

Farm300 – using a coaching methodology to support livestock producers in developing skills and implementing practices to reduce greenhouse gas emissions and increase profit

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Abstract. Meat & Livestock Australia's Farm300 project demonstrated the appropriateness of supported learning using a coaching methodology to assist livestock producers develop skills to achieve practice change on farm. The project focussed on management of greenhouse gas emissions from livestock production, with practice change resulting in private and public benefits. A supported learning methodology based on coaching was used to develop skills. A number of critical findings emerged from the adaptation of the approach. The project also confirmed that implementing practices that will reduce greenhouse gas emissions from livestock systems need not compromise increased productivity.

Keywords: extension methodology, greenhouse gas emissions, increasing productivity and profit, livestock, coaching, monitoring and evaluation

Introduction

Livestock businesses are complex and operate in a very dynamic environment. For these reasons livestock producers require a broad skill set to run a profitable business. There are demonstrated links between producer skill level and business profit (Doonan 2011; Doonan 2012). Therefore, improving livestock producers' skills is a key objective for Meat & Livestock Australia (MLA) to help producers improve the profitability of their businesses and have the capability to adopt new practices and innovations.

Where an area of farm business improvement requires complex systems analysis and skill development, extension programs based on a supported learning model have been proven most effective in promoting practice change that results in improved productivity on farm (Davey and Maynard 2007; Doonan 2012). A supported learning model is one that provides the opportunity and support for skill development. Generally this support is in the form of a coach, and there is opportunity throughout the production cycle to practice the skills, implement them on farm and observe the outcomes.

Supported learning activities are often more expensive to deliver per producer than other extension activities due to the intensive level of individualised support provided in the process. The outcome of this results in significant private benefit to individuals, hence it has not been mainstream for Research and Development Corporations (RDCs) to adopt the methodology using producer levies and government funds to underpin extension programs. However, the Australian Government's Extension and Outreach (E&O) program, under the Carbon Farming Futures program, provided an opportunity for Meat & Livestock Australia to trial the effectiveness of a supported learning model using coaching in the Farm300 project. The project aimed to enable producers to obtain skills that would both improve their profitability and decrease greenhouse gas emissions from their livestock operations.

The project used methodological principles from the Tasmanian Dairy Industry Skills Audit (Doonan 2012), which linked profit and skill development (Figure 1) and an earlier MLA beef producer group pilot program (Doonan 2011) that demonstrated a supported learning model using coaching was an effective method to achieve skill development. On-going supported learning and having the opportunity to practice new skills led to a larger increase in profit (Figure 2).

Methodology

The key components of the project methodology were: project governance, recruitment of coaches and producers, coach training and support, producer coaching and monitoring, evaluation and reporting (MER).

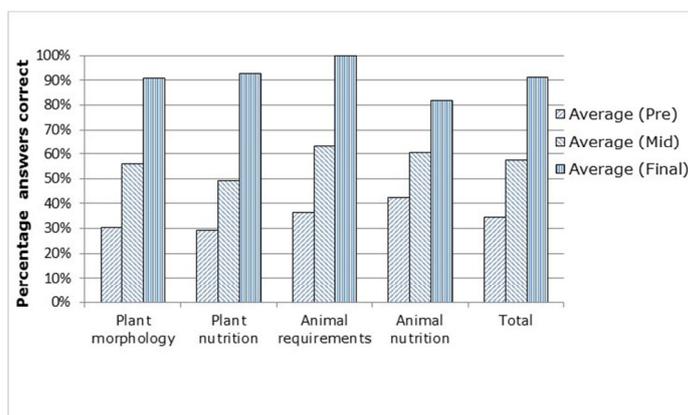
A National Coordinator was engaged to deliver the project against a detailed work plan that integrated and streamlined all activities to maximise the use and exposure of resources at every stage. Further, a Steering Committee provided expert advice and guidance on many of the technical issues associated with the science underpinning greenhouse gas (GHG) emission mitigation strategies.

Figure 1. The link between capability (measured as level of skill/questions answered correctly) and business performance (measured as return on capital)



Source: Doonan 2012

Figure 2. The change in skill level over the course of the MLA beef producer group coaching program



Source: Doonan 2011

Coach recruitment, training and support

Coaches were recruited from the advisors that participated in a one day awareness workshop on climate change and GHG emissions, held in seven locations around the country. Following these events 23 coaches were selected to work with groups of 8-15 livestock producers. Due to the short timeframe of the project, coaches recruited producers from existing discussion groups or their existing client base. Under the rules outlined by the E&O program, producers participated free of charge. The reduced timeframe also meant that the time available to deliver the supported learning program was less than a full production cycle, which meant adapting delivery for six months without compromising the outcomes.

Coaching, whether one-on-one or in a small group situation, provides an opportunity for participants to be supported by a coach to practice and implement skills in their own business while at the same time facing the normal challenges of their operating environment. In this context, coaching is defined as providing a supported learning environment over a series of sessions to enable producers to improve their skills and decision making capability to subsequently make changes to their management practices. The development of management capability through skills acquisition results in a lasting ability to improve business performance.

The coaches used in this project were technical experts and able to provide supporting technical information to support producers in finding solutions to problems. Coaches were encouraged to not 'give away' answers to specific technical management questions, but to facilitate discussion amongst the group. The exchange between coach and producer provided the platform that enabled solutions to be found, with the producer using management principles and improved skills. This process ensures the producer is driving the process to find solutions and fosters a culture of principle and evidence-based problem-solving.

Coaches were provided with a toolkit for delivery of Farm300 material, including introductory workshop technical materials, templates for feedback and use of GHG calculators, running sheets and an example coaching program. With this material and one-on-one support from the National Coordinator, coaches were encouraged to develop their own coaching program tailored to the needs of their producer group. The essential components of the coaching program were learning activities clearly linked to achieving defined learning outcomes, delivery of 6-8 sessions (of which one was a one-on-one session), opportunity for producers to learn and practice skills, and an overarching objective of training that would result in increased productivity and decreased GHG emissions. Coaches were provided with ongoing support throughout the program via an on-line forum, coach webinars and email updates, in addition to one-on-one support via phone and email.

Monitoring and Evaluation

A monitoring and evaluation (M&E) plan was developed for the project and coaches were provided with structured M&E materials, including guidelines for a skills audit conducted before and after the program. Skills audit questions were designed to enable objective measurement of shifts in skills between the start of a coaching program and at the end. Objectivity is critical to determining whether a skill can be applied or not. The skills audit was divided into two parts – one based on understanding of GHG emissions and the other on the specific topic of the coaching program (e.g. pasture productivity, reproduction, business management, animal nutrition or genetics). A skills audit score of at least 70% in the appropriate section of the skills audit is required before a participant could be said to be “competent” to implement the skills in their business and improve business performance. This “competency threshold” is based on comparative analysis data linked with skills auditing data that illustrates that this is the level exhibited by the top 10% of producers (Doonan 2008). This threshold was used in analysing skills audit data for Farm300, where only those coaching programs that achieved an average post audit score of greater than 70% were included in measuring the impact and benefit of the program.

Coaches were required to provide modelled data on the impact of their programs on GHG emissions and profit, as the timeframes of the program did not make it possible to measure actual on-farm improvements in profit or GHG emissions. The GHG emissions were calculated using one of four GHG calculators – Sheep-GAF, Beef-GAF, FarmGAS or Grassgro. The GHG calculators provided an estimate of total emissions; however, total emissions are not as clearly linked with improved efficiency (and profit) as emissions intensity (Eckard et al. 2015). Farm300 coaches provided an estimate of emissions intensity (emissions (t CO₂e) per kg of live weight produced), which has been strongly linked with improved productivity and profitability (Eckard et al. 2015). Profit was calculated using either the coaches’ own tools or an Excel spreadsheet developed for the project (profit was measured as Return on Capital).

Coaches modelled the impact by comparing the production figures for an average or typical farm in the group, with the production figures that could be expected to be achieved if producers in the group implemented the practices being learned via the coaching program. For example for programs that focussed on lifting reproductive performance, production figures would model increases in the numbers of lambs/calved weaned.

As a full production cycle was not covered by the program, the impact of the coaching program on industry profitability could only be estimated indirectly using the models. Sheep and cattle numbers of participating producers were used to calculate an average DSE. The average profit of the top 20% of livestock producers (\$22/DSE) minus the average profit of the typical livestock producer (\$10/DSE), gave a potential increase in profit of \$12/DSE.

Results

Table 1 outlines the key outputs and the legacy created from Farm300, in terms of meeting the project objectives. The project was approved by the Australian Government as achieving all milestones and objectives in June 2015.

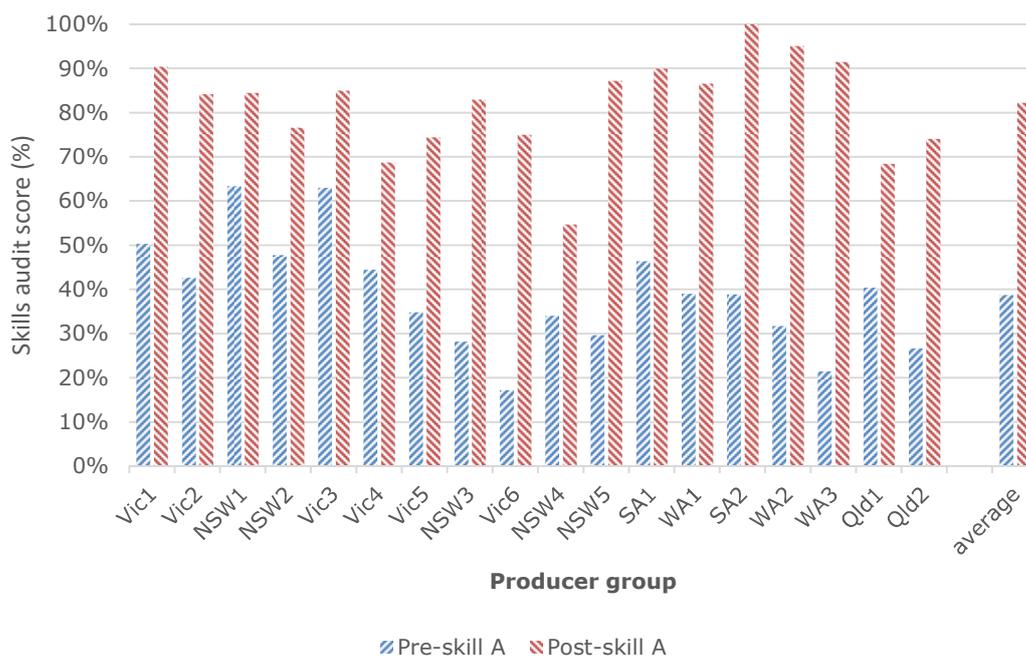
The outcome of the Farm300 project was upskilling 333 producers (of which there were 175 beef businesses and 178 sheep businesses). The project covered approximately 60,000 head of cattle and 540,000 head of sheep and a total land area of 455,000 ha was managed by participating producers.

Table 1. Farm300 achievements in meeting project objectives

Key Performance Indicator	Impact	Legacy
100 advisors upskilled	128 advisors upskilled	Improved industry awareness of GHG emissions from livestock and the link with productivity
25 coaches recruited	23 coaches recruited	A network of trained coaches
300 producers participating in coaching	333 producers participating	A variety of extension materials and tools available to industry
Increase profit by 10%	Increase profit by 24%	
Decrease GHG emissions by 30%	Decrease total GHG emissions by 7%	
	Decrease GHG emissions intensity by 24%	

The average results for the GHG skills audit was 39% pre-coaching, which increased to an average of 82% post-coaching (Figure 3). The average result for the coaching program skills audit was 43% pre-coaching and this also increased to 82% post-coaching (Figure 4). These significant improvements in skills and knowledge are consistent with data from MLA’s Majority Market Programs (Howard & Beattie, 2014).

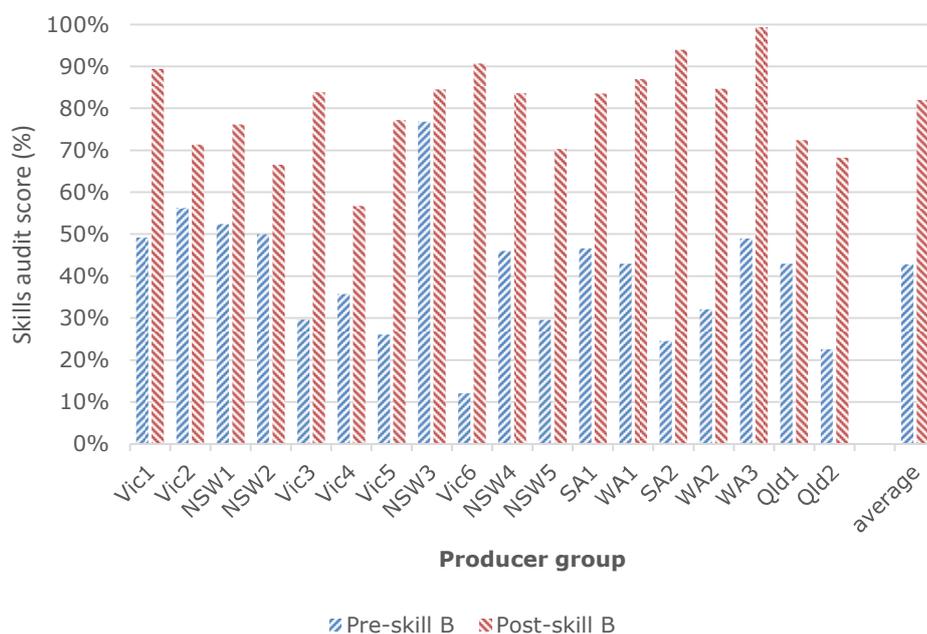
Figure 3. Average skills audit results (GHG emissions) pre and post coaching by producer group



Based on the threshold of a 70% score in the skills audit to be considered skilled (Doonan 2008), three Farm300 coaching groups did not meet this criterion and consequently the results from these groups were not included when measuring the overall impact of the program on GHG emissions and profit.

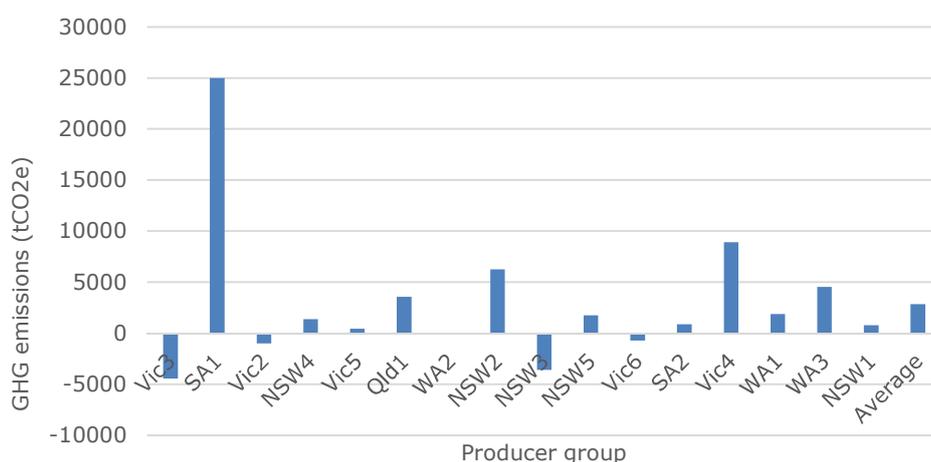
Feedback from producers about the project was very positive. Seventy-nine percent of participants either intended to - or had already made - changes as a result of participating in Farm300. The average intention to change from MLA’s traditional adoption programs, such as More Beef from Pastures and Making More from Sheep is approximately 70% (Howard & Beattie 2014). This demonstrates the effectiveness of the coaching model to upskill and empower producers to make changes on-farm. The majority of the practice changes being adopted included aspects of pasture/grazing management and animal management (e.g. genetics, improving reproductive performance).

Figure 4. Average skills audit results (coaching program specific) pre and post coaching by producer group



Farm300 reduced total GHG emissions from the production systems of participating producers (Figure 5). GHG emissions were reduced by over 45,000 t CO₂e for the whole project, with an average reduction of 121 t CO₂e per participant (although it should be noted that for four groups the improvement in production resulted in an increase in total GHG emissions). Based on the carbon price at the time (April 2014) of \$13.95/t of CO₂e, this equates to a total financial benefit of \$636,000 for the project (\$1688 for an average producer) that could be accrued were eligible producers to participate in the Emissions Reduction Fund (ERF). This compares with a total profit of \$14 million (average of \$779,000 per producer) (Figure 7).

Figure 5. Modelled impact of total GHG emissions by Farm300 producer group



GHG emissions intensity decreased for all groups, with an average reduction of 19%, 7.7 t CO₂e/kg liveweight before the program compared with 6.3 t CO₂e/kg liveweight after (Figure 6). These findings are consistent with results from the Whole Farm Systems Modelling (WFSAM) studies (and with the net present value data), and reinforces the importance of the link with profit in encouraging livestock producers to engage in practices to reduce their GHG emissions (Eckard et al. 2015).

A large variation in the GHG emissions reduction (Figure 5) was found between participating groups, which reflected the management practices being targeted by the coaching activities and the baseline GHG emissions of the group (i.e. the level of improvement in efficiency to be expected based on the practices currently being employed by the group). For example, one of the groups with predicted emissions reductions of greater than 5,000 t CO₂e had a focus on feed alternatives such as grape marc, which *in vitro* studies have indicated are likely to have a significant impact on reducing emissions (Rebbeck 2016).

The impact of the coaching program on profit is illustrated in Figure 7. The average modelled increase in profit for participants was 24% Return on Capital.

Figure 6. Modelled GHG emissions intensity pre and post Farm300 by producer group

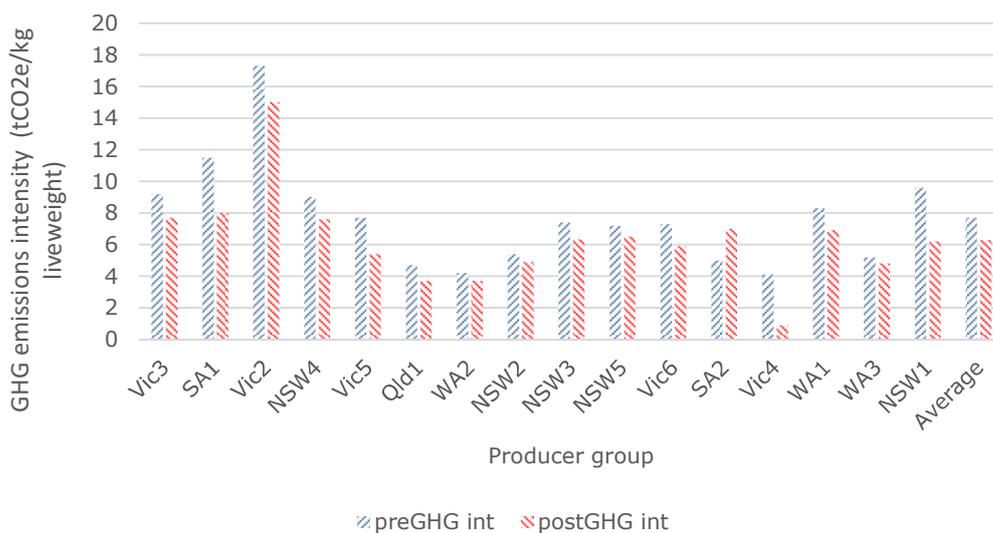
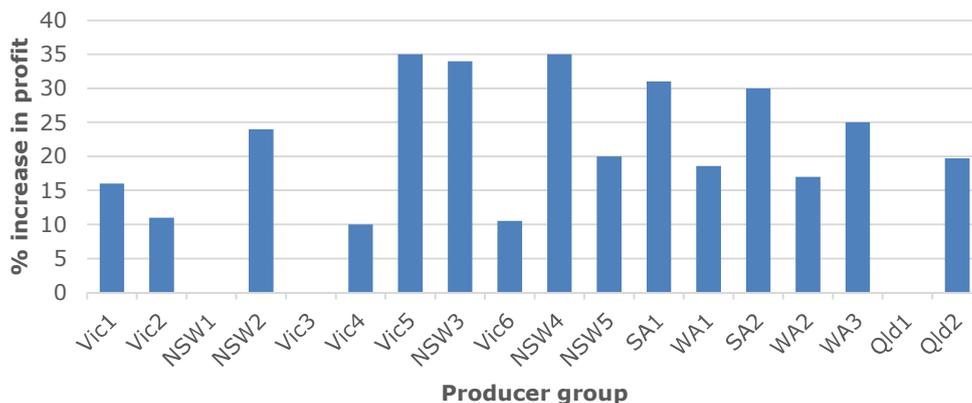


Figure 7. Estimated percent increase in profit by producer group (assessed by coaches based on the estimated impact of their coaching program on business performance)



Discussion

Coach training and support

Significant effort by both coaches and the National Coordinator went into designing the coaching programs to ensure that the objectives of Farm300 would be met. The process the National Coordinator used to review the coaching programs and provide feedback helped the coaches design programs that had a high chance of success. Whilst some of the time invested in design and support of the coaching program was due to tailoring programs to individual groups and regions, most was due to the lack of experience of advisors in designing effective coaching programs.

During development of the coaching programs it appeared that whilst advisors (farm consultants in this case) had substantial technical expertise and consulting experience, they lacked experience as coaches. The key difference is between telling producers what to do versus using a process where producers are supported to find solutions for themselves. In order to implement new skills it was important for producers to not only learn how and why certain actions are important, but to be able to apply this learning to decision making and implement the skills and learning on farm, ideally in a supported environment.

To ensure a supported environment, investment in upskilling of advisors to coaches is essential. Providing a framework, tools and support for prospective coaches (including relevant training) was important to help them develop and deliver a relevant and effective program that was regionally adapted to meet the needs of specific producer groups. However, the program framework, whilst having a level of prescription, must be combined with a capacity to incorporate flexibility into program delivery so that outcomes can still be achieved and programs adjusted to address unanticipated issues. For example, drought, bushfire and cyclone all impacted the Farm300 coaching groups and had they not been able to adjust delivery, their programs would have failed. Some of the critical elements to ensure the coaching programs were continued during natural disasters included adjusting the program to include opportunities to avoid productivity losses and recovery, and provision of additional collegiate support for group members.

Ideally coaching programs should run over a full production cycle. This enables a group to implement changes over time and experience together the various challenges that different stages of the production cycle and season may pose. It provides sufficient time to practice skills and it also means that group members can fully experience the impacts of implementation, and the benefits (and challenges). Where the time frame is reduced (as it was for Farm300) and a full production cycle is not possible, the method can still be effective by adapting the learning outcomes to fit the season and the M&E framework to be based on modelling rather than actual data. The supported learning methodology helps to build Knowledge, Attitude, Skills and Aspirations (KASA) of participants and is likely to motivate them to continue their on-going capability building. In the final project evaluation it became evident that many producers were keen to continue working with their coach and peer support group, which indicates increased motivation to learn.

Coaching program delivery

Defining relevance and finding the 'hook' to engage producers is critical. For Farm300 it was the potential to increase profit and efficiency that inspired producers to get involved. Just focussing on GHG emissions and climate change issues alone would not have been enough for the majority of producers to engage. It is important to get 'group buy-in' at the beginning of the program to ensure that everyone had consistent and complementary objectives they wanted to achieve from the process. A good coach will develop an understanding of what the key motivators and interests are of group members. They can use this information to encourage producers to continue contributing to the group discussions and activities. In addition, practical and personalised activities, which are easily developed by experienced coaches based on their knowledge of their clients, are highly valued by participating producers. It is also assisted by keeping groups small and through one-to-one activities.

Working as a group provided participants with peer support and the opportunity to share learnings (including successes and failures) with each other. Many coaches noted that those group members that had implemented learnings on-farm and had a successful outcome, provided encouragement and confidence to others to also try new practices.

Information provided by coaches to participants should be provided in such a way that it is comprehensive, but succinct. It is important not to provide too much information at one time or the key messages get lost. Producers need ample time to test their new skills (this requires a level of repetition for practising skills). Time for reflection and review of new skills and concepts is also a critical component of an effective coaching program. Hence a fine balance between learning and implementing exists. The opportunity for individual contribution was highly valued and engaged groups more effectively than an advisor "talking at them".

Coaches noted that they were 'Seeing the knowledge, skills and confidence grow and develop in the participants as they progressed through the program', and that the program provided an excellent opportunity for 'continual review by producers of what they are learning and how to implement on their farm. The learnings and outcomes of this project continued to evolve throughout'.

It was a requirement under the Federal funding that Farm300 was free for producers. Some coaches believed that because producers were not required to pay, it reduced producer commitment to the program. It also created a challenge in relation to continuation of the program once the externally funded activities were completed.

Monitoring, evaluation and reporting

The key project data were the results of the pre and post skills audits that measured the increase of producer's skills and the outcomes of the project. Three groups did not meet the 70% criterion (i.e. achieving at least 70% correct in their post skills audit) and their results were omitted from the final evaluation. The reasons behind the failure of some groups to meet the 70% threshold requires further investigation to determine the critical factors relating to success or failure of coaching programs. However, it is suspected that the short timeframes and the complexity of some of the themes covered may have affected the results of these groups.

In the Farm300 project, skills audits were used to assess the impact of supported learning using a coaching technique. The reason for this was that skills have been proven in previous work to be strongly linked to profit (Doonan, 2012), and skills are not affected by seasonal fluctuations (such as price, or weather) which may influence both overall farm performance and profit. Deliverers were initially apprehensive about using skills audits (far more so than participants). However, the value of skills audits in measuring coach performance and the outcomes of their program, thereby enabling them to improve their delivery, was recognised by coaches once they had experience with this assessment methodology. Skills audits also have the advantage that they could measure program outcomes over a short timeframe.

Climate change and greenhouse gas emissions

The presence of a meaningful value proposition to engage producers was essential. For Farm300 this was - *Good business management is good carbon management*. Farm300 was effective in enabling both coaches and producers to better understand GHG emissions, and to be able to link GHG emissions and profit. Farm300 provided an excellent opportunity for professional development for coaches learning to use GHG calculators, being updated on ERF method developments, and exposure to research on livestock GHG emissions. There were two key challenges related to assessing GHG emissions experienced by Farm300 coaches and producers:

- There was no industry standard for the calculation of emissions intensity (and the importance of emissions intensity vs total emissions to the livestock industry). The livestock GHG calculators do not calculate emissions intensity, only total emissions.
- The GHG calculators provided a crude measurement of GHG emissions for animal production systems - they are not able to account for fine adjustments to systems in their calculations. Based on this, many coaches noted that 'for progressive businesses in it is difficult to make substantial improvements in emissions intensity without making major changes to production system (i.e. shift to feedlotting, replacing breeding flocks/herds with "finishing" systems, or change from Merino to crossbred flocks)'.

Conclusion

The use of a supported learning approach and the associated coaching methodology was a highly effective approach to achieve practice change and adoption on farm. Even with the restricted timeframes the methodology was successful in enabling producers to improve their skills and adopt new practices. The majority of participating producers either already implemented change or intended to do so. It is also likely that the project has motivated producers to seek more learning opportunities and to continue with their groups in other skill development programs.

Farm300 has improved the capability of the 23 advisors directly involved in the program to understand and deliver a supported learning program, and it has provided MLA with a model and the tools to support delivers. Further, a total of 128 advisors now have increased the awareness and knowledge of GHG emissions, climate change and livestock production and the ERF.

For the supported learning approach to be successfully extended more broadly to MLA's industry extension programs, there is a need for training and support for advisors to enable them to deliver a supported learning (coaching) model effectively. Additionally, a valid business model is required that incorporates user-pays and private providers to deliver in a commercial environment, which will enable a sustainable model for delivery in the long term. Finally, a well-structured and designed M&E program, utilising a skills audit methodology and commitment

from coaches to this, is essential to measuring program impact and enabling continual improvement of program delivery.

The link between emissions management and productivity was also a critical element to the success of Farm300, and positive feedback from producers and coaches indicates that there is more to be done in exploiting this value proposition to benefit the livestock industry. Farm300 also highlighted the significance of good governance, collaboration and effective communication between project team members, and an adaptive and flexible approach in achieving project success.

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Strong commitment to delivering significant outcomes through Farm300 was demonstrated by the 23 coaches: Garry Armstrong, Paul Wallace, Andrew Whale, David Rendell, Melissa Rebbeck, Tim Prance, Anthea Ferguson, Jason Lynch, Maria and Callen Thompson, James Whale, John Marriott, Thakur Bhattarai, Richard Brake, David Brown, John Francis, Mark Gardner, Kristy Howard, San Jolly, Graham Lean, Paul Omodei, Ed Riggall and Ben Watts. Thank you to the more than 330 producers who engaged in the project.

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