

AgriFutures Rural Futures Open Call: Carbon Initiatives RFQ funding for the Roadmap to Zero Grampians Agriculture Project (R2ZGAP).



WIMMERA BROADACRE FARMING NET ZERO EMISSIONS PROJECT

The Wimmera Broadacre Farming Net Zero Emissions Project will demonstrate how carbon emissions calculators can be applied to broadacre farms in the Wimmera to identify the most economically and environmentally advantageous on-farm carbon abatement strategies. The project will apply the most appropriate carbon accounting models at the individual farm level to quantify the contribution of specific farming practices and activities to emissions, including costs and revenue opportunities, using farm business accounts.

The objectives of the project are to:

- Apply carbon emissions calculators to real life broadacre farming enterprises
- Demonstrate how carbon emissions calculators can be used by farmers to assess carbon reduction strategies
- Develop on farm practice examples
- Demonstrate the economic and environmental benefits of reducing carbon emissions from agriculture in the Wimmera
- Increase the adoption of carbon abatement and offset mechanisms in farming practice.
- Understand the value proposition and potential of soil carbon sinks and native vegetation offsets.





KEY PROJECT DELIVERABLES AND TIMEFRAMES

July - September 2021	Secure participating local farming enterprises and source data from sites
July - September 2021	Workshop and desktop study identifying appropriate carbon emissions calculators
September 2021 - June 2022	Apply carbon emission calculators and pilot with test land managers
March - October 2022	Demonstrate applicability of carbon emissions calculators to local farming community
August - October 2022	Improve farmer capacity to use carbon emissions calculators to make informed decisions about low carbon emissions farming practices
July 2021 - November 2022	Gather and evaluate feedback, key recommendations and reporting

Longerenong College farm will be an important primary data source due to accessibility of the data. Two additional local farming enterprises will be identified that cover areas not covered by Longerenong.

The proposed community engagement sessions will be both practical and informative. Land managers will be given realistic scenarios with carbon emissions and have the opportunity to review the impact on carbon emissions reduction by alternative decisions. By providing real scenarios and the capacity for land managers to use the tools in a supported environment where questions can be answered, they are much more likely to consider utilising the tools on-farm.

EXTENSION AND ENGAGEMENT

Through the extension and engagement process, the project will:

- Show the farming community that the calculators are less complex than perceived
- Engage with farmers and identify realistic actions for carbon reduction
- Farmers can determine likely strategies that would be advantageous in their farming business
- Identify opportunities to make carbon abatement tools more useable
- Identify broader benefits for the Wimmera region.

The expertise gained through this project, and on-farm uptake of the tools, will be shared across the Australian broadacre grains industry to improve environmental sustainability and economic viability.

ROADMAP TO NET ZERO EMISSIONS GRAMPIANS AGRICULTURE PROJECT (R2ZGAP)

The Roadmap to Net Zero Emissions Grampians Agriculture Project (R2ZGAP) will build on the Wimmera Broadacre Farming Net Zero Emissions Project. The R2ZGAP aims to understand broader barriers to adoption by farmers and implementation success factors that should be considered.

The R2ZGAP will undertake engagement and extension activities with farmers across the Grampians region to understand:

- Barriers to adoption of carbon calculators as a farm business tool
- Implementation strategies essential to encourage widespread uptake of these tools in agriculture

Approximately 300 farm managers and stakeholders will be engaged across the region through farming networks, Landcare groups, Longerenong College, plus local government and business groups.

A targeted extension program will be co-designed and piloted based on engagement findings.

For farmers to embrace working toward net zero emissions in their enterprises, their business requirements, and the evidence, support and practical implementation guidance they need, must be understood. Once these issues, and others identified through

engagement, are appropriately addressed, it is expected that farmers will be more confident to make the significant capital and time investment required to adopt carbon calculators as an essential farm tool.

The expected outcomes of the R2ZGAP are to:

- Improve knowledge at the farm level and across the agriculture industry of what is required to build and sustain adoption of carbon emissions calculators by farm managers
- Increase the adoption of carbon accounting models in farming practice to quantify the contribution of specific farming practices, approaches and activities to carbon emissions
- Understand the value proposition required to drive practice change by farmers to consider carbon abatement and offset mechanisms and the potential of soil carbon sinks and native vegetation offsets
- Demonstrate the economic and environmental benefits of reducing carbon emissions at the individual farm level



KEY PROJECT DELIVERABLES AND TIMEFRAMES

December 2021	Face-to-face indepth interviews in relation to carbon accounting and emissions reduction
February 2022	Stakeholder workshops facilitated by local experts to validate interview findings
April 2022	Co-design a carbon calculator implementation support framework
June 2022	Pilot implementation resources and activities
June 2022	Broad engagement around adoption
August 2022	Publish implementation framework and resources
October 2022	Final report

Project findings about barriers, success factors and implementation requirements will be shared across the Australian agriculture industry via professional networks and publications.



Future funding OPPORTUNITIES

The Australian Government National Soil strategy states “To better support individual and national-scale decision-making, we need to have a greater understanding, in both fundamental and applied science, of how different management practices impact soil organic carbon levels across different soil types, production systems, land uses, landscapes and climates ... The Commonwealth will continue to incentivise land management practices that increase soil carbon, including through the world’s largest government-led carbon offsets scheme.”⁷

Under the Victorian Climate Strategy Agriculture Pledge, the Victorian Government has committed

\$20M

to reduce emissions in the agricultural sector.⁵

The government have allocated \$3.9 million to fund research on animal feed innovations to reduce carbon emissions from livestock.



Investment of \$10 million will support a pilot of up to 250 on-farm action plans to reduce emissions. This program will be delivered in collaboration with industry service providers so that lessons can be applied across the sector.



\$15.3 MILLION has been committed under the Victorian Carbon Farming Program.⁶



This Program will support private landholders to:

- plant agroforestry and shelterbelt trees
- access existing carbon markets, and
- realise on-farm benefits and new income streams.

The Australian Government National Soil Strategy⁷ was released in 2021 with the goals to prioritise soil health, empower soil innovation and stewards, and strengthen soil knowledge and capability. The 2021–22 Budget allocated \$196.9 million in new funding over four years to implement the strategy. An action plan is due to be released in mid-2022.

The 2021–22 Budget allocated

\$196.9

million to prioritise soil health



⁵ https://www.climatechange.vic.gov.au/_data/assets/pdf_file/0028/522766/Agriculture-sector-pledge-full-colour.pdf

⁶ <https://www.abc.net.au/news/2021-05-02/victorian-government-targets-or-agriculture-transport-interim/100110140>

⁷ <https://www.agriculture.gov.au/sites/default/files/documents/national-soil-strategy.pdf>

NEXT STEPS

01

These Wimmera Broadacre Farming Net Zero Emission Project and the Roadmap to Net Zero Emissions Grampians Agriculture Project contribute significantly toward achieving Output 1 and building community awareness and knowledge (part of Output 3(a)).

02

Large-scale adoption of on-farm carbon emission reductions tools, implemented in collaboration with farmers, researchers and industry bodies, has the potential to unlock economic gains through increases and diversity in income, and deliver wide-scale environmental benefit through increased biodiversity and emissions reduction.

03

There is a gap between the existing tools and on-farm implementation that also needs to be better understood and addressed through engagement and co-design of an implementation approach together with farm managers. There is a perception that many strategies to reduce carbon emissions are impractical, and/or result in significant reduction in farming enterprise profitability.

04

Through an iterative feedback loop these projects will bring together improvements in the science and research at a practical level, and social, business and other factors that influence the decision making of the target audience, to improve overall project outcomes.

05

The outcomes of these two innovative and critical projects will inform project future proposals for recommended Outputs 2 and 3.