113

Carbon in the rangelands: Developing a training package for pastoralists

Bawden, HT[1]; Connors, H[2]

[1] Dentsu Creative; [2] Meat & Livestock Australia

Key words: carbon; emissions; agriculture; extension; training

Abstract
Agriculture accounts for approximately 17.4% of Australia's national greenhouse gas emissions, of which around 68% is attributable to enteric fermentation (DCCEEW 2022). In line with national and global climate commitments, the pastoral industry will play a significant role in helping to reduce emissions, whilst also acting as a major sink for carbon storage in vegetation and soils.

The ability for pastoralists to be able to calculate, demonstrate and manage their enterprise based on their carbon footprint is becoming important to maintain social license and market access. Enterprises with a low carbon position may also be presented with opportunities around value-adding and business diversification.

When it comes to on-farm emissions reductions or carbon sequestration, Australian pastoralists express concern and confusion, and are unsure what actions to take or who to trust for independent information, thereby stalling adoption. Carbon EDGE, a new training program for the red meat industry, was born out of the need to scale up industry capacity, responding to these adoption challenges.

The process involved the co-design of a two-day workshop with supporting resources by a Working Group of livestock producers, service providers, supply chain representatives and researchers.

Six pilot workshops and two train-the-trainer sessions were delivered in different regions to seek feedback from over 100 industry participants representing 2.9 million ha under management. This included a specific focus on ensuring the program was relevant for rangeland environments.

Covering key terminology and concepts; supply chain and policy drivers; environmental markets; carbon accounting and on-farm interventions, the program aims to provide participants with information to make confident decisions and form an action plan aligned to their own production system and business goals. The success of the program was reflected in satisfaction scores averaging 8.5/10. The need for continued extension in this space was reflected in the project outcomes, with participant confidence levels sitting between 3-3.5 out of 5, and over 90% of attendees indicating their intent to take action following the workshop.

Introduction

Whilst many livestock producers and industry service providers recognise the need to demonstrate action on decarbonisation, there are several barriers to on-farm emissions reductions, sequestration and reporting (Henry unpublished; Farners for Climate Action 2023):

1. An absence of policies or incentives for sustainable practices, whether those be government, supply chain or market-driven.
2. High upfront costs and limited access to capital for investing in sustainable practices.
3. Uncertainties in the methods for measuring and validating on-farm change.
4. Confusion due to mixed messaging and difficulty sourcing information from independent (non-commercial) sources.
5. A lack of independent advisors with the expertise to support on-farm reporting, planning and implementation of emissions-reduction strategies.
6. The pace of research and development for technologies to support on-farm emissions reductions.

Carbon EDGE, a new training program for the red meat industry, was born out of the need to scale up industry capacity, targeting several of these adoption challenges (in particular, points 4 and 5, above).

Consistent with the Adoption Strategy of Meat & Livestock Australia (MLA), Carbon EDGE was designed to increase knowledge and skills of participants, building on other awareness-raising activities already on offer across the sector (MLA 2024). Developed in the context of whole-farm business planning, Carbon EDGE was also designed with a focus on increasing participants' business sustainability, profitability and/or productivity.

Method

This project was undertaken with a team made up of MLA staff, expert service providers and a Working Group. The ways of working were established early in the project, with the implementation of project management protocols and regular project meetings. The project was divided into two stages, with service providers selected to deliver each stage:

1. Stage 1 involved the development of a technical manual. This underpinned the development of other resources in Stage 2.
2. Stage 2 involved the design of the training package using best-practice extension principles. This included the development of training resources, delivery of two train-the-trainer sessions and six pilot workshops, and the project evaluation.

The Working Group, comprising of livestock producers, advisors and technical experts, was used as a sounding board for both stages. The group was formed through an Expression of Interest process, with participants representing different regions and production systems, including the southern and northern rangelands.

Stage 1

The Working Group determined the outline for a "master" technical manual, which could be used with supplementary material to ensure relevance for different regions and production systems. The service provider subsequently undertook a review of Australian and international literature for the development of five modules: Greenhouse gases 101; Greenhouse gas accounting; Carbon credits and carbon neutrality; On-farm emissions; and On-farm sequestration. MLA staff provided additional content for the manual with a focus on livestock production. It was reviewed by the project management team and Working Group before being finalised.

Stage 2

The design of the training package was based on a set of learning outcomes determined by the Working Group:

- Improving carbon literacy and understanding of carbon farming, carbon sequestration and greenhouse gas emissions.
- Increasing participants' level of confidence around the carbon accounts for their business.
- Participants have identified short and long-term actions to reduce their emissions and increase the sequestration occurring within their farming business.
- Participants have the tools and knowledge to critically assess actions which fit within their business.

Information was presented through a mix of visual, auditory, reading, written reflection and activity-based learning. Activities were designed to incorporate a mix of individual reflection, small group work, teamwork, presentation and role play.

An important outcome of the Carbon EDGE program was for each participant to develop an Action Plan to align to their own business objectives and opportunities. The Action Plan was broken down into step-by-step activities to complete throughout the workshop, set out in a participant workbook.

During this stage, the workshop resources were also developed. This included a participant manual (a simplified and more visually engaging version of the technical manual), a slide deck, run sheet, evaluation forms, activity information, and supplementary regional materials for deliverers (e.g. datasheets, case studies).

Based on the content developed in Stage 1 and the learning outcomes identified in Stage 2, it was determined that the program should be delivered in person over two days. The training program was designed using a "flipped learning" model in which participants are provided with information prior to attending and are given the opportunity to revisit the material during the workshop. The flipped learning model for Carbon EDGE was designed to leverage existing online training programs, tools and 'how to' videos.

Pilot workshops were run over a five-month period in different regions of Australia. The pilot workshop deliverers were service providers already involved in the project via the Working Group, who undertook online train-the-trainer sessions before the workshops. Extensive preparation was required for deliverers to familiarise themselves with the material and customise the information for each region (environment, production system, livestock enterprise, markets etc). Two deliverers, and MLA staff, were present at each pilot workshop.

Updating the training program was an iterative process, with adjustments tested after each of the pilot workshops. A major revision of the training package was completed following collation of the workshop feedback from all six pilots, taking into account the reflections of workshop deliverers. An additional train-the-trainer workshop was offered in person for new deliverers after this process had been completed.

Results

Six pilot workshops and two train-the-trainer sessions were run in different regions to seek feedback from over 100 industry participants representing 2.9 million ha under management (see Table 1). Participants travelled extensive distances to workshops, with representatives from rangeland production systems present at four of the six sessions – Mackay, Roma, Narrabri and Alice Springs.

Table 1. Pilot Carbon EDGE workshops delivered

Pilot location	Date	Producers	Others
Mackay, QLD	9 – 10th November 2023	10	0
Benalla, VIC	5-6 December 2023	15	5
Roma, QLD	15-16 February 2024	20	1
Narrabri, NSW	20-21 February 2024	16	2
Coonawarra, SA	27-28 February 2024	15	4
Alice Springs, NT	18-19 March 2024	9	10
Totals		85	22

Participant feedback

Pilot workshop participants completed feedback and evaluation forms to support the review of the program. The forms included questions related to their knowledge, attitudes, skills and aspirations (KASA), completed before and after the workshops. The average percentage change in KASA across all workshops was 7.6%. Base knowledge, as evidenced by the pre-course answers, was quite high, and the course led to an improvement in the level of correct answers. However, it was also determined that the knowledge questions were too simple,

and the forms have since been updated. Participants in all workshops improved their attitude/confidence in carbon farming and greenhouse gas related topics by an average of 23%, with post-workshop confidence levels sitting between 3–3.5 out of 5 (self rated).

Participants rated overall average satisfaction in the workshop delivery and content as 8.58/10. Over 90% of attendees also indicated their intent to take action following a workshop. When participants were asked what action they would take, common responses included: completing a carbon account; exploring on-farm interventions (cited examples of these interventions were highly dependent on location and production system); further self-educating on the topic or; in the case of advisors, looking for opportunities to support primary producers by offering similar training.

Deliverer feedback

Thirteen advisors were trained as deliverers. Advisors in the first cohort were involved in online train-the-trainer sessions and the delivery of the pilot Carbon EDGE workshops. They reiterated the need for at least two deliverers per workshop to effectively support participants during activities, especially with carbon accounting. The complement of two deliverers also proved useful to be able to cover the material in depth – particularly if one deliverer has expertise in livestock production and the other in carbon farming.

Participants in the second cohort completed a one day in-person training session which they rated 9/10, on average, for meeting their expectations. They will be paired with accredited deliverers to complete workshop delivery as part of their training.

Discussion

Feedback from the pilot workshops reflects a positive response to Carbon EDGE. The results demonstrate the importance of ongoing extension on this subject, with significant scope still to increase confidence levels across the industry and high numbers of participants expressing an intent to take action. The continued success of Carbon EDGE and broader industry adoption relies on several factors:

Delivery model

MLA's EDGEnetwork workshops are typically delivered under a fee-for-service model. With the availability of no-cost or low-cost extension programs – and in some cases a perception that the support for emissions reductions should come from government or supply chain – there was mixed appetite from producers to pay to attend (the pilot workshops were heavily subsidised). This issue would be alleviated if supporting organisations, such as government, industry bodies, NRM groups or corporate agriculture, could provide ongoing subsidies. To secure this type of funding, the program would need to ensure it meets the needs of these organisations, and complements (rather than duplicates) other extension services on offer.

The extension ecosystem

It is likely that complementary models of extension will be required to support on-farm adoption, taking the training knowledge and concepts into the field. This may include, for example, advisor upskilling, long-term practice change programs, grower/producer groups, or the incorporation of relevant information into existing and well-established industry programs (e.g. BMP programs).

Currency

Given the frequency of change and the level of investment in new R&D in this space, Carbon EDGE will require regular updating to remain current. This is particularly pertinent for rangelands environments where less is known about the interventions available to livestock producers to reduce their emissions, and information in Carbon EDGE is lacking (which could further exacerbate confusion and/or low confidence of pastoralists).

It will also be important to reflect developments in Australia's Carbon Market and emerging Nature Repair Market. As methodologies are retired and released, producers will want to understand the options available to them. The possibility for interactions between carbon projects and biodiversity projects are yet to clarified.

Additionally, as new extension programs such as the Federal Government's Carbon Farming Outreach program become available, Carbon EDGE will need to be reviewed to ensure consistent, reliable and accurate information is presented to industry. Engagement with relevant research and extension providers will be essential.

Acknowledgements
We are grateful to the following project contributors: Dr Carly Green (Environmental Accounting Services), Dr Felicity Thomas (Environmental Accounting Services), Sarah Barrett (Pinion Advisory), Kate Carmichael, Leanne Sheriff, Stuart Smith (Pinon Advisory), Rhonda Toms-Morgan (ConnectAg), Tanisha Shields, John Francis (Agrista), John McLaughlin (Upscale Carbon), Chris Wyhoon (Campfire Agri), Melinee Leather (Leather Cattle Co.), Liz Allen, Iain Bruce (Western Plains Beef) & Gus Whyte (Wyndham Station).

References

DCCEEW (2022) Quarterly Update of Australia's National Greenhouse Gas Inventory: December 2022. Australian Government. Available at https://www.dcceew.gov.au/sites/default/files/documents/nggi-quarterly-update-dec-2022.pdf

Farmers for Climate Action (2023) A Survey of Australian Agricultural Perspectives on a Path to Net Zero. Available at https://farmersforclimateaction.org.au/wp-content/uploads/2023/12/Compressed_DIGITAL_A-Survey-of-Australian-Agricultural-Perspectives-on-a-Path-to-Net-Zero.pdf

Henry, B. (unpublished). A Review of Ecosystem Service Market Opportunities for Livestock Producers. Project AS10309 4122. Prepared for Queensland DAF.

Marston, J. (2024) The 2024 list of agrifood corporates making regenerative agriculture commitments. *AgFunder News.* https://agfundernews.com/the-2024-list-of-agrifood-corporates-making-regenerative-agriculture-commitments

Meat & Livestock Australia (2024) 2023-24 Production Adoption Outcomes Report. Available at https://www.mla.com.au/globalassets/mla-corporate/extensions-training-and-tools/documents/mla-adoption-outcomes-report-2324-web.pdf