

## **Final report**

# Argyle Foods Group – Sustainable Land, Cattle and Beef Research and Development

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## Abstract

Significant administrative, economic, and social barriers continue to prevent farmers from pursing efforts to introduce elements of regenerative land-use into their production systems. This project was undertaken to investigate the opportunities available to landholders operating grazing systems and assess their economic, social and environmental impacts to overcome persistent limitations in transitioning the industry in line with MLA's CN30 goals.

Argyle has undergone changes in its operating model over the course of this project, which has seen the development of a carbon arm (Argyle Carbon) as one of three foundational arms of the company. A strategic ambition of this project and the company more broadly was to explore ways to build niche technical capability into our team to retain as much future ownership over environmental credits and projects as possible. This will ultimately shine light on the fundamental issues farmers face in leveraging environmental markets and offer suggestions for improvement such that more value is retained by landholders to assist the broader industry transition.

The direction of this project has shifted over time as we have encountered issues and consolidated our understanding of where we most effectively fit in the developing carbon industry in both the short- and long-term. Our unique consumer and integrated supply chain insights offer benefit to the industry as we have been committed to relaying the constraints, opportunities, and emerging perspectives in this space. As such our methodology has focused on providing personal reflections that 1) provide farmers with the tools to identify if a carbon project is right for them, 2) offer an example of how diversifying land-use at all scales can offer long-term benefits and security to agricultural businesses, 3) explore ways to overcome barriers to increase the overall adoption of regenerative practices within the meat and livestock industry, and 4) outline ways to communicate this through branding and consumer engagement.

This project has involved working outward from five pillars – baseline measurement, avoidance, sequestration, accounting, and value capture. Naturally, this has led to key results including the registration of a carbon project under the Clean Energy Regulator's ACCU Scheme, the establishment of a Biodiversity Stewardship Site, the development of a property acquisition strategy, and ongoing branding to communicate our success to consumers and our value chain. These results will benefit the industry by offering a wholistic insight into how to leverage market opportunities to introduce regenerative activities into a grazing system.

## **Executive Summary**

## Background

This research project has addressed the questions involved in transitioning a traditional grazing system to one defined by regenerative practices, with focus on reducing emissions intensity while improving productivity. It is vital to understand the opportunities and limitations that define this process as the Australian red meat industry has set a target to be carbon neutral by 2030 (CN30). Moreover, governments and markets globally are incentivising the transition to regenerative systems, offering a win-win scenario for those who successfully implement sustainable activities.

The audience and demographic which this research primarily targets are Australian landholders with grazing systems of any size who have interest in pursuing environmental markets and adopting regenerative practices. The key learnings may also be valuable for academic institutions, carbon project developers, state and federal governments, retail suppliers and individual consumers of red meat.

The results of the research herein will be used by Meat and Livestock to continue developing tools, resources and training to aid the industry in its pursuit of net zero emissions by 2030. Delivery of findings to the primary targets will help reduce the limitations which prevent farmers from taking steps towards lowering their emissions.

## Objectives

This research project had seven key objectives, all of which have been achieved.

- 1) Encourage the adoption of sustainable agriculture production and enable farm gate branding.
- 2) Capture carbon through regenerative agricultural practices.
- 3) Enable best practice knowledge transfer by registering and managing projects as a service to landholders who don't otherwise have the capability.
- 4) Engage in commercial partnerships to expand the land under decarbonisation management improving land biodiversity and natural capital reserves.
- 5) Innovate through partnerships with researchers, academia and industry to innovate, collaborate and accelerate best practice.
- 6) Leverage our reputation and business model to promote and demonstrate best practice carbon farming methodologies to enhance the integrity of the Australian carbon market.
- 7) Develop a trusted red meat brand that delivers on its customer promise of sustainability, health, socially responsible and Carbon Neutrality.

## Methodology

The (case study) methodology used in this research has involved documenting firsthand recounts of our experience, producing 11 Milestone reports which have been prepared in collaboration with MLA. Establishing KPIs and an innovation strategy at the outset of this project has helped frame each step along the process.

### Results

The key findings of this project have related to the administrative barriers of the Clean Energy Regulator; developing a property acquisition strategy which incorporates diversified land use; and communicating the benefits of regenerative farming to our value chain and consumers. Results have seen the approval of a soil carbon project, the acquisition of two properties with regenerative focus and the development of a red meat brand delivering on promises of sustainability.

## **Benefits to industry**

Our unique approach to fostering operational change of our grazing system under an integrated supply chain offers valuable insight for the industry into the current challenges and opportunities for farmers. The recount of our experience hopes to shed light on possible solutions such that the industry can implement best practices, extract maximum value from emerging markets and technologies, and transition to low emissions systems as quickly as possible.

## Future research and recommendations

Argyle Foods Group is committed to values of transparency and collaboration in all of our pursuits, and we will continue to partner with industry and academic bodies to help. Based on the results of this project we recommend further research and development in the following areas:

- The impact of specific land use activities on the sequestration of carbon and general soil health.
- Identifying the viability of carbon projects based on climate and topographical features.
- Improvement of the ACCU Scheme's Beef Herd Management Methodology, particularly as it relates to data requirements of the Calculator.

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## 1. Background

## **1.1 Problem Statement**

As the red meat industry continues its transition to more sustainable and regenerative land use practices, in line with MLA's CN30 target, emerging challenges and opportunities are facing farmers. Environmental market schemes, legislated emissions targets and new technologies are three forces seeking to influence the practices of industry to help accelerate this transition. Farmers of all sizes have the chance to benefit from these three trends, however there are persistent barriers to entry which have stagnated the industry in adopting practice changes.

## 1.2 Co-Innovation Strategy

Argyle Foods Group's co-innovation strategy aimed to increase the area of agricultural land under decarbonisation management, increase the capability of regenerative agricultural management of our network and capture market opportunities to demonstrate the ability to sustainably produce red meat. We sought to focus on five key project pillars: *Registering/Baseline Measurement, Avoidance, Sequestration, Accounting* and *Value Capture*.

## 1.3 Scope and Target Audience

The learnings of this research program have all been drawn out of first-hand experience. As such, our primary audience are livestock operations of similar size, entities operating within our value chain, and administrators of environmental markets. However, many of the learnings within this project may be of interest to the agricultural industry and consumers more broadly.

## **1.4 Implementation of Initiatives**

Results of this research will continue to be used as reference for capacity building internally at Argyle Foods Group and will be distilled across our value chain through demonstration sites, branding and industry events. Recommendations will also be given to government, suppliers and industry bodies on how to improve outcomes for farmers.

## 2. Project Objectives

## 2.1 KPIs and Innovation Objectives

As the structure of Argyle Foods Group has undergone significant change over the course of this project, KPIs have been kept broad and amended where necessary. Developed in collaboration with MLA, the KPIs of this project encompass financial, social and environmental goals.

## 2.2 Success of KPIs

Three key performance indicators were originally sketched out at the start of the project. Over time these were refined into KPIs that have been tracked in coordination with MLA at each Milestone of the project, each with a specific metric being measured.

## 3. Methodology

## 3.1 Co-innovation Methodology

Devising an innovation strategy with measurable KPIs was the first step in establishing a foundation for this project's success. As such, significant time was spent discussing carbon market opportunities with investment funds, government entities, project developers and individual businesses with the same vision as Argyle. Following a period of research and capacity building, Argyle Carbon was created, and processes were established internally to help value land holistically. Our experience through partnerships, environmental markets and our value chain was then relayed back to MLA via Milestone reports dictating first-hand recounts of the challenges and opportunities.

## 3.2 Clean Energy Regulator Projects

#### 3.2.1 Client Registration and Strategy

As client registration was initially handled by a previous employee prior to this research project, an official request was made with the CER to transfer account administration. In order to transition lost knowledge, key legislation of the ACCU Scheme and Methodology determinations were studied closely. Three key methodologies were targeted due to their compatibility with the type of land use Argyle is proficient is: *Beef Cattle Herd Management; Estimating soil organic carbon sequestration using measurement and models*; and *Reforestation by environmental and mallee plantings*.

#### 3.2.2 Beef Herd Management

- Identify reporting requirements by downloading the Beef Herd Calculator and interrogated how current data fields can be used to meet requirements.
- Engage with industry to identify likely abatement results and understand on-farm management changes available.

- Complete registration forms with the Clean Energy Regulator.
- Collate data from previous years and enter data into Beef Herd Calculator to determine baseline emissions.
- Initial documentation outlining what is required for the first reporting period has been completed.
- Researched and engaged potential auditors for project reporting and ACCU verification.
- Engaged with 3 leading auditors to gain quotes for assessment. Received proposals from Category 2 greenhouse and energy auditors for comparison (approx. cost 30-40k).
- Informally accepted proposal from ERM.
- Backed up archived stock data from previous stock-book software, Practical Systems, to gather baseline data.
- Initiated development of data management processes across the company to make ongoing reporting requirements more streamline.
- Sent application for voluntary revocation to the Clean Energy Regulator for Beef Herd Management Project.

#### 3.2.3 Soil Carbon

- On-farm assessment with Matthew Harrison from University of Tasmania to undertake initial assessment of soil carbon potential and improvement practices.
- Engaged in discussions with soil measurement company Hone Carbon and reviewed their strategy as a technology to help reduce sampling costs.
- Reviewed property overview provided by Information Memorandum.
- Assessed climate predictions using the NSW Interactive Climate Change Projections Map.
- Gathered soil characteristics of the surrounding area using NSW eSpade Soil Profile Map.
- Mapped cadastral boundary and paddocks in ArcDesktop GIS platform.
- Determined potential CEAs and identified exclusion zones with farm manager and agronomist.
- Received soil test results and fertiliser program from Nutrien agronomist
- Determine C-sequestration potential using LOOC-C (developed by CSIRO).
- Literature review on C-sequestration rates in the area to determine likely gains given the farming system and proposed management changes.
- Development of a Land Management Strategy document as per CER registration process.
- Complete registration forms with the Clean Energy Regulator.
- Planning of soil carbon baseline with FarmLab (to be undertaken in Jan 2024).
- Submitted ERF registration for Soil Carbon Project on Hillview Park.
- Reconfigured Soil Strata GIS Maps under FarmLab's guidance in preparation of baselining.
- Produced outstanding information requested by the Regulator including legal right, qualified persons description and soil sampling maps.
- Baselining with Grounded Coring organised in correspondence with FarmLab.

- Successful visit for the baseline sampling of 36 randomised points at 2 different depths 0-30cm and 30-100cm. Soil cores sent to Adelaide for lab testing.
- Received raw data for baseline samples from FarmLab. Formatted results for ease of reading.

#### **3.2.4 Environmental Plantings**

The following tasks have been completed to-date:

- Map project boundaries on Argyle farm using GIS software.
- Conduct initial carbon assessment and estimate Forward Abatement Estimate using the FullCAM software.
- Complete registration forms with the Clean Energy Regulator
- Liaised with CER to provide further details on land title holdings.
- Pursued consultation from carbon project experts at GreenCollar, which involved site visits and assessment of internal modelling to gain a clearer picture of this method's feasibility.
- Determined that the size of the project was insufficient for meaningful returns on project.
- With potential plantings areas already mapped out, Argyle is still pursuing plantings programs on Hillview Park due to additional on-farm co-benefits they provide.

## 3.3 Life Cycle Analysis

Under MLA's Carbon Neutral 2030 Initiative, the University of Tasmania (UTAS) is acting as the Lead Research Organisation helping support investment in technologies and practices with the greatest potential to deliver environmental, economic and social benefits to industry, consumers and the community. Argyle has been involved with one of these initiatives, the Carbon Storage Partnership, which has involved individually modelling 14 properties across different regions of Australia for a variety of pathways to reduce emissions on-farm. Our collaboration has involved providing as much on-farm data as possible on fertiliser history, livestock numbers and pasture species to then be inputted by an assigned specialist into modelling software's GrassGro and SGS Pasture Model.

- Answer questionnaire from University of Tasmania.
- All available emissions relevant data collated and sent to modelling team.
- 'GrassGro' software walkthrough with assigned modelling specialist, Rowan Eisner, to validate inputs for Argyle Farm.
- Transitioned the project to Hillview Park, providing input data for vegetation, livestock, fertiliser, and energy via ongoing email correspondence with UTAS team.
- Made assumptions using historical records of the property to determine baseline reading for emissions.
- Received first output of the project, baseline emissions.
- Received results on scenarios for improving pasture species and adding N fertiliser.
- Awaiting results on the impact of rotational grazing on total net emissions.

- New project lead assigned to analysis of Hillview Park, specialising in livestock enterprises. Followed by introduction to rework understandings of project context.
- Received updated results on 7 different simulations using SGS Pasture model version 5.4.3 including livestock rotation, mixed species pasture and fertiliser inputs.

## **3.4 Exploring Other Opportunities**

#### 3.4.1 Livestock Supplementation Projects

Over the course of this project, Argyle has remained informed on various other emission reduction opportunities, particularly related to enteric methane.

A proposal was submitted in collaboration with MLA for a Producer Demonstration Site for the use of lick blocks on Argyle Farm. Although it offered the potential to expand our ERF portfolio through the 'Feeding Nitrate Supplements' methodology, the following limitations were outlined:

- OHS risk associated with transporting nitrate.
- Animal welfare risks associated with incorrect feeding of nitrate exposing livestock to nitrate poisoning.
- Due to the above point, the levels of nitrate supplementation permitted under the methodology may only promote minimal abatement in livestock.
- Other lick block and supplementation options are entering the market; however, these are currently not available under an ERF methodology and have limited peer reviewed research available on the effectiveness.
- This submission was ultimately unsuccessful in the standard MLA PDS structure.

Research has been conducted into the effectiveness of enteric methane supressing products and their market readiness. A "carbon interventions matrix" table has been developed to track ingredients, reported emissions reduction ranges, price and references. This has been continually updated overtime as we connect with more feed supplement producers.

#### 3.4.2 Biodiversity Stewardship Sites

Under the NSW Biodiversity Offset Scheme, Biodiversity Stewardship sites are permanently established and earn credits based on the profile of threatened species they protect. These credits must be presold prior to project development. Our land acquisition strategy has taken this into account, targeting potential properties with preliminary biodiversity modelling. Following the settlement of Hillview Park, a specific area of forest was targeted as a potential site for a stewardship project under the NSW Biodiversity Scheme.

- Preliminary biodiversity assessment via the Protected Matters Search Tool.
- Identify stewardship agreement requirements under the NSW Biodiversity Offsets Scheme.

- Approached Tucker Environmental to request environmental consultation and site visit to validate assumptions.
- Received Biodiversity assessment report from Tucker Environmental confirming credit potential.
- Mapped site area with GIS software.
- Discussions with potential biodiversity credit buyer.
- Established interest and drafted an agreement for the purchase of relevant credits.

#### 3.4.3 Capability Building

To maximise the impact of Argyle Carbon and maintain full agency over carbon projects, internal capability building was conducted over the course of the co-innovation project. Highlights of these activities are listed below:

- NSW Farm Writers Lunch: Farming carbon- what are the opportunities
- Packhorse Webinar: Outlook of Australian Land Valuations and Australian Agriculture Markets
- Harvest Road Group and MLA webinar: WA beef supply chain carbon baseline
- Carbon Market Institute Corporate Roadshow Seminars
- Clean Energy Finance Corporation webinar: Delivering on Australia's Net Zero Ambitions
- Agriwebb Corporate Workshop
- Nature Based Solutions Conference 2023
- SparkLabs Cultiv8 Conference 2023

A carbon-specific role was introduced mid-way through this research project. This employee underwent the following capability building:

- University of Melbourne Carbon Neutral Agriculture course run by Prof. Richard Eckard
- QGIS YouTube Tutorial Series
- UC Davis Coursera ArcDesktop GIS Course:
  - Fundamentals of GIS
  - GIS Data Formats, Design and Quality
  - Geospatial and Environmental Analysis
- Innovation Forum Webinar series
- 25+ academic articles reviewed relevant to innovation strategies

This has led to the output of the following tasks to help forward the innovation strategy of Argyle Carbon:

- 55 excel ACCU modelling documents for investigated properties.
- GIS Mapping for 55 distinct properties in NSW, QLD and TAS.
- 21 briefing papers and multiple shorter research summaries into potential innovation opportunities.
- 2 ERF land management strategies.
- Assisted with 6 MLA CN30 reports.
- Registration and approval of one carbon project through the Clean Energy Regulator.

## **3.5 Consumer Insights**

In order to gauge insights on trends and perspectives from the end-buyers of our value chain we have engaged with one key research project as well as more casually through social media channels.

In February 2023, Argyle worked with the University of Sydney as a partner to provide the scope for an Interdisciplinary Project for third year students. We presented challenges in the industry around how we should brand our beef products to show our sustainability journey to consumers of today and future consumers. Argyle asked MLAs insights team to join us in this project with the hope of being able to turn MLA's information into commercially ready branding solutions.

## 4. Results (to-date)

## 4.1 Clean Energy Regulator Projects

Argyle's work through the CER has remained a constant key driver of the overall carbon reduction strategy. Learning the intricacies of the three highlighted methodology categories and the carbon market in general has been vital in informing land management changes and naturally the direction of our approach has fluxed over time. We have made the following decisions regarding ERF projects over the course of this research project:

- Voluntarily revoked Beef Herd Management Project due to change data management processes. Plan to resubmit for a later date.
- Successfully submitted soil carbon project on Hillview Park and received baselining sampling results for respective carbon estimation areas.
- Decided against tree planting methodologies (Environmental Plantings or Plantation Forestry) on Hillview Park until update on the Integrated Farm Method (IFM).

#### 4.1.1 Beef Herd Management Project

#### 4.1.1.1 Project Learnings

In reflecting on the process of bringing this beef herd management carbon project through to the first reporting stage, there are a few key learnings which stand out that were either unexpected, challenging, or worthwhile:

- The Beef Herd Management project methodology under the Clean Energy Regulator offers producers a way in which they can log emissions reduction from increasing the productivity of their herds.
- Even as a relatively well-equipped operation, we encountered hurdles to reach the required level of data compliance. We don't believe that others with less capacity would be able to overcome these easily.
- Once the project was registered and it came to the stage of logging data into the beef herd management calculator we encountered key issues in the data requirements, including:
  - Cattle classes broken down into 10 different categories that are not compatible with an industry standard so all data must be organised manually.
    - These required categories include: Bulls (>1yr and <1yr), Steers (<1yr, 1-2yr, 2-3yr, >3yr) and Cows (<1yr, 1-2yr, 2-3yr, >3yr)
    - These do not match regular categories or terms found in purchase/sales invoices i.e. dentition, heifers.
  - Animal numbers and average liveweight per class for three years prior to the project start date (baseline period)
  - Distinction between "resident herd" and "transient herd" stock movements for each individual animal recorded.

- The transient herd (cattle being purchased and sold), is difficult to record due to cattle class requirements, which makes recording the resident herd (cattle onfarm) difficult.
- Prior to our first reporting period, we tried to collate all of this data by searching through archived stock-book data and excel sheets of cattle purchases/sales.
- We were able to pull together somewhat comprehensive list however large gaps in data persisted and we were unable to file numbers into the specific class requirements.
- In order to avoid these problems in the future, we would put a more comprehensive data system in place that would categorise animals and log liveweight and age at each point of movement.
- Having uniform data collection methods across the 3-year baseline period and moving forward is a crucial element of this methodology which can be easily overlooked.
- There are only a select few auditors in Australia who have experience in the methodologies related to agriculture and soil carbon. There are even fewer with experience in beef herd methodology.
- Auditors are a significant cost for project participants. Beef Herd Management auditing has been quoted at \$17,500 \$38,000 for the single project.
- The audit process from terms agreement to project reporting takes roughly 6-8 weeks.
- The process will require significant time from the project proponent to complete and site visits are essential which adds to costs.
- The cattle class requirement of the method, extending to LOOC-C, means that these limitations are present even when modelling future returns of a project.
  - Not being able to estimate the hypothetical breakeven point of the project was a major deterrent to continuing with the reporting and upfront audit costs.

#### 4.1.2 Hillview Park Soil Carbon Project

#### 4.1.2.1 Forward Abatement Estimate

Project application requires that a calculation of a Forward Abatement Estimated be delivered. Using a formula was provided to Argyle by UTAS to accurately calculate a figure given interchangeable parameters of starting soil carbon (%), soil carbon increase (%) and bulk density (allowing it to be applied to a variety of properties). These figures have also been cross-referenced with the CSIRO's LOOC-C tool, which estimates the starting soil organic carbon percentage and allows for a targeted increase to be set. Both these techniques have subsequently been included in our ACCU modelling process for property acquisition.

#### 4.1.2.2 GIS Mapping

Specialist GIS knowledge is a key requirement in registering carbon projects under the ACCU Scheme and is one of the most obvious technical barriers to entry for farmers. Carbon Estimations Areas (CEAs) and Exclusion Zones where the project would be ineligible to operate must be provided in .kml format when applying to register a soil carbon project. Capability building, specifically GIS specialist courses online and free YouTube tutorials have helped train our Carbon Project Officer to take on this responsibility, which has removed the need for an external service provider to do this work. This mapping is an achievable skill most famers to learn, however it is often framed as a skill that requires a data expert to undertake.

#### 4.1.2.3 Project Costs

A commonly held understanding of barriers to projects under this methodology is the risk imposed by costs across the 25- or 100- year permanence period. Through engagement with multiple service providers for quotes and consultation with carbon project experts we have sought to gain more clarity surrounding this. Costs are found mainly in the following areas, and we are constantly working towards ways to reduce these in the future:

- Project developers charge for consulting and project administration services.
- Soil sampling and lab analysis.
- Auditing for each required reporting period.
- Initial cost in change of management practices, varying depending on extent of changes.
- Fee for service vs ACCU payment: different models exist, and both are worthy of considerations. One area which has become clearer is the variation in support and guidance different project developers provide landholders. It is important for landholders to consider this in relations to any fee structures.

#### 4.1.2.4 Application and Land Management Strategy

The CER project registration process requires the development of a Land Management Strategy (LMS) document, of which there is no template for in the CER's resources. The LMS requires declaration and proof of new and materially different land management activities, and how these will lead to an increase in soil C. Having already brought one project under this methodology to registration, the knowledge gained has been transferred towards creating a similar application for Hillview Park.

Argyle met with the farm manager and had various on-farm visits with agronomists to identify broad management practice changes that fit with the current and future farming system on Hillview Park. To understand a holistic picture of the sequestration potential, we have also reviewed historical information provided in an Information Memorandum for the property. Various publicly available tools have also been implemented to gather distinct characteristics such as climate (NSW Interactive Climate Projections Map), soil profile (NSW eSpade) and topography/key soil properties (NSW SEED). After gathering all relevant data, four key land management activities were picked from the ERF methodology's eligible list.

Having compiled all the necessary information with confidence in modelling figures, GIS files were mapped out based on lot boundaries, topographical uniformity and future production systems. Shapefiles were generated in this regard for Carbon Estimation Areas, Exclusion Zones and Emissions Accounting Areas. These were added into the application form along with a Land Management strategy, and a soil carbon project for Hillview Park was submitted on 21 September 2023. Following the submission, we received three separate requests for outstanding information from the Clean Energy Regulator which significantly delayed the acceptance of our application. The CER notes that there is a legislated 90-day timeframe in which applications may take, which is applied to each request for information. From our experience it will take the maximum of 90 days for individual information requests to be accepted.

Our Land Management Strategy has been slightly tweaked since its submission, largely in the way we have presented eligible interest holder consent. As our selected eligible activities have not changed, we have continued consulting with experts and our agronomist around a program for the immediate term. The CER informed us of a provision that allows baseline sampling to be undertaken prior to the project being declared eligible. The project was eventually approved on 5 August 2024.

#### 4.1.2.5 Baseline Soil Sampling

In early March, following extensive consultation with FarmLab under the National Soil Carbon Innovation Challenge (NSCIC), a soil coring team visited Hillview Park to conduct CER-compliant sampling. The NSCIC covered the cost of 18 points, halving the upfront cost of baselining for our project under agreement that soil data is shared for the program. Prior to the visit, 36 points were randomised by FarmLab and attached to a seed number which was generated according to the CER's "sampling guidance for measurement-based soil carbon methods". Each soil core was taken within 2m of these points, then separated at 0-30cm and 30-100cm for lab testing. This process was completed over 2 days as the coring team encountered several issues (discussed in Project Learnings below).

Soil cores were delivered to APAL Agricultural Laboratory on 28/03/23 with raw results returned by FarmLab on 16/5/24. At submission of this report, we still await a formal report from FarmLab on their analysis. In the meantime, we have formatted these results to read easier, and updated our preliminary models based on the new SOC% figures.

#### 4.1.2.6 Baseline Soil Sampling Analysis

Baseline soil results were returned to us as raw data in an excel spreadsheet, and measured the soil profile, gravel, moisture, mass and soil organic carbon for each individual core from 0-30cm and 30-100cm. The gravimetric organic carbon content was presented with a "whole soil" and a "fine fraction" measurement – the latter being used in the final baseline calculation according to the methodology Supplement. As such, the raw data was formatted to average the "whole soil" gravimetric soil organic carbon results for each carbon estimation area. Figures for 0-30cm were then applied to the forward abatement model to update our forecasted figures for the project over its 25-year lifetime.

At this stage we must now decide whether the project will include both the 0-30cm as well as the 30-100cm layers, which will impact baseline calculations and project activity restrictions. Once we receive the formal analysis report from FarmLab we will discuss this and get their opinion. From our research calculating only in the 0-30cm range is optimal for a 25-year project as it removes variability factors in measurement and SOC increase at depth is negligible in this timeframe.

#### 4.2.2.7 Project Learnings

In reflecting on the process of bringing this soil carbon project through to registration, there are a few key learnings which stand out that were either unexpected, challenging, or worthwhile:

- Soil organic carbon estimations can only go so far without on-ground sampling. Have leeway in numbers and work with ranges rather than absolute values.
- 25-year to 100-year permanence periods are a key requirement that should inform the project. All considerations of management change, modelling and CEA division should be forecasted to this level.
- The division of CEAs must consider potential subdivision of the property in the selected permanence timeframe.
- Less CEAs are naturally more optimal due to lowered sampling costs. This must be weighed up against the uniformity of the selected areas and future management practices that will be undertaken. FarmLab has noted that 4 samples across 6 strata is the optimal number for least variability with the best return on investment. More strata and fewer samples per strata are always better.
- The soil sampling strata map could be easily overlooked but is a crucial step in optimising the measurement success of your project over its lifetime. We found that using publicly available data of NSW Topographical Wetness Index would help ensure our strata were divided by the most similar physical characteristics that dictate change in soil carbon. Conversations with soil samplers also taught us that these strata maps did not need to be entirely contiguous.
- The process of soil sampling naturally comes with challenges due to coring equipment, the variability of landscape and CER compliance requirements. Once points are randomised cores must be taken within 2m radius of the given coordinates. Where obstacles make coring in this area unattainable, reserve points must also be randomly generated and used instead. Due to the presence of rock outcrops on various paddocks on Hillview, a few sampling points were discarded as the coring rig was unable to reach the 100cm required depth.
- Having existing knowledge of GIS software has been a crucial part of having autonomy over the project. At many steps along the way GIS files are required under strict guidelines for the project to be approved. Having the capacity to generate maps reduces costs and reliance on carbon advisory companies.
- At stages requiring CER approval, it is important to plan around longer than expected wait times as regulator takes time to ensure all requirements are met. Each time a request for information has been delivered, it has taken the maximum length of 90-days to hear back from the CER.
- The sampling process from coring to receiving baseline results took roughly two months.
- Calculations are made for either 0-30cm or 0-Xcm values. This decision impacts the equation for SOC content as well as restrictions on project activities at depths below those allocated.

#### 4.1.3 Environmental Plantings Project

#### 4.1.3.1 Environmental Plantings Preliminary Investigation

A 346.51\* ha property located within the Southern Highlands – Tablelands region, approximately 99\* km from Crookwell was targeted in May 2024 as an opportunity suitable for livestock grazing, biodiversity conservation and an Environmental Plantings carbon project. Preliminary mapping and modelling was conducted, which was used to inform the final decision to settle on the property in August. Roughly 200\* ha of country was estimated using LOOC-C, returning an average of 25 ACCUs/ha/yr. Following analysis of these figures an on-farm visit was arranged with environmental consultants specialising in tree planting methodologies. It was determined that an extra 40\* ha could be added on to the initial CEA estimate after discussions around whether tea tree could be cleared on the property to make room for plantings. We are continuing to communicate with the same environmental consultants to refine modelling and structure a plan for plantings. We have approached various seedling distributors for quotes and further advice.

#### 4.1.3.2 Project Learnings

In reflecting on the process of modelling a potential environmental plantings project on many farms across Australia, there are a few key learnings which stand out that were either unexpected, challenging, or worthwhile:

- Measuring the forward abatement estimate for this method requires the use of the FullCAM tool, along with understanding of plantings species and row spacing. The useability of the FullCAM tool is very low, with the only meaningful tutorial being a 60-page pdf.
- LOOC-C provides an easier workaround for modelling; however, it is limited in only allowing for estimation under the "Block environmental services" growth calibration.
- Seedling sourcing and exclusion fencing are two other major barriers to entry. However, funding for greening projects exists through government and non-government organisations.
- Even with upfront costs removed, the possible returns of a small project area would not outweigh the costs of management.
- In consultation with Tucker environmental we determined that the economics of these projects is ideal around 30 ACCUs/ha/yr. Higher rainfall is the primary determinant of greater per hectare returns.
- The Environmental Plantings Pilot reduces the numbers of audits for projects under 200ha, making it feasible to run projects at lower ACCU/ha/yr returns in smaller instances.
- Hillview Park did not estimate sufficient returns, primarily due to annual rainfall levels. We continue to model these projects in areas of higher rainfall (over 700ml mean annually).
- Trees can be planted as close as the drip line of the next closest tree. Seedlings are planted by hand when machinery cannot access the CEA, including at slopes over 20 degrees.

## 4.2 Life-Cycle Assessment

The UTAS LCA has been an ongoing project that has required collection on on-farm data and a handful of calls with our assigned specialists to tweak data inputs for the models. The project started on our previous property in Harden, NSW, prior to our relocation to Hillview Park, requiring coordination to transition the project. As Hillview Park offered a more diverse opportunity to change land use for the improvement of biodiversity and emissions, we agreed that it would be a much greater candidate for this type of modelling and scenario simulating.

We received a baseline estimate and initial recommendations in September 2023 as the modelling team presented the first round of results for scenario modelling which was focused on improving pasture with the aim of reducing methane by reaching sale weight earlier. This included categories of cattle productivity (liveweight change, improved conception), supplementary feed requirements, net GHG emissions change and emissions intensity change compared to the baseline. Results showed that emissions intensity came down by 0.44 kg CO2e/kg LW (3.7% lower), however the team has not yet provided figures on the economics of the interventions.

A new project lead who specialises in livestock enterprise was assigned to assist the next stage of the analysis. In an introduction meeting, a few assumptions made by our previous project lead were challenged and cross referenced with stock numbers, the grazing area and average liveweights. In July 2024 we received the first of these refined results which simulated Hillview Park under the SGS Pasture model version 5.4.3. These results evaluated 7 different scenarios and their impact on soil carbon sequestration from 1980 to today. The most optimal scenario offered was described as "a high input system with hay fed during Feb and March, one paddock of white subclover and chicory, and the remaining are with perennial ryegrass, clovers and annual ryegrass". This analysis has helped with future planning of management activities on Hillview Park under our registered soil carbon project.

## 4.4 Biodiversity Stewardship Site

Following the relocation to Hillview Park, the opportunity for biodiversity credit generation was apparent on large sections of forest present on farm. Through previous research into the structure and process of working through this scheme we learnt that NSW State Significant Developments are legally required to purchase biodiversity credits to offset ecosystems and species disturbed. With the construction of the Crookwell 3 Wind Farm this year, Argyle has recognised the opportunity to be the supplier of these credits to the developer and engaged a consultant to help establish this connection.

The area of interest was assessed by a consultant at Tucker Environmental which involved a site visit and the creation of a biodiversity credit diligence report for the Hillview Park property. This report assessed the landscape context, native vegetation, threatened species and the consent conditions for the Crookwell 3 Windfarm. We continue to work with Tucker Environmental to assist with the administrative processes which require specific technical understanding of this area. The site has successfully passed a fencing inspection, and an ecologist survey was undertaken in the first week of December 2023 to validate and fully register the project.

## 4.6 Research and Development

#### 4.6.1 Strategy Development

As a newly established division of the company, Argyle Carbon has undergone significant change along the timeline of this project. The original innovation strategy particularly outlined goals that would require Argyle to be positioned as a competitive carbon project developer and/or aggregator (I.e., 200+ carbon projects by 2027). After engaging with the space in depth, we have ultimately determined that reaching this position on our own, without compromising the pastoral and meat business, would likely require a large restructuring of the business that may not be viable. As such, we have started to refine our strategy around the following key points learned:

- Producers are sceptical of the carbon market but must engage with it to continue operating in the future.
- We are uniquely placed as farmers running our own projects, which resonates with similar groups.
- Partnering with a project developer will allow us to sustain this position, extending the reach of our carbon portfolio while offloading prerequisite responsibilities we are not well-versed in.

Following this deliberation, Argyle has decided to leverage the Carbon arm of the company as an extension of the existing operation in terms of what services we hope to offer in the future. Rather than recalibrating as a carbon project developer, we have refined the strategy to focus on our strengths as a meat and pastoral business with carbon and regenerative agriculture expertise. From this position we are able to work outwards from our existing value chains to aid other aspiring farmers to incorporate similar approaches to holistic land management which we are on track to embed into our business.

#### 4.6.2 Innovation Research

The Argyle Carbon team conducts ongoing research into potential technologies, industry developments and market opportunities (schemes, partnerships etc.). In order to condense information and communicate findings to the broader team, we have established two main methods based on the nature of what needs to be conveyed – briefing papers and excel matrices. Briefing papers deal with qualitative information, following a similar structure of investigating the purpose, key points, and relevance to Argyle for innovation opportunities.

We have developed a spreadsheet comparing levels of carbon sequestration or emissions reduction for different land management activities and technologies. We continue to add this excel document to compare the effectiveness of similar products/processes as opportunities arise on-farm. Forecasting the operating costs of carbon projects and regenerative practices has been difficult to achieve so far with accuracy. However this information will be vital for future projects, and we believe that putting in templates early to measure and report on timing and rates of management practices will go a long way.

#### 4.6.3 Grants and Partnerships

#### 4.6.3.1 Carbon Code of Conduct

As the carbon market matures, regulatory bodies will continue to push for best practices that involve high levels of transparency to instil trust in the system. The Carbon Market Institute – Code of Conduct is a world-leading domestic protection code that frameworks the ways in which this can be achieved. AFG has recognised that entering this space as carbon advisor and project development consultant will require that stringent procedures are in place for dealing with clients.

During this project Argyle became a signatory to the code as we believed it would be in our best interest to showcase this for future relationships with landholders. We have reviewed all requirements of the code and structured the layout of our commercial terms accordingly. We have currently attended three Education and Training sessions run by the ACI, which have explored the constitution of the Code and how carbon consulting is conducted with integrity.

#### 4.6.3.2 Net Zero Emissions Ag CRC

Argyle has had extensive engagement and input as an industry stakeholder in the design and development of the Net Zero Emissions Ag CRC. The CRC has submitted the bid to the federal government and has now passed its initial phase of review. The determination from the first-round review was expected in June 2023.

#### 4.7 Branding and Communications

#### 4.7.1 Branding

Milestone 7 of this project had a large focus on our brand and market strategy for the US. Two new brands, along with marketing material, have been created to align with our sustainable Australian beef messaging. We have engaged with the north American MLA office, as well as partnered with Investment NSW for a trade show at the end of June. Lachlan Graham and Naomi Leahy both travelled to the US to launch these new brands. Considerable engagement with US partners and potential clients has taken place over the last quarter in preparation for face-to-face meetings in June/July. Alongside this, Argyle has refined its strategy for the US. We have found there is considerable demand for the product we are selling, however the reputation of brands based on regenerative agriculture/sustainability in the US require sustained brand trust. For this reason, we engaged a smaller partner to begin with, to build our brand in partnership with them, focussing on telling our farm-gate story, with growth achieved long-term through increased consumer awareness.

On 9 October 2023, this branding strategy materialised with the launch of our Coles exclusive range, which better showcases our company values. To do this we redesigned our packaging and changed the brand name from *8 Mile* to *Argyle Nurture*. The packaging now includes information about our sustainability initiatives with a QR code that links to a website providing detail about our farm practices. We did this to substantiate our claims against the current backdrop of scrutiny against greenwashing. To

go along with these changes, we have been posting more consistent content that highlights the economic, environmental, and social benefits of our product.

In the first month of sale, the product line was up 369% based on the previous year's sales. Performance is tracked weekly to ensure this growth is sustained. No price premium is placed on the product for the sustainability elements, and it is our belief that is more about ensure our product is the customer's choice rather than a willingness to pay for these attributes.

This branding development has been developed in conjunction with Argyle's expansion of its exports into the United States. With a media announcement on the partnership of Argyle Foods Group and a global meat trading company, Sure Good Foods (SGF), we look to establish a focused regen brand and sustainable claim in the grass-fed U.S. market.

#### 4.7.2 Communications

Over the last two quarters, Argyle has reinvigorated its social media and communications strategy with key objectives now in place:

- 1. Engage and grow consumer awareness of Argyle brands domestically to support our missions of sustainable land management, cattle and beef.
  - a. Consumer focused Instagram: @Argylemeats
- 2. Engage the Australian red meat industry in our journey to become more sustainable and promote our business through educational posts on what we are working on and broader industry impacts.
  - a. New industry channel: @Argylefoodsgroup

We continue to refine our approach to communications and have experienced a steady increase in engagement since renewing our focus on our social media.

During this project, we took steps to showcase the development of our sustainability strategy by entering two separate sustainability awards – *The 35<sup>th</sup> National Banksia Sustainability Awards* and *The Australian Financial Review Sustainability Leaders* list. Both competitions seek to shine a spotlight on the achievements and innovations of organisations in a variety of select industries. Under both, we described the ways in which we have adopted a renewed strategy built on regenerative farming practices, and how this has impacted all levels of our business down to the launch of our newest line of beef, 'Argyle Nurture'. As a result, we were recognised by both competitions, being put through to the second round of submissions for the AFR Sustainability Leaders List and named finalists for the Banksia Awards.

## 4.8 Advisory Services

As Argyle Carbon has improved its internal capabilities over time, this project we investigated steps to formally structure the business as a carbon advisory provider. By identifying key elements of carbon and biodiversity projects which we have experience in delivering successfully, a clear picture of potential services and deliverables was formed. These include project mapping, credit modelling, project

registration/administration, and land management consultancy, among others. The goal of Argyle Carbon was to create a sustainability advisory arm which has experience in both project administration but is a high-quality food producer first and foremost. After consultation with partnerships and consideration of company structuring, we had considered plans on establishing a separate entity who will perform these functions. This would streamline the operations of Argyle Foods Group while giving autonomy to a new entity and help focus on the following overarching goals: supporting landholders in implementing new projects on farm to generate secondary income streams, facilitating regional development, and creating long-lasting positive environmental outcomes in harmony with primary production.

## 5. Conclusion

## 5.1 Key Findings

As this project has developed alongside the creation and establishment of Argyle's carbon and sustainability endeavours, there have been a wealth of key learnings that will serve to the industry as it transitions to net zero emissions by 2030. Specifically, our reflections should help landholders with interest in establishing carbon and biodiversity projects under federal and state market schemes, as well as those looking to rejuvenate their branding and communications to showcase regenerative practice changes. Below is a list of these key learnings:

#### • ACCU Scheme Projects

- Historical data is needed to deliver key documents (such as a Land Management Strategy) to the CER when registering and reporting on carbon projects. This must cover the baseline period (usually 5 years) and be contextually relevant to selected activities.
- GIS Mapping is a requirement to legally establish the boundaries of project and the ineligible zones within this area.
- Upfront and management costs are significant barriers to entry for carbon projects and should be understood based on the chosen methodology. Costs can be separated into two key groups of audit costs and operational costs. Request for quotes from registered auditors and plan your management activities in advance.
- If an application for a carbon project does not have all relevant information included a request for information will be sent to the proponent. Once this information is received by the CER, there is a legislated 90-day timeframe for them to reply. In our experience the regulator will take the maximum amount of time to respond, so ensure all information is included in your first submission to avoid waiting for extended periods for a project to be approved.
- Property Acquisition
  - Any given piece of agricultural land in Australia can be diversified from a base production system and there are state and federal schemes available to help do so.
     Learn about how to value your natural capital in a more holistic way and capture value through deploying projects which have overlapping benefits.

- There are many publicly available tools and resources to help understand government schemes and estimate the value of your own land under them. LOOC-C is a good example of this; as a free and easy way to measure the potential returns of carbon projects on a given piece of land.
- If you are in a position to do so, diversify your portfolio of land assets across production systems, climates and projects. This will embed resilience into your operations by providing buffers to market shocks and physical risks of changing climate.
- Branding and communications
  - Establishing trust should be a main priority in branding under practice changes on-farm.
    Connecting on an individual level with consumers is a good way to do this in any market.
    We have done this by telling our stories and giving on-farm updates.
  - Avoiding greenwashing and overclaiming. Understand the validity of certain certification schemes and only pursue them if they truly align with your sustainability goals.
- Leveraging niche capabilities
  - Carbon advisory providers are very important at this stage of the ACCU market's maturity as there are many niche, technical skills required in estimating the potential of a property and planning accordingly. Work with consultants and providers who give sound advice and do not take project autonomy away from you.
  - The next few years may see potential automation pathways opening up for the market that will reduce the administrative burden of establishing environmental projects. In the short-term tools such as ChatGPT may help with structuring registration documents if used correctly.

## 5.2 Benefits to industry

The key strength of this project for practical recommendations for the industry lies in the first-hand recounts of our experience in engaging with these key findings with as little external assistance as necessary. As red meat livestock grazers ourselves, we hope to shine light on the difficulties and opportunities in adopting practices that will see the industry meet the goals and targets of CN30. Below are some key takeaways regarding practical recommendations for the industry:

- Retain ownership of projects through embedding technical skills into your team.
- Explore market schemes and incentives that diversify land use and promote long-term resilience of your system.
- View agricultural properties as multipurpose and understand that environmental projects can supplement your primary production system.
- Tell your personalised story through branding and communications, let land stewardship drive the claims of your product.