Final report

L.PDS. 2007: Tough Systems

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Abstract

The Tough Systems for Tough Seasons project ran from 2020 to 2022 in Western Australia's Wheatbelt and Great Southern region. The main target audience are producers that are most at risk of increasingly variable seasons, and are increasingly turning away from sheep to cropping, due to its high risk and management required in tough seasons. This project aimed to demonstrate a 'tough systems package', showcasing proven management techniques to deal with varying climate and feed gap issues, in order to increase system resilience, increase productivity and profitability. This was done by sowing cereals into pastures, and deferring grazing.

Using paired-paddock methodology, performance of ewes that were confinement fed and lambed into deferred pastures sown with cereals was compared to ewes that were run traditionally. The project found the value of the tough seasons package greatly varies based on yearly climatic conditions, but overall, its value is driven by the additional feed produced. Additional Feed On Offer (FOO) from deferment gave an average of $36.30/ha benefit over 3 relatively average years, with deferred pastures having 170% higher FOO than the control pastures. Ewe and lamb survival increased by 1% (modelled 2%), and ewe condition score post lambing increased by 0.2CS. Supplementary fed costs were on average $0.29/h/day. In addition, the project led to significant increases in producer knowledge, skills and confidence, with high adoption rates of condition scoring, confinement feeding, deferred grazing, and sowing cereals into pastures.

Executive summary

Background

Western Australia's Mediterranean climate traditionally results in 5 months of green feed a year, a short season which makes livestock enterprises highly sensitive to seasonal variation, which can radically impact their output.

These factors created a need for systems which can deal with tough, variable seasons, with effective yet flexible management. The PDS aimed to demonstrate a 'tough systems package', showcasing proven management techniques to deal with varying climate and feed gap issues, in order to increase productivity and profitability while reducing risk.

The 'Package' has two key aspects, sowing cereals into pastures to bulk up feed, and deferring grazing.

The main target audience was those in the Wheatbelt area, who are most at risk with these increasingly variable seasons, and who are increasingly turning away from sheep to cropping, due to this high risk. The demonstrate site and its results will be used to showcase the package tools, how it can be easily implemented, and its impacts each year, to help support practice change in the area.

Objectives

The aim of this producer demonstration site project was to demonstrate how the 'Tough Systems for Tough Seasons Package' can increase system resilience, increase productivity and profitability (measured by ewe condition score, lambing percentage, feed on offer and weaner weights) and address varying climatic and feed gap issues. The project successfully demonstrated this, as well as meeting its further objectives. These objectives were involving adoption, increases in producer knowledge, skill and confidence, and an economic analysis. Extension activities were used to communicate the outputs and outcomes of the project, and while successful, did not fully meet the intended outcomes.

Methodology

Using paired-paddock methodology, the performance of ewes that have been confinement fed and lambed into deferred pastures sown with cereals was compared to ewes that were run traditionally. The metrics captured included feed costs and rations, feed quality and quantity, lamb survival, stocking rate and condition score. These were used for economic analysis and modelling, using the LifeTime Ewe Management Condition Score (LTEM CS) Comparison Calculator, and the Australian Farm Optimising model (AFO).

Results/key findings

- The value of the tough seasons package varies depending on the season
- Value predominately from the additional feed produced
- Deferred pastures had 170% higher Feed on Offer than the control pastures.
- Supplementary feeding costs, additional FOO resulting from deferment, and sheep production gave a $36.30/ha benefit compared to traditionally run mobs
- Cost of creating additional FOO ranged from $0 to $333 per hectare, reflecting the varied practices used

- Ewe and lamb survival increased by 1% (modelled to be 2%), ewe condition score post lambing increased by 0.2CS.
- Significant increases in producer knowledge, skills and confidence
- High adoption rates of condition scoring, deferred grazing, and sowing cereals into pastures

Benefits to industry

- Increased knowledge, skills and confidence, as well as awareness
- Increased adoption rates
- Increased management flexibility
- Increased resilience, productivity and profitability within sheep systems
- Ability to run higher stocking rates (carrying capacity)
- Decreased hand feeding requirements
- Flexible package, that can be adapted to suit individual properties or businesses
- Project findings can continue to be easily adopted beyond its lifespan

Future research and recommendations

Further adoption could be encouraged by continuing to share the project's case studies and findings, while further investigation would be welcome into cereal pasture's fertiliser and seed rates. There is a strong recommendation that a mix between producer demonstration site and research sites are needed- Producer led research run by people with experience running trials; on a producer scale, with flexibility to adapt to seasonal conditions (or farming mishaps), but with financing to ensure solid, scientifically sound results.

PDS key data summary table

Project Aim:
The aim of this producer demonstration site project was to demonstrate how the 'Tough Systems for Tough Seasons Package' can increase system resilience, increase productivity and profitability (measured by ewe condition score, lambing percentage, feed on offer and weaner weights) and address varying climate and feed gap issues.

	Comments		Unit
Production efficiency benefit (impact) Pasture productivity – kg DM/ha Reproductive efficiency – marking %, weaning % Condition Score pre and post lambing	*170% increase in pasture productivity* *1% measured increase, but 2% in modelling* *0.2CS advantage*	0	Insert unit
Increase in income	Modelled only	$54	/ha
Additional costs (to achieve benefits)	Unable to accurately measure pasture costs- too variable	$0.29	/hd/day supplementary fed
Net $ benefit (impact)		**36.3**	**/ha**
Number of core participants engaged in project		20	
Number of observer participants engaged in project		300	
Core group no. ha		50,000	
Observer group no. ha		260,00	
Core group no. sheep		300,00	hd sheep
Observer group no. sheep		700,00	hd sheep
% change in knowledge and skill – core	*In understanding confinement feeding, improving early season feed, lamb survival and sowing cereals into pastures*	57%	
% change in confidence – all producers	*All producers noted the project was valuable in helping increase their confidence. There was an average increase of 170% in the surveys, from 7.1 to 8.5 out of 10.*	17%	
% change in knowledge and skill – observer	*In understanding confinement feeding, improving early season feed, lamb survival and sowing cereals into pastures*	59%	
% practice change adoption – core	*Deferring grazing of pastures, sowing cereals into pastures, condition scoring sheep*	636%	
% practice change adoption – observers	*Deferring grazing of pastures, sowing*	98%	

	cereals into pastures, condition scoring sheep		
% of total ha managed that the benefit applies to	*E.g. % of total ha, fodder crop is grown on*	50%	
Key impact data			
Gross Margin / Ha	**$36.3.00/ha**		

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1. Background

The aim of this producer demonstration site project is to demonstrate how the 'Tough Systems for Tough Seasons Package' can increase system resilience, increase productivity and profitability (measured by ewe condition score, lambing percentage, feed on offer and weaner weights) and address varying climatic and feed gap issues.

In summary, the problem is how to sustainably improve livestock productivity in the face of increasingly variable seasons. Western Australia's Mediterranean climate traditionally results in 5 months of green feed a year. This means livestock graze crop stubbles and dry pastures from November through to the season break in May, with these parameters setting production potential. The short length of the season makes livestock enterprises highly sensitive to seasonal variation, which can radically impact their output. The main target audience is those in the Wheatbelt area, who are most at risk with these increasingly variable seasons.

These factors have created a need for systems which can deal with tough, variable seasons, with effective yet flexible management. The PDS aims to demonstrate a 'tough season package', showcasing proven management techniques to deal with varying climatic and feed gap issues, in order to increase productivity and profitability while reducing risk. This allows producers to run appropriate stocking rates and large flocks with confidence. This has been discussed with members of the WALRC committee, who have helped shape this project.

The Tough Systems for Tough Seasons 'package' has two key aspects:

1. Sowing cereals into pastures to bulk up feed for the season (earlier autumn feed and increased autumn/winter biomass)

2. Deferring grazing, through setting up small deferment paddocks or feedlots/confined feeding (then sowing these for weaning paddocks)

The deferred grazing is to make producers focus on a myriad of flexible options available, such as early sowing, crop grazing, bulking pastures with cereals, grazing fodder shrubs and confinement feeding. There is huge potential for these to be more effectively utilized by pregnant ewes, and these options can also increase feed availability throughout the year, leading to more resilient, more robust feed systems.

However, producers need to increase confidence in these tools, as many are only used sporadically, and there is little knowledge or regular use of these practices despite them having being around for many years. This project aims to help producers understand when and how to utilise them, and integrate the options into their systems.

2. Objectives

By 2023, have completed the following in the South of WA:

1. Demonstrate and assess the Tough Systems package's ability to increase the following, through "paired paddock" treatments at seven sites per year:
   a) Resilience - Expected 25% more FOO and 10% increase in stocking capacity. Measured by assessing & comparing pasture quality and quantity in deferred, seeded, lambing paddocks to those that have been grazed since break of season (traditional system).

   b) Lamb & ewe survival - Modelled (and actual lambing % where possible) based on increased feed availability and condition scores.

c) Ewe condition post lambing- Measured in condition score of ewes, expected 0.5 CS increase.

2. Complete a cost benefit analysis to demonstrate the economic performance of the system, compared to traditional, standard grazing and management system.

3. Implement extension activities to increase the knowledge and skills of the 20 core producers, 300 observer producers and wider industry through:
    - 3 field days
    - 2 workshops
    - 3 host case studies
    - 1 guideline manual
    - 2 podcasts

4. Lead to an estimated 70% of core producers and 40% of observer producers making practice changes, while 60% of core producers and 40% of observers will increase their knowledge and skills.

3. Demonstration site design

3.1 Methodology

The demonstration sites were replicated over three years at up to 7 host sites per year, with the groups meeting at the host sites twice a year.

The paired paddock demonstration sites involved comparison of:

1. Ewes that had been confinement fed and lambed onto deferred pastures sown with cereals against
2. Ewes that had a traditional preparation for lambing, where pastures were not deferred pre lambing.

The demonstration mob were compared against the control with the following metrics collected:

a) Winter stocking rate potential based on available Feed On Offer (FOO)
b) Feed costs (and rations)
c) Feed quality (Metabolisable energy, crude protein percentage, dry matter of deferred pasture and non-deferred pasture)
d) Feed quantity (Feed on Offer (kg/DM/ha)) of deferred pasture and non-deferred pasture
e) Lamb survival (scanning to marking)
f) Condition score of ewes at scanning and lamb marking

Host producers were identified in February to allow planning for early sown grazing options. AgPro did so over the phone, with follow up and input from the groups at the initial meeting.

There was a planning meeting with the core producers in March, to collect their benchmarking data. This allowed assessment of the tough systems' performance compared to the producers' traditional

systems. Ideally, was based on producers' existing data to give a 5-year average as the baseline data. At this point, management of the tough systems mob was discussed and decided on by the group. Paddocks to use for the tough systems lambing paddocks and confinement paddocks were selected. The lambing paddock was sown with pasture and cereals early in the season (April-early May) and allowed to establish while the mob was in confinement feeding at the break of the season. The exact timing and length of this phase was dependent on the break of the season. Stocking rates and confinement timing were determined by each host producer.

3.1.1 Demonstration site measurements: Feed

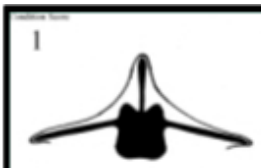
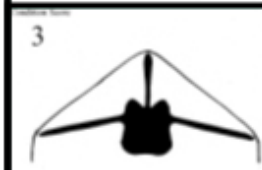
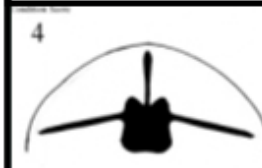
The winter field day aligned with taking the feed samples, just before the start of lambing, and when the early lambing tough systems mob moved into the lambing paddock. Feed tests were undertaken at the winter field day by producers, to compare pasture quality and quantity in the deferred lambing paddocks compared to those in the traditional system that weren't deferred. Members of the core group helped to take 0.1sqm pasture cuts from the treatments which were sent for analysis of Feed On Offer (kgDM/ha), digestibility, (%DM), crude protein (%DM) and metabolisable energy (MJ/kgDM).

3.1.2 Demonstration site measurements: Ewe condition score and lambing percentage

Condition score of the two mobs at each site was measured and compared to see the impact of the two treatments on sheep productivity. Lamb survival was collected, and weaning weights where possible.

Mobs were condition scored at pregnancy scanning, as well as post lambing at marking. Condition scoring was the preferred method of measuring sheep productivity for a variety of reasons. It is more farmer accessible as not all producers own scales, and is a more accurate comparison of sheep's health than weight changes, particularly during pregnancy. The industry standard condition scoring method is outlined in Fig. 1 below, which involves assessing the level of body fat and tissue over the loin area. (LifeTimeWool.com).

Figure 1. Condition scoring assesment

1 	**Backbone** The bones form a sharp narrow ridge. Each vertebra can be easily felt as a bone under the skin . There is only a very small eye muscle. The sheep is quite thin (virtually unsaleable)	**Short Ribs** The ends of the short ribs are very obvious. It is easy to feel the squarish shape of the ends. Using fingers spread 1cm apart, it feels like the fingernail under the skin with practically no covering
2 	**Backbone** The bones form a narrow ridge but the points are rounded with muscle. It is easy to press between each bone. There is a reasonable eye muscle. Store condition- ideal for wethers and lean meat.	**Short Ribs** The ends of the short ribs are rounded but it is easy to press between them. Using fingers spread 0.5cms apart, the ends feel rounded like finger ends. They are covered with flesh but it is easy to press under and between them.
3 	**Backbone** The vertebrae are only slightly elevated above a full eye muscle. It is possible to feel each rounded bone but not to press between them. (Forward store condition ideal for most lamb markets now. No excess fat).	**Short Ribs** The ends of short ribs are well rounded and filled in with muscle. Using 4 fingers pressed tightly together, it is possible to feel the rounded ends but not between them. They are well covered and filled in with muscle.
4 	**Backbone** It is possible to feel most vertebrae with pressure. The back bone is a smooth slightly raised ridge above full eye muscles and the skin floats over it.	**Short Ribs** It is only possible to feel or sense one or two short ribs and only possible to press under them with difficulty. It feels like the side of the palm, where maybe one end can just be sensed.
5 	**Backbone** The spine may only be felt (if at all) by pressing down firmly between the fat covered eye muscles. A bustle of fat may appear over the tail (wasteful and uneconomic).	**Short Ribs** It is virtually impossible to feel under the ends as the triangle formed by the long ribs and hip bone is filled with meat and fat. The short rib ends cannot be felt.

3.2 Economic analysis

Economic analysis was undertaken by Mike Young, who used collected production data to determine the economic impacts of deferring pasture. This was using the Australian Farm Optimising (AFO) model, with full methodology and explanation in Appendix 6.7. It comprises a powerful whole year feed budget that can examine the optimum utilisation of feed resources across the whole farm. This makes AFO appropriate for valuing extra feed at different times during the year.

Lifetime Ewe Management Condition Score calculator was used for modelling, to determine the impact of condition score change on carrying capacity, sheep weight gain, wool growth and lamb survival. This was supported by the animal production data collected, which included lambing and marking percentage and weaner survival. If this was not feasible, percentages were modelled using the Lifetime Ewe Condition Score Profile Comparison Calculator. This assumes that the condition score advantage occurred in late pregnancy, and that the ewes did not fall below condition score 3 before giving birth. This analysis included impact of condition score changes on lamb, ewe and weaner survival, as well as birth weight.

3.3 Extension and communication

Involvement of the core and observer producers was key to this project meeting its objectives, and to increasing producer adoption, skills and knowledge. This is why extension and communication activities focused predominantly on field days and workshops, with a winter field day each year to demonstrate the projects' findings and promote discussion. There were also two summer workshops which looked at benchmarking.

These days helped producers, as well as interested wider industry, to visually see and be involved in the different practices that made up the tough systems package. Key discussion points from the field days included:

- Time of sowing
- Value of extending deferment
- Nutritional and health requirements in confinement, as well as ideal confinement set up
- Feed tools in confinement for both water and grain
- Feed differences, and species composition, in terms of quality and quantity
- Alternative forage species
- Time of lambing impact on ability to defer
- Value of cereal in pastures, and as crop grazing
- Results each year: weaning weights, smaller mob tail, management ease, autumn feed
- How to best utilize this system in good years-e.g. crop grazing the highest value stock only
- Impact of seasons eg Shortened time of confinement, value of cereal as wind break for lambs

Annual summaries of the project and its findings were also shared through the Facey Group and AgPro channels (Appendix 6.10) as were the annual producer case studies (Appendix 6.9). These summarise the entire project's findings and are valuable extension tools that are to be shared beyond the life of this PDS, as are the podcasts produced within the AgPro Cast.

The PDS was also shared more widely at various events through presentation slots, at conferences and field days The full communication plan can be seen in Appendix 6.2.

3.4 Monitoring and evaluation

The monitoring and evaluation process is outlined in the updated monitoring and evaluation report (MER) attached in Appendix 6.1. This shows the processes used for data collection, with the metrics measured being:

- Total number of attendees at events
- Practice change- actual and intended
- Self-evaluation (of knowledge, attitude, skill, perception, project value)
- Stocking rates (DSE/ha)
- Carrying capacity (potential DSE/ha)
- Pasture productivity (kgDM/ha)
- Pasture quality (crude protein, digestibility, energy)
- Feed rations converted into $/hd and $/ha
- Mortality rate (where possible)
- Lambing percentage
- Condition score (CS)
- Profit ($/ha)

4. Results

4.1 Demonstration site results

4.1.1 Feed quality and quantity

Over the three years of the project, deferred pastures consistently produced more biomass, with higher Feed on Offer than the control pastures. This was to be expected, with an average of 1.7 times more FOO. The sites showed variation in the amount of feed produced, but this trend remained constant, as did higher energy content.

The inconsistent data is crude protein, which was higher in deferred pastures in 2020, lower in 2022, and a mix of both in 2021. This could be due to different growth stages, fertiliser application timings, or other unknown causes.

Looking at the results each year (Appendix 6.4 for full feed test results), we can see the variations and similarities. 2020 results showed that energy was on average 18% higher in the deferred paddocks, at all sites except one. Feed On Offer averaged over 2.5 times higher in the deferred paddocks, except at one, where the deferred pasture had 7% lower FOO than the control. Crude protein was 1.9% higher in the deferred pastures, and similar at and between sites.

2021's results followed similar patterns, with crude protein 1.8% higher in the deferred pastures compared to those that were grazed. Despite this, there was significant differences across the sites this year. Two sites showed a reversal of the expected trend, with higher protein levels in the control pastures. Feed On Offer averaged over 1.4 times higher in the deferred paddocks. Feed test results show that energy was on average 5% higher in the deferred paddocks compared to the undeferred paddocks on which the control mob grazed.

2022 showed a combination of the previous years' results, with similar energy results to 2021 (7% higher in deferred pastures) and FOO (1.3 times higher in deferred pastures). However, crude protein was on average 17% lower in the deferred pastures, a trend which all sites but one demonstrated.

4.1.2 Sheep feed costs (supplementary feed)

2021 and 2022 had unreliable data collected during confinement. For this reason modelled averages from the area were used in the economic analysis. Based on the area, nutritional requirements of the animals in confinement, a standard ration of barley and lupins, and using feed prices at the time, we modelled an average supplementary feed cost of $0.29/hd/day. In comparison, project data in Table 1 showed the control mob required a total of $0.25/h/day compared to the confined mob, with a cost of $0.16/h/day. This shows our feed ration may be a bit too high, did not take into account existing pastures the traditional mobs were grazing, or underestimates the amount of cereals and hay/straw producers are feeding.

Table 1. Actual cost of supplementary feeding per head per day

	Cost of supplementary feed per head per day	
	Control mob	**Confined & Deferred mob**
Average	**0.25**	**0.16**
Maximum	**1.05**	**0.45**
Minimum	**0.0**	**0.0**

However, most importantly, this trend, and its large difference, was not what is expected to be found, as the mobs were consuming the same amount of energy, which was not possible with this data It is believed that hosts did not record the feed rates correctly for the confinement and deferred periods, and reinforces why modelled data was used for the economic analysis. Modelled data showed that the confinement cost was more likely to be $0.33/h/day, and the control mob $0.26.

However, the significant data collected during this time, which allowed us to undertake the analysis, was the amount of time each mob required supplementary feeding once the confined mob was let onto deferred pastures. Over the three years, the confined and deferred grazed mob required much less supplementary feeding, with an average of 2.7 days post confinement, while the traditionally run mob averaged the equivalent of 15 days on a $0.29/h/day ration. This means that the control mob cost an additional $4.35 per head in supplementary feed compared to the mob on the tough systems treatment.

4.1.3 Sheep performance

2020 (Table 2) saw marking percentage and weaner survival to be higher by 1% in the tough system treatment mobs. In addition, these animals lost 0.2CS less condition during pregnancy than the control mob, which indicated better nutrition and management. At one site, sheep gained condition while on the deferred pastures, which has positive implications for ewe management.

Table 2. 2020 sheep performance

2020 Metric	**Deferred grazing average**	**Control average**
Winter grazed stocking rate (ewe/WgHa)	6.0	6.2
Marking (% from scanning to marking)	111	110
Weaner survival (% marking to weaning)	95	94
CS change during lambing (CS)	-0.2	-0.4

In 2021, condition score changes remained negative as to be expected, but this year there was no difference between the mobs, perhaps due to less time in confinement, and less time hand feeding.

Stocking rate was higher this year compared to 2020, perhaps reflecting more hectares returning to a normal cropping regime, as there were no late/early season breaks. Lambing percentages were significantly below average, due to poor seasonal conditions across the state, so has not been reported.

Table 3. 2021 sheep performance

2021 Metric	Deferred grazing average	Control average
Winter grazed stocking rate (ewe/WgHa)	7.7	7.7
Weaner survival (% marking to weaning)	94	92
CS change during lambing (CS)	-0.2	-0.2

2022's condition score changes were negative as expected over the duration of pregnancy and lactation. Lambing and weaning percentages were again seen to be low this year, with no obvious explanation- this was widespread across the south. Stocking rates were much higher this year, with producers running double the previous year's average. When asked, this was down to increased confidence in their grazing management, and wanting to best utilise deferred feed, containment feeding, having adopted the system across more normal mob sizes and stocking rates.

Table 4. 2022 Sheep performance

2022 Metric	Deferred grazing average	Control average
Winter grazed stocking rate (ewe/WgHa)	13.4	13.4
Marking (% from scanning to marking)	109%	108%
Weaner survival (% marking to weaning)	95%	94%
CS change during lambing (CS)	-0.17	-0.33

4.1.4 Benchmarking workshop results

One workshop was held in January 2021, and the second in April 2022. Data from at least 7 host sites in 2021 and 5 in 2022 was collected and is available in Appendix 6.6. Additional producers attended the workshops to learn, without submitting their own data.

These workshops were extremely beneficial to producers, for some learning the fundamentals of benchmarking and how to approach it. Others noted that the data was much more powerful and useful now that they knew how to interpret it and compare to local benchmarks.

The original plan was to compare the producers' performance of the treatments. However due to the very varied differences across the sites, and the years, the benchmarking data was not included as the basis of the economic analysis.

Farm wide data, as shown in Table 5, shows us the great variation in KPI's across the host properties, with stark differences between minimum and maximum performance or application. This is what has made fair, scientific comparison and economic analysis difficult.

Table 5. Minimum and maximum benchmarking data across the project lifespan

	Minimum	Maximum
Fertiliser cost/ha	$0	$18
DSE/ha	2	7
Lambs/ha	1.1	2.3
GM/ha	$129	$222
GM/DSE	$32	$71

4.2 Economic analysis

There were a multitude of factors to consider with the economic analysis, all of which varied across the demonstration sites. The primary management change was to defer pasture grazing. Pasture deferment can be achieved by either crop grazing, re-sowing, bulking with cereals or confinement feeding,-or a combination, which makes analysis difficult. The key points are:

- The cost of confinement feeding is additional supplement as sheep in confinement receive 100% of their diet from supplement- assumed $0.29/hd/day.
- However the mob required less time supplementary feeding, with an average of 1.7 days post confinement, while the traditionally run mob averaged the equivalent of 10.1 days on a $0.29/h/day ration.
- The key result of the Tough Systems package is the additional FOO resulting from deferment.
- Table 6 shows the calculated benefit per hectare deferred based on the three years' data averages, which takes into account the value of grown feed compared to supplementary feed.
- The $36.30/ha benefit, when modelled over an average farm in the area, makes the total value of pasture deferment range from $5,800 to $20,600 per farm.

Table 6. Calculated net benefit per hectare based on deferred feed

	Ave FOO gains (kg/ha)	Assumed Stocking rate	Benefit ($/ha)
Ave	393	9.7	36.30

As shown in Appendix 6.7's graphs, the economic value of additional FOO varies depending on climatic conditions, prices, stocking rate and timing of availability of deferred pasture. Key points are:

- The estimated value of extra feed decreases as more feed becomes available. This is because feed at other times of the year or other factors such as labour become limiting.

- The value of deferred pasture varies by up to 72% depending on seasonal conditions.
- Higher stocking rate significantly increases the value of feed early in the season. However, during spring when there is lots of feed available the marginal benefit of extra feed varies less for different stocking rates.
- If the same stocking rate is used extra feed is worth more in later breaks. Note: The marginal benefit will diminish as the break gets later (the linear trend will not continue).
- Increased grain prices increase the value of pasture while it is still profitable to feed grain to increase SR. But past a certain point feeding grain to increase SR will become unprofitable and the value of extra pasture will unlink from the grain price.

Additional Analysis

When looking at the direct impact on sheep productivity and profitability due to the increased feed availability, the condition score advantage of 0.2CS resulted in modelled increased lamb survival 1% higher than what was recorded at the sites. Table 7 demonstrates the production benefits, while Table 8 has converted this into these into financial benefits, including wool data. It is important to remember that this analysis is separate to the one above.

Table 7. Production benefits of condition score advantage

Benefit of Condition Score Advantage	
Increased lamb birthweight	0
Increased lamb survival	2%
Increased ewe survival	0.1%
Extra weaning %	4%

Table 8. Financial benefits of condition score advantage

Financial Benefits		
Value of the extra weaning %	$	2.27
Value of ewe survival	$	0.28
Change in ewe fleece value	$	0.66
Change in progeny fleece value	$	0.24
Total Benefits	$	3.45

We also had to consider the cost of producing pastures, as in many cases producers were using early sowing to bulk up the pastures they were to defer. Hosts used a variety of seeding and fertiliser rates, as well as different species and mixes. This led to very varied pasture input costs, with a range of $0 to $333.5 per hectare. A full break down can be seen in Appendix 6.3, with cost break downs in 6.3.4.

It is hard to determine how much of this cost should be subtracted from the benefits produced by deferred grazing, as the pasture costs are not necessarily increased due to deferment practices, and can occur as part of normal pasture rejuvenation. That is why it has not been included in the calculated net benefit above.

4.3Extension and communication

The communication and extension activities of this PDS were successful, with a lot of interest in the project due to a series of poor season breaks. This meant that the messages of the project were well timed and widely shared by the industry, reaching all sheep producing regions around W.A. thanks to the Grower Group and producer networks AgPro utilises. The activities and outcomes we were able to measure are outlined below, however this does not encompass the influence of the project.

Engagement / Adoption Activities	**Details**	**Attendees and resources**
Initial planning meeting with core producers	Plan for the project and season, in March 2020	Host producers only
Summer workshops	Two benchmarking workshops were run with core 20 producers to collect and discuss the importance of benchmarking, discuss the initial BCA results, and undertake benchmarking analysis.	2x benchmarking workshops held over summer, with full results available in Appendix 6.6.
Winter field days	These are open to the wider group and any other interested producers. The aim of the field days is to have the feed tests taken, results so far discussed, and the project objectives reinforced.	Attendance: • The first field day was held June 30 2020, with 19 producers in attendance • The 2021 field day was held on June 10 with 18 producers in attendance. The 2022 field day was held 8th July at Tom Wittwer's, with 14 producers in attendance.
Case studies	Case studies on three host producers, to be shared with group and mainstream agricultural media.	The case studies are attached in Appendix 6.9, completed in 2023. They have been distributed through AgPro and grower group channels, are available for MLA channels, and will continue to be shared after the project's completion.
Annual summary articles	Outlining project results and aims. Was distributed through the AgPro and Facey Group network, as well as other interested grower groups. Reached a very wide industry network.	Available in Appendix 6.10.

Podcast episodes	Two podcasts produced and shared through the AgPro Cast outlining producers' experiences, and the project outcomes.	
Producer guideline manual	Outline package, challenges and benefits, as well as producer experiences	Did not complete. Grain and Graze have very thorough crop grazing materials, confinement feeding best practice materials currently lack practical, producer friendly materials, and case studies have already been produced.
Other (please provide details):	Discussed at other events such as MLA's 2021 and 2020 MeatUp events.	Discussed at all AgPro "StockPro" meetings (over 30 groups across WA) and through the network of over 300 producers, presented at MLA's WA MeatUp Forum, and data has been widely shared

4.4 Monitoring and evaluation

24 pre-project surveys were returned, and 25 post producer surveys. Although low, these are the expected response rates to surveys handed out or emailed. Analysis is broken into core and observer producers, with the pre producer survey questions and results available in Appendix 6.11. Post producer questions and results summary can be seen in Appendix 6.12, and raw results in the Excel file submitted with this report. Table 9 below shows the average property involved, based on pre-producer survey data.

Table 9. Metrics of involved properties

Metric	Ave	Min	Max
Hectares owned	4239	1300	7700
Number ewes	3016	600	7100
Lambs turned off per year	1461	400	4000
Total number of sheep	6531	2100	17000

The post project producer surveys showed that the project resulted in increased producer confidence in sowing, increasing from 6.8 to 8.4 out of 10. This was 8.6 in core producers, and 8.2 in observers. Overall this equates to a 17% increase in confidence, which does not correlate with the increase in knowledge and skills.

There was also an increase in producers' knowledge and skills, with significantly more correct responses to the survey questions. On average, 96% of core producers and 26% of observers answered the KASA questions correctly regarding the definitions of confinement feeding, increasing lamb survival, and increasing early season biomass. This was a very high increase in correct answers compared to the pre-KASA report, where only 19% of core producers, and 22% of observers answered correctly.

Producers ranked the project as valuable in assisting them to manage their livestock enterprise (7.8 out of 10) and 100% would recommend the PDS program to others, with satisfaction with the project ranked at 8.

88% of core producers used deferred grazing of pastures as normal practice, a 2% increase from the start of the project.

In comparison there was a higher impact on observer producers with, 35% of observer producers now regularly defer grazing (6% increase), and 59% sometimes, which was a 10% increase.

Sowing cereal with or into pastures is common practice for 100% of core producers, compared to 29% at the beginning of the project, and 71% sometimes. For observer producers, the project's impact meant that now 72% sometimes sowed pastures with cereals, and 29% did so rarely, compared to 38% sometimes and 62% rarely.

For observer producers, regularly condition scoring sheep has doubled, to be normal practice for 12%. There has been a similar impact on core producers, doubling the use of condition scoring as normal practice, with an additional 45% adopting it.

Overall, adoption rates were 63% in core producers and 98% in observers, which is the result of a myriad of practice changes.

Data was also collected looking at the impact of implementing the practices on farm financially, utilising benchmarking. The results are demonstrated in Table 10 below, however, it should be noted that these show a great deal of variation and other possible influences and should not be attributed directly to the project's impact.

Table 10. Pre and post KASA KPI differences

	Metric	Ave	Min	Max
PRE	Lamb survival at marking (%)	93	74	100
	Stocking rate	6.4	1.1	10.2
POST	Lamb survival at marking (%)	98.0	77.0	114.0
	Stocking rate	6.2	1.1	10.2

4.5Outcomes in achieving objectives

The project aim was supported by the following objectives:

By 2023, have completed the following in the South of WA:

1. Demonstrate and assess the Tough Systems package's ability to increase the following, through "paired paddock" treatments at seven sites per year:

a) Resilience - Expected 25% more FOO and 10% increase in stocking capacity. Measured by assessing & comparing pasture quality and quantity in deferred, seeded, lambing paddocks to those that have been grazed since break of season (traditional system).

b) Lamb & ewe survival - Modelled (and actual lambing % where possible) based on increased feed availability and condition scores.

c) Ewe condition post lambing- Measured in condition score of ewes, expected 0.5 CS increase.

Objective one was successfully completed, with a total of 21 paired paddock sites demonstrating an average of 1.7 times more FOO and a proven capability to increase stock carrying capacity. Ewe and lamb survival was shown to be increased by 1% (modelled to be 2%), while ewe condition score post lambing increased by 0.2CS.

2. Complete a cost benefit analysis to demonstrate the economic performance of the system, compared to traditional, standard grazing and management system.

Objective 2 was successfully achieved, with economic analysis conducted showing a $36.30/ha benefit, which when modelled over an average farm in the area, makes the total value of pasture deferment range from $5,800 to $20,600 depending on the seasonal conditions.

3. Implement extension activities to increase the knowledge and skills of the 20 core producers, 300 observer producers and wider industry through:
    - 3 field days
    - 2 workshops
    - 3 host case studies
    - 1 guideline manual
    - 2 podcasts

Objective 3 was mostly achieved, with a few impacts. This resulted in all activities being implemented except the one case study and the guideline manual.

4. Lead to an estimated 70% of core producers and 40% of observer producers making practice changes, while 60% of core producers and 40% of observers will increase knowledge and skills.

Objective 4 was successfully met, with all producers increasing knowledge and skills, while 86% of surveyed producers made practice changes as a result of the project.

5. Conclusion

5.1Key Findings

- The value of the tough seasons package varies each year, and also varies based on the many options that can be implemented to achieve deferred grazing
- Deferred pastures consistently produced more biomass, with 170% higher Feed on Offer than the control pastures. The sites showed variation in the amount of feed produced, but this trend remained constant, as did higher energy content.
- Economic analysis conducted showing that the tough system treatment resulted in a $36.30/ha benefit, which when modelled over an average farm in the area, makes the total value of pasture deferment range from $5,800 to $20,600 depending on the seasonal conditions.
- However, sowing costs to produce this feed averaged $140.2/ha, with a huge range of $0 to $333/ha depending on the pasture and farmer management.
- Ewe and lamb survival was shown to be increased by 1% (modelled to be 2%), while ewe condition score post lambing increased by 0.2CS.
- The project led to significant increases in producer knowledge, skills and confidence
- Producers also increased adoption of condition scoring, deferred grazing, and sowing cereals into pastures

5.2Benefits to industry

This project has benefited W.A. sheep producers by helping increase confidence, knowledge and skills, adoption rates and awareness around the Tough Systems packages. The post KASA surveys clearly showed that there was significant impact on both core and observer producers, with high adoption rates. Overall, the project aimed to help producers build more resilient systems, which it has demonstrated with easily adopted, and relatively simple methods.

Use of the tough systems package concepts are much more commonly seen in the area, and the wider industry, as producers are more aware of the options available to them, and how the “Tough Systems” package can help fill feed gaps, optimising sheep health, productivity and profitability. A big part of this is helping red meat producers achieve sustainably higher stocking rates through reliable early season feed, which we have seen anecdotally but was not captured in this project’s data. Also not captured was the impact usually seen when hand feeding is not required during lambing (in poor/late seasons only), where interruption of mobs is reduced and mismothering decreases.
An important intangible benefit not captured by the project, but flagged by producers as being very valuable, is the management flexibility created by the increased green feed available, as well as the knowledge and skills gained from the benchmarking workshops.

As mentioned above, the findings of the project are easily implemented by producers, whether by themselves or in a facilitated group, as they are simple practices that can be easily adopted or tried for one season. Some can even be implemented in response to a late season break, used reactively rather than proactively, without giving the full “Tough Systems” package benefits. This means increased likelihood of adoption beyond the project. Further extension could include promotion of case studies to a national audience and continuing to share the project’s findings through presentations with grower groups and at events.

There is always further work that can be done, whether it is extension or research. For example; focusing on the individual aspects of the package (supplement feeding nutrition, confinement feeding, alternative forages, cereal pastures, crop grazing), further demonstration with better animal production data to allow a more robust economic analysis, looking at different seeding and fertiliser rates.

6. Appendix

6.1Monitoring and Evaluation Plan

6.1.1 Original MER plan

MER Plan: Producer Demonstration Sites

Project name: L.PDS. 2007: Tough Systems

Date: 7/4/2020

Evaluation level[1]	**Project Performance Measures**	**Evaluation Methods**
Inputs – What did we do? *Describe the planned and expected inputs involved in your project*, including *funds, resources, development & projects structures*	• Demonstration site hosts selected and appointed • Initial planning meeting with host producers • 10 producers on 7 on-farm demonstration sites, and 300 observer producers, managing approximately 260,000, with 700,000 sheep • $73,500 total funding from MLA to be used for professional technical expertise, data collection, field days/workshops, project management, case study publication and reporting • Minimum $28,800 in kind from producers (expected to be higher)	○ Financial records ○ Documentation of all project activities, including notes from each site, producers' insights, challenges and topics discussed ○ Steering committee notes
Outputs - What did we do? *Describe the outputs planned/expected from your project*, *including engagement activities & products from demonstration sites*	• 3 field days and 2 workshops, 1 initial project plan meeting • 3 case studies published on host producers • 1 guideline manual • Cost-benefit analysis and comparative analysis undertaken • Collection of data from 7 host sites every year, including: ○ Condition score ○ Lambing percentage ○ Weaner survival ○ Ewe survival, ○ Cost of production ○ Gross margins ○ Feed quality and quantity • Communication activities: ○ 3 field days ○ 2 workshops	○ All activities recorded in central documents and milestone reports, as well as collated in annual reports ○ Comparative analysis also in this central document. ○ Records of field days and workshops ○ Copies of all communication / extension materials

[1] Note: The headings in column 1 are also listed in the PDS Final Report template.

	○ 1 initial planning meeting ○ 1 guideline manual ○ Annual project summaries (in depth articles) • Practices demonstrated: ○ Condition scoring ○ Benchmarking ○ Feed estimates (Feed on Offer) ○ Feed cuts ○ Grazing management ○ Sowing cereals into pastures ○ Confinement feeding ○ Pastures From Space ○ Pregnancy scanning	
Changes in knowledge, attitudes and skills - How well did we do it? *Describe the changes in KASA that you are planning to achieve*.	• 90% of producers involved find the project valuable and worthwhile • 70% of core producers and 40% of observer producers make practice changes • 60% of core producers and 40% of observers will increase knowledge and skills. • Profitability of the systems quantified to the entire industry	○ Pre and post project surveys to capture baseline data and changes in KASA
Practice changes – Has it changed what people do? *Describe the practice changes that you are expecting to achieve by the end of your project*	• 70% of core producers and 40% of observer producers making practice changes • 60% of core producers and 40% of observers will increase knowledge and skills.	○ Pre and post producer surveys to capture changes in practice
Benefits – Is anyone better off? *Describe the benefits that you are expecting to achieve as a result of the project*	• Increase in farm resilience- 25% higher Feed On Offer and 10% increase in stock carrying capacity • 0.5 condition increase in ewes post lambing • Increased ewe and lamb survival • Benefit cost analysis and comparative analysis showing the impact compared to traditional, standard grazing management system. • Increase in adoption, skill, and knowledge	○ Pre and post producer surveys to capture changes in practice ○ Results of benefit cost analysis ○ Comparative analysis to identify if targets have been achieved

General observations / outcomes – Is the industry better off?	• The need to increase system resilience is relevant to all of WA's sheep producers. • Wide-spread adoption is dependent on the success of the communication activities, and calculated benefits	○ Communication of the findings to a broader producer audience ○ MLA's long-term surveys ○ Results of benefit cost analysis ○ Comparative analysis ○ Collection of key learnings and unexpected consequences from the steering committee

6.1.2 Updated MER plan: Progress as of end of project

MER Plan: Producer Demonstration Sites

Project name: L.PDS. 2007: Tough Systems

Date: 31/1/2023

Evaluation level[1]	Project Performance Measures	Evaluation Methods	Progress at project end
Inputs – What did we do? *Describe the planned and expected inputs involved in your project*, including *funds, resources, development & projects structures*	• Demonstration site hosts selected and appointed • Initial planning meeting with host producers • 10 producers on 7 on-farm demonstration sites, and 300 observer producers, managing approximately 260,000, with 700,000 sheep • $73,500 total funding from MLA to be used for professional technical expertise, data collection, field days/workshops, project management, case study publication and reporting	○ Financial records ○ Documentation of all project activities, including notes from each site, producers' insights, challenges and topics discussed ○ Steering committee notes	○ Four groups establishing with 18 demonstration sites hosted over the three years, in Yealering, Wickepin, Wagin and Borden. ○ 20 core producers engaged, with wider producer interest ○ 3x field days held ○ 2 x benchmarking workshops held

[1] Note: The headings in column 1 are also listed in the PDS Final Report template.

	• Minimum $28,800 in kind from producers (expected to be higher)		
Outputs - What did we do? *Describe the outputs planned/expected from your project, including engagement activities & products from demonstration sites*	• 3 field days and 2 workshops, 1 initial project plan meeting • 3 case studies published on host producers • Cost-benefit analysis and comparative analysis undertaken • Collection of data from 7 host sites every year, including: ○ Condition score ○ Lambing percentage ○ Weaner survival ○ Ewe survival, ○ Cost of production ○ Gross margins ○ Feed quality and quantity • Communication activities: ○ 3 field days ○ 2 workshops ○ 1 initial planning meeting ○ Annual project summaries (in depth articles) • Practices demonstrated: ○ Condition scoring ○ Benchmarking ○ Feed estimates (Feed on Offer)	○ All activities recorded in central documents and milestone reports, as well as collated in annual reports ○ Comparative analysis also in this central document. ○ Records of field days and workshops ○ Copies of all communication / extension materials	○ 6x milestone reports, plus one final project report ○ 4x initial project plan meetings held in each area due to COVID-19 restrictions in 2020 ○ 3x field day/workshops, one held on June 30 2020, with 19 producers in attendance. The 2021 field day was held on June 10 with 18 producers in attendance. The 2022 field day was held 8th July at Tom Wittwer's, with 14 producers in attendance. ○ Feed tests, base line benchmarking data and sheep data collected from 7 demonstration sites for 2020 and 2021, 5 sites in 2022 ○ 1 workshop held January 2021, the second in April 2022. ○ 2 completed case studies ○ 3 annual summaries completed ○ 2 podcast episodes produced and

	○ Feed cuts ○ Grazing management ○ Sowing cereals into pastures ○ Confinement feeding ○ Pastures From Space ○ Pregnancy scanning		shared with the wider group
Changes in knowledge, attitudes and skills - How well did we do it? *Describe the changes in KASA that you are planning to achieve*.	• 90% of producers involved find the project valuable and worthwhile • 70% of core producers and 40% of observer producers make practice changes • 60% of core producers and 40% of observers will increase knowledge and skills. • Profitability of the systems quantified to the entire industry	○ Pre and post project surveys to capture baseline data and changes in KASA	○ Pre PDS survey has been returned by 24 producers. ○ Only 28% of producers answered all pre PDS KASA questions correctly regarding the definitions of confinement feeding, increasing lamb survival, and increasing early season biomass ○ The post PDS survey has been returned by 25 producers. Increased producer confidence in sowing, increasing from 6.8 to 8.4 out of 10. This was 8.6 in core producers, and 8.2 in observers. On average, 96% of core producers and 26% of observers answered the KASA questions correctly regarding the definitions of confinement feeding, increasing lamb survival, and increasing early season biomass. Producers ranked the project as valuable in assisting them to manage their livestock enterprise (7.8 out of 10) and 100% would recommend the PDS

			program to others, with satisfaction with the project ranked at 8. 88% of core producers used deferred grazing of pastures as normal practice, a 2% increase from the start of the project. In comparison there was a higher impact on observer producers with, 35% of observer producers now regularly defer grazing, and 59% sometimes, Sowing cereal with or into pastures is common practice for 100% of core producers, compared to 29% at the beginning of the project, and 71% sometimes. For observer producers, the project's impact meant that now 72% sometimes sowed pastures with cereals, and 29% did so rarely, compared to 38% sometimes and 62% rarely. For observer producers, regularly condition scoring sheep has doubled, to be normal practice for 12%. There has been a similar impact on core producers, doubling the use of condition scoring as normal practice, with an additional 45% adopting it.
Practice changes – Has it changed what people do? *Describe the practice changes that you are expecting to achieve by the end of your project*	• 70% of core producers and 40% of observer producers making practice changes • 60% of core producers and 40% of observers will increase knowledge and skills.	○ Pre and post producer surveys to capture changes in practice	○ Pre PDS survey returned by 24 producers. ○ Post PDS survey returned by 25 producers Increased producer confidence in sowing, increasing from 6.8 to 8.4 out of 10. This was 8.6 in core producers, and 8.2 in observers.

			There was also an increase in producers' knowledge and skills, with significantly more correct responses to the survey questions. On average, 96% of core producers and 26% of observers answered the KASA questions correctly regarding the definitions of confinement feeding, increasing lamb survival, and increasing early season biomass. This was a very high increase in correct answers compared to the pre-KASA report, where only 19% of core producers, and 22% of observers answered correctly. Producers ranked the project as valuable in assisting them to manage their livestock enterprise (7.8 out of 10) and 100% would recommend the PDS program to others, with satisfaction with the project ranked at 8. 88% of core producers used deferred grazing of pastures as normal practice, a 2% increase from the start of the project. In comparison there was a higher impact on observer producers with, 35% of observer producers now regularly defer grazing and 59% sometimes. Sowing cereal with or into pastures is common practice for 100% of core producers. For observer producers, now 72% sometimes sowed pastures with cereals, and 29% did so rarely. For observer producers, regularly

			condition scoring sheep has doubled, to be normal practice for 12%. There has been a similar impact on core producers, doubling the use of condition scoring as normal practice, with an additional 45% adopting it. ○
Benefits – Is anyone better off? *Describe the benefits that you are expecting to achieve as a result of the project*	• Increase in farm resilience- 25% higher Feed On Offer and 10% increase in stock carrying capacity • 0.5 condition increase in ewes post lambing • Increased ewe and lamb survival • Benefit cost analysis and comparative analysis showing the impact compared to traditional, standard grazing management system. • Increase in adoption, skill, and knowledge	○ Pre and post producer surveys to capture changes in practice ○ Results of benefit cost analysis ○ Comparative analysis to identify if targets have been achieved	○ Increased knowledge, skills and confidence, as well as awareness ○ Increased adoption rates ○ Increased management flexibility ○ Increased resilience, productivity and profitability within sheep systems ○ Ability to run higher stocking rates (carrying capacity) ○ Decreased hand feeding requirements ○ Flexible package, that can be adapted as suits individual properties or businesses ○ 0.2CS advantage ○ 1% increase in weaner survival, modelled to be 2% ○ $36/ha increase in profit due to increase FOO
General observations / outcomes – Is the industry better off?	• The need to increase system resilience is relevant to all of WA's sheep producers. • Wide-spread adoption is dependent on the success of the communication	○ Communication of the findings to a broader producer audience ○ MLA's long-term surveys ○ Results of benefit cost analysis	○ Communication and engagement activities are on track and have been recorded in the milestone reports. ○ Increased knowledge, skills

	activities, and calculated benefits	○ Comparative analysis ○ Collection of key learnings and unexpected consequences from the steering committee	and confidence, as well as awareness ○ Increased adoption rates ○ Increased management flexibility ○ Increased resilience, productivity and profitability within sheep systems ○ Ability to run higher stocking rates (carrying capacity) ○ Decreased hand feeding requirements ○ Flexible package, that can be adapted as suits individual properties or businesses ○

6.2Communications plans

Communications Plan: Producer Demonstration Sites

Project name: L.PDS.2007 Tough Systems
March 2020
Project overview

MLA Program Manager	Alana McEwan-Brown (Russell Pattinson – PDS national coordinator)
Project objectives	By September 2023, have completed the following in the South of WA: 1. Demonstrate and assess the Tough Systems package's ability to increase the following, through "paired paddock" treatments at seven sites per year: a) Resilience - Expected 25% more FOO and 10% increase in stocking capacity. Measured by assessing & comparing pasture quality and quantity in deferred, seeded, lambing paddocks to those that have been grazed since break of season (traditional system). b) Lamb & ewe survival - Modelled (and actual lambing % where possible) based on increased feed availability and condition scores. c) Ewe condition post lambing- Measured in condition score of ewes, expected 0.5 CS increase. 2. Complete a cost benefit analysis to demonstrate the economic performance of the system, compared to traditional, standard grazing and management system. 3. Implement extension activities to increase the knowledge and skills of the 20 core producers, 300 observer producers and wider industry through: • 3 field days • 3 workshops • 3 host case studies • 1 guideline manual 4. Lead to an estimated 70% of core producers and 40% of observer producers making practice changes, while 60% of core producers and 40% of observers will increase knowledge and skills.
What were/are the deliverables from the project?	1. Data from the seven sites for three years 2. Publication of the project results, including impacts on sheep, gross margin and feed availability.

	3. Delivery of three field days and three workshops to showcase results, discuss the project and collect producer feedback. 4. Three case studies produced on host producer, one each year. 5. One guideline manual to help extend the project's reach and impact.
What are the 'outcomes' for producers?	1. Benefit cost analysis to quantity the impact of the tough system package on producers in the Wheatbelt. 2. Increased farm resilience, with 25% more feed on offer and 10% increase in carrying capacity. 3. By demonstrating and analysing the impact of implementing the tough seasons package, producers in the core, primary and secondary
Measure of success of communication plan and / or activities (KPIs and how measured)	• The seven demonstration sites will provide the basis for extension activities, with results presented and producers' experiences shared. • Annual project summaries will be produced and distributed through the Facey Group and AgPro channels • Field day, workshop and project planning meeting will all be recorded, in order to track producers' interest, challenges and intangible benefits of the project. • The host producers profitability will also be measured • The outcomes of the project will be shared with the wider observer group through: ◦ Seeking presentation slots state-wide at sheep and mixed-enterprise presentations and workshops. ◦ Annual summary reports distributed through AgPro and Facey Group channels, as well as interested grower groups through the Grower Group Alliance. ◦ Final results will be shared as a summary sheet with the producer guide, distributed through the same channels. ◦ Three case studies will be published and also included in full in the producer guidelines, describing each system and the profitability achieved. ◦ Public access to results via summaries and MLA final report • Achieve the level of practice change and targeted improvements in knowledge and skills
Primary audience (include regions/species)	Sheep producers in the following groups: • The Facey Group, based in Wickepin • StockPro groups • Stirlings to Coast (potential)
Secondary audience (include regions/species)	• Sheep producers in the Borden and Wagin Shires • Wider Facey Group network • AgPro Management clients across WA

Communications Plan / Activities

Activity	Responsibility	Target Audience	Key messages and must-have elements	Timing	Estimated reach
Initial planning meeting with core producers	Ed	Primary	Benchmarking data collection, plan for season	March 2020	10 producers (hosts producers only, multiple from certain properties)
Winter field day	Ed	Primary and secondary	Feed tests taken, objectives of project reinforced, Presenters: 2020 agronomist, 2021 fertiliser rep, 2022 vet.	Winter 2020, 2021, 2022	30 producers
Summer workshops	Ed	Primary	BCA initial results, Benchmarking collection and analysis	Summer 2021, 2022, 2023	20 core producers
Case studies	Lois, Ed	Primary, secondary	One completed each year on different host producers, outlining experiences with the package	November 2020, 2021, 2022	Facey and AgPro network
Producer guideline	Ed, Lois, Georgia	Primary, secondary	Outline package, challenges and benefits, as well as producer experiences	January 2023	Industry wide
Podcast episodes	Ed	Primary, Secondary, wider industry	Outlining the project, producers' experiences and the outcomes.	2 episodes, 2020 and 2022	200+
Articles	Ed, Lois	Primary, Secondary	In depth articles summarising the projects' finding to date	Spring/Summer 2020,2021, 2022	Facey and AgPro network

6.3Pasture treatments

6.3.1 2020

Site	Seeding Rates	Fertiliser rates & type
Andrew Scanlon-Wagin	Ryegrass at 10.5kg/ha. Other paddocks- oats 60kg into clover	100kg MOP 60L/ha FlexiN. + 80kg urea across farm
Clayton South-Wagin	Self-sown cereals, last year's crops which are now pastures	0
Xavier White-Wagin	Ryegrass 40kg	50kg MOPMAP blend of 65%MAP, 35%MOP,
Wade Brockway-Wagin	80kg barley 8kg rye, 0.2kg pillar forage rape	70kg MOP blend 40L FlexiN
Anthony Rowell-Wagin	60kg oats, 10kg clover	superPhos 90kg
Audrey Bird-Yealering	EARLY: ryecorn 20, vetch 20, oats 20, canola LATE: 10kclover, 20 ryecorn, 20 oats	-
Gary Lang-Yealering	Brook: 40kg oats/clover mix. Sartoris:40kg oats.	35kg MAPblend, Sartoris 40kg MAP

6.3.2 2021

Site	Seeding Rates	Fertiliser type and rate
Andrew Scanlon-Wagin	40kg oats + 4kg rye+ 0.5 canola + 0.5 clover. Early April.	
Xavier White-Wagin	40kg scope into ryegrass pasture	50kg MOP/MAP blend 65%MAP, 35%MOP,
Wade Brockway-Wagin	1st week of march. Barley 80kg/ha +10kg rye	60kg MOP blend
Anthony Rowell-Wagin	March. barley oat mix 70kg into pasture	100kg super, drilled
Nathan Brown	March, 40kg cereals into pasture	30kg MAP
Gary Lang-Yealering	pasture in mid april oats and subclover	?

6.3.3 2022

Site	Seeding Rates	Fertiliser type and rate
Scanlon	40kg oats + 4kg rye+ 0.5 canola + 0.5 clover. Mid April.	-
White	40kg scope into ryegrass pasture	50kg MOP/MAP blend 65%MAP, 35%MOP,
Wittwer	-	-
Wickepin East	-	-
Wickepin West	-	-

6.3.4 Cost calculations

2020	153.5
	0
	333.5
	201.14
	207
	275
	250.5
2021	97.906
	101
	194
	148
	87
	136
2022	97.85
	101
AVERAGE	140.1998
MAX	333.5
MIN	0

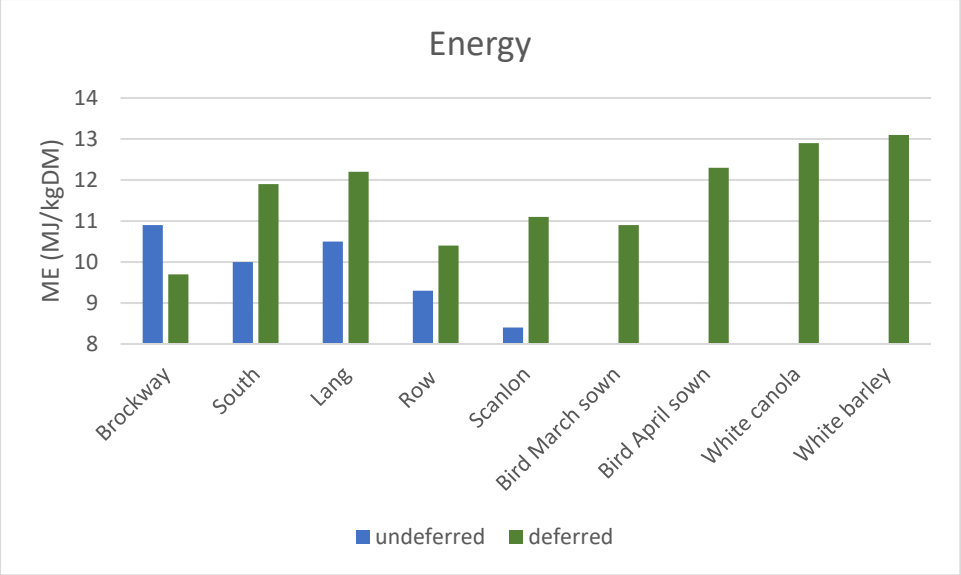
Cost assumptions

Contract	Clover	Rye	Cereal	Fert	Canola	Vetch
$50/h	10kg/ha $7/kg	15kg/ha @ $7kg	40kg/ha $400/t	80kg @ $700/t	$700/t	$1000/t

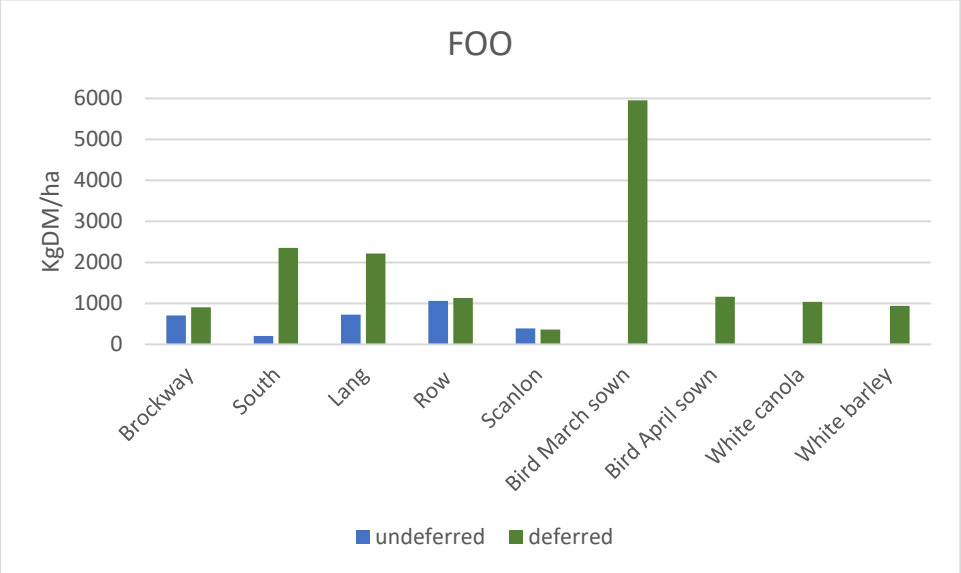
6.4Feed test results

6.4.1 2020

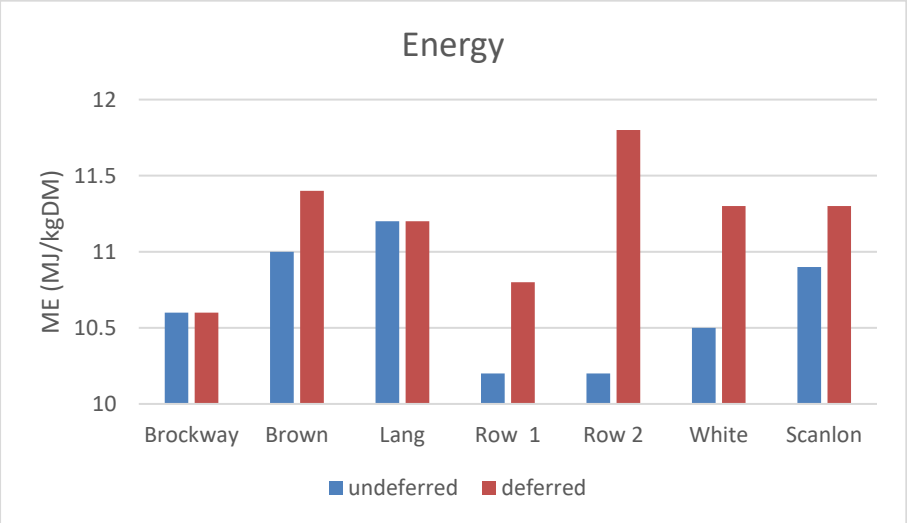
Energy

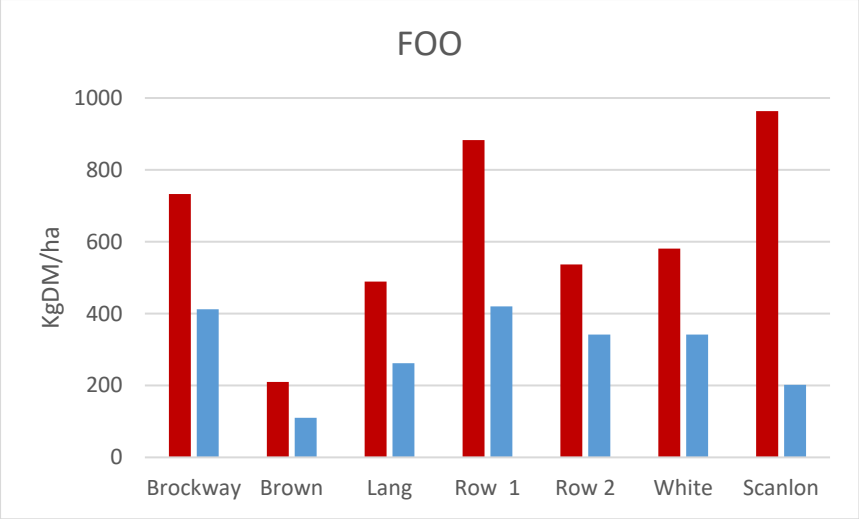


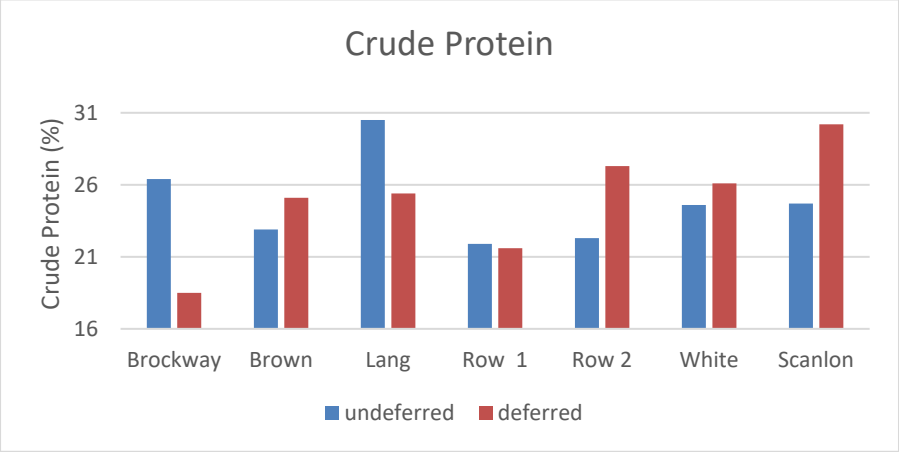
Feed On Offer



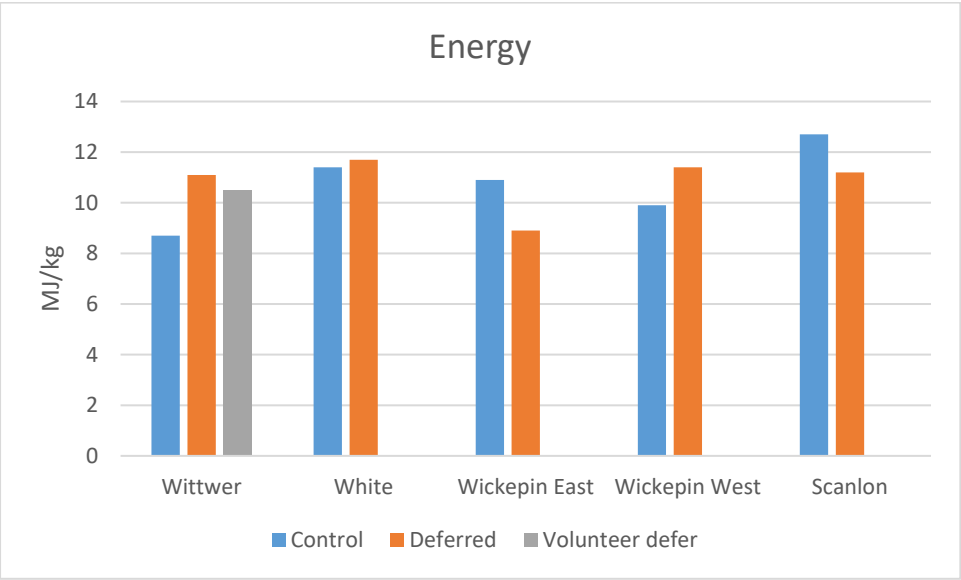
6.4.2 2021

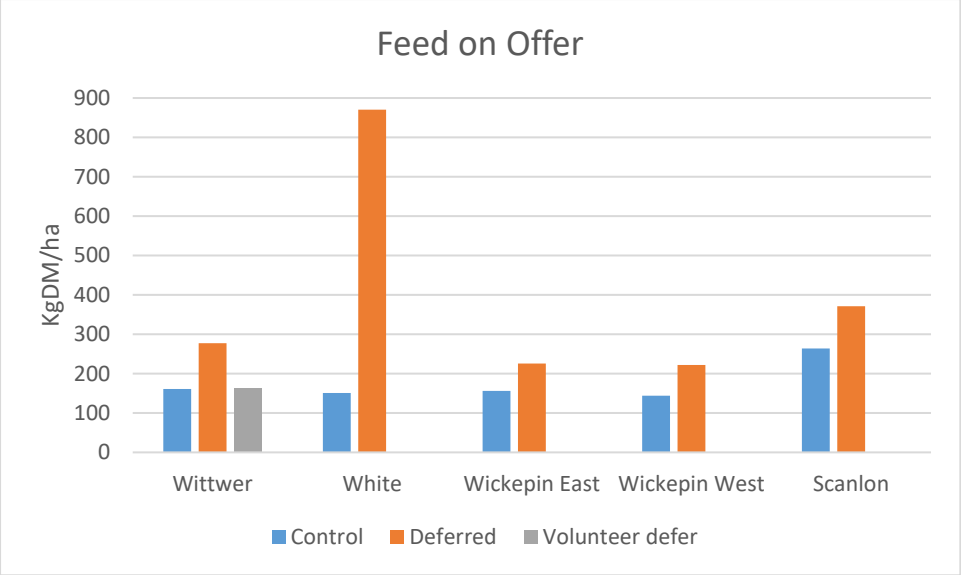


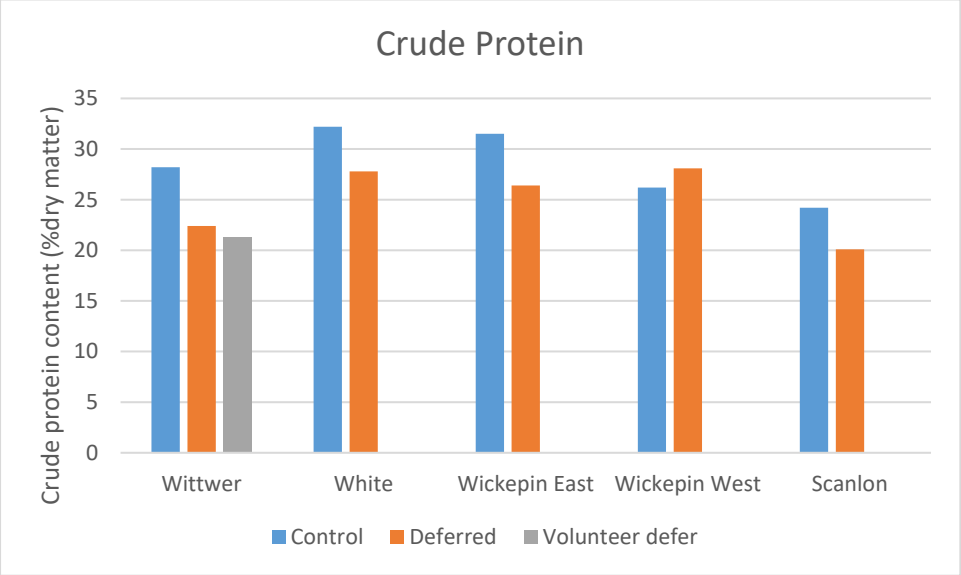

FOO
KgDM/ha
1000
800
600
400
200
0
Brockway
Brown
Lang
Row 1
Row 2
White
Scanlon


Crude Protein
Crude Protein (%)
31
26
21
16
Brockway
Brown
Lang
Row 1
Row 2
White
Scanlon
undeferred
deferred

6.4.3 2022


Energy
MJ/kg
14
12
10
8
6
4
2
0
Wittwer
White
Wickepin East
Wickepin West
Scanlon
Control
Deferred
Volunteer defer





6.5Sheep results

6.5.1 2020

Sheep data

	Lambing date	Pre lambing Confinement length	CS Pre Lambing	CS Post lambing		Stocking rate		
				Deferred Cereals	Control	Deferred	Control	diff
Andrew Scanlon-Wagin	22-Jul	3weeks	3	-	-	8.3	10.6	-2.3

Clayton South-Wagin	20-Jun	6 weeks	3.25	2.7	2.6	-	-	
Xavier White-Wagin	1-Jul	3 weeks	3.1	2.8	2.7	7.0	12.3	-5.2
Wade Brockway-Wagin	1-Jul	4 weeks	3	2.9	2.8	4.8	3.8	1.0
Anthony Rowell-Wagin	1-Jul	3 weeks	3	2.6	2.5	4.6	4.4	0.2
Audrey Bird-Yealering	25-Jun	5 weeks	3.25	3	-	5.3	5.3	0.0
Gary Lang-Wickepin	1-Jul	3 weeks	2.93	3.21	2.54			

6.5.2 2021

Metric	Deferred grazing average	Control average
Winter grazed stocking rate (ewe/WgHa)	7.7	7.7
Weaner survival (% marking to weaning)	94	92
CS change during lambing (CS)	-0.2	-0.2

6.5.3 2022

Site	Lambing Date	Pre lambing Confinement length	CS Pre Lambing	CS Post lambing		Stocking rate		
				Deferred Cereals	Control	Deferred	Control	diff
Andrew Scanlon-Wagin	22-Jul	21 days	3.1	2.98	2.8	15.0	15.0	0

Xavier White-Wagin	1-Jul	17 days	3.0	3.0	2.9	22.2	22.2	0
Tom Witter	10-Jul	21 days	3.15	-	-	10.2	10.2	0
Wickepin East	1-Jun	20 days	3.0	2.8	2.8	11.3	11.3	0.05
Wickepin West	1-Jul	26 days	3.2	3.16	3.0	9.0	9.0	0

6.6Workshop benchmark results

6.6.1 2021 workshop

	Minimum	Maximum
Fertiliser cost/ha	$0	$15
DSE/ha	2	7
Lambs/ha	1.1	2.3
GM/ha	$129	$197
GM/DSE	$44	$55

	Low 30%	Average	Top 30%
Land (Ha)			
Winter Grazed	1,418	1,367	1,452
Forage Crop	0.0	33.0	0.0
Sheep Used	1418	1400	1452
Stubble	989	1964	2344
General - Production Parameters			
Kg Wool / WGHa	14.0	17.3	18.9
Lambs / Ewe Ha	1.8	2.5	2.5
Lambs / WGHa	1.3	1.6	1.7
Stocking Rate DSE / WGHa	3.1	3.8	4.2
Total Kg	20,780	22,336	23,660
Kg Wool / hd	5.25	5.07	4.75
General - Finance Parameters			
Sale Price Average ($/hd)	$145	$138	$124
Net Wool Price	$10.62	$9.30	$8.38
Shearing Cost/Head	$11.57	$9.26	$7.40
Dip Drench Medicine cost/dse	$6.11	$2.58	$0.34
General - Flock Parameters			
Lambing %	80%	88%	86%
Losses %	2.91%	3.45%	3.34%
Ewes % flock structure	64%	61%	66%
Income / DSE			
Wool Proceeds	$45	$41	$37
Profit from Livestock Trading	$54	$50	$48
Total Sheep Income	$99	$91	$85
Expenses / DSE			
Sheep Costs	$21	$17	$13
Fertiliser	$0	$2	$2
Feed	$24	$20	$14
Pasture	$0	$3	$6
Total Variable Costs	$46	$43	$36
Gross Margin / DSE	$53	$48	$49
Income / Ha			
Wool Proceeds	$142	$157	$162
Profit from Livestock Trading	$166	$183	$181
Total Sheep Income	$307	$340	$344
Expenses / HA			
Sheep Costs	$75	$72	$62
Fertiliser	$1	$10	$12
Feed	$94	$86	$61
Pasture	$1	$14	$27
Total Variable Costs	$171	$181	$163
Gross Margin / WGHa	$136	$159	$181
Gross Margin / Sheep Used Ha	$136	$155	$181
Wool Production/WGHa/100mm GSR	7.5	9.6	10.9
S.Rate DSE/WGHa/100mm GSR	1.7	2.1	2.4
Gross Margin/WGHa/100mm GSR	$73	$87	$102
Operating Efficiency	46%	50%	44%

6.6.2 2022 workshop

	Minimum	Maximum
Fertiliser cost/ha	$9	$18
DSE/ha	3.4	3.8
Lambs/ha	1.5	2.1
GM/ha	$121	$222
GM/DSE	$32	$71

	Low 30%	Average	Top 30%
Land (Ha)			
Winter Grazed	1,457	1,177	896
Forage Crop	0.0	24.3	48.5
Sheep Used	1457	1201	945
Stubble	2633	2147	1661
General - Production Parameters			
Kg Wool / WGHa	17.4	18.1	18.9
Lambs / Ewe Ha	2.1	2.6	3.0
Lambs / WGHa	1.6	1.7	1.7
Stocking Rate DSE / WGHa	3.7	3.6	3.5
Total Kg	21,637	19,534	17,432
Kg Wool / hd	5.14	5.62	6.10
General - Finance Parameters			
Sale Price Average ($/hd)	$126	$141	$156
Net Wool Price	$9.53	$8.94	$8.35
Shearing Cost/Head	$9.90	$9.44	$8.98
Dip Drench Medicine cost/dse	$4.47	$4.25	$4.03
General - Flock Parameters			
Lambing %	84%	98%	111%
Losses %	3.34%	3.02%	2.70%
Ewes % flock structure	67%	62%	56%
Income / DSE			
Wool Proceeds	$44	$44	$44
Profit from Livestock Trading	$50	$59	$68
Total Sheep Income	$94	$103	$112
Expenses / DSE			
Sheep Costs	$20	$22	$23
Fertiliser	$5	$4	$3
Feed	$27	$26	$25
Pasture	$5	$4	$3
Total Variable Costs	$56	$55	$55
Gross Margin / DSE	$37	$47	$57
Income / Ha			
Wool Proceeds	$164	$159	$155
Profit from Livestock Trading	$180	$212	$244
Total Sheep Income	$344	$371	$398
Expenses / HA			
Sheep Costs	$76	$81	$85
Fertiliser	$16	$13	$11
Feed	$98	$94	$91
Pasture	$16	$14	$11
Total Variable Costs	$206	$202	$198
Gross Margin / WGHa	$137	$169	$200
Gross Margin / Sheep Used Ha	$137	$164	$190
Wool Production/WGHa/100mm GSR	13.5	12.7	12.0
S.Rate DSE/WGHa/100mm GSR	2.9	2.6	2.2
Gross Margin/WGHa/100mm GSR	$107	$117	$126
Operating Efficiency	60%	56%	51%

6.7Economic Analysis Report

Aim/background

The aim of this project was to examine how changing pasture management can increase system resilience and profitability. The primary management change was to defer pastures. Pasture deferment can be achieved by either crop grazing, re-sowing, bulking with cereals or confinement feeding. The cost of crop grazing is reduced yield, which based on previous work has been shown to be about 15% of the amount consumed (e.g. if 1 tonne of crop is consumed 150 kg of yield is forgone). The cost of confinement feeding is additional supplement as sheep in confinement receive 100% of their diet from supplement.

The costs of pasture deferment were not recorded in this trial as it was a producer demonstration project.

The trial did record the extra FOO resulting from deferment and stocking rate (a summary is provided below). Meaning we can put a value on the additional feed.

	2020	2021	2022	Stocking rate
Farmer 1	200	321	-	5.2
Farmer 2	2148	100	-	12
Farmer 3	1491	227	-	7
Farmer 4	69	463	-	5.2
Farmer 5	-27	762	107	9.3
Farmer 6	-	239	719	17.2
Farmer 7	-	-	116	10.2
Farmer 8	-	-	69	11.3
Farmer 9	-	-	78	9
Ave	**776**	**352**	**218**	**9.7**

Method

To quantify the value of additional feed we utilised a whole farm model called AFO (https://australian-farm-optimising-model.readthedocs.io/en/latest/index.html). It comprises a powerful whole year feed budget that can examine the optimum utilisation of feed resources across the whole farm. This makes AFO appropriate for valuing extra feed at different times during the year.

Economic results

Case study results

	Ave FOO gains (kg/ha)	Stocking rate	Benefit ($/ha)
Farmer 1	260	5.2	14.3
Farmer 2	1124	12	59.5
Farmer 3	859	7	37.9
Farmer 4	266	5.2	14.6
Farmer 5	281	9.3	27.2
Farmer 6	479	17.2	74.5
Farmer 7	116	10.2	13.8
Farmer 8	69	11.3	9.4
Farmer 9	78	9	8.3
Ave	393	9.7	36.3

Sensitivity analysis

As shown in the following results the economic value of additional FOO varies depending on climate conditions, prices, stocking rate and timing of availability of deferred pasture.

- Figure 1: The estimated value of extra feed decreases as more feed becomes available. This is because feed at other times of the year or other factors such as labour become limiting.
- Table 1: The value of deferred pasture varies by up to 72% depending on seasonal conditions.
- Figure 2: Higher stocking rate significantly increase the value of feed early in the season. However, during spring when there is lots of feed available the marginal benefit of extra feed varies less for different stocking rates.
- Figure 3: If the same stocking rate is used extra feed is worth more in later breaks. Note: The marginal benefit will diminish as the break gets later (the linear trend will not continue).

- Figure 4: Increased grain prices increase the value of pasture while it is still profitable to feed grain to increase SR. But past a certain point feeding grain to increase SR will become unprofitable and the value of extra pasture will unlink from the grain price.

Table 1: Value of pasture deferment in different seasons.

	Good season	Medium season	Poor season
Pasture deferment [1]	$5,854	$16,834	$20,683

[1] Average of case study farms

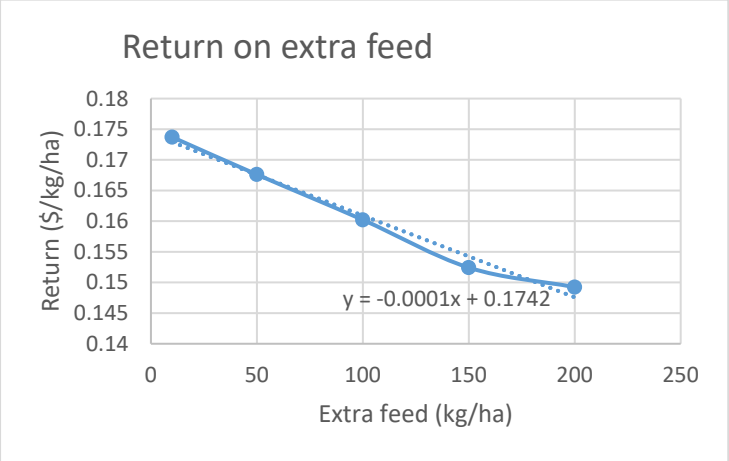


Figure 1: Return on extra feed

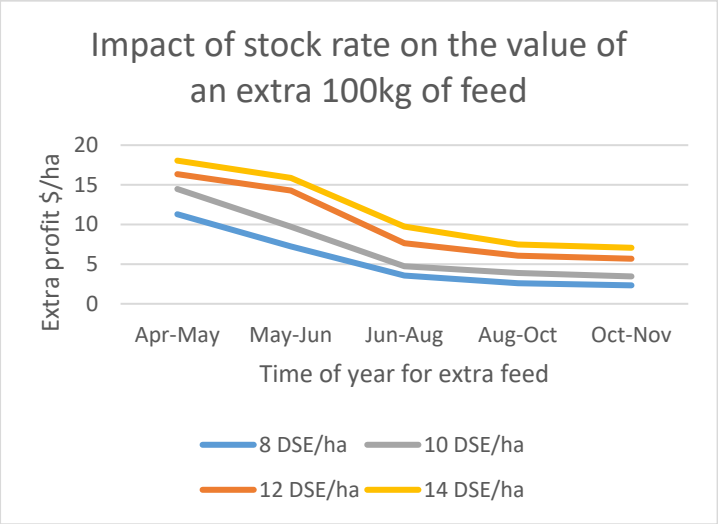


Figure 2: Impact of stocking rate on the value of an extra 100kg/ha of feed at different stages during the year.

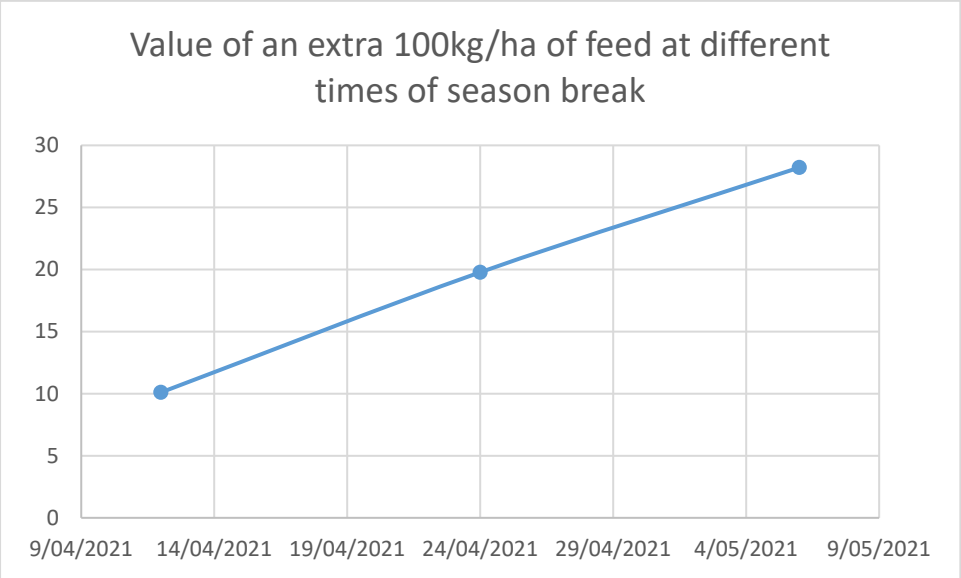


Figure 3: Value of an extra 100kg/ha of feed at different times of season break.

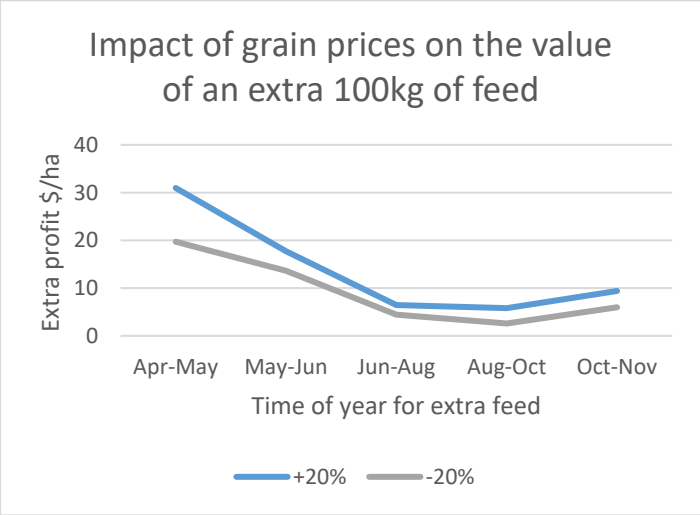


Figure 4: Impact of grain prices on the value of an extra feed

6.8LTEM Condition Score Comparison Calculator results

Benefit of Condition Score Advantage	
Increased lamb birthweight	0
Increased lamb survival	2%
Increased ewe survival	0.1%
Extra weaning %	4%

Financial Benefits		
Value of the extra weaning %	-$	2.27
Value of ewe survival	-$	0.28
Change in ewe fleece value	-$	0.66
Change in progeny fleece value	-$	0.24
Total Benefits	-$	3.45

6.9Case Studies

6.9.1 2021

A 'Tough Seasons' approach: doubling stocking rate
Lindenwood Farm

Xavier White is one of the producers who is has taken a new approach to his sheep and pasture system, trying to build up flexibility, resilience and increase his stocking rate. Xavier lives between Wagin and Dumbleyung in Western Australia, on the family farm, 'Lindenwood'. He runs a mixed farming operation consisting of 1900 ha cropping and 400 ha pasture, with 1900 merino ewes and over 900 ewe hoggets. Xavier has come back to the farm like most young guns- ready for action, with new ideas and energy. He is continuously trying to improve what they do on the farm, whether it be cropping, pasture, reproduction or sheep health.

One of his methods has been to be heavily involved in MLA producer demonstration sites over the last several years, one of which has been "Tough Systems". The aim of this project to help producers sustainably improve livestock productivity in the face of increasingly variable seasons. Xavier, as most producers in WA do, experiences a very short length of season, which makes his livestock enterprise highly sensitive to seasonal variation. This can radically impact this system's output, and has led Xavier to develop a robust but flexible grazing and sheep system. The focus at Xavier's has been on bulking up his pastures with cereals, and defer pastures by confinement feeding. Through this, he has increased Lindenwood's carrying capacity and allowed stocking rate to double - increasing productivity and profitability while reducing his risk.

Xavier's key goal was to push the stocking rate higher, as it was below average for his rainfall zone. However, he simply didn't have the feed production to support this from Lindenwood's existing clover pastures. With a feed system that didn't have a high carrying capacity, Xavier decided to radically change things.
The changes were:

- Created dedicated, permanent pasture paddocks, and permanent crop paddocks.
- Seeded pasture paddocks with ryegrass and barley
- Confinement fed at the break of the season

To support these changes, Xavier also decided to:

- Shift lambing from May to first week of July
- Shortened joining to 4 weeks
- Use 'teasers'

This was because the pasture system could better match sheep demands with a winter lambing, helping Xavier nearly double Lindenwood's stocking rate from around 5DSE/ha to 10.6 in 2021, which is a sustainable increase based on his rainfall zone's average stocking rates

"The DSE capacity increase is due to a combination of changing lambing from May to July as well as utilising the larger, earlier feed we're growing" he explained. "In 2019, when we first started with the system changes, we moved towards 7-8DSE/ha. In 2020, with 160ml of growing season rainfall, we ran 8.6DSE/ha. We've learnt and are able to run higher stocking rates in poorer seasons, with 10.6 in 2021". Essentially, Lindenwood is running a more intensive system- the same amount of sheep, but on half the country previously used.

Xavier explained how he now looks at his sheep and grazing system: "Sheep are just harvesters - all the money comes from utilising pasture. You grow as much feed as you can, and harvest it with sheep. Once you think of it like that, like cropping, it changes your system."

Lindenwood's joining is now over 4 weeks in February. To ensure the new timing worked, they used 'teasers'- vasectomised rams- for 6 weeks before the active rams went in with the ewes. Xavier

wanted to make sure that there were no excuses for the new system to fail! Conception averaged 120%, with a lot less twins than Xavier's usual average. This was likely due to the ewes being in average condition because of the previous poor season. Shifting from May to July lambing has bought challenges, such as having younger, smaller lambs coming into summer. "It has changed how we manage them, really using the stubbles and feeding more lupins to those mobs" Xavier explained. Overall, he has been happy with the change, as it allows more effective pasture utilisation.

Like most farms in the area, Lindenwood used to operate on a crop- pasture rotation. Now, it has dedicated pasture paddocks, and dedicated cropping paddocks. Crop paddocks are clean and weed-free, with the property's average cropping yield increasing - although Xavier did admit this was "because we determined the permanent pasture paddocks by looking at the lowest performing crop paddocks historically, and better utilised them as pasture paddocks". Xavier is utilising benchmarking, which has shown him that the gross margins for his cropping land and pastures are very similar now that higher stocking rates are supported.

Xavier sowed permanent pasture paddocks early in the first week of April. A combination of Scope barley at 45kg, 25kg MAP and 50L Flexi N per hectare was sown into existing diploid & tetraploid ryegrass pastures. "Two years previous, we sowed barley and a mix of Whicher and Fantastic, let them set seed and went again in 2020. Then this year we added the barley, and there has simply been masses of feed" said Xavier. "There's just more pasture…so much density in these continuous pastures".

So far, there have been no issues, with pests and diseases managed through early or heavy grazing of the pastures. "Early nitrogen gets the barley component of the pastures up and vigorous, and then its grazed. It's also seeded with insect spray, from then it looks after itself- we just graze it". Despite this 'ease', Xavier has been finding it difficult to get nitrogen back onto the pastures due to concerns over nitrogen toxicity. "We don't have spare paddocks to allow pastures to be spelled when we need to apply fertiliser, so we're looking at putting double the Flexi-N rate down the tube with the barley". The aim is to remove the risk of nitrogen toxicity and really get the early season growth.

Thanks to the permanent pastures and addition of cereal, Lindenwood has earlier autumn feed. This is combined with the pastures being able to be deferred as Xavier utilises confinement feeding. "We've begun confinement feed to get better production out of our pastures. With the variable nature of WA starts, we often find we need to put sheep onto paddocks before the pasture is ready It's the equivalent of putting a harvester into a crop of wheat when its half grown- you just aren't harnessing the production".

Sheep are run on stubbles as long as possible, moving out of the paddocks ahead of the seeder. They then go into small containment areas and smaller paddocks for 4-6 weeks, with this timing depending on the season. After the break of season, when pastures are established, sheep are released into the permanent pasture paddocks in time for lambing. Xavier is happy with the outcome- "We're hand feeding less than we used to, thanks to the pastures and shifting lambing timing. Usually, once they are out of confinement, we don't need to feed them - depending on the year of course! We're not feeding during lambing which was one of our key goals".
While in confinement, Lindenwood has been using barley as the main feed, but have switched to lupins due to the decreased acidosis risk, and for ease of management. This could change as they look to build a proper confinement feeding pen system, a setup that could hold 2,000 ewes initially. "It will be a multi-purpose setup, so we can use it for feedlotting, emptying sheep out, additional

holding for the yards. The idea is that it will be modular, and can be added on to after the initial 2,000 head".

Xavier has really enjoyed seeing the outcomes of the tough seasons package in play at Lindenwood. "The grazing system and shifting lambing timing has meant we're smashing it from a productivity and profitability point of view, and looking after our soils with more ground cover and organic matter in the soils." Soil organic matter is particularly important to Lindenwood's few grey clay paddocks, which they are improving with these pastures.

When the project team last visited, he was excited about investigating the possibility of introducing forage shrubs to the permanent pasture paddocks. "I like the idea and science behind shrubs reducing wind chill for lambs- but not sold on it yet!" Xavier added.

Moving forward, the aim is to continue to push stocking rate now that the new grazing system is in place. Xavier also wants to begin to be a bit more flexible when it comes to cropping, and potentially pull a paddock out of pasture and into crop if the season is looking promising: "Then we can push DSE/ha further on a good year."
Overall, he doesn't believe the tough systems package has given him more flexibility-yet. "I can see where it will be created, but right now it's a completely new system so we don't have that flexibility yet, or the ease of management."

6.9.2 2022

The journey to creating tougher systems

Producer case study: The Reid family

Peter, Carolyn and Alex Reid farm in the high rainfall zone of Western Australia, running a self-replacing Merino flock with over 8,000 breeding ewes, and cropping barley, canola wheat and sometimes hay and oats. Like many in WA, the cropping component of their business has been steadily increasing, to make up 60% of their area.
Based in Boyup Brook, the family runs a relatively high stocking rate on subclover and rye grass pastures, with a late June/early July lambing. This combination makes them reliant on good management and supplementary feeding to negate the impacts of poor seasons.

Poor season tools

While their area isn't know for its variable rainfall, in the last five years, the family has seen many late and false breaks, leading them to try a variety of options to try and alleviate the enhanced autumn feed gap.
They were involved in a previous MLA PDS looking at crop grazing, utilizing their barley crops to graze pregnant ewes and allow pastures to grow in late breaks, or get away in normal years.
They have also looked at using cereals to bulk pastures for early season growth, but found their environment needed a true break in the pasture phase due to disease and pest pressure.

Image 1 Lightly grazed barley in the PDS, 2019

Confining

While involved in the previous PDS, and trickling cereals in with their pastures, the Reids were also doing what they referred to as "opportunistically confining". This was confining sheep in response to late breaks in their smallest paddocks, in laneways that had water access, and in creeklines. Peter explained: "This was before confinement feeding really was a known thing, no-one even really knew the word. It was a really poor year. We were trying to let the pastures get away, and just feed the sheep." This was for between 1 and 3 weeks, usually in May or June.

Next steps

Every year since, the Reids have used their “opportunistic confinement”, learning along the way. Having seen its benefits, they want to use confinement every year to allow pastures to be deferred. Despite being outside of the Tough Systems PDS target area, they were interested in hearing about the confinement systems some producers were using, before designing their own purpose built set-up.
“Confinement is the way to go, rather than crop grazing or messing with pastures. It’s simple, makes sheep management easier, and you aren’t risking your crop yield” said Alex. “To me, it’s the best way to buffer your sheep enterprise from seasonal variation, because you can easily feed and shelter them (together), while pastures grow the cheap feed for a lambing boost.”

Unfortunately, the Reids are still designing their setup, so there are no photos to include!
Last we heard, the design was to be laneway style, pens on each side to accommodate 500 head each, and full length feed out troughs.

6.10 Annual summary articles

6.10.1 2020

Tough Seasons Project

The project is designed around how to sustainably improve livestock productivity in the face of increasingly variable seasons. Our short length of season makes livestock enterprises highly sensitive to seasonal variation, which can radically impact their output.

This creates a need for systems which can deal with tough, variable seasons, with effective yet flexible management. The MLA funded demonstration site aims to demonstrate a ‘tough season package’, showcasing proven management techniques to deal with varying climate and feed gap issues, in order to increase productivity and profitability while reducing risk.

The Tough Systems for Tough Seasons ‘package’ has two key aspects:

1. Sowing cereals into pastures to bulk up feed for the season (earlier autumn feed and increased autumn/winter biomass)

2. Deferring Grazing, through setting up small deferment paddocks or feedlots/confined feeding (then sowing these for weaning paddocks)

Ed Riggall from AgPro Management is running the project, with 7 sites across the Wagin and Yealering areas this year. The project will continue to run until the end of 2022, testing the system across different seasons and properties. Feed availability and quality will be combined with feed costs, lambing performance and ewe condition to create an economic comparison between the tough system and a normal system without deferment and cereal pastures.

For now, we have the latest feed test results, taken from the properties as sheep came out of confinement after the break of the season. The data shows that late June feed on offer is 3.5 times higher in paddocks that have been deferred, and/or had cereals added to the pastures. In addition,

they had higher energy levels, which is extremely valuable to lambing ewes. The next data collection involves reproductive performance: lambing results and ewe condition score. Stay tuned!

6.10.2 2021

Tough Seasons Project

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2. Deferring Grazing, through setting up small deferment paddocks or feedlots/confined feeding (then sowing these for weaning paddocks)

Ed Riggall from AgPro Management is running the project, with 7 sites across the Wagin and Yealering areas this year. The project will continue to run until the end of 2022, testing the system across different seasons and properties. Feed availability and quality will be combined with feed costs, lambing performance and ewe condition to create an economic comparison between the tough system and a normal system without deferment and cereal pastures. Interestingly, of the surveyed producers, sowing cereal with or into pastures is common practice for 9%, and used sometimes by 48% of producers. Another 43% did so rarely. In comparison, 48% of producers used deferred grazing of pastures as normal practice, and 52% sometimes. Producers admitted that use of deferred grazing had increased in the last 4 years, in response to increasingly more difficult season breaks.

Feed tests were taken from the properties as sheep came out of confinement after the break of the season. In 2020, late June feed on offer is 3.5 times higher in paddocks that have been deferred, and/or had cereals added to the pastures. In addition, they had 18% higher energy levels, which is extremely valuable to lambing ewes. In 2021, there was less of a difference, perhaps due to the good opening season rains. Feed On Offer averaged over 1.4 times higher in the deferred paddocks, while energy was on average 5% higher in the deferred paddocks.

When it came to looking at sheep performance, the tough systems package delivered. While 2021's lambing and weaning data was not included this year due to state-wide poor performance. In 2020, Weaner survival increased by 1%, as did marking percentage. With ewe condition score, the control

mobs lost more condition than the confined and deferred mob. This averaged 0.1CS over the two years of the project.

Feed rations were mixed, with some producers feeding pellets and others a combination of grain and lupins. On average, a full feed ration cost $0.28/hd/day, with length of deferment varying over the sites and years. Confinement feeding and deferring pastures resulted in producers being able to cease hand feeding earlier compared to the control mob.

We will be conducting an economic analysis to see the impact on sheep productivity, feed costs, and pasture costs. This will be compared to producer's 5 year average performance, and is expected to be completed by the end of 2022.

6.10.3 2022

Annual summary: Tough Seasons

The project is designed around how to sustainably improve livestock productivity in the face of increasingly variable seasons. Our short length of season makes livestock enterprises highly sensitive to seasonal variation, which can radically impact their output.

This creates a need for systems which can deal with tough, variable seasons, with effective yet flexible management. The MLA funded demonstration site aimed to demonstrate a 'tough season package', showcasing proven management techniques to deal with varying climate and feed gap issues, to increase productivity & profitability while reducing risk.

Background

The Tough Systems for Tough Seasons 'package' has two key aspects:

1. Sowing cereals into pastures to bulk up feed for the season (earlier autumn feed and increased autumn/winter biomass)

2. Deferring Grazing, through setting up small deferment paddocks or feedlots/confined feeding (then sowing these for weaning paddocks)

Ed Riggall from AgPro Management is running the project, with 7 sites across the Wagin and Yealering areas this year. The project is now complete, after running for three years. Having tested the system across different seasons and properties, feed availability and quality will be combined with feed costs, lambing performance and ewe condition to create an economic comparison between the tough system and a normal system without deferment and cereal pastures.

Results so far: Feed

Feed tests were taken from the properties as sheep came out of confinement after the break of the season.

In 2020, late June feed on offer is 3.5 times higher in paddocks that have been deferred, and/or had cereals added to the pastures. In addition, they had 18% higher energy levels, which is extremely valuable to lambing ewes.

In 2021, there was less of a difference, perhaps due to the good opening season rains. Feed On Offer averaged over 1.4 times higher in the deferred paddocks, while energy was on average 5% higher in the deferred paddocks.

2022 showed a combination of the previous years' results, with similar energy results to 2021 (7% higher in deferred pastures) and FOO (1.3 times higher in deferred pastures). However, crude protein was on average 17% lower in the deferred pastures, a trend which all sites but one demonstrated.

Results so far: Sheep

When it came to looking at sheep performance, the tough systems package delivered. 2021's lambing and weaning data was not included this year due to state-wide poor performance. In 2020 and 2022, weaner survival increased by 1%, as did marking percentage. With ewe condition score, the control mobs lost more condition than the confined and deferred mob. This averaged 0.12CS over the two years of the project.

Over the three years, feed rations were mixed, with some producers feeding pellets and others a combination of grain and lupins. On average, a full feed ration cost $0.26/hd/day, with length of deferment varying over the sites and years. Confinement feeding and deferring pastures resulted in producers being able to cease hand feeding earlier compared to the control mob.

We will be conducting an economic analysis to see the impact on sheep productivity, feed costs, and pasture costs. This will be compared to producer's 5 year average performance, and will be shared in the project summary.

Key outcomes

- Sowing cereals with or into pastures significantly increases early season feed on offer.
- Deferring grazing leads to higher feed availability for lambing ewes, and ceasing hand feeding earlier
- Deferred grazing leads to increased ewe condition score and lower weaner mortality.

Things to consider

- Confinement or containment set up, timing and length of time
- Economic impacts: Grain and feed prices
- Pasture management- weeds, grass seeds and disease

6.11 Pre PDS survey

6.11.1 Core producer survey questions

MLA Producer Demonstration Sites

Pre-project Survey - Core Participants

PDS Name Tough Seasons

PDS Project Code L.PDS.2007

The following questions are used to determine your level of understanding of tough systems. The knowledge and skills audit is used at the start and completion of the program to allow individuals to track their skill development and adoption of new practices. It will also be used:

To improve the content of future project meetings; and As part of the evaluation process for the project

The information will be completely confidential and individuals will not be identified in the analysis of data.

Participant **Name**: -

Date: / /

MLA may contact me to further assess the impact of their programs? ☐ Yes ☐ No

MLA may send me newsletters and inform me of future events? ☐ Yes ☐ No

I have read, understood and accept the terms of MLA's "PDS Participant Consent & Release" (see appendix 1) ☐ Yes ☐ No

Participant **Signature**: -

Section A – Demographic Information

A1. Your contact details

a. Property name.....

b. Business / trading name.....

c. Property address.....

d. Postal address .....

e. Email address .....

f. Phone.....

g. Mobile.....

A2. What area do you manage? *(please write the number of hectares that you managed)*

a. Hectares.....

A3. What numbers of livestock do you run? *(please write the number of head against each of the categories of livestock that you run)*

a. Number of beef breeders .....

b. Number of cattle turned off per year.....

c. Total number of cattle .....

d. Number of ewes .....

e. Number of lambs turned off per year.....

f. Total number of sheep .....

g. Number of goats turned off per year .....

h. Other .....

Section B – Knowledge and Skills *(If you do not know, please select the 'Unsure' option)*

B1. What do you think is the best way to improve early season biomass? *(Tick one of the options below)*

a. Sow pastures early ☐
b. Add grasses into pasture mix ☐
c. Add cereals into pasture mix ☐
d. Fertilise ☐
e. Unsure ☐

B2. Confinement feeding is when: *(Tick one of the options below)*

a. Ewes lamb in small paddocks ☐
b. Sheep are run at high stocking rates in large paddocks ☐
c. Sheep are run specifically to fatten up ☐
d. Sheep are run in small paddocks at high stocking rates ☐
e. Unsure ☐

B3. How would you best increase lamb survival? *(Tick the answer that applies to you)*

a. Increase lamb birthweight liveweight ☐
b. Increase ewe condition score in pregnancy ☐
c. Provide good lambing paddocks ☐
d. Unsure ☐

Section C – Confidence and Practices

C1. How confident are you in sowing cereals into or with pastures?

(please rate out of 10, with 1 being poor and 10 being very good, by circling your choice below)

1	2	3	4	5	6	7	8	9	10
Poor									Excellent

C2. Do you currently use the following practices?

	Normal practice	Sometimes	Rarely	Never	Not Applicable
Defer grazing of pastures					
Sow cereals into pastures					
Condition scoring of sheep					

C3. For the key metrics you are seeking to demonstrate in this PDS, please advise what is your current performance

Metric	**Current performance**
Lamb survival at marking (%)	
Stocking rate (DSE/winter grazed hectare)	

As a host of a demonstration site for MLA's Producer Demonstration Sites (PDS) program, from time to time certain information about you may be included in reports, case studies, factsheets, images, videos, articles and other material developed during the course of the PDS program. This information may include your name, property name and location (as the identifier each of demonstration site), photographs of you engaged in demonstration activities and quotes provided by the project facilitator (**Materials**). Please note that full property addresses and contact numbers of site hosts will not be published.

As you would be aware, many producers learn by hearing from or observing their peers. Therefore, components of PDS program outputs which include the Materials may be made publicly available (e.g. shared via social media, rural press, print media, and website views) to demonstrate to a broad audience the value, implementation and benefits of particular management practices, technologies or tools.

MLA requires each demonstration site host to consent to MLA publishing the Materials in various platforms, including:

- on the MLA website
- shared via media channels
- newspaper advertisements
- promotional material for the MLA PDS program

The terms of the consent required by MLA to enable your participation in the PDS program are as follows:

1. As a producer demonstration site host, you consent to MLA:
   (a) using the Materials at events associated with the above mentioned PDS Program;
   (b) using, reproducing, publishing and otherwise communicating, exhibiting or distributing the Materials (in full or in part) in all formats and all media now known or later devised throughout the world; and
   (c) adapting and editing the Materials at its sole discretion.

2. You also understand and agree that:
   (a) you are not entitled to any remuneration for the exploitation of the rights described in item 1 above;
   (b) you will not have any interest in the Materials or in the copyright or any other rights in the Materials; and
   (c) MLA may use your likeness and the Materials to promote its activities and programs.

3. You release MLA from any claim by you or anyone on your behalf arising out of use of the Materials and/or your appearance in promotional campaigns in which the Materials are used.

4. You understand and agree that any information, including personal information, provided by you when participating in a PDS project will be collected by your PDS project facilitator and provided to MLA. You consent to MLA collecting, using and handling your information for the purpose of the PDS program, any purposes set out above and as otherwise specified in MLA's privacy policy located at https://www.mla.com.au/general/privacy/. You can request access to, correction and deletion of your personal information by contacting MLA using the contact details on its website.

Please indicate your acceptance of the above by completing the relevant sections and returning a copy to your PDS project facilitator.

If you have any queries, regarding this consent, please contact your PDS project facilitator. Alternatively, you can contact MLA's project manager of the PDS Program Alana McEwan by calling 0417 541 000 or emailing at amcewan@mla.com.au.

6.11.2 Observer producer survey questions

MLA Producer Demonstration Sites

Pre-project Survey - Observers

PDS Name Tough Seasons

PDS Project Code L.PDS.2007

Event name:

The following questions are used to determine your level of understanding of tough systems. The knowledge and skills audit is used at the start and completion of the program to allow individuals to track their skill development and adoption of new practices. It will also be used To improve the content of future project meetings; and As part of the evaluation process for the project

The information will be completely confidential and individuals will not be identified in the analysis of data.

Name: -

_____

_____

Date: / /

MLA may contact me to further assess the impact of their programs? ☐ Yes ☐ No

MLA may send me newsletters and inform me of future events? ☐ Yes ☐ No

Section A – Demographic Information

A4. Your contact details

i. Property name.....

j. Business / trading name.....

k. Property address.....

l. Postal address .....

m. Email address .....

n. Phone.....

o. Mobile.....

A5. What area do you manage? *(please write the number of hectares that you managed)*

p. Hectares.....

A6. What numbers of livestock do you run? *(please write the number of head against each of the categories of livestock that you run)*

e. Number of beef breeders .....

f. Number of cattle turned off per year.....

q. Total number of cattle .....

r. Number of ewes .....

s. Number of lambs turned off per year.....

t. Total number of sheep .....

u. Number of goats turned off per year .....

v. Other .....

Section B – Knowledge and Skills (If you do not know, please select the 'Unsure' option)

B4. What do you think is the best way to improve early season biomass? ***(Tick one of the options below)***

f. Sow pastures early ☐
g. Add grasses into pasture mix ☐
h. Add cereals into pasture mix ☐
i. Fertilise ☐
j. Unsure ☐

B5. Confinement feeding is when: ***(Tick one of the options below)***

f. Ewes lamb in small paddocks ☐
g. Sheep are run at high stocking rates in large paddocks ☐
h. Sheep are run specifically to fatten up ☐
i. Sheep are run in small paddocks at high stocking rates ☐
j. Unsure ☐

B6. How would you best increase lamb survival? ***(Tick the answer that applies to you)***

g. Increase lamb birthweight liveweight ☐
h. Increase ewe condition score in pregnancy ☐
i. Provide good lambing paddocks
j. Unsure ☐

Section C – Confidence and Practices

C4. How confident are you in sowing cereals into or with pastures?

(please rate out of 10, with 1 being poor and 10 being very good, by circling your choice below)

1 2 3 4 5 6 7 8 9 10

Poor Excellent

C5. Do you currently use the following practices?

	Normal practice	Sometimes	Rarely	Never	Not Applicable
Defer grazing of pastures					
Sow cereals into pastures					
Condition scoring of sheep					

C6. For the key metrics you are seeking to demonstrate in this PDS, please advise what is your current performance

Metric	**Current performance**
Lamb survival at marking (%)	
Stocking rate (DSE/winter grazed hectare)	

C7. If Not Applicable, please provide reason why

_____

_____

_____

6.11.3 Survey Results Analysis

24 producer surveys were returned from the producers, 15 were from core producers and 9 from observer producers. The table below shows the average property involved, based on all 24 surveys:

Metric	**Ave**	**Min**	**Max**
Hectares owned	4239	1300	7700
Number ewes	3016	600	7100

Lambs turned off per year	1461	400	4000
Total number of sheep	6531	2100	17000

Analysis is broken into core and observer producers.

86% of core producers used deferred grazing of pastures as normal practice, with 14% using it sometimes. In comparison, 31% of observer producers regularly defer grazed, and 69% sometimes. Producers admitted that use of deferred grazing had increased in the last 4 years.

Sowing cereal with or into pastures is common practice for 29% of core producers and used sometimes by 71%. For observer producers, 38% sometimes sowed pastures with cereals, and 62% did so rarely.

For observer producers, regularly condition scoring sheep is common practice for 6% of producers, while 94% say they use it sometimes. Core producers used condition scoring much more regularly, with 43% recording it as a normal practice, and 57% sometimes.

19% of core producers and 22% of observers answered all KASA questions correctly regarding the definitions of confinement feeding, increasing lamb survival, and increasing early season biomass. This indicates some confusion or lack of knowledge around definitions, which should lead to a high increase in correct answers in the post-KASA report

6.12 Post PDS survey

6.12.1 Observer producer survey questions

MLA Producer Demonstration Sites

Post-project Survey - Core Participants

PDS Name Tough Seasons

PDS Project Code L.PDS.2007

The following questions are used to determine your level of understanding of tough systems. The knowledge and skills audit is used at the start and completion of the program to allow individuals to track their skill development and adoption of new practices. It will also be used:

To improve the content of future project meetings; and

As part of the evaluation process for the project

The information will be completely confidential and individuals will not be identified in the analysis of data.

Participant **Name**: -

Date: / /

MLA may contact me to further assess the impact of their programs? ☐ Yes ☐ No

MLA may send me newsletters and inform me of future events? ☐ Yes ☐ No

I have read, understood and accept the terms of MLA's "PDS Participant Consent & Release" (see appendix 1) ☐ Yes ☐ No

Participant **Signature**: -

Section A – Your Thoughts on the PDS

A7. Overall, how **satisfied** are you with this PDS?

1	2	3	4	5	6	7	8	9	10
Very unsatisfied									Very satisfied

A8. How **valuable** was this PDS in assisting you manage your livestock enterprise?

1	2	3	4	5	6	7	8	9	10
Poor									Excellent

A9. Would you **recommend** MLA's PDS program to others? ☐ Yes ☐ No ☐ Not Sure

A10.....
General Feedback

Please provide feedback to help us improve the PDS program:

_____

_____

_____

_____

Section B – Knowledge and Skills *(If you do not know, please select the 'Unsure' option)*

B7. What do you think is the best way to improve early season biomass? *(Tick one of the options below)*

k. Sow pastures early ..... ☐

l. Add grasses into pasture mix ..... ☐

m. Add cereals into pasture mix ..... ☐

n. Fertilise ..... ☐

o. Unsure ☐

B8. Confinement feeding is when: *(Tick one of the options below)*

k. Ewes lamb in small paddocks ☐
l. Sheep are run at high stocking rates in large paddocks ☐
m. Sheep are run specifically to fatten up ☐
n. Sheep are run in small areas at high stocking rates ☐
o. Unsure ☐

B9. How would you best increase lamb survival? *(Tick the answer that applies to you)*

k. Increase lamb birthweight liveweight ☐
l. Increase ewe condition score in pregnancy ☐
m. Provide good lambing paddocks ☐
n. Unsure ☐

As a result of this project, has your knowledge and skills around sowing cereals into pastures and deferring grazing increased? Yes/No

Section C – Confidence and Practices

C8. How confident are you in sowing cereals into or with pastures?

(please rate out of 10, with 1 being poor and 10 being very good, by circling your choice below)

1	2	3	4	5	6	7	8	9	10
Poor									Excellent

C9. Have you begun implementing changes regarding the following practices, as a result of participating in this PDS ?

	Normal practice	Sometimes	Rarely	Never	Not Applicable
Defer grazing of pastures					
Sow cereals into pastures					
Condition scoring of sheep					

C10. If you ticked "not ready yet', please indicate what additional information, training or advice you require

_____
_____
_____
_____

C11. If you have implemented changes, what impact did they have on:

Metric	**Current performance**
Lamb survival at marking (%)	
Stocking rate (DSE/winter grazed hectare)	
other	

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MLA requires each demonstration site host to consent to MLA publishing the Materials in various platforms, including:

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- shared via media channels
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(f) adapting and editing the Materials at its sole discretion.

You also understand and agree that:

(d) you are not entitled to any remuneration for the exploitation of the rights described in item 1 above;
(e) you will not have any interest in the Materials or in the copyright or any other rights in the Materials; and
(f) MLA may use your likeness and the Materials to promote its activities and programs.

You release MLA from any claim by you or anyone on your behalf arising out of use of the Materials and/or your appearance in promotional campaigns in which the Materials are used.

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Please indicate your acceptance of the above by completing the relevant sections and returning a copy to your PDS project facilitator. If you have any queries, regarding this consent, please contact your PDS project facilitator. Alternatively, you can contact MLA's project manager of the PDS Program Alana McEwan by calling 0417 541 000 or emailing at amcewan@mla.com.au.

6.12.2 Core producer survey questions

MLA Producer Demonstration Sites
Post-project Survey - Core Participants

PDS Name Tough Seasons

PDS Project Code L.PDS.2007

The following questions are used to determine your level of understanding of tough systems. The knowledge and skills audit is used at the start and completion of the program to allow individuals to track their skill development and adoption of new practices. It will also be used:

To improve the content of future project meetings; and as part of the evaluation process for the project

The information will be completely confidential and individuals will not be identified in the analysis of data.

Participant **Name**: -

Date: / /

MLA may contact me to further assess the impact of their programs? ☐ Yes ☐ No

MLA may send me newsletters and inform me of future events? ☐ Yes ☐ No

I have read, understood and accept the terms of MLA's "PDS Participant Consent & Release" (see appendix 1) ☐ Yes ☐ No

Participant **Signature**: -

Section A – Your Thoughts on the PDS

A11. Overall, how **satisfied** are you with this PDS?

1	2	3	4	5	6	7	8	9	10
Very unsatisfied									Very satisfied

A12..... How **valuable** was this PDS in assisting you manage your livestock enterprise?

1	2	3	4	5	6	7	8	9	10
Poor									Excellent

A13.....
Would you **recommend** MLA's PDS program to others? ☐ Yes ☐ No ☐ Not Sure

A14.....
General Feedback

Please provide feedback to help us improve the PDS program:

_____

_____

_____

_____

Section B – Knowledge and Skills *(If you do not know, please select the 'Unsure' option)*

B10. .....What do you think is the best way to improve early season biomass?
(Tick one of the options below)

p. Sow pastures early..... ☐

q. Add grasses into pasture mix..... ☐

r. Add cereals into pasture mix..... ☐

s. Fertilise ☐

t. Unsure ☐

B11. .....Confinement feeding is when: *(Tick one of the options below)*

p. Ewes lamb in small paddocks ☐

q. Sheep are run at high stocking rates in large paddocks ☐

r. Sheep are run specifically to fatten up ☐

s. Sheep are run in small areas at high stocking rates ☐

t. Unsure ☐

B12. How would you best increase lamb survival? *(Tick the answer that applies to you)*

o. Increase lamb birthweight liveweight ☐

p. Increase ewe condition score in pregnancy ☐

q. Provide good lambing paddocks ☐

r. Unsure ☐

B13. As a result of this project, has your knowledge and skills around sowing cereals into pastures and deferring grazing increased? Yes/No

Section C – Confidence and Practices

C12. .....How confident are you in sowing cereals into or with pastures?

(please rate out of 10, with 1 being poor and 10 being very good, by circling your choice below)

1	2	3	4	5	6	7	8	9	10
Poor									Excellent

C13. Have you begun implementing changes regarding the following practices, as a result of participating in this PDS ?

	Normal practice	Sometimes	Rarely	Never	Not Applicable
Defer grazing of pastures					
Sow cereals into pastures					
Condition scoring of sheep					

C14. If you ticked "not ready yet', please indicate what additional information, training or advice you require

_____
_____
_____
_____

C15. If you have implemented changes, what impact did they have on:

Metric	**Current performance**
Lamb survival at marking (%)	
Stocking rate (DSE/winter grazed hectare)	
other	

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(i) adapting and editing the Materials at its sole discretion.

You also understand and agree that:

(g) you are not entitled to any remuneration for the exploitation of the rights described in item 1 above;
(h) you will not have any interest in the Materials or in the copyright or any other rights in the Materials; and
(i) MLA may use your likeness and the Materials to promote its activities and programs.

5. You release MLA from any claim by you or anyone on your behalf arising out of use of the Materials and/or your appearance in promotional campaigns in which the Materials are used.

   You understand and agree that any information, including personal information, provided by you when participating in a PDS project will be collected by your PDS project facilitator and provided to MLA. You consent to MLA collecting, using and handling your information for the purpose of the PDS program, any purposes set out above and as otherwise specified in MLA's privacy policy located at https://www.mla.com.au/general/privacy/. You can request access to, correction and deletion of your personal information by contacting MLA using the contact details on its website.

Please indicate your acceptance of the above by completing the relevant sections and returning a copy to your PDS project facilitator.

If you have any queries, regarding this consent, please contact your PDS project facilitator. Alternatively, you can contact MLA's project manager of the PDS Program Alana McEwan by calling 0417 541 000 or emailing at amcewan@mla.com.au.

6.12.3 Survey Results Analysis

25 producer surveys were returned from the producers, 8 were from core producers and 17 from observer producers.

Overall, 100% of producers were satisfied with the PDS and would recommend it to others.

Analysis is broken into core and observer producers.

Producers ranked the project as valuable in assisting them to manage their livestock enterprise (8 out of 10)

Core producers ranked the project as 7.8 out of 10, while observer producers ranked it as 8.6.

Confidence in sowing cereals into or with pastures was on average 8.4 out of 10, with core producers slightly higher at 8.6 and observers at 8.2.

88% of core producers used deferred grazing of pastures as normal practice, with 13% using it sometimes. In comparison, 35% of observer producers regularly defer grazed, and 59% sometimes.

Sowing cereal with or into pastures is common practice for 100% of core producers. For observer producers, 72% sometimes sowed pastures with cereals, and 29% did so rarely.

For observer producers, regularly condition scoring sheep is common practice for 12% of producers, while 88% say they use it sometimes. Core producers used condition scoring much more regularly, with 88% recording it as a normal practice, and 13% sometimes.

On average, 96% of core producers and 26% of observers answered the KASA questions correctly regarding the definitions of confinement feeding, increasing lamb survival, and increasing early season biomass. This was a very high increase in correct answers compared to the pre-KASA report.

Metric	Ave	Min	Max
Lamb survival at marking (%)	98.0	77.0	114.0
Stocking rate	6.2	1.1	10.2