Commercial in Confidence

Final Report

Grantee Name	**AirborneLogic Pty Ltd**
Application Receipt No.	**AGF2-17696322**
Due Date	**Final Report required to be submitted as part of Milestone 4 – 31 May 2024**

It is a requirement under the Grant Agreement for the Grantee to submit a final report on completion of Milestone 4. The final report provides PIRSA with information on the project outcomes, including whether the original project objectives have been achieved, key findings and results, industry benefits and end user impacts, technology adoption, pathway to commercialization, and any areas for future research.

Please post a completed Final Report to:

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OR

Please email scanned documents to: PIRSA.grantsenquiries@sa.gov.au

FINAL REPORT

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1. Project Outcomes

The project brought together AgTech companies AirborneLogic and FarmLab with the South Australian wine industry to put in place the technology and reporting framework to quantify carbon in vineyards, trees and soils.

The project has delivered the first vineyard soil carbon project baselined and lodged under the Emissions Reduction Fund (ERF) 2021 Soil Carbon Methodology. The ERF will be developing this into a case study, delivering a significant milestone for South Australia's wine industry in leveraging technology to meet sustainability requirements.

The project has created a pathway for wine producers who currently offset their emissions, to accurately measure the carbon they are able to sequester on their land.

The current lack of access to scalable technology to enable wine grape growers to quantify the carbon in the trees and soil of their properties, and to share that with the wineries that they supply to, has been addressed. Currently vineyards are only able to share their CO2e emissions data via Sustainable Winegrowing Australia and there is no framework in place to report any CO2e insetting activity.

The project has enabled project partner Hither & Yon to join the government's Climate Active program and demonstrate their own on-farm in setting of carbon, rather than reliance on purchase of carbon offsets from 3rd parties.

The project has used technology to deliver a compliant, scalable and globally leading solution for the SA wine industry to quantify carbon in the soil and natural vegetation of vineyards, by utilising existing ERF soil carbon measurement methodology and using tree measurement (LiDAR) technology, alongside industry recognized carbon modeling (CSIRO LOOC_C and ERF FullCAM) estimation software. Growers can now measure soil and tree carbon potential, compare this against their emissions profile and understand their journey toward carbon net zero and the practical land management activities needed to achieve this.

Furthermore, this project recommends future scope to enable Australian wine grape growers to work alongside AWRI to input their carbon storage data into the SWA platform, and share it with the entire wine supply chain to ensure continued market access.

The project has created a tangible proof point from which to advocate for an update to certification programs, such as Climate Active and the CER's existing soil carbon estimation methodology, to enable increased storage of carbon on agricultural land to inset against emissions.

Outcomes of the project have been communicated to the industry through workshops (June and July 2024), through industry partner Wine Australia and through industry magazines (Grapegrower and Winemaker) and uplifted by the CER through development of a case study.

2. Project Objectives

The objectives of the project were:

1) Leveraging technology to enable grape growers to measure, monitor and increase their stores of carbon, this project will lead to the following longer term benefits:
    a) Promotion of practices such as tree planting and mid row cropping to improve the diversity of wine regions, both from a biodiversity and aesthetic improvement perspective;
    b) Support to winegrape growers to be more resilient to the effects of climate change through increased soil carbon, leading to improved soil / vine health, improved soil water holding capacity and capacity to better withstand future extreme weather events;
    c) Position the SA wine industry at the forefront of leveraging technology for sustainability and climate change adaptation;
    d) Preparing the wine industry to meet the upcoming market access challenges, such as carbon border adjustment tariffs in key export markets such as the EU;
    e) Using technology to enable data sharing from growers up the supply chain to wineries and brands in order to prove progress towards the collective decarbonisation of the industry; and
2) Creating a template for other agricultural sectors such as horticulture, to follow.

The project has successfully identified:

1) Industry best practices for carbon measurement and carbon modeling (soil and trees) to support growers in assessing their carbon insetting potential;
2) information in case studies to assist growers seeking to either lodge an ERF compliant carbon farming project using existing methodologies and to be prepared for new and emerging methodologies.
3) a method for the wine industry to demonstrate management and adaptation to climate change through greater data capture and modeling on carbon insetting potential in the winegrowing supply chain.
4) information relevant for the wine sector to demonstrate a pathway to carbon net zero.
5) methods for using soil and vegetation carbon for reporting similarly in other horticulture sectors.

3. Project methodology

The project used the following methodology:

1) Farmlab collected existing soils information across 5 vineyard locations to enable first pass consideration of soil types and soil limitations to assist stratification for establishing a soil carbon baseline.
2) AirborneLogic used drone mapping and GIS modeling to assist FarmLab in then creating a soil sampling plan compliant with the CER soil carbon methodology.
3) FarmLab then conducted soil core sampling (Baseline) within the stratified zones (row and interrow) as per the CER soil carbon methodology determination 2021.
4) AirborneLogic collection RGB imagery over each vineyard and LiDAR tree data from existing revegetation (tree planting) zones (Hither & Yon and Lacey Vineyards) and then modeled tree carbon potential using both CSIRO LOOC_C and FUllCAM assessment tool whilst measuring selected trees for individual tree volume (m3) and carbon quantity (TCO2e).
5) Project management partner, Quetaka worked with the vineyard owners and Land & Soil Co to interpret the legislative requirements of the method and prepare land management plans compliant with the CER soil carbon methodology . In the case of Treasury Wine Estates, this was achieved in collaboration with the company to the standards required for a CER registered soil carbon project , and therefore likely eligible for issue of ACCU's.
6) Farmlab and Quetaka worked with the CER to ensure that the soil stratification and soil sampling methods used within the vineyards were aligned and compliant with the approved methodology.
7) Quetaka worked with AWRI to increase the understanding of the soil and tree carbon data collection methods and data outputs so that the SWA carbon calculator and workbook methods could accept insetting carbon data in the future in an appropriate format.
8) A Land Management Strategy and Soil Carbon Baseline was developed for each vineyard landholder partner, with partner input to enable transparent data to be captured and used by each partner vineyard.
9) A workshop/field day has been booked for each participating partner region (Barossa Valley, McLaren Vale and Coonawarra) to assist with dissemination of the project findings and engagement of the industry, supported by the regional wine industry associations and Wine Australia.

The method used was successful in identifying the soil and vegetation carbon components on partner vineyards to demonstrate a pathway for winegrape growers to identify carbon insetting potential and future scope to use this information for SWA reporting,and to register a CER soil carbon project where relevant for the grower.

4. Key findings and results and project deliverables

1. Soil Carbon Estimation

Mapping:

The ability to create a soil carbon estimation that is compliant with the CER soil carbon methodology determination 2021 requires the design of a vineyard map that is highly accurate. This is due to the fact that randomised sampling locations must be assigned with confidence to either the undervine or interrow area. The individual collecting samples is unable to modify the planned location, else the compliant method set out by the CER is breached. This is most important if the vineyard intends to use the soil carbon baseline as part of an officially registered soil carbon project for the crediting of ACCU's (to be used to support carbon net zero claims) - a key pathway that this project aimed to address.

- ➢ For all 5 vineyard locations this required the aerial survey and mapping of the vineyard area to RTK accuracy such that vineyard extents and individual rows could be mapped. Outside of the scope of this project this would present a cost to the majority of SA vineyard owners as the industry does not currently have such a dataset available to winegrape levy payers. This mapping work was completed by AirboreLogic to assist FarmLab with accurate mapping enabling the accurate baseline mapping.

Historical soil data / Soil sampling strategy:

It is a finding of this project that although many vineyard sites do have historical soil testing results and information to hand (largely due the successful uptake of the SWA reporting framework), often this is not sufficient means for stratifying the sampling areas required of a soil carbon baseline. This was found to be because historical soil samples are typically composite samples for the entire vineyard management unit and lack the granularity of grid sampling that could be used for stratifying sampling areas. This project used the Topographical Wetness Index model available via the FarmLab software platform for the purpose of stratifying a compliant sampling plan.

Another potential shortcoming of industry-standard historical soil data is that it is typically obtained for 0-10cm or 0-15cm depth. This does provide some useful insight into potential soil carbon building limitations but is not consistent with the standardised minimum sampling depth required of CER compliant soil carbon baseline (0-30cm). Ideally, a number of single point soil samples of 0-30cm depth should be used to inform potential management practice changes that could be applied by a landowner to increase soil carbon stocks for the crediting of ACCU's.

- ➢ Individual sample core pre-baseline soil sampling (0-30cm) was required on all 5 vineyard locations to inform the sampling strategy for the soil carbon baseline in this project.
- ➢ A transition to grid sampling or single point sampling at depths of 0-30cm should be considered to complement traditional soil data, if the grower is seeking carbon insetting from soil stocks.

Soil Carbon Baseline / Baseline Sampling:

This project followed the CER *'Carbon Credits (Carbon Farming Initiative - Estimation of Soil Organic Carbon Sequestration using Measurement and Models) Methodology Determination 2021'* in producing a soil carbon baseline estimate for the 5 vineyard sites. As part of that methodology it was a requirement to sample a minimum of 9 individual soil cores across each of the 2 separate Carbon Estimation Areas on the vineyard (Undervine area and Interrow areas respectively). In total, 18 soil sample cores were taken across

each vineyard area to a depth of 60cm. These sample cores were then recorded and divided in to 0-30cm and 30-60cm fractions before being analysed, so that carbon stocks could be calculated for each fraction (0-30cm reporting is compulsory under the method.

- The CER Carbon Credits Methodology Determination 2021 is a robust approach to soil carbon measurement and is a requirement if landholders are seeking to register soil carbon projects for ACCU's (currently a requirement for Climate Active carbon neutral status)
- A minimum of 9 soil sample cores are required per Carbon Estimation Area when completing a soil carbon baseline, and the minimum requirement is to produce a 0-30cm measurement sample of 38mm diameter or greater. This required specialised equipment and suitably qualified individuals to prepare - outside the capacity of most vineyard management.
- In 4 out of 5 vineyard sites, the soil carbon baseline data showed that soil organic carbon levels were higher in the undervine area than in the midrow under recent historical management (baseline history). It is speculated that this may be the result of 2 main drivers; higher soil moisture content for extended periods undervine (irrigation supplements rainfall), and historical nutrient inputs tend to be applied via fertigation (viz. undervine). Readily available soil moisture and nutrition tend to lead to increases in soil carbon stocks.
- In the 1 out of 5 vineyard sites that deviated from this trend has a history of proactive animal husbandry and supporting pasture development in the midrow areas which may form part of the observation. Randomised sampling locations cannot be ruled out however, as the midrow and undervine samples were not taken as paired/adjacent sets (not applicable under the CER methodology).
- Soil carbon stocks were higher in the 0-30cm than the 30-60cm soil fraction across all 5 vineyard locations, and represented an expected trend.
- For all 5 vineyard sites in the project, soil carbon stock calculations were prepared using FarmLab software (CER compliant) which readily converted the %SOC and bulk density values into a Soil Carbon tCO2e value at the per hectare and per vineyard scale. This software represents significant time saving and approachability for landholders to complete this calculation independently, and enables growers to translate soil carbon % into industry standard metrics of tCO2e.

2. Tree Carbon Quantification / Estimation

LiDAR Approach

Following RGB drone-based mapping across the partner vineyards, AirborneLogic captured LiDAR data using a Emesent STX-1 SLAM based LiDAR camera, which is interchangeable between a DJI M300 quadcopter drone and handheld Terrestrial LiDAR (sweep and scan).

The camera captures a very high number of points per square metre (ppsm) (thousands) when compared to airborne aircraft LiDAR capture, which may be much lower (5-300 ppsm), potentially reducing its ability to measure a tree's volume.

The Emesent STX-1 LiDAR capture enabled highly accurate, tree specific measurements. AirborneLogic tested the ability to scan vegetation using this technology and capture sufficient accurate data to translate this into a tree mass (m3, Tonnes) and convert this to the carbon industry standard of measurement of Tonnes CO2 equivalent (tCO2e). AirborneLogic then related this to calculation of potential sequestration "at scale". Furthermore, a number of individual trees were scanned as examples of farm scale vineyard planting trees.

Analysis of this data assisted the overall project objective to understand the annual sequestration potential of trees and enable this form of carbon in-setting to be assessed against a vineyard's emissions profile

(Scope, 1,2,3), as recorded by many winegrape growers in the SWA members platform to determine its potential for offsetting their carbon footprint.

Key findings included;

- LiDAR is a highly accurate way to repeatedly measure objects, like trees, but assessment and software still requires research and development to validate accuracy and enable high confidence "block" scale assessment of tree volumes to be achieved.
- Individual tree LiDAR measurements and calculations for tCO2e were very useful for validating the sequestration potential of a planted tree and may help winegrape growers evaluate how many trees they might need to plant to offset their emissions profile.
- There was a range of individual tree volumes and carbon equivalents calculated that ranged from 0.06 tCO2e to 1.2 tCO2e that was dependent on the size of the tree (low range, small tree; highest value, large tree)
- Capturing a full coverage of LiDAR data on a tree substantially assisted calculation of the tree mass and carbon volume equivalent. Measuring the volume of a tree planting area needs further work to automate and create a cost-effective workflow.

LOOC-C and FullCAM Models

The CSIRO LOOC-C tool is a useful, simple, high-level mapping approach used to estimate the likely sequestration of a tree planting or environmental planting carbon project. The ERF FullCAM model is more complex. It is provided by the federal government as the mandatory tool for calculating the sequestered carbon within a registered ERF carbon project such as environmental tree planting.

AirborneLogic used both tools to model a hypothetical area of 1ha planting (environmental or mallee style planting) on each of the partner vineyard properties.

Key findings included;

- LOOC and FullCAM outputs were comparable with their estimations of insetting potential (TCO2e/ha/yr) for each of the partner vineyard properties.
- Outputs ranged from an average of approximately 4.0 tCO2e per ha per year to approximately 15.0 tCO2e per ha per year over a project life of 25 years.
- Growth potential of trees and therefore their sequestration potential as calculated by these tools are (not unexpectedly) influenced by soil type, rainfall and prior land use.
- Trees are a valid and highly useful method for off-setting carbon and may, when used in collaboration with soil carbon sequestration projects (depending on overall emissions profile of the vineyard), assist in achieving a carbon net zero position, providing that the tree plantings achieve sufficient longevity to sequester and offset the projected carbon amounts.

3. Development of Land Management Strategy & Registration of soil carbon sequestration project with CER

LMS Document:

The cornerstone element which supports a registered soil carbon sequestration project for the generation of ACCU's (and claiming carbon sequestration units towards Carbon Neutral status with Climate Active) is the landholder's Land Management Strategy (LMS). This LMS document provides supporting evidence that carbon abatement and storage in soils is likely with specified modified land management practices on the

property (often termed ‘additionality’). The CER Carbon Credits Methodology Determination 2021 lists 13 eligible management activities (EMA’s) which landholders can adopt to underpin their LMS. Other practice changes can be ‘stacked’ with these 13 EMA’s, but the critical requirement is that at least one of these is applied.

- With considerable grower contributions of time and consultation with carbon service-providers, this project delivered land management strategies for all 5 vineyard sites which are compliant with the requirements outlined by the CER for registering a project (nominating a suitable EMA).
- Data obtained from pre-baseline soil sampling (0-30cm) and review of management practices over the previous 5-year period (‘baseline period’) was required to inform which EMA to nominate. Requirements for good record-keeping of inputs and practices should be noted by growers - in the form of sales invoices, contractor agreements, and journals/applied recommendations.
- For all 5 vineyard partners, it was relatively easy to nominate an EMA for the midrow area that aligned-well with the greater business interests and productivity gains of the site; however, it was challenging for partners to nominate a suitable EMA for the undervine area. This should be noted by growers interested in this process.
- This project also extended resources and support to further the LMS and project design all the way through to official registration of a soil carbon sequestration project with the CER; that of Treasury Wine Estates ‘Coonawarra Vineyard Soil Carbon Project’.
- Registration of this project in a vineyard setting represents one of the first in this field of agriculture, and proves a way forward for other wine and grape enterprises to progress to carbon insetting and, potentially, recognised carbon neutral status.
- A CER requirement that suitably qualified persons with extensive agronomic and soils experience either prepare or review the LMS document, presents a potential adoption barrier (financial) to grape and wine producing SME’s. Current market costs for this service vary considerably but are significant investments of financial capital.
- Grower participants in this project were of the opinion that (without financial support) an economical return-on-investment is unlikely in terms of simple ACCU’s current market value. Nonetheless, credible soil carbon sequestration claims would represent significant marketability of their product.

4. Integration of Carbon Storage data; Sustainable Winegrowing Australia & Supply Chains

Sustainable Winegrowing Australia (SWA) - Future opportunities

The increasing adoption of the SWA reporting framework for the grape and wine industry, and the use of its trust mark, present an opportunity to standardise across the industry the way in which carbon emissions are reported alongside other sustainability metrics relevant to viticulture. Currently there is an industry best practice carbon emissions calculator embedded in the workbook which enables grapegrowers to report the CO2e emissions of their operation over time. However, in an accounting sense, this is limited to measuring ‘expenditure’ without measuring ‘income’ to arrive at a net balance; a term called ‘Emissions Intensity’ across other agricultural sectors. It was within the scope of this project to review the SWA framework and recommend future scope that could see producers of wine grapes determine their product’s Emissions Intensity, and report that to supply chain stakeholders - who are expected may demand this in coming years.

- A review of the SWA workbook and reports established that many of the key data sets required to deliver CO2e emissions intensity reports are already present in grower data (yield, area, emissions sources), but confirmed that potential carbon ‘insetting’ data sources do not yet exist.
- The 2 most likely sources of CO2e insetting data were determined to be from soil carbon sequestration projects and tree planting projects taking place on the vineyard property; both of which are addressed in this project.

- It is proposed that in the future state of the SWA reporting framework, carbon sequestration ('insetting') fields for data entry could be included; allowing the creation of emissions intensity values for winegrapes to be produced at the vineyard level. A logical next step would see the ability to share this emissions intensity values (t CO2e / t Grapes) to wineries who could, in-turn, convert these emissions intensity values into values for wine after incorporating their own scope 1 & 2 emissions data (kg CO2e / L Wine).
- This project produced visual resources to demonstrate how future SWA reporting workflows, datasets, and report graphs may appear to illustrate the potential for such an evolution.
- One of the potential challenges to incorporating carbon sequestration data from soil and tree projects on vineyard sites lies in the differences in the time-step of periodic reporting; SWA emissions for grape production are on an annual timestep, whereas changes in soil carbon and tree carbon data are often in multi-year.

Industry Benefits and End User Impacts

Stakeholder Engagement. The project Team engaged across three key viticultural regions in SA, Barossa Valley, McLaren Vale and Coonawarra. The project partner trial vineyard sites formed target sites in each region. Field days are confirmed to take place for presentation of key findings in the three regions, associated with the winegrape grower associations in each region. Industry information is being distributed through specific wine industry magazines and industry peak bodies such as Wine Australia. Furthermore, the CER is preparing a Case Study to demonstrate the value of the project to the wider carbon farming industry and its applicability to agriculture and horticulture, highlighting the scope that the 2021 methodology determination affords to permanent alley crop systems.

Industry benefits.

The project has enabled winegrape growers, for the first time, to experience and see the benefit of investing in soil and tree carbon sequestration activities and that a pathway for carbon net zero is achievable, and therefore transferable and recordable to the AWRI SWA platform as well as communicable to the wider global wine industry to transparently address market access issues and highlight action on climate change in the agriculture sector.

Practical Application.

Using the information generated from the project, it is possible for a winegrape grower to:

1) Apply the CER soil carbon methodology to design a compliant soil carbon estimation plan, obtain soil carbon baseline, and subsequently calculate the soil carbon stocks of their vineyard (TCO2e). They can utilise the LOOC-C modeling and explore practical changes to land management outlined by the CER to then establish possible gains in soil organic carbon (see attached FarmLab and Quetaka reports for each participating landholder).
2) Using FullCAM or LOOC_C modeling, calculate the likely above ground carbon that can be sequestered through a tree planting project within a vineyard property, and where applicable derive individual tree carbon LiDAR measurements using software calculations for individual trees to demonstrate the carbon (TCO2e) than can be sequestered through individual (or farm forestry) tree plantings.
3) prepare for a future scenario where soil and tree carbon sequestration can be inset against carbon emissions calculations (for example within the Sustainable Winegrowing Australia workbook) to demonstrate the carbon insetting nature of soils and trees to achieve or contribute to a carbon net zero position.

Wider Primary Industries benefit.

The methods developed are applicable to any agricultural/horticultural Primary industry. Soil and/or vegetation based carbon are able to be measured and the long term insetting nature of these carbon components can be shown where specific land management agreements are met to ensure that the sequestration outcomes of the land management approaches are permanent and create additionality, effectively removing carbon from the short term negative life cycle thereby contributing to positive agricultural outcomes for sequestering carbon in soils and trees with beneficial climate change mitigation outcomes.

Furthermore, additional positive outcomes are likely, namely reduced soil and land erosion, improved water retention for cropping, trees, vines and other forms of horticulture, overall improvement in biodiversity (particularly where tree plantings form part of an environmental or biodiverse planting), better

soil structure and fertility and positive overall outcomes for the plant/soil/water matrix potentially resulting in healthier plants.

Overall, when the methods the project successfully tested, are adopted by farmers, they should:

1) create opportunity for primary industries to create and engage in positive climate change adaptation strategies and potentially create additional revenue through ACCU's where a project is lodged with the ERF.
2) improve the ability to demonstrate positive action on climate and assist market entry for markets through transparent demonstration of carbon insetting and pathways to carbon net zero.
3) have overall benefit to health soils and environment and create greater farm resilience.

5. Economic Benefits

Economic benefits of the project were estimated as follows:

- *Zero - Total jobs and new jobs created (full-time equivalents (FTEs)) – during 2023-24*
- *Two - Estimate jobs that will be created in future (FTEs)*
- *$100,000 - Private investment attracted ($ amount and sources) – during 2023-24*
- *Zero - Increased productivity (farmgate value)*
- *3 - New local customers acquired during 2023-24 and total customers EOFY (numeric)*
- *5 - Demo-farm and farm visits and/ or demonstrations 2023-24 (free text)*

6. Technology Adoption

Reporting and assessing carbon in soils and vegetation is an emerging industry. Currently the carbon market in Australia is voluntary and Australian Carbon Credit Units (ACCU's) are managed through the Australian government (Emission Reduction Fund, ERF). Measuring the carbon footprint of a business operation using life cycle assessment is relatively mature and well understood in the wine sector, with participants in Sustainable Winegrowing Australia (SWA) having the opportunity to measure their emissions profile (Scope 1, 2 & 3) through use of a carbon footprint calculator. However, there is presently no agreed process for measuring carbon in-setting i.e. how much carbon might off-set an emissions profile through sequestration of carbon in vineyard soils or associated property tree plantings.

The measurement methodology for soil carbon projects is well defined in the ERF methodology, however application of this approach to vineyard soils is immature. This project has demonstrated a clear process for stratifying a vineyard for soil carbon measurement purposes and identified the likely sequestration profile for carbon across a 25 year vineyard soil project.

Lodgment of the process through the ERF has/is being tested by project partner Treasury Wine Estates (TWE). This process is lengthy and challenging, but now demonstrable. For growers not seeking an ERF compliant (ACCU driven) project, cost maybe a barrier for demonstrating a measurable, transparent process for the purposes of "self declaring" action on climate change and addressing potential market barriers to overseas markets.

There is no current approved methodology for measuring tree carbon, however the ERF (CER) is close to releasing the revised tree planting method for . The process of measurement demonstrated in this project i.e. FullCAM modeling and CSIRO LOOC_C carbon modeling for vegetation (environmental or mallee planting) is useful for demonstrating the enormous potential of trees to sequester carbon and assist winegrape growers with presenting information on a carbon net zero pathway, where tree planting is adopted. LiDAR measurement and software modeling of individual trees has demonstrated that it is possible to accurately measure a tree volume (m3) and determine the TCO2e of that tree and therefore accurately forecast the potential of carbon sequestration through targeted tree planting on a property i.e. shelter belt, woodlot or environmental planting.

When both soil and tree carbon sequestration forecast modeling is used in collaboration with know emissions profiles (Scope 1,2 & 3 TCO2e) a winegrape grower can now forecast in a certain location (wine region) what commitments would be required to achieve a carbon net zero position.

This is an important benchmark for the industry.

This project and the allied grower case studies demonstrate that with targeted land management approaches it may be possible for winegrape growers to achieve a net carbon zero position through investment in soil and tree planting projects on their properties and that overall benefits to production through soil, soil water and biodiversity are also likely to add value through overall vineyard and vine health improvements (as supported through other industry literature and research on soils and biodiversity).

7. Pathway to Commercialisation

A combined soil carbon and vegetation carbon project is yet to be fully commercialized, but may emerge once the ERF releases a carbon methodology for Integrated Farm and Land management (IFLM), expected later in 2024.

There is evidence to demonstrate that some winegrape growers (example TWE & Hither & Yon) are progressing soil carbon projects formally (ERF application and Climate Active) and others are considering how best to demonstrate their commercial commitment to carbon net zero with interest in commitments to biodiversity.
Other industry sectors (horticulture) are taking a similar direction with soil carbon and considering how best to incorporate commitments to natural capital, including biodiversity.

It is clear in these emerging industry directions that landholders seek professional advice from advisors that can demonstrate clear and transparent, industry supported methods for measurement of carbon.

AirborneLogic, FarmLab and the industry partner sub-contractors will be providing evidence of the methods used in this project at future agricultural and industry field days, within national marketing campaigns and general sales materials to create market confidence that there are robust and measurable methods being employed.

8. Future technology development and recommendations

Further work is required with LiDAR and tree volume estimations of carbon to enable single tree calculations to estimate biomass at the lock planting and landscape scale. Whilst the FullCAM tool models forest level assessments, it has not been designed to incorporate accurate tree level data to assist with advanced model refinement using such data now possible with LiDAR and software “tree” specific approaches. The data presented at the tree level for two of the project partners is very useful for modeling potential carbon sequestration in farm-based plantations such as driveways, windbreaks, fence lines and infill between vineyard blocks, where appropriate.

The modeling estimates from the FullCAM and LOOC_C outputs have helped to provide greater clarity on the benefits of larger environmental plantings and the property scale carbon sequestration possible to complement soil carbon project outcomes.