Final report

Development and delivery of Pasture Paramedic in Southern and Western Australia.

Project code:	L.FAP.2102
Prepared by:	Cam Nicholson Nicon Rural Services
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Abstract

This project was to develop, train and distribute *Pasture Paramedic* to regions in Victoria, New South Wales and Western Australia.

Pasture Paramedic kits were developed for southeast South Australia, the Western Australian Wheatbelt and Northern New South Wales. This complements the Southern High Rainfall Pasture Paramedic kit developed through L.FAP.1903 and aimed to represent some of the diverse feedbase systems across the country.

The kits consist of an assessment grid, recording booklet, pen and a supporting technical manual, which includes images for species identification. An electronic version of the species identification, including download links through a QR code was also created (although not part of the original contract).

Products have been printed, with some versions already distributed.

Training has been conducted through nine training sessions with 58 agronomists in Southern Australia, Western Australia and Northern New South Wales (target 80). Training has been hampered by Covid-19 restrictions (online delivery), preventing anticipated training at agronomy workshops and in-paddock.

Feedback from those engaged has been extremely positive, providing confidence *Pasture Paramedic* will provide the 'hook' to engage producers in undertaking rapid assessment of their existing pastures and be motivated to engage with further activities to improve or renovate these pastures.

Executive summary

Background

Many pastures around Australia are considered sub optimal in their performance. This may be through soil conditions, grazing method, weed infestations or a lack of suitable species. However, getting producers to recognise this has been an ongoing challenge.

A simple engagement tool called *Pasture Paramedic* was developed for perennial pastures in the Southern High Rainfall zone . This product was well received so it was decided to develop similar products for Southeast Australia, Western Australia and Northern New South Wales.

Project objectives

The objective of this project was to deliver resources to producers and advisors to assist in identifying desirable species composition, stresses/constraints and knowing when to resurrect or intervene in the life of a pasture to optimize productivity, profitability and persistence. The resources are captured under the product name of *Pasture Paramedic.*

Methodology

Development of the various Pasture Paramedic kits involved working with six highly experienced consultants in Victoria, New South Wales and Western Australia. Three new kits were developed, one for Southeast Australia, one for the Western Australian Wheatbelt and one for Northern New South Wales, including signposts to MLA follow on products. Training on the use of the tool was undertaken with advisors, facilitators and merchandise groups within these regions.

Results/key findings

- 2,500 Pasture Paramedic kits were produced
- 9 training session held (all online when intention was face to face and in-paddock)
- 58 'distributors' were trained in the use of the relevant *Pasture Paramedic* kits
- *Pasture Paramedic* has been embedded into three Profitable Grazing Systems courses
- Resource kit to link to MLA products was produced
- A monitoring and evaluation plan was developed.

Benefits to industry

It is anticipated *Pasture Paramedic* will be the catalyst to encourage producers to assess the condition of their pastures. This can occur in a group or individual setting. After this assessment it is anticipated producers will seek existing MLA information and practices to improve the rating of these pastures.

Future research and recommendations

1. Create new category B products related to grass and legume management, weed control and soil condition to capitalise on the interest generated by *Pasture Paramedic* and enhance the impact of <u>existing</u> MLA products.

2. Consider commissioning new information on sub-tropical species relevant to the Northern New South Wales *Pasture Paramedic.* There was a lack of good information to signpost compared to the temperate pasture systems.

3. Consider implementation of the monitoring and evaluation plan outlined in this report to ascertain *Pasture Paramedic* use data.

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1. Background

1.1 History of *Pasture Paramedic*

Many pastures around Australia are considered sub optimal in their performance. This may be through soil conditions, grazing method, weed infestations or a lack of suitable species. However, getting producers to recognise this has been an ongoing challenge.

A simple engagement tool called *Pasture Paramedic* was developed for perennial pastures in the Southern High Rainfall zone (a Category A product). The aim was to encourage producers to look down at their pasture, make some rapid assessments and compare these observations against industry accepted benchmarks. It was developed by Southern Farming Systems for MLA as part of the Feedbase Adoption Plan project L.FAP.1903. The aim of the *Pasture Paramedic* tool was to enable a rapid assessment of the condition of a pasture to determine if the pasture is OK, could be improved with manipulation or oversowing or whether it requires full resowing.

The kit consisted of a folding assessment grid, recording book and pen and a supporting technical manual. It was deliberately designed to be simple, have a curiosity factor, but enabled a sound conclusion to be drawn on what to consider doing. It was not designed to inform what action to take next. However, use of the tool highlighted a significant opportunity to 'on sell' additional MLA products, whether this be the revised materials produced in the Feedbase Adoption Plan (sub clover, perennial pasture, soil management), or by directing producers to manipulation and resowing training through programs such as Profitable Grazing Systems.

The first 1000 copies of the Southern High Rainfall tool were rapidly adopted by advisors, resellers and producers. A second print run was required. However, it became clear there were limitations to the appropriateness of *Pasture Paramedic* in other regions, mainly due to different species present, the assessment criteria used and the benchmarks applied. While the design principles used in *Pasture Paramedic* was appliable around Australia, the content needs to be modified to suit the different species encountered, expectations of what is a good, average and poor pasture and the growing conditions of each region.

1.2 Pasture *Paramedic* for other regions

Producer and advisor interest came from other regions around Australia including in New South Wales and Western Australia, as well as the medium rainfall zone of Victoria. Nicon Rural Services was contracted to develop regionally specific *Pasture Paramedic* kits for three additional regions, as well as developing support resources and a suggested monitoring and evaluation plan post training.

The tasks required included:

- Modification of the high rainfall *Pasture Paramedic* tool for the medium rainfall zone in Southern Australia and the printing of 1000 copies.

- Creating two new tools applicable to different farming zones in Western Australia and New South Wales, printing 500 and 1000 copies respectively.

- Design a resource kit that identifies <u>existing</u> products and tools e.g. Feedbase Adoption Plan (FAP) products, MLA tools and calculators, PTN etc that link to the pathways for manipulation or resowing.

- Training delivers to talk about and distribute the tool to producers and producer groups (this would also help to capture grower responses and promote FAP products and PGS)

- Development of a monitoring and evaluation plan to track the roll out and impact of *Pasture Paramedic* over time.

2. Objectives

The objective of this project was to deliver resources to producers and advisors to assist in identifying desirable species composition, stresses/constraints and knowing when to resurrect or intervene in the life of a pasture to optimize productivity, profitability and persistence. The resources are captured under the product name of *Pasture Paramedic.*

Objectives:

1. Modify the high rainfall *Pasture Paramedic* tool for the medium rainfall zone in Southern Australia in conjunction with leading agronomists and print 1000 copies. **Completed successfully**

2. Work with key agronomists and advisors in Western Australia and New South Wales to create two new tools based on the approach used in *Pasture Paramedic* and produce 500 copies for WA and 1000 copies for NSW. **Completed successfully**

3. Create regionally relevant resource kits that link other MLA products and services to the decision pathways emanating from the use of Pasture Paramedic. **Completed successfully**

4. Training of 80 distributors in medium rainfall southern Australia (3 workshops – 30 people), WA (2 workshops – 20 people) and NSW (3 workshops – 30 people) to extend and distribute the tool to producers and producer groups. These trained delivers will be 'licenced' to deliver the *Pasture Paramedic* tool to producer and other clients and will collect copies of the kits at the end of the training sessions. **Largely completed.**

5. Initiate discussions with the PGS program leader to develop a minimum of two appropriate PGS training packages associated with pasture manipulation and pasture resowing. NB: Development of the PGS training packages would be separate to this project. **Completed successfully**

6. Development and initiation of a monitoring and evaluation plan to track the roll out and impact of *Pasture Paramedic.* **Completed successfully**

3. Methodology

3.1 Development of *Pasture Paramedic*

Experienced consultants were identified in each of the three regions to help develop the *Pasture Paramedic* packages. These were:
- South East Australia (Meridian Agriculture, Lisa Warn Consulting)
- Western Australia (AgPro Management, Agvivo).
- Northern New South Wales (Lester McCormick Agronomy).

These consultants have 30+ years' experience in the target zones.

The first step was to identify regions where the application of *Pasture* Paramedic would be likely to have high demand and what changes would need to be made to the current Southern High Rainfall version to better suit each region (Table 1).

Table 1. Description of *Pasture Paramedic* zones and summary of required modification to Southern High Rainfall version.

Region	Target zone selection	Changes to Southern High rainfall assessment approach
South East Australia	North of Great Dividing Range, plus sub tropicals in Gippsland	Change in pasture species to include more annuals, native grasses and sub-tropical species. Late summer assessment split to include early after the autumn break because of reliance on annual grasses and shallow rooted perennial grasses (cocksfoot) that pull out with the 'pinch and twist' test.
Western Australia	Wheat sheep zone, where the vast majority of livestock reside. Southern Australian version would suit most higher rainfall zones.	Pastures mainly based on cereals and annual grasses / legumes rather than perennials. Mid-winter assessment only relevant, followed by second assessment of weed type
Northern New South Wales	Northern region which includes sub-tropical zone. Southern Australian version would suit most temperate rainfall zones.	Pastures contain both temperate and tropical species, wit pasture growth all year round. Green pasture assessment changed to suit both species types (so assessment can be undertaken twice a year). Combined with groundcover assessment.

Table 1 illustrated there was significant change required to meet the needs of each region (method and content). This took considerable effort to modify the original, while maintaining the intent of *Pasture Paramedic* to be a simple, rapid method to assess a pasture.

A preliminary version of the tool was drafted, with the consultants running multiple scenarios to see how effectively the suggested decision indicated by using the tool matched their professional option. Multiple tweaks were made to the conditions and scores. A prototype was then created and tested with clients of the consultants. Further minor changes were made to the flow of the assessment and the wording. The final version was then laid out and printed.

Details on the changes to each version of Pasture Paramedic have been described in previous progress report and are summarised in Appendix 1.

Feedback from the producer testing was positive. Of particular interest was the species identification provided in the technical manual. Producers requested this be available online if possible. This output was not in the original contract but was developed to enhance the overall effectiveness of the kits. It was configured to enable easy forward and back movement of images on a smartphone.

Access to the online version was via a QR code. Each region was assigned a unique QR code than, once scanned, enabled users to load the species identification and save this to their phone. This meant producers could access the information even when not receiving 4G phone reception.

3.2 Distributor training

While *Pasture Paramedic* was designed to enable producers to obtain a kit and conduct their own assessments without training (the technical manual provides the 'how to'), there was additional value in having distributors of the kits more informed about the origins, intent and thinking behind *Pasture Paramedic.* Therefore, a training component was included in the project to ensure those wishing to obtain and distribute multiple copies of the kits were 'qualified' in its use.

Training was originally designed to be conducted face to face (with a practice in the paddock), offered as part of agronomist or merchandise group training days. The subsequent discussion around what to do with different results would then follow, allowing the introduction of additional MLA products and services. Unfortunately, Covid-19 restrictions meant this type of training could not be completed. Instead, online versions were created for each regional *Pasture Paramedic* and offered via video conferencing. These presentations are available on request (very large PowerPoint slide deck) Figure 1.

Figure 1. Images from training package

Four online training events were held in Southern Australia, two in Western Australia and three in Northern New South Wales (four were offered, but only one person logged in, so the session was cancelled, and they joined another session).

Invitations to the training relied on the known networks of the local consultants engaged. This proved effective at identifying a comprehensive list of potential 'distributors'. However, the desire to conduct online training was not enthusiastically received by some, who preferred to wait until they could do it in the paddock.

Part of the training involved a virtual paddock walk, where 10 images of a paddock were shown, and participants had to apply the assessment criteria to it. This proved challenging because of the difficulty in identifying the images (they would have examined the plants using their online ID if in the paddock). Participants shared their results after the assessment.

A register of people who have participated in the training has been kept and can be used in the proposed Monitoring and Evaluation plan (see section 3.4). Participants came from Agriculture Victoria, Victoria Better Beef Network and Bestwool/Bestlamb co-ordinators, NSW Local Land Services, NSW Department of Primary Industries, along with 27 private consultants and merchandise businesses.

3.3 Signposting of where to go next

Pasture Paramedic was designed to enable producers to assess their pasture and decide if the pasture was good, could be more productive through manipulation, or requires resowing. It deliberately avoided providing information on what to do next, as it was deemed there was sufficient information already available, either through technical experts, courses or online to take the next step.

A short document was produced to identify what MLA products were relevant and available to use when having initial discussions about the suggested decisions from *Pasture Paramedic*. This list was provided to those undertaking the online training and updated as new products from L.FAP.1901 to L.FAP.1904 were produced (Appendix 2). Note: this is not an exhaustive list, which was prepared and submitted through L.FAP.1903.

3.4 PGS training packages

Discussions were held with the appropriate people in MLA and two PGS training packages were contracted. One related to pasture manipulation and the other to pasture resowing. Both require the use of *Pasture Paramedic* as the starting point for the courses.

The Pasture Manipulation package includes assessing the potential of the pasture (using *Pasture Paramedic* and stocking rate calculations), limitations to pasture growth (soils, grazing, weeds) and creating a manipulation plan to implement. The Pasture Resowing package includes assessing that resowing is worth it (and cannot be improved more cost effectively through manipulation), developing a resowing plan (preparation period, sowing period, post sowing management), and implementing the plan (calendar, key assessment points).

3.5 Monitoring and evaluation plan

A draft monitoring and evaluation plan was developed to support measurement of the impact on *Pasture Paramedic* in the future (Appendix 2). The intent of the plan is to measure the use of *Pasture Paramedic* (focussed on those who have been trained to distribute it, and whether the tool was having the desired effect of motivating producers to consider manipulation or resowing of pasture.

Given that distribution of *Pasture Paramedic* is intended to be undertaken directly with individual producers (at field days and forums), as well as through agronomists and embedded in group activities, the M&E plan focusses on those where direct follow-ups contact with producers can be made. This is most likely through those who have undertaken *Pasture Paramedic* training and have ongoing contact with the producer.

4. Results

4.1 *Pasture Paramedic*

Three *Pasture Paramedic* kits were developed, with production of 2,500 (1,000 for South East Australia and Northern New South Wales, 500 for Western Australia). The kits, while quite different in the species and assessment benchmarks, maintained the integrity of *Pasture Paramedic*, names a rapid tool to assess a pasture that captures producers and advisors interest. Each kit consisted of a grid, recording book, pen and technical manual (figure 2).

Figure 2. Pasture Paramedic kit (South East Australia shown)

Assembly of the *Pasture Paramedic* kits were delayed due to the availability of certain materials. The steel fasteners for the grid could not be supplied for many months (supply chain issue) and the yellow pens used in previous versions were changed to orange because the yellow pens were unavailable.

Although not in the contract, QR codes were created for each region (figure 3), with the plant identification in the technical manual converted to a smartphone accessible product.

Figure 3. QR codes for South East Australia, Western Australia and New South Wales

Example of the contents page once scanning the QR code is shown (figure 4).

Figure 4. Example plant identification page in the electronic manual.

A limitation with the tool is there are only specific times in the year where it is appropriate to do the assessment. This is in late winter / early spring and around the autumn break. Unfortunately, by the time the kits were printed and available, this delivery window had passed for 2021.Therefore, it is impossible to measure the use of the tool in the timeframe of this project. However, indications from the Southern High Rainfall *Pasture Paramedic* kit (through L.FAP.1903), which was produced in late 2020, suggests it was well received and used extensively. It led to several *Paydirt* courses being delivered on the back of its use.

4.2 Distributor training

Nine on-line training courses (target 8) were held for potential distributors/deliverers in Victoria, Western Australia, and Northern New South Wales.

South East Australia

Four training sessions were conducted in December 2020. They were attended by 29 people, 16 from Agriculture Victoria, 13 from private enterprise (consultants). Several attendees also represented larger groups e.g. Grasslands Society of Southern Australia, Perennial Pasture Systems.

Pasture Paramedic kits were distributed through two main points. Southern Farming Systems and project Leader Sheep Industry Development with AgVic. It was felt this was the best way to maintain records of who was ordering kits and to reduce distribution costs.

Feedback was captured from participants in the four workshops conducted online in December. A summary that captures the key points follows.

Overall reaction:

- *It's a great name*
- *Looks fabulous Cam I reckon a great motivator and tools for discussion. Practical and getting people look at their pastures but simple. Would be great for most groups including local GSSA group.*
- *Excellent package of info Cam. Really like the QR code for the pastures ID, very hand tool to have. Also, the ID of oestrogenic clovers is great, always a tough one to identify.*
- *Great practical course and will be using it in the paddock.*
- *I will definitely be using this training to good advantage.*
- *Using PP will be a great starting point with groups to help determine a bit of a discussion focus for the year going forward in regard to pasture management, and a good way to monitor results from actions taken*
- *Logical process for pasture management. Great initiative.*
- *Good process and tools for everyone, especially for consistency between consultants agros, great photos and training tool for both farmers and agros. Brings many things together well done.*
- *Great segue to further group discussions or training for perennial pasture systems.*
- *Will be using it in the paddock in Gippsland*
- *Thanks Cam and team, excellent program, I like how it streamlines and organises the logic that you would traditionally work through when doing a paddock assessment - makes that process a lot easier without forgetting/bypassing aspects. Looking forward to using the groundcover assessments to help determine containment entry and if residual levels are low enough, especially given big year this year!*

- *Thanks Cam, it looks great and good to have all this in one spot. Imagine it prompts some great discussions. Like use of QR & Books too & complimentary resources will be handy.*
- *Such a simple tool that no doubt will create some great discussion between farmers*
- *Having had this tool since the start of the year, I've actually given one of my groups a brief introduction to the tool and they were really interested, so am planning on doing a session with them early next year. I think this is going to be a really good tool for me to help with my decision making and being able to pass that onto farmers to help them with their decision making.*
- *Just tried using the QR code off the presentation and it worked well*
- *Great tool - I am planning to use it with one of my BWBL groups in Feb/March next year as a trial. I have already ordered some kits from Alison today.*
- *Good to keep it simple, easier to get take-up.*

Improvements:

- *If we had the kit with the training as it would have been helpful*
- *Provide links to the online resources in the follow up notes*
- *Some aspects of Pasture Paramedic could be put into an app, data collection, upload to cloud, aggregation of data.*
- *Have the book as an App to improve the decision making and monitoring process.*

Western Australia

Two training session were conducted in January 2022 (5 and 7 attendees). A total of 12 agronomists attended the training (target was 20 people), from major WA consulting groups including Farmanco and Planfarm and smaller agricultural businesses (Agrarian, Consultag, AgPro, Agvise).

The attendance was disappointing despite the invitation list and a concerted effort to get people to participate. The online approach to training was not considered ideal given the nature of the product, as was the timing of the training. Further reasons for the lower participation are discussed later.

The training sessions were conducted by AgPro Management. The training slides used in Southern Australia were shared and modified (new training pictures inserted) to achieve consistency in delivery.

The product was well received for those that attended. When asked about their likelihood to use **Pasture Paramedic** with clients, the average score was 4.2/5, where 0 = not use at all to 5 definitely use (range in scores from 3 to 5). While some of the people participating only operate small businesses, participants from two of the largest consulting groups in Western Australia were very enthusiastic about the product and are likely to encourage the use of *Pasture Paramedic* as a conversation starter with their client groups. It is anticipated a multiplier effect will occur.

No measure was made of the quality of the training (this was an oversight), however the response to the likely use question would suggest *Pasture Paramedic* was well understood.

Comments by participants made at the end of the training also supported the value of the tool. Some examples included:

- *Great conversation starter, really enjoy the logic*
- *Should be a good product, will definitely use it*
- *I like the square and its logical progression and conversation it starts*
- *look forward to getting it out in the field*
- *Would have been more helpful if it was a hands on experience in the field.*
- *10 observations are time consuming and producers may struggle with doing that many.*

New South Wales

Four training sessions were offered for people in Northern and central New South Wales during February 2022 (target 3 sessions). A total of 17 people attended (26 registered). The target was 30 people. One training session only had 1 person, so was directed to another date.

Most attendees came from the Local Land Services and NSW Department of Primary Industries. They represented the areas of Mudgee, Glen Innes, Coonabarabran, Warialda, Dubbo, Gunnedah, North coast and Tamworth. The private sector (private consultants) was underrepresented, with only four attending from independent merchandise businesses (McGregor Gourlay).

The number of advisors and the private advisory network is less well developed in Northern New South Wales compared to Southern Australia and Western Australia. Gaining traction with this cohort was more difficult than in Southern or Western Australia. In Southern and Western Australia, personal working relationship from the trainers (Niconrural, AgPro Management, Agvivo) that had been developed over previous decades was important in getting private sector engagement. In Northern NSW this relationship was not as well developed, and the LSS/DPI still seem to remain a significant player in pasture extension. This government presence is much less in Southern and Western Australia.

The reduced number of potential private sector participants to invite and then who attended the training would have had an impact on the final training number. This challenge requires a rethink on how best to engage this sector, but at a time when in paddock training could be conducted.

The initial training session was conducted by Niconrural, however the photographs used in the virtual paddock assessment were not ideal given the breadth of locations participants were attending from (temperate winter pastures). The pictures used were changed to represent a summer pasture, but participants struggled to correctly identify the species (which you would do if in the paddock). Subsequent delivery was jointly by Niconrural and Lester McCormick Agronomy.

Despite this, the *Pasture Paramedic* concept was well received. The training scored an average of 4.0 out of 5 (where 0 = not relevant to 5 exceptionally good). The range in scores was 3 to 5.

When asked about their likelihood to use *Pasture Paramedic* with producers, the average score was 4.0, where 0 = not use at all to 5 = definitely use (range in scores from 3 to 5).

Comments by participants made at the end of the training also supported the value of the tool. Some examples included:

- *Easy tool to get people talking and using an objectivish tool*

- *Simple, quick assessment that could be very useful for when a decision is necessary*
- *Was great, but would have been good to be in the paddock for this*
- *Can see that it is a quick resource to use, but concerned that this cannot be used further west*
- *Looks pretty easy to use with growers*
- *Always good to have an objective measurement for discussions*
- *Would be good to see a rangelands version*

Overall

In total 58 people attended the training (target was 80). Participation was lower than anticipated. Several factors are likely to have contributed to the lower participation.

Firstly, people were tired for video conferencing. The training for New South Wales was being offered after almost two years of electronic engagement due to Covid-19. It was seen as just another event in front of a computer screen compared to a training event where people could get out in the paddock and interact. A positive out of this, however, is the online learning materials have been created and can be easily used in the future.

Further to this point, the intention when the contract was signed was to integrate this training into face to face events attended by agronomist. This would enable in-paddock demonstration. Covid-19 prevented this from happening and while every effort was hade to conduct training on-line, it was not the preferred method of engagement.

Secondly the training did not co-inside with when people would be using *Pasture Paramedic.* As mentioned, the kits became available at a time when they could not be immediately put to use. This lag in applications was a dis-incentive for some (and probably need a reminder being sent out to those who have previously done the training).

Finally, some of the training needed to be conducted in the lead into Christmas and early in the New year to meet the project deadline. People were busy or on leave and attendances were lower than anticipated.

The most common feedback to the training was "this would have been more helpful if it was hands on in the field".

Despite all of this, the evaluation from those participating in the training was positive.

Participants at some training sessions were asked to rate their likelihood to use *Pasture Paramedic,* individually or in a group setting rather than written comments. The average score was 4.1 out of 5 (range 2 to 5), where 1 = not at all to 5 = definitely. The score of 4 or above was consistent at each training session.

No information was collected on the use of *Pasture Paramedic* with clients because the timing of completing the tools and then conducting the training did not co-incide with the time when the tool should be used (and this contract to be completed). The next opportunity for application of *Pasture Paramedic* is:

- South east Australia – Autumn break (less ideal), then late winter (ideal)
- Western Australia – mid winter (ideal)
- Northern NSW – summer growing season (summer to autumn), winter growing season (winter to spring).

As a result, the training target was largely met in this project.

4.3 Other products and documentation

Other products including a signpost resource kit, suggested monitoring and evaluation approach and two relevant PGS packages were all completed.

The signpost resource kit was intended to direct uses of Pasture Paramedic to new MLA products, as well as existing MLA products, rather than relying on the deliverer knowing what is out there (or rely on information they may have used in the past). It is not an exhaustive list of all materials related to the topics but provides a focus to consider highly relevant MLA materials as the first point of investigation.

The intent of the Profitable Grazing Systems packages and the monitoring and evaluation document have been discussed in sections 3.4 and 3.5 respectively.

5.Conclusion

5.1 Key findings

This project was successful at creating three new *Pasture Paramedic* kits for locations in South East Australia, Western Australia and Northern New South Wales. The project also trained 58 'distributors' of the *Pasture Paramedic* kits and received very positive feedback from them about its future use.

Two concise documents were also produced, one outlining the relevant materials that provide information on what to do based on the results from *Pasture Paramedic* and a second with a suggested monitoring and evaluation plan for the *Pasture Paramedic* roll out.

The failure to reach the anticipated participation numbers has not been through a lack of effort, relevance of product or quality of training (as reflected in the feedback). It is more likely to be a combination of circumstances that have prevented implementation as originally anticipated. However, it is recommended a small future engagement project be conducted in Northern NSW to better engage the private sector.

There will be ongoing extension and potential 'training' of further people in using *Pasture Paramedic*, as the three PGS courses (Paydirt, Pasture Manipulation and Pasture Resowing) all have this tool as the starting point of these courses. In addition, the extension of the new FAP themes around weeds, sub clover and perennial grasses reference *Pasture Paramedic* as the assessment method to use. If these are turned into Category B type activities, then further training opportunities should present.

5.2 Benefits to industry

The application of *Pasture Paramedic* should be significant to the grazing industries as it provides a simple product to rapidly assess a pasture a draw a conclusion about the status of that pasture.   It should provide an increased level of motivation to explore options to improve pasture productivity of the conclusions are less than ideal. However full benefit will only be achieved if the pathway to practice change is also readily available.

6. Future research and recommendations

The Pasture Paramedic kits provide a valuable tool to motivate farmers to assess and reach a simple conclusion about the state of their pasture. The kit has a novelty value that creates a curiosity that is more likely to lead to its ongoing use. However, it only intended to 'spark interest' and may not lead to practice change unless the next steps in the adoption pathway are also in place.

Currently there are a number of useful resources that have recently been updated through L.FAP.1901 to L.FAP.1904 projects, but these are written, video or have ben included in the e-learning platform. There has also been progress in creating two PGS courses that directly address the decision that may be reached from using *Pasture Paramedic*. These are category C products. It would be unlikely many producers would go directly from using *Pasture Paramedic* to then immediately seek to undertake an appropriate PGS course.

There is an absence of materials (category A and B products) to take producers through an increasing practice change pathway. This is the next component that needs to be addressed to gain maximum impact from the investment in *Pasture Paramedic*.

8.Appendix

8.1 Appendix 1: Further explanation on the changes to the original *Pasture Paramedic* version

South East Australia

The 'medium rainfall' *Pasture Paramedic* kit (now referred to as South East Australia) is based on the previous version developed for the Southern High Rainfall zone (original version). The name was changed as the content of the kit covered pastures that were not only in the medium rainfall zone but were sufficiently different to the existing Southern High Rainfall tool.

Five notable changes were made to the tool. These were:
- Change in desirable species and weeds, reflecting the different environment the tool is to be used in. This included the addition of Astrodanthonia, Kikuyu and annual ryegrass as desirable annual species and the replacement of five southern high rainfall weeds with more common species.
- The field assessment was altered to record direct percentages rather than a score. The original version requires users to rate the grasses, clover, and weeds <u>within ranges</u> at each observation e.g., between 20% and 40%, greater than 40% etc and then use the associated score. The South East Australian version requires estimation of the <u>specific %</u> of desirable grasses, clover, broadleaf weeds and grass weeds at each observation. This change was strongly driven by advisors in the region, who had used a % measure for many years (a legacy of the *Evergraze* and *Prograze* days) and were reluctant to introduce a new approach. However, the conclusion was not compromised by using this alternative method.
- The categorisation of weeds. This version measures percentages of grass and broadleaf weeds, whereas the original version categorised weeds based on their feed value, palatability, and animal health issues.
- The assessment of desirable perennial plants at the start of the season. In the Southern High Rainfall version this is done just <u>before</u> the autumn break, because plants are generally well anchored given the soil types. However using the same assessment in the South East Australian version would result in some plants on very light soil types being pulled out even though they were alive e.g. cocksfoot, ryegrass. Therefore, a subtle change was to do the assessment soon after the autumn break when new shoots have emerged.
- The benchmark determining when to consider resowing and when to consider manipulation (because there are enough good species left to build from). The Southern High Rainfall version has a higher benchmark, reflecting the more favourable growing conditions experienced.

None of these changes altered the original intent of Pasture Paramedic, to provide a simple and rapid assessment of producer's pasture. Importantly testing showed the two assessment approaches led users to the same end point conclusion.

Western Australia
The main difference of the Western Australian tool to the original Southern Australian tools was changing the desirable species from perennial grasses to annual grasses, with a focus on winter /spring decisions. What were considered category A weeds in the Southern Australian versions were now classified as desirable species (e.g., annual ryegrass, volunteer cereals). The focus on

annual grasses was to accommodate the possibility the pasture would be used in a future cropping phase. Perennial grasses were not considered desirable because of the difficultly of removing them to go cropping and the challenge of getting them to persist in a lower rainfall environment.

The change in desirable species had a flow on effect to the assessment on the second side of the *Pasture Paramedic* square. The test for summer survival of perennial grasses and the management of groundcover was no longer appropriate (grazing on the pasture ceased in December as stock moved onto crop stubbles and stock did not return until after the autumn break).

To make use of the second side a new consideration related to weed control was introduced. The intent was to help guide the most appropriate control method. Firstly the grazing value of the dominant weed were considered. Then the ability to control the weed by grazing was explored. This led to three decision points:
- weed control through grazing only
- weed control through herbicides only or
- a combination of weed control through herbicides and grazing.

Approximately 30% of the species described in the original Southern Australian tools were replaced, new photographs sourced, and the technical manuals (hard copy and electronic versions) redesigned.

New South Wales
The New South Wales version retained the perenniality of the Southern Australian version, but because of the presence of both tropical and temperate species, introduced and native species and effectively two growing seasons, meant the type of perennial species, desirable legumes and the dominant weeds were significantly different. Close to 80% of the original species were replaced, requiring significant time sourcing photos and redesigning the technical manual.

The second side of the *Pasture Paramedic* square retained the soil cover assessments. Minor changes were made to the loose litter assessment to match a previous soil health assessment kit developed as part of the Sustainable Grazing Systems program in the early 2000's. The survival of temperate perennial grasses was removed as it was no longer applicable with the presence of tropical grasses.

8.2 Appendix 2: Products to support follow on action from using *Pasture Paramedic*

Pasture Paramedic is designed to rapidly assess the condition of a pasture. During the growing season three critical factors are assessed. These are:

1. Amount of **desirable grasses**
2. Amount of **desirable legumes**
3. **Dominant weeds**.

The species included in the three critical factors may vary depending on the location. For example, annual ryegrass may be considered a high quality weed in the Southern High Rainfall zone, but may be classified as a desirable grass in the Western Australian wheatbelt.

There is also a groundcover assessment that considers:

1. Amount of **dead, loose litter** (trash) on the soil surface and
2. The amount of **groundcover**

After making these assessments the result will suggest one of three possible courses of action:

1. **Maintain current management** (or minor tweaks), as the pasture assessment indicates very good condition
2. **Consider manipulation**, because while there is an adequate base of desirable species to build a good pasture, the current pasture composition is less than ideal, or
3. **Consider resowing**, as there is insufficient desirable species to build a good pasture.

This document signposts some relevant written and video materials to address the suggested course of action (Tables 1 to 5). It is not an exhaustive list but have been chosen because they maintain the thinking associated with *Pasture Paramedic* and are relevant to the suggested decisions.

The material listed align with a decision to **consider manipulation**, as this is where most results are likely to occur. However, the information is also relevant to those who wish to **maintain their current management**. Information to **consider resowing** is likely to require addressing soil constraints, enhanced grazing management and weed control, as well as other considerations around pasture improvement costs and species selection.

There are three Profitable Grazing Systems courses that use *Pasture Paramedic* as the tool for initial pasture assessment. While it is not anticipated many would progress immediately from using Pasture Paramedic to these multi session workshop, they are worth noting. The courses are:

- *Paydirt* which uses soil testing and economic analysis to decide on optimum fertiliser investment
- *Pasture manipulation*, which creates and implements actions to improve the *Pasture Paramedic* score through soil improvement, grazing management and weed control.
- *Pasture resowing,* which examines the benefit cost of resowing, develops a resowing plans, including preparation, species selection, sowing and post sowing management.

Resources to support discussion leading from using *Pasture Paramedic*.

Table 1: For desirable grasses

Resource	Synopsis
How do I improve my desirable perennial grasses?	Provides a simple hierarchical checklist to ensure ideal conditions are provided to the plants. This includes examination of critical soil factors, growing season and dry season grazing, weeds and pests. Useful first step to narrow down possible reasons for less than ideal performance.
How do perennial grasses survive and thrive?	Covers the main principles of temperate perennial grass growth for perennial ryegrass, phalaris, cocksfoot and tall fescue. Identifies commonalities and differences between species. Useful to inform the development of the appropriate grazing approach.
How do I optimise seedling recruitment to avoid resowing?	Explains which desirable species can successfully recruit new seedlings (and which cannot) and the method to achieve this.
Tips & Tools: Making perennial ryegrass-based pastures productive and persistent	Focuses on the specific management of perennial ryegrass. Includes pasture benchmarks.
Tips & Tools: Making phalaris-based pastures productive and persistent	Focuses on the specific management of phalaris. Includes pasture benchmarks.
Tips & Tools: Maximising production from kikuyu-based pastures	Focuses on the specific management of kikuyu. Includes pasture benchmarks.
Evergraze Actions: Growing and using summer active tall fescue	Focuses on the specific management of summer active tall fescue. Includes pasture benchmarks.
Evergraze Actions: Growing and using winter active tall fescue in Southern Australia	Focuses on the specific management of winter active tall fescue. Includes pasture benchmarks.
Evergraze Actions: Management of native pastures in Victoria	Focuses on the specific management of native grasses. Includes pasture benchmarks.

Table 2: For desirable legumes (sub-clover)

Resource	Synopsis
How do I identify sub-clover cultivars?	Provides a clear guide on how to accurately identify the sub clover cultivars growing in a pasture. Important to know what cultivars are present to avoid encouraging outclassed or troublesome (oestrogenic) sub-clovers. Video also available: https://www.youtube.com/watch?time_continue=7&v=-K7Bz0_WUuk&feature=emb_logo
How do I replace outclassed or troublesome sub-clover?	Explains how to reduce the seed bank and then introduce new cultivars. Valuable next step if undesirable cultivars are identified.
How do I determine if my sub-clover is underperforming?	Provides a simple rule in / rule out diagnostic chart that considers seasonal conditions, soil condition, grazing approach, pests and diseases and herbicide impacts. Video also available: https://www.youtube.com/watch?v=GJOvDJ3-UoY
How do I manage soil health to grow high quality sub-clover?	Follow on information if the rule in / rule out diagnosis identifies soil conditions as a possible reason for poor performance.
How do I optimise sub-clover based pastures?	General overview that discusses the five critical times for management intervention in the lifecycle of sub-clover and the impact on subsequent production.
How do I maximise sub-clover establishment in existing pastures?	Provides detail on two of the five critical times in the sub-clover cycle – summer grazing management and seedling establishment.
How do I manage grazing to maximise sub-clover seed set?	Provides detail on three of the five critical times in the sub-clover cycle – winter and spring growth, flowering and successful seed set.

Table 3: If weeds are an issue

Resource	Synopsis
How do I know if a herbicide would improve my pasture?	Steps through five considerations before making a decision: What problem is the weed causing, are there desirable species to fill the gaps, what technique to use, the anticipated costs and benefits and the actions to make the benefits long lasting.
Weed Fast Facts	Contains information of 15 common pasture weeds, including their lifecycle, grazing value and possible interventions. Complements the How do I know if a herbicide would improve my pasture factsheet.
How do I spraygraze to remove broadleaf weeds?	Explains the process, timing, grazing, pasture recovery and the benefit costs of using the technique. Video is also available. https://www.youtube.com/watch?v=q6IoFM4Fets
How do I winter clean a pasture to remove annual grass weeds?	Explains the process, timing, grazing, pasture recovery and the benefit costs of using the technique. Video also available: https://www.youtube.com/watch?v=hpKRHZ3zHFA

How do I spray-top to reduce annual grass weeds in pastures?	Explains the process, timing, grazing, pasture recovery and the benefit costs of using the technique. Video is also available: https://www.youtube.com/watch?time_continue=11&v=QXQ4pd9NA5o&feature=emb_logo
How do I use selective herbicides to safely remove common weeds from sown mixed pastures?	Describes the main selective herbicide groups available, their efficacy, ways to minimise damage to desirable species and a traffic light system to indicate suitability of various herbicides.
How do use hay and silage production to remove annual grasses	Explains the pros and cons of using fodder conservation for weed control.
3D weed management series	Weed management series of specific weeds listed in *Pasture Paramedic*. Include: Serrated tussock, Paterson's curse, silver nightshade, Chilean needle grass, African lovegrass

Table 4: Discussion around grazing method

Resource	Synopsis
Tips & Tools: Get the best out of set stocking	Outlines the pros and cons of set stocking and management targets
Tips & Tools: Intensive rotational grazing	Outlines the pros and cons of set stocking and management targets
Tips & Tools: Managing ground cover to reduce runoff and water loss	Supports discussion around managing groundcover to optimise water infiltration whilst allowing germination of annual plants.

Table 5: Discussion around soil condition

Resource	Synopsis
Visual indicators of soil condition – Part I	Poster featuring images of common pasture responses to various soil deficiencies. Video is also available: https://www.youtube.com/watch?v=2uShF3AnBu8
Visual indicators of soil condition – Part II	Poster featuring images of individual species responses to various soil deficiencies./ Includes soil visual indicators and what some dominant weeds indicate about the soil. Video is also available: https://www.youtube.com/watch?v=OEVyK1tq1EQ https://www.youtube.com/watch?v=zCJqinqCpv4
Tips & Tools: Taking the most of phosphorus fertiliser applied to the soil	Good background info on P cycle and useful tips of management practices

8.3 Appendix 3: Draft monitoring and evaluation plan to support impact measurement of *Pasture Paramedic*

Context

The aim of *Pasture Paramedic* is to motivate farmers to assess the condition of their pasture and conclude if the pasture is adequate, could be improved through manipulation or requires resowing. *Pasture Paramedic* is the first step along a path to possible practice change and ultimately a positive change in farm productivity. It was always intended to be an 'initiating product', along the practice change pathway. It was also designed as a 'novel' product, that evoked curiosity in producers and advisors, and could be obtained without charge.

Pasture Paramedic can be used without external support. If a producer obtains a kit, they can 'follow the instructions', undertake the assessment by themselves and become aware of the state of their pastures. They can then choose what action to take.

Pasture Paramedic kits are distributed to producers at structured group activities, public events such as field days and forums as well as through direct request. This means keeping track of who has a *Pasture Paramedic* kit and how they have used them challenging from a monitoring and evaluation perspective.

These are important aspects to appreciate when developing a monitoring and evaluation plan.

Suggested monitoring and evaluation plan for stand-alone *Pasture Paramedic* distribution

Meat and Livestock Australia recognise the adoption pathway and have created three categories of activities: categories A, B and C. *Pasture Paramedic* as a stand-alone kit is a category A product and therefore should be evaluated in a similar way to other category A awareness raising products. The awareness being evaluated with producers is a new understanding of the condition of their pastures and a knowledge of where to go next if they wish to make change. Therefore, the evaluation should consider measures like:

- Distribution / uptake of *Pasture Paramedic* by producers, producer groups, advisors and retailers
- Use of *Pasture Paramedic* at the appropriate time(s)
- Intended action in response to using *Pasture Paramedic.*

Contact details and numbers of kits can be kept of 'distributors' who have undertaken the *Pasture Paramedic* training. Contact details can also occur for individual producers who contact distributors for a kit (this has already been established as a condition of accessing multiple kits). While this is only likely to be a subset of the total distribution, it will provide a solid sample cohort. It would be possible to survey these distributors later, say 12 months to 2 years, to determine the distribution, use and actions arising from their 'clints' use of the kits. Similar survey questions could be included in wider producer surveys conducted by MLA in the future.

Data to be collected in the survey would include:
- Enterprise type and farm size

- Area being treated after using *Pasture Paramedic*
- Type of practices being adopted to improve pasture condition.

This data could then be extrapolated to generate an impact statement.

Further evolution of *Pasture Paramedic*

While *Pasture Paramedic* is designed to be a standalone product, its value is greatly enhanced by incorporating or combining it with other existing information to develop category B and category C offerings (rather than just signposting). Most notably the new range of feedbase products (L.FAP.1901 to L.FAP.1904) have a direct and logical connection to the decision points created by using *Pasture Paramedic* (refer to appendix 1). For example, if producers assess a paddock and determine manipulation is suggested, and this manipulation is related to improving the desirable legume content, then working through the new products on say sub-clover would enhance the value extracted from both products.

At present only three category C products have been developed that use *Pasture Paramedic* as the start. These are *Paydirt, Pasture Manipulation and Pasture Resowing*. There are no category B offerings that link *Pasture Paramedic* to the information being discussed. The creation of some category B products to achieve this would be highly desirable because *Pasture Paramedic* provides the 'evidence' or motivation for the producer to pursue the information being offered. It also enhances interest in the new (and some existing) information MLA has on offer.

The evaluation of category B products, because they are delivered in a more controlled environment, would enable greater evaluation of both the materials used in the category B offerings, but also the value of *Pasture Paramedic.*

The evaluation requirements of the existing category C products will directly capture the skill of using *Pasture* Paramedic, as pasture evaluation is a necessary first step.

Recommendations

- Use the contact details of the distributors to conduct a short survey 12 month to 2 years after kits have been shared (need to take into account the timing of when assessments are made).
- Urgently look to create some category B products that combine *Pasture Paramedic* and MLA information, which includes an evaluation of *Pasture Paramedic*.
- Collect the relevant skills data coming from Category C products that use *Pasture Paramedic* in their delivery.