

THE GILLAMII CENTRE

JUNE 2019 - JUNE 2023

# CLIMATE ACTION PROJECT

RLPGILP6



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## **SUMMARY**

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# REGIONAL LAND PARTNERSHIPS



Artwork by Leslie Brims

**Regional Land Partnerships** invested \$450 million over 5 years from July 2018 to June 2023, delivering national priorities at a regional and local level. As the largest component of the National Landcare Program, this investment is being delivered through a reformed regional model that supports a range of projects contributing to four environment and two sustainable agriculture outcomes.

Projects are connecting efforts for the recovery of species identified under the Threatened Species Strategy, protecting threatened ecological communities, and reducing threats to our globally-important wetlands and world heritage sites. Projects are also improving on-farm soil, biodiversity and vegetation, and increasing the capacity of our farms to adapt to climate change and evolving market demands.

South Coast Natural Resource Management received \$11.8 million in investment over five years – from July 2018 to June 2023. Together with 15 key partners including catchment groups such as Gillamii, delivered on national priorities at a regional and local level.

# CLIMATE ACTION PROJECT

Climate action was identified as a priority for the agricultural industry, investing in supporting the region to adapt, innovate and address market demands for sustainable food production.

Australia's climate has warmed on average by  $1.44 \pm 0.24$  °C since national records began in 1910, leading to an increase in the frequency of extreme heat events. There has also been a decline of around 16 per cent in April to October rainfall in the southwest of Australia since 1970 (State of the Climate Report, 2020). During the delivery of this project, our region experienced the warmest year and second driest on record in 2019, followed by the second warmest year on record in 2020. In 2021 and 2022 WA received above average rainfall due to La Nina, providing a stark juxtaposition and different challenges compared to the seasons of 2019 and 2020.

The project enabled Gillamii to deliver a mixture of on-ground action and provision of resources including the Super Sweet Sudan trial, events, workshops, and field walks, and facilitated landholders to complete an on-farm carbon audit.

Driven by a global interest to adapt to and mitigate the effects of climate change, the delivery of this project coincided with a significant boom of interest in agriculture's role and opportunities in this space. This resulted in an overwhelming amount of initiatives, resources, consultancies, and demands on farmers. Delivering the climate action project during this period presented it's challenges, however the resources provided during this time supported the community to adapt, innovate, and address market demands within our agricultural region.

## DELIVERABLES

- Conduct 8 greenhouse gas surveys (audits) utilising established methodology.
- Conduct 6 community/stakeholder events.
- Collect surveys to gather baseline data on knowledge of climate change and adoption of new tools or strategies.
- Produce a report on the greenhouse gas audits conducted in collaboration with NSPNR.
- Development of 3 trial sites including implementation, monitoring regimes, and reporting.
- Establishment of 30ha of ground cover to mitigate the effects of climate change using a deep rooted perennial species.





# Regional Landcare Partnerships: Climate Action Project (RLPGILP6)



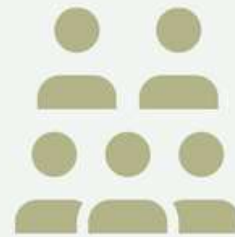
Project Period: June 2019 - June 2023

## Funding

# \$63,990.00



## 367 People



Directly engaged with the project

## Industry Engagement



## Key Topics

- Farming Resilience
- Summer – Autumn Feed Gap
- Fire Preparation
- Carbon Audits
- Perennial Pastures
- Carbon Farming Projects
- Farm Management Strategies for Climate Change
- Soil Health
- Beneficial Invertebrates
- Climate Change and Seasonal Variation
- Grazing Cereals
- Biodiversity and Farming
- Natural Capital Accounting





# Regional Landcare Partnerships: Climate Action Project (RLPGILP6)



Project Period: June 2019 - June 2023



## Soil Health and the Summer Feed Gap: SSS Trial

- 135 ha of Super Sweet Sudan established over 3 years.
- **Trial Set Up:** Three 12m x 100m strips of SSS, leaving voluntary pasture in between as control plots.
- **Monitoring:** Bulk density and soil moisture in 10cm increments to 50cm.
- **Partnerships and Collaboration:** 3 local landholders, DPIRD and Pioneer Seeds.



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Carbon Audits conducted for farming enterprises



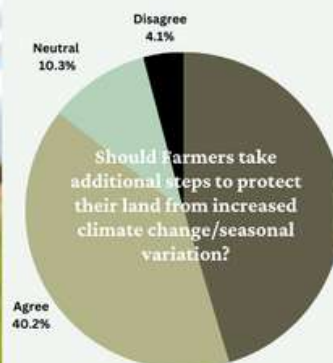
80

Survey responses collected  
(Climate Change Issues for the South Coast Agricultural Industry)



## Key Climate Action Findings

- Over the survey period, there has been a **shift in certainty** in climate change theory, and a slight shift in the degree of concern about the impact on agriculture.



- 86% of respondents have seen a **change in rainfall patterns** on their property.

- The on-farm **mitigation practice** with the highest rates of 'Improved' knowledge over the last three years were **soil amelioration, maintaining ground cover** across all seasons, and **feedlot/confinement feeding**.

- The **most adopted** on-farm mitigation practices by respondents included **incorporation of trees** and protection of remnant vegetation, **maintaining groundcover** across all seasons, and improving **livestock performance**.



# EVENTS

## OVERVIEW OF THE SIX EVENTS DELIVERED

Over the duration of the project, Gillamii was able to listen to issues and areas of interest that emerged within the community and act, hosting a range of workshops, field walks, forums, and networking events.

## CARBON OFF-SET FUNDING FOR ON-FARM REVEGETATION

The aim of the forum was to inform farmers, landholders and natural resource management staff about the details of the carbon offset industry and new alternative funding opportunities for revegetation to help promote large scale restoration in our region. The event was planned in close consultation with the Gillamii Centre, North Stirling Pallinup Natural Resources, the Fitzgerald Biosphere Group, the Yongergnow Mallee fowl Centre, carbon offset company representatives, Gondwana Link and several landholders.

Topics and presenters included,

- "Agricultural Carbon Capture" - Kent Broad (Outback Carbon)
- "Carbon Offset Funding For On-Farm Revegetation" - Ray Wilson and Jenifer West (Carbon Neutral Charitable Fund)
- Dave Viner and Jonathan Schultz (GreenCollar)
- "Carbon Funded Ecological Restoration, the science and practice SW WA" - Justin Johnson (Threshold Environmental)
- "Greening Australia's role in large scale restoration of degraded farmland" - Barry Heydenrych, Glen Steven and James McGregor (Greening Australia)

The forum was a huge success with positive feedback and discussions following on from the event. The event attracted presenters from all around Australia and attendees from the Wheatbelt, South Coast and South West regions. All presentations and contact details were sent to attendees who provided their email addresses after the event.



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## OVERVIEW OF THE SIX EVENTS DELIVERED

### BUILDING FIRE RESILIENT COMMUNITIES

Fire safety was increasingly at the forefront of everyone's minds, with changing climate and weather patterns fuelling more intense and unpredictable fires across Australia, and the beginning of the year seeing over 40,000 ha of the Stirling Range National Park burn. Over 200 of our Volunteer and career Firefighters made their way to the blaze, however a feeling of helplessness resonated with many left at home. The workshop was designed to empower and inspire those in the community who feel the need to gain an increased awareness around fire and add important and relevant skills and knowledge to their tool-belts.

Topics and presenters included,

- *"Minimising the Impact of Climate Change and Fire on Property"* - Chris Ferreira (The Forever Project)
- *"Fire Theory and Training"* - Jason Stasev (Mt Barker VFRS Captain)



The workshop was a successful, informative and enlightening afternoon, which offered an opportunity to learn from industry experts and from each other. We had many requests for more future content particularly from Chris Ferreira and more opportunities for hands on practical experience, which we hope to be able to provide. Our region is experiencing changing weather patterns, with plenty of backing to indicate that climate change drivers may be responsible, as a result we are experiencing more frequent, unpredictable and intense fire seasons and implications of drought.

After speaking with members of the community and local W.I.F.E group, it became evident that many felt unprepared with little opportunity to learn about drought and fire proofing farms, homesteads, and fire awareness. Chris Ferreira covered topics such as advice on setting up rural property to reduce a minimize the impacts of fire, drought, and the impacts of climate change in general, advice on fire-wise landscaping including fire retardant plants and landscaping, understanding threats to the property and how to mitigate these and techniques to help landscapes and homesteads to recover effectively post fire. Jason Stasev followed with a 'fire chat' presentation including a video interviewing 5 women who survived and combatted the 2003 Tenterden fires on their properties and concluded with practical demonstration on how to operate a typical fire unit found on farm. The workshop was closed with a sundowner which enabled the participants to ask questions, reconcile their learnings and network.





## OVERVIEW OF THE SIX EVENTS DELIVERED

### WONGIN MIA SPRING FESTIVAL

Wongin Mia Spring gathering was a festival event held over two days that brought together artists, environmentalists, and first nations people to the town of Cranbrook WA to celebrate our unique culture and biodiversity. The event saw over 100 attendees including locals from Tambellup, Gnowangerup and Denmark, and travelers from the Perth and Peel region.

Activities and presenters at the event engaged with the theme, hosting guided bush walks by Wendy Bradshaw, a welcome to country, round table discussions on fire and fuel reduction and the Gondwana link. Attendees were able to engage with the full festival experience with live music performances from groups like Sonic Forrest Nyoongar and artistic workshops.

Local land owner and community member Mel Butcher was the lead organiser of the event, Gillamii was able to provide support to enable this exciting vision come to life. Overall, the weekend was a huge success building on the capacity to improve the communities awareness of the local environment, issues surrounding climate change, and cultural inclusion in decision making processes



## OVERVIEW OF THE SIX EVENTS DELIVERED

### AGRICULTURE IN TRISITION: THE ROLE OF NATURAL CAPITAL ACCOUNTING

The aim of the forum was to contribute to natural capital capacity building in the sub-region and help farmers navigate the challenges and opportunities for natural capital accounting, carbon and co-benefits and nature repair investment in response to the energy transition. The workshop also aimed to address climate risk and natural capital knowledge gaps by creating collaborative opportunities for individuals, businesses and organisations across the agricultural industry.

Topics and presenters included,

- *"Primary Industries in the Energy Transition: What is Net Zero/Nature Positive?"* - Larissa Taylor (Savoir Consulting)
- *"It Starts with Connection to Country: Caring for Boodja"* - Oral McGuire (Director, Noongar Land Enterprise Group & Danjoo Korrliny)
- *"Biodiversity: Why you'll want to be talking about the 'Restoration Economy' too"* - Renee Young (Director, Conservation and Restoration, WA Biodiversity Science Institute (WABSI))
- *"Transforming Food Systems: A View From Food Nation in Denmark" (pre-record)* - Lise Walbom (CEO, Food Nation Denmark)
- *"Measurement, Reporting and Verification of Environmental Condition for Natural Capital reporting: Accounting for Nature"* - Dr Rachael Marshall (General Manager/APAC Regional Director, Accounting for Nature)
- *"Creating Natural Capital Accounts for Farms: A Natural Capital Accounting & Regenerative Approach to Ecosystem Restoration"* - David Broadhurst (Senior Manager, Perth NRM /Regen WA)
- *"Farm Benchmarking to Make Natural Capital Practical? You have more than you think to work with"* - Stacey Bell (Farmanco Natural Capital Lead)
- *"An overview of Natural Capital Accounting and DPIRD's current work in NCA: Research, Development, Extension and Adoption"* - Thomas Picton-Warlow (Business Development and Natural Capital Lead, DPIRD) and Emily Lewis (Manager, DPIRD Climate Resilience Program)
- *Community Ground-Truthing Panel Discussion* - Local Farmers

This forum was the first community-led Natural Capital event for the Gnowangerup, Cranbrook and Broomehill-Tambellup Shire's and surrounding communities. Natural Capital Accounting is a complex, exciting and immerging industry, one that is often confronting to discuss. Both NSPNR and the Gillamii Centre believe we achieved our purpose of beginning to build Natural Capital Accounting capacity within our sub-region, however recognise the long journey ahead in disseminating high-level research, information and policy into on-ground action.



## OVERVIEW OF THE SIX EVENTS DELIVERED

### THE GRASS IS ALWAYS GREENER ON THE OTHER SIDE: GRAZING TOUR

This event was an extension opportunity to provide growers in our region with grazing options to enhance sustainability and profitability on their farms. The field walk covered themes including soil health, summer-autumn feed gap options, insect control, and grazing crops.

Topics and presenters included,

- *"Grazing Cereals for Lambing Ewes"* - Serina Hancock (Murdoch University)
- *"Summer Forage and Improving Soil Health - Super Sweet Sudan Trial"* - Peter Bostock (Pioneer Seeds) and Wendy Bradshaw (Consultant)
- *"Pest and Resilience Update, and Intensive Grazing for RLEM Control"* - Svetlana Micic (DPIRD Entomologist)
- *"Enhancing Kikuyu Content in Pastures"* - Paul Sanford (DPIRD)
- *"Pasture/Crop Selection to Minimise Cost and Risk"* - Angelo Loi (DPIRD)

The field tour took place over an afternoon, with attendees visiting the year 2 Super Sweet Sudan trial site, March seeded grazing cereals, and finishing off with presentations and a sundowner in the shearing shed. Events like this are always well attended, supporting the notion that farmers learn best from other farmers. What better way for our group to support this by hosting an afternoon to look over the fence at farmer driven trials that support sustainability and resilience.



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## OVERVIEW OF THE SIX EVENTS DELIVERED

### BUILDING BIODIVERSITY FOR RESILIENT FARMING ECOSYSTEMS

This event provided the platform to discuss and view on-farm action around the role of biodiversity in maintaining resilient and productive farming ecosystems.

Topics and presenters included,

- *"Building Biodiversity: Murray Wells"* - Wendy Bradshaw (Tambellup Farmer and Ecological Restoration Specialist)
- *"The Link Between Biodiversity and Rainfall"* - Walter Jehne (CSIRO Climate Scientist and Microbiologist)
- *"The Role of Biodiversity in the Farming Ecosystem"* - Dr Nicole Chalmer
- *"The Value of Carbon and its Co-Benefits Above and Below Ground"* Kent Broad (WA Carbon Projects)
- *"Supporting Beneficial Invertebrates"* - Svetlana Micic (DPIRD Entomologist)
- *Perennial Pastures* - Paul Sanford (DPIRD)

Wendy Bradshaw introduced her pursuit of fostering farming alongside biodiversity at Murray Wells, providing context to the field day before introducing Walter Jehne who joined us on Zoom. Walter discussed issues including non wetting soils "We're losing 50 drops of rain out of 100 due to the constraint in our soils to infiltrate & retain it", the link between vegetation and rainfall, and farming practices that build the 'soil-carbon sponge'. Gillamii and RegenWA have recorded a webinar with Walter Jehne on the link between rainfall, biodiversity, and farming resilience available to watch on our website.

The opportunity to see biodiversity and agriculture working synergistically at Murray Wells supported further discussion between Kent Broad, Svetlana Micic and Paul Sanford. Attendees visited sites including a waterlogged saline hillside seep that had been successfully revegetated to restore landscape function and stability. The event was concluded by a sundowner and dinner in the shearing shed, providing the perfect opportunity to network and continue the important conversation of farming resilience.







# SUPER SWEET SUDAN TRIAL

Super Sweet Sudan (SSS) is a hybrid Sorghum that has been developed in Australia for local conditions. SSS not only provides great production benefit as it is a fast growing, highly palatable option over the summer-autumn feed gap, but is deep rooting providing added soil health benefits.

The three year trial engaged landholders to establish a minimum of 30 hectares of the SSS including a strip trial to monitor performance. The design consisted of four 12m by 50m strips, alternating between the control (volunteer pasture/crop) and the SSS. The monitoring procedure was developed in collaboration with Wendy Bradshaw and Jeremy Lemon (DPIRD), with additional help being provided by Raj Malik (DPIRD). The SSS was established in October each year, with monitoring conducted in the following growing season.

Monitoring of the trial was developed around interest in the potential productivity and soil health benefits in utilising a deep rooted summer crop option such as the SSS. Given the opportunity of summer rainfall, planting a forage crop enables producers to increase nutritional value, liveweight gain, stocking rates, and provide valuable ground cover over soils in summer. This project did not support monitoring stock productivity values for this trial however the impact of summer forage crops can be seen in MLA's study on 'Alternative Forage Crops for Southern WA'.

This trial focused on monitoring the additional soil health benefits of the SSS. Sorghums are renowned for their drought tolerance as a result of an extensive root system.

Deep roots are pivotal to ecosystem services such as pedogenesis, groundwater and streamflow regulation, soil carbon sequestration and moisture content. Deep roots can lead to a greater pore space with the immediate result that water infiltrates more readily and can be held in the soil (Roth, 1985). Selecting a deeply rooted summer crop may increase the potential to enhance the soil organic matter and beneficial microbes including mycorrhizal fungi. Apart from nutritional benefits, soil microbes are also known to increase soil structure and suppress diseases.

To assess this, we sampled for bulk density and soil moisture up to 50cm, soil cores were taken in each treatment, and separated into layers at 10cm increments. Soil compaction was also measured with a penetrometer across the treatments. A total of 40 soil samples were weighed wet before drying in an oven for 48-72 hours to remove the total moisture content from the soil. We were able to obtain these measurements in year one and two of the trial, with measurements unable to be conducted in year 3 due to coring issues. The data from the trial is in the process of being analysed, and will be made available on our website.



# SUPER SWEET SUDAN TRIAL



**YEAR 1**  
TRIAL SITE

- 50-hectares established.
- Pioneer Seeds Super Sweet Sudan.
- Seeded on the 2 October 2019 at 3kg/ha.
- Rainfall (DPIRD weather station) recorded rainfall between October - February at 43 mm.
- Total of 309mm cumulative rainfall recorded for 2019.
- Grazed by 400 ewes in April.



**YEAR 2**  
TRIAL SITE

- 55 hectares established.
- Pioneer Seeds Super Sweet Sudan.
- Seeded on the 14th of October 2020 at 3-4 kg/ha.
- Rainfall recorded from October - February total of 90 mm.
- Total of 323mm cumulative rainfall recorded for 2020.
- Grazed 766 Merino lambs in January.



**YEAR 3**  
TRIAL SITE

- 35 hectares established.
- Pioneer Seeds Super Sweet Sudan.
- Seeded on the 19th of October 2021 at 3-4kg/ha.
- Rainfall recorded October - February at 85mm, this included a total of 3mm from December - February.
- Total of 546mm cumulative rainfall for 2021.
- Grazed by ewes in March.

## Key Points

- Like any crop, poor establishment and follow up rain impacts the growth of the crop, delaying grazing opportunity as seen in year 1. Following above average rainfall in year 3, the SSS was sown into good moisture, but lack of follow up rain impacted the crop, delaying grazing.
- Grazing management is key for the SSS. Intermittent crash grazing is recommended, grazing when the SSS reaches 30cm in height, and repeating in 3-4 weeks time when the plant has recovered. This is best managed in smaller paddocks (less than 50 hectares)



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# CLIMATE ACTION

## OVERVIEW

Over the course of the RLP project period (2019-2023), The Gillamii Centre (Gillamii) and North Stirlings Pallinup Natural Resources (NSPNR) have delivered a range of activities designed to support the region to adapt, innovate and address market demands for sustainable food production.

Gillamii and NSPNR collected 80 survey responses from farmers across our catchment areas, designed to collect data on knowledge of agricultural climate issues across the South Coast of Western Australia. Whilst the sample size does not allow us to make generalisations for the whole population, the data collected gives meaningful insight to some consistent attitudes about climate change and seasonal variation, and management practices being implemented in the region.

Gillamii and NSPNR also conducted 16 'Carbon Audits' for interested landholders utilising the Primary Industries Climate Change Centre's Greenhouse Accounting Framework Tool (PICCC-GAF). The beginning of the project coincided with an influx of industry interest in carbon farming. The project aim to conduct the carbon audits was premature to available information and accessible tools to complete a farm carbon audit, and at current there is no accessible model to accurately account for on-farm sequestration.

The measuring of GHG emissions for Australian farms is still in its infancy, with accuracy of calculators and tools continuously developing although, these calculators are yet to be standardised. Other calculators available include the Cool Farm Alliance Tool and CSIRO Farm Print calculator, however under current industry guidance the PICCC-GAF tool was recommended due to its usability and alignment with Intergovernmental Panel on Climate Change and the Australian National Greenhouse Gas Inventory

Both organisations methodology for conducting the audits were slightly varied, with NSPNR providing repeat audits for interested farmers in 2021 and 2023. Participating landholders received their GHG emissions summary upon completing the audit process. Gillamii worked in consultation with Richard Brake to conduct an initial carbon audit for farmers. Richard Brake consulting is at the forefront of advising on farm carbon accounting. Richard provided technical guidance to Gillamii and information to participating landholders, producing individual carbon profile reports.

This report highlights and discusses the findings of the surveys and carbon audits conducted by Gillamii and NSPNR over the course of this project.

# CLIMATE ACTION

## SURVEY FINDINGS



### CLIMATE CHANGE ISSUES FOR THE SOUTH COAST AGRICULTURAL INDUSTRY

Two surveys on the Climate Change Issues for the South Coast Agricultural Industry were released in 2020 and 2023. The surveys were designed in collaboration with South Coast NRM, Gillamii, North Stirlings Pallinup Natural Resources, and Fitzgerald Biosphere Group. The initial survey released in 2020 aimed to gather data on existing attitudes and observations of climate change or seasonal variation, and on-farm mitigation practices. The changes made to the survey released in 2023 aimed to understand if there had been any attitude or knowledge shifts around climate change or seasonal variation, and the adoption of mitigation strategies on-farm.

#### Demographics Survey 1

47% of respondents have a mixed farming enterprise, 39% are producers of grain only, 2% viticulturists and 7% peri-urban landholders. The respondents had an average of 24 years farming experience, with the highest number of years being 55 and a 3-generation history within the enterprise, and lowest being one year of farming experience. Most respondents were 26-45 years of age (34%) closely followed by 56-75 years of age (31%), and 15% of respondents between the ages of 18-25 and 46-55 and only 2% over the age of 75. Survey responses were obtained through online release across membership channels, social media, and phone calls.



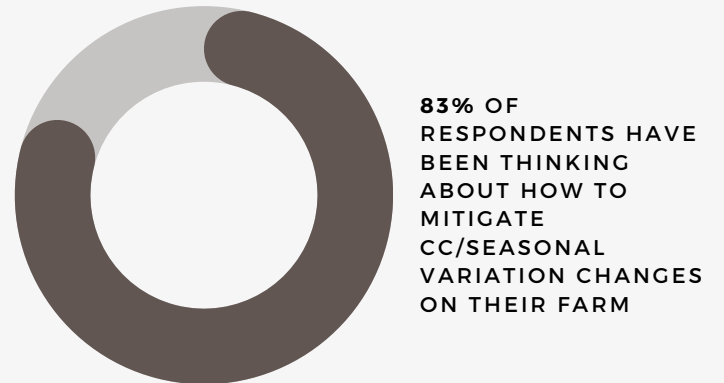
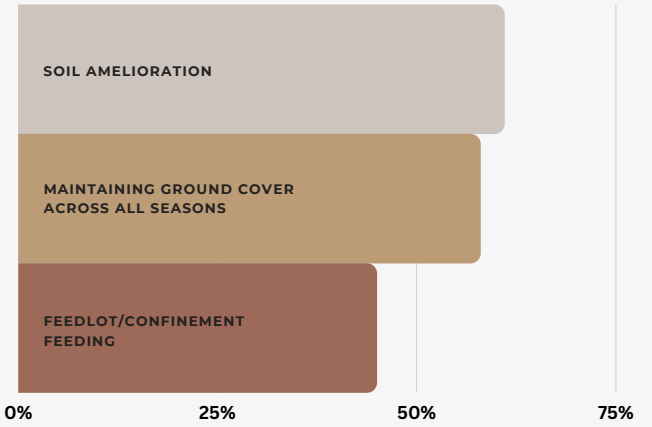
#### Demographics Survey 2

67% of respondents have a mixed farming enterprise of both stock and grain, with 22% producers of grains only, and 9% producers of sheep only. There was an average of 32 years farming experience, the highest being 110 years of intergenerational farming, and the lowest was 5 years of farming experience. Most respondents were 26-45 years of age (41%) followed by 29% in the 46-55-years age bracket, 25% were 56-75 years of age and 3% were 75 years or older. Survey responses were obtained through online release across membership channels, social media, and phone calls.

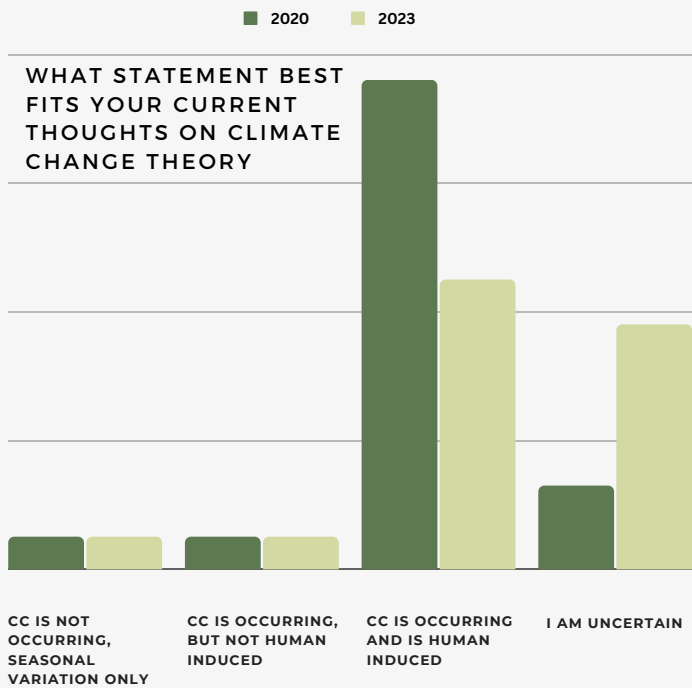


# SNAPSHOT SURVEY FINDINGS

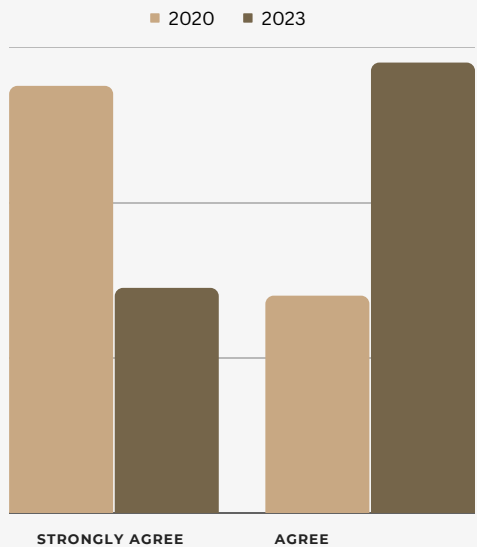
ON-FARM MITIGATION PRACTICES WITH THE HIGHEST RATES OF 'IMPROVED' KNOWLEDGE (OVER THE LAST 3 YEARS)



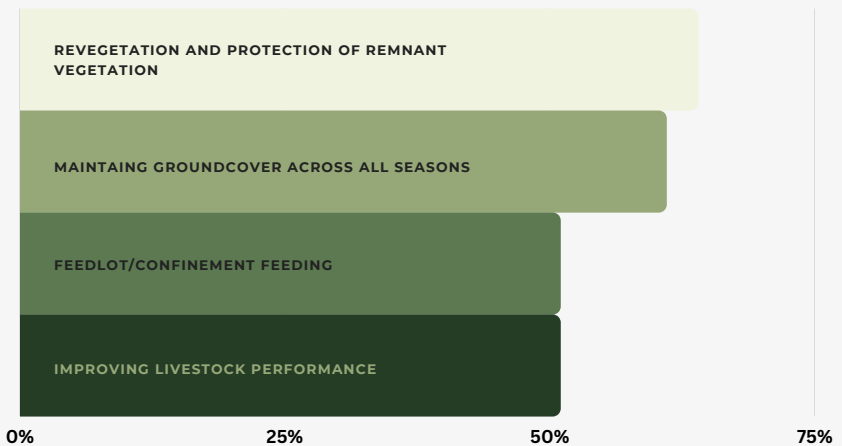
WHAT STATEMENT BEST FITS YOUR CURRENT THOUGHTS ON CLIMATE CHANGE THEORY



SHOULD FARMERS TAKE ADDITIONAL STEPS TO PROTECT THEIR LAND FROM INCREASED CC/SEASONAL VARIATION?



HIGHEST ADOPTED ON-FARM MITIGATION PRACTICES (OVER THE LAST 3 YEARS)



**86% OF FARMERS HAVE SEEN A CHANGE IN RAINFALL PATTERNS ON THEIR PROPERTY**

# CLIMATE ACTION

## CARBON AUDIT FINDINGS

Agricultural 'carbon' audits involve a process of analysing annual farm data which include agricultural inputs that are known to impact emissions of importance (in line with the Australian Government's National GHG Inventory) which include nitrous oxide (N<sub>2</sub>O), methane (CH<sub>4</sub>), and carbon dioxide (CO<sub>2</sub>). By undertaking a GHG emissions audit landholders can determine their carbon footprint. By definition (ISO 14067), a carbon footprint is the sum of GHG emissions and removals in a product system, expressed as CO<sub>2</sub> equivalents and based on a life cycle assessment, using the single impact category of climate change. Emissions are defined into three categories.

- **SCOPE 1: DIRECT GHG EMISSIONS FROM SOURCES OWNED OR CONTROLLED BY THE ENTERPRISE. THIS CAN INCLUDE ENTERIC METHANE, MACHINERY FUEL USE, AND FERTILISERS.**
- **SCOPE 2: GHG EMISSIONS FROM THE GENERATION OF PURCHASED ELECTRICITY CONSUMED BY THE ENTERPRISE.**
- **SCOPE 3: EMISSIONS ARE A CONSEQUENCE OF THE ENTERPRISES ACTIVITIES BY OCCUR FROM SOURCES NOT CONTROLLED BY THE LANDHOLDER. IN THE FARMING INDUSTRY THIS CAN BE AGRICULTURAL CHEMICAL PRODUCTION, FEED FOR LIVESTOCK PRODUCED OFF FARM, AND TRANSPORTATION OF COMMODITIES.**

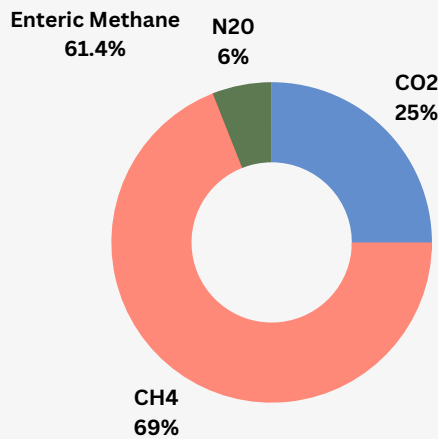
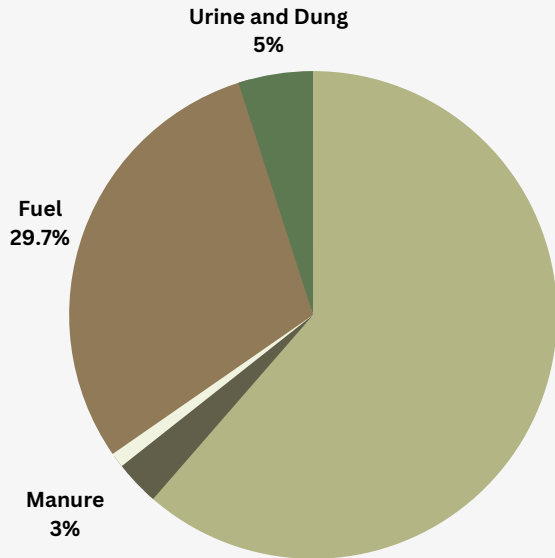
Calculating agricultural emissions is a developing space that will continue to progress along with accepted science, coupled with industry and landholder input. While conducting the carbon audits, assumptions had to be made around electricity use and fuel use split across different crops and livestock (mixed practice), which is not necessarily common data for landholders to hold. There is a reward for effort theory when utilising these calculators, with certain agricultural inputs significantly impacting the overall GHG emissions output and are worthwhile determining accurate figures for. These inputs include livestock numbers and their live weights (LWG), specific fertilisers (MAP, DAP, SOA, UAN and Single Superphosphates), lime, and urea application. GHG emission calculators are currently unable to accurately measure sequestration of emissions in the agricultural system.

As a result, when landholders determine their carbon footprint, it is not necessarily an entirely accurate representation of the full carbon cycle picture. While the calculator accounts for plantations (not remnant vegetation), the audits do not accurately reflect on-farm natural capital and the emission sequestration opportunities that are unique to the agricultural industry. Upon engaging the community with the opportunity to conduct a carbon audit for farming enterprises, Gillamii and NSPNR received variable interest. Partaking in the audit process appeared to be a lower priority to time poor farmers, with a perceived lack of clear incentive and urgency to determine their farm's carbon footprint.



# CARBON AUDIT SNAPSHOT

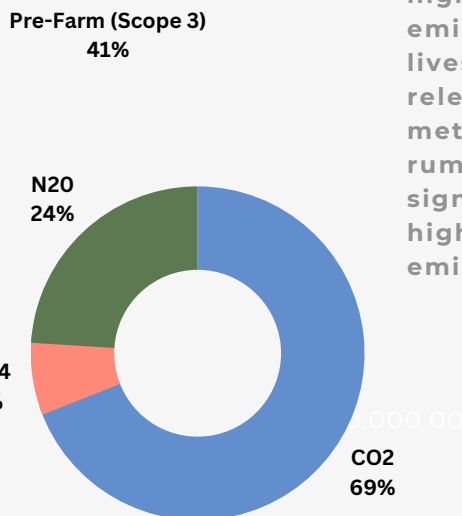
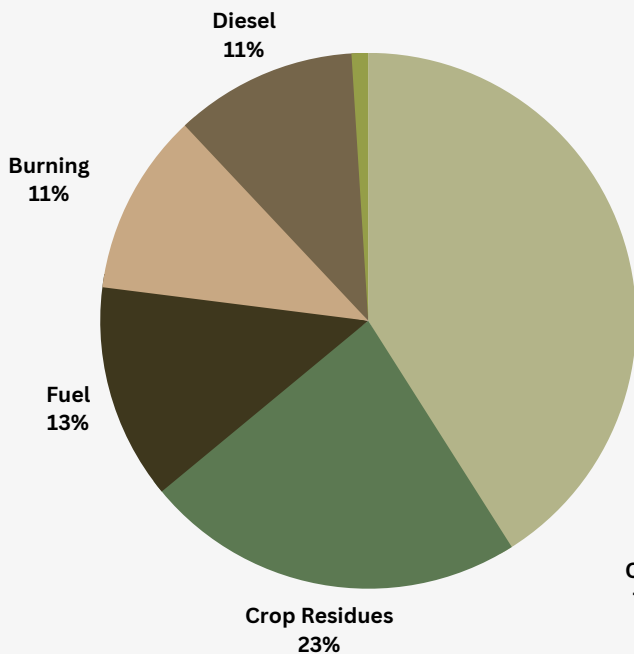
## LIVESTOCK GHG AUDIT



The audits depicted on the left are a reflection of the typical emissions trends between a livestock or cropping enterprise. Emission intensities or percentages are variable dependent on individual farm practices and location.

Cropping enterprises release higher amounts of Co<sub>2</sub> and N<sub>2</sub>o compared to livestock enterprises, where methane (CH<sub>4</sub>) is the most prominent GHG emission for the livestock industry.

## CROPPING GHG AUDIT



In the cropping audits fertiliser, urea, crop residues, and scope 3 emissions have the highest outputs of GHG emissions. In the livestock audits the release of enteric methane from ruminants is significantly the highest output of GHG emissions.

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# CLIMATE ACTION

## SUMMARY

Gillamii and NSPNR set out to understand our agricultural communities' attitudes and response to climate change through conducting surveying and carbon audits. Through the duration of the project landholders have experienced a significant boom in interest around agricultural GHG emissions, carbon farming, and most recently natural capital accounting. Increasing importance of sustainability priorities laid out by government, industry, and consumers have resulted in an influx of resources, organisations, consultancies, and demands on farmers across the South Coast.

Farmers have also experienced extreme seasonal variation over the last 5 years with 2019 being the warmest and second driest on record for Western Australia, followed by consecutive wetter than average years in 2021 and 2022. Combining these events together may have set the scene for increasing uncertainty around the impact of climate change on agriculture amongst farmers which can be seen in response to surveys conducted.

The climate action project outlined an uptake of management responses to climate change by 50%. We now know that measuring of agricultural emissions and sequestration is still in development, and it would not be possible to accurately represent management changes in the current calculators. Until calculators become standardised and are able to represent carbon sequestration, confidence in the validity of carbon audit outputs will remain low. Despite the need for ongoing development of available calculators, industry consultant Richard Brake encourages landholders to continue to use the emissions calculators. This not only enable developers to improve the usability and accuracy of these tools, but will begin the process of making carbon profiling a standard part of business practice.

Currently, while climate change theory and seasonal variations are accepted by the majority, and potentially being experienced with 86% of respondents seeing changes in rainfall patterns on their farm, there is not a perceived large enough impact on agriculture for individual enterprises to make management decisions based on mitigating climate change alone. Farmers in our region are adopting practices that benefit the mitigation of climate change impacts, but are often linked with other motivations such as increasing productivity. Currently the most commonly adopted practices include revegetation and protection of remnants, maintaining ground cover across all seasons, confinement feeding, and improving livestock performance.

There is no denying the push for sustainability and traceability in the market and amongst consumers, which may mean measuring and mitigating GHG emissions will become a standard practice of management on-farm. As 'carbon' or 'GHG' profiling becomes consistent, the ability for landholders to benchmark their enterprise against others will increase. The benefit of comparison often drives an individual farmer to adopt or trial new practices if there is a perceived benefit to their enterprise.

Gillamii is deeply connected to the communities we service, with our very formation driven by the community itself to meet the desire for sustainable agricultural practices and healthy environments. Our organisation often supports the research and extension of sustainable management practices, as a trusted link between industry, researchers, and the grass roots on the ground. Gillamii will continue to advocate for our farming community, providing information and supporting initiatives to drive positive outcomes for climate change mitigation.



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# WHERE TO NEXT

## NATIONAL LANDCARE PROGRAM



The Australian Government is continuing to invest in natural resource management. These investments include a range of measures to protect our unique environment, biodiversity and natural heritage, as well as build stronger and more sustainable agriculture and land care; and contribute to the broader suite of actions, programs and strategies targeting Threatened Species and Threatened Ecological Communities (TECs), World Heritage properties, and Ramsar Sites. Through this, the Departments are seeking to engage a Regional Delivery Partner for each Management Unit to provide Regional Capacity Services and to offer to provide Project Services, as specified in this Statement of Requirement.

South Coast Natural Resource Management have put in a tender on behalf of the South Coast region, after conducting an extensive collaborative approach. Gillamii is optimistic for the potential opportunities to come over the next 5 years of funding from this important initiative.

**"WE ARE DEPENDENT ON THE NATURAL WORLD FOR EVERY BREATH OF AIR WE TAKE AND EVERY MOUTHFUL OF FOOD WE EAT. BUT IT'S EVEN MORE THAT THAT WE ARE ALSO DEPENDENT ON IT FOR OUR SANITY AND SENSE OF PROPORTION"**

**-SIR DAVID ATTENBOROUGH**