

BUSINESS CASE



Early weaning using a high starch diet for rumen development

James and Kerrie Robertson run Chowilla Station located on the Murray River near Renmark in South Australia. James is a keen wool producer, however he recognises that meat production in a Merino flock is still an important component of profitability. Lamb carcass weight and the marking rate of the ewe flock were areas that James felt required improvement. He identified lamb growth rate to weaning as a key factor in the poor performance. Utilising a feedlot in the pastoral environment is not common practice, however James has built and used one on his property to improve weaner performance and the business profitability.

This business case explores the key issues that James considered before implementing this innovation. You can use the method shown here to help prepare your own business case and assess this innovation on your own property.



Figure 1: Feedlot pens at Chowilla Station. Pen on right (foreground) has increased fence height to allow goats to be contained.



BUSINESS SNAPSHOT

OWNERS

James and Kerrie Robertson

PROPERTY NAME

Chowilla Station

PROPERTY LOCATION

North of Renmark, SA

SIZE OF PROPERTY

130,000 hectares

BRIEF ENTERPRISE DESCRIPTION

Self replacing Merino flock for wool and meat production

NUMBER OF PEOPLE WORKING IN THE BUSINESS

4 full time equivalents

AVERAGE ANNUAL RAINFALL

212mm

WHY THIS IS A PASTORAL ZONE INNOVATION

Improving weaner survival and performance is critical to increasing profitability. This innovation can provide a method for pastoralists to improve the management of weaners and overall profitability.

Section 1: Weaning lambs at Chowilla Station

BACKGROUND

James and Kerrie Robertson run Chowilla Station, a property which borders the River Murray near Renmark in South Australia. Chowilla Station is made up of undulating pastoral country with areas of Mallee scrub and chenopod shrub land.

The flock at Chowilla Station lamb in winter and traditionally lambs were weaned in November when they reached suitable weights. James had been concerned that the long term marking percentage of the flock was too low and that lambs were not growing as quickly or efficiently as he thought they should. James determined that feed quality was the limiting factor. As lamb growth rates in the paddock were not high, this was delaying weaning which shortened the time for ewes to recover condition prior to the next joining.

James began to investigate his options for addressing the issue and in 2010 he trialled weaning the lambs earlier into a feedlot on a controlled diet. The aim was to achieve higher growth rates and improved rumen development in weaners, whilst providing a longer recovery period for ewes before the next joining.

MOTIVATION TO CHANGE PRACTICES

Not happy to settle for average lambing rates and weaner growth rates, James realised that the performance of the sheep flock could be improved. Through addressing both the low lambing rates and poor performance of weaners on the property, he hoped that they would see increased productivity and business profitability and reduced mortality rates.

Figure 2: Example of trough feeders used at Chowilla Station.





Figure 3: Central laneway used for feeding and stock movement at Chowilla Station.

OUTLINE OF THE OPTIONS

The Robertson's recognised they needed to find an alternative management system that would allow the ewes to be in better condition before joining and increase lamb growth rates and survival. They determined that they could do either of the following:

1. Maintain the current situation of weaning lambs when ready onto the best available paddocks.
2. Wean lambs earlier than normal into a feedlot to provide a high level of nutrition. This would increase liveweight and improve rumen development whilst providing the ewes more time to gain condition before joining.
3. Wean lambs earlier than normal into the paddock (without supplementary feed) to allow the ewes more time to gain condition before joining.

Table 1: The benefits of each option considered at Chowilla Station.

Option 1: No change to system.	Option 2: Wean lambs earlier into the feedlot.	Option 3: Wean lambs earlier into a paddock.
<ul style="list-style-type: none"> • No feeding costs. • No additional labour required. • No additional capital costs. 	<ul style="list-style-type: none"> • Improved lamb liveweight post weaning. • Improved rumen development of weaners resulting in more efficient feed utilisation. • Reduced weaner mortality rate. • Increased time for ewes to regain condition prior to joining. • Improved lambing rate of replacement hoggets due to increased weight and condition at first joining. 	<ul style="list-style-type: none"> • Increased time for ewes to regain condition prior to joining. • No feeding costs. • No additional labour required. • No additional capital costs.

RESULTS OF THE CHANGE

Option 2 (earlier weaning of lambs into a feedlot) was the preferred option for the following reasons:

- It ensures that lambs gain weight after weaning which helps to minimise post weaning losses.
- The expected improvement in rumen development assists in weaner performance later in life.
- Weaners can be observed and managed closely in the critical post weaning period.
- It provides ewes with more time between weaning and joining to gain condition.

This option was chosen over Option 3 as James felt that simply weaning lambs earlier would not address one of the key problems of lamb growth and survival. Weaning lambs earlier without any supplementation would have helped ewes gain condition before the next joining, but James felt that it would have a negative effect on the weaners and potentially result in higher losses.

Traditionally when lambs were weaned at Chowilla Station they did not gain weight for up to 2 months as they struggled with the change in feed and stress of weaning. James now weans the lambs into a feedlot facility for 21 days with a controlled diet consisting of barley, lupins, straw and concentrate pellet. As a result the lambs gain weight at approximately 150g/hd/day.

The mortality rate of lambs between marking and first shearing had traditionally been between 5% and 10% and was a key issue James wanted to address. Providing an improved post weaning diet resulted in an increase in liveweight, improved rumen development and a reduction in weaner mortality rate to less than 1%.

As a result of weaning lambs earlier than normal, ewes at Chowilla Station were observed to be in better condition at joining. This has resulted in the average lambing rate increasing from 85% to 95%.

James also observed improved performance of the maiden ewes which had been weaned into the feedlot the previous year. Typically maiden ewes had a lambing rate of 70%, now through the changed management practice, maiden ewe lambing rate has increased to approximately 90%.

A key benefit James was advised would be a result of providing the feedlot ration to weaners was that the starch component of the diet would improve rumen development, results in more efficient utilisation of feed post weaning. In the first year James trialled this technique he compared the rumen lining of lambs that had been weaned into the feedlot to those that had not. He observed that lambs that had received the feedlot diet containing starch had increased length and density of rumen papillae which increases nutrient absorption. It should be noted however, that for this strategy to have the greatest effect, lambs should be under 2 months of age when starch is provided.

OPPORTUNITIES FOR THE FUTURE

Since James has been implementing the innovation of weaning lambs into the feedlot, he has found that the facility has proved valuable for other purposes as well. The feedlot pens have proven useful for longer periods of feeding to finish wethers before sale, as well as a droughtlot for ewes when paddock feed is limited.

Locating the facility close to handling yards and the shearing shed has meant that it is a useful area to hold and feed stock before and after shearing or prior to transport off the property. James is also looking into the ability to use the pens for joining ewes to hopefully further improve conception rates.

When building the facility James designed four of the pens to be goat proof, allowing these pens to be used as a depot for trapped goats before sale. Goats can be split, contained and fed in groups of nannies, billies and kids.

KEY LEARNINGS

James received advice before putting the first group of weaners into the feedlot and also learnt several things along the way including the following key points:

- Ensure that lambs are familiar with grain before putting them in the feedlot. James 'imprints' the lambs to grain by feeding them with the ewes before weaning at least two to three times.
- It is important to identify and remove shy feeders from the feedlot as soon as possible and manage them accordingly.
- Using self-feeders, rather than troughs, for grain in the feedlot can significantly reduce labour requirements.
- An accurate set of scales is important when mixing feed rations, as this will ensure that the ration is as cost effective as possible. Certain components of the ration (such as protein) are quite expensive and it pays to make sure that excess amounts are not wasted.
- Optimal growth and rumen development are affected by the ration components (ie. starch), not the brand name of a product.

Section 2: How to use a business case to assess 'Early weaning using a high starch diet for rumen development'

AIM OF THE BUSINESS CASE

The following business case details the benefits and costs the Robertson's considered before changing the weaning management system at Chowilla Station. This information can assist in demonstrating the potential overall benefit or cost that this innovation may have for your business. Section 3 provides a template which can be used to assess the option of early weaning into a feedlot for your business.

WHAT ARE THE COSTS?

To implement this innovation requires initial capital investment in the feedlot facilities, as well as on-going operational costs.

Capital investment to build the feedlot, as well as the purchasing any necessary feeding equipment and machinery, will vary depending on the scale and design of the operation. However, the following items are typical costs that should be considered:

- Pen fencing
- Feed troughs/feeders
- Water troughs and piping
- Shade
- Shelter
- Laneways
- Handling yards (if applicable)
- Feeding machinery (eg feed cart or mixer, tractor)
- Labour for construction
- Professional advice regarding design
- Fees for consent from relevant authority(s)

The construction costs for the Robertson's feedlot which has a capacity of 5,500 lambs was approximately \$32,000 including labour. James located his feedlot close to existing handling yards so that lambs could be inducted and weighed easily.

Figure 4: Self feeders with slides to regulate grain flow are used at Chowilla Station.



Table 2 shows the benefits and costs of each option compared to Option 1: No change to system. A blank table is provided in Section 3 to assess your individual benefits and costs.

Table 2: Description of benefits and costs for alternative weaner management options considered at Chowilla Station.

	Option 2 - wean lambs into feedlot at earlier age	Option 3 - wean lambs into paddock at earlier age
BENEFITS		
<i>New income</i>		
Lambing rate	Improved lambing rate of both mature and maiden ewes will increase income.	Improved lambing rate of mature ewes will increase income.
Mortality	Higher survival rate of weaners will result in more lambs for sale.	Earlier weaning at lighter weights is likely to result in higher mortality rate and reduced income.
Lamb growth rate	Increased growth rate of lambs will increase carcass weight.	
Costs saved		
Labour	No labour required to check lambs in paddock whilst in feedlot	
Total benefits	\$	\$
COSTS		
<i>New capital costs</i>		
Feedlot facility	Feedlot pens, feed and water equipment, shade/shelter, laneways and handling area.	
Machinery	Feed cart/mixer and tractor.	
<i>New variable costs</i>		
Lamb induction	Vaccination and drench (inc labour).	
Feeding	Ration cost plus labour associated with feeding out.	
Labour	Labour associated with routine checking of lambs and cleaning troughs whilst lamb in feedlot.	
<i>New overhead costs</i>		
Feedlot depreciation	Depreciation on feedlot asset.	
Machinery depreciation	Depreciation on machinery used for feedlot operation.	
Total costs	\$	\$
GROSS MARGIN	\$	\$



Figure 5: Sheep in the feedlot.

Table 3 shows the benefits and costs that James identified as the key drivers of whether the alternative options would be worthwhile. The costs below are a combination of figures provided by James and industry averages. Total benefits (income) and total costs have been divided by the number of ewes at Chowilla Station to provide a benefit per head so that this innovation can be assessed at different scales.

Table 3: Partial budget for alternative weaner management options considered at Chowilla Station.

	Option 2 - wean lambs into feedlot at earlier age	Option 3 - wean lambs into paddock at earlier age
BENEFITS		
<i>New income</i>		
Lamb (\$ per ewe)	\$60.01	\$45.94
<i>Variable costs saved</i>		
Labour (checking lambs in paddock)	\$0.06	
Overhead costs saved		
Total benefits	\$60.07	\$45.94
COSTS		
<i>Income forgone</i>		
Lamb (\$ per ewe)	\$42.08	\$42.08
<i>New variable costs</i>		
Lamb induction	\$0.94	
Feed	\$6.88	
Labour	\$1.78	
<i>New overhead costs</i>		
Feedlot depreciation	\$0.50	
Total costs	\$52.18	\$42.08
OVERALL BENEFIT/ COST	\$7.89	\$3.86

This partial budget demonstrates the effect of changes in lambing rate, weaner mortality rate and growth rate (carcase weight). Lamb income has been calculated as the total lamb income per ewe for each option. The variables used to calculate total lamb income are shown below in Table 4.

Table 4: Variables used to calculate lamb income for each option.

	Option 1	Option 2	Option 3
Lambing rate			
Mature ewes	85%	95%	95%
Maiden ewes	70%	90%	70%
Weaner mortality rate	7%	0.8%	10%
Lamb live weight	46 kg	49 kg	46 kg

WHAT ARE THE LIKELY RISKS?

When considering making a change to the management practices in a business it is important to consider the risks of doing so and how they may be mitigated. Table 5 outlines some of the key risks that the Robertson's considered and addressed before changing the way that weaners were managed.

Table 5: The risks associated with changing management to wean all lambs into a feedlot rather than directly into a paddock.

What are the risks?	How is this risk managed?
Increased mortality rate of weaners.	<ul style="list-style-type: none"> Seek professional advice regarding management of weaners in a feedlot environment. Adherence to strict management protocols for weaners in a feedlot.
Poor growth and health of lambs due to incorrect introduction to feed.	<ul style="list-style-type: none"> Seek professional advice regarding ration formulation and feeding protocols. Strictly follow a prepared feeding plan designed to minimise the risk of acidosis.
Increased incidence of flystrike.	<ul style="list-style-type: none"> Suitable feedlot design which minimises or preferably excludes wet areas from the pen. Suitable ration formulation which does not induce scouring. Shearing of lambs before entry to feedlot.
Reliance on a single water supply.	<ul style="list-style-type: none"> Awareness of the risk and regular monitoring of water supply. Preparation of an emergency plan for action required if water supply is interrupted.

WHAT ELSE IS THERE TO CONSIDER?

When making a decision the cost of implementation isn't the only thing to consider. The other areas on top of costs and risks are the implications to Workplace Health and Safety (WHS), labour, time requirements, and how easy the innovation will be to implement.

Table 6: Implications to WHS, labour, ease and time requirements which may result from alternative weaner management options considered at Chowilla Station.

What to consider?	Option 2: Wean lambs earlier into a feedlot.	Option 3: Wean lambs earlier into paddock.
Workplace Health and Safety (WHS)	<p>Feedlot environments can present WHS risks to those managing them:</p> <ul style="list-style-type: none"> • Risk of personal injury through increased level of handling and interaction with sheep. • Risk of injury from machinery associated with mixing and feeding stock. 	<ul style="list-style-type: none"> • No different WHS implications compared to traditional management strategy.
Labour	<ul style="list-style-type: none"> • Initial labour is required to build the feedlot facility. • Labour is required to manage the lambs in the feedlot including, induction, checking and feeding. 	<ul style="list-style-type: none"> • As lambs will be weaned younger and lighter an increased level of monitoring may be required.
Ease of implementation	<ul style="list-style-type: none"> • Advice may be required to ensure that design and management systems are suitable. • Feedlot facilities may require approval from relevant authorities (varies state to state). • Regulations regarding providing supplementary feed in pastoral regions may need to be adhered to in some states • On site feed storage and handling facilities • Access to grain and hay sources at a cost effective price. 	<ul style="list-style-type: none"> • No different compared to traditional strategy.
Time taken to implement	<ul style="list-style-type: none"> • Time is required to initially build the facility as well as the on-going management whilst sheep are in the feedlot. 	<ul style="list-style-type: none"> • Can be implemented immediately.

Section 3: How can you make the change?

Section 3 provides all of the tools necessary to work through a business case process to assess an innovation. You can assess the option of investing in grain feeders on your own property by completing the templates below.

WHAT ARE THE BENEFITS?

Benefits can be measurable, such as income, lambing percentage and achievement of business goals; or non-measurable, such as safety. List all the benefits associated with each option in the table below.

Option 1:	Option 2:	Option 3:

WHAT ARE THE LIKELY COSTS?

Detail the expected cost of implementing each option in your business in the partial budget template below. Include figures for income, overhead, variable and financial costs in the areas highlighted.

	Option 2	Option 3
BENEFITS		
<i>New income</i>		
Costs saved		
Total benefits	\$	\$
COSTS		
<i>New capital costs</i>		
<i>New variable costs</i>		
<i>New overhead costs</i>		
Total costs	\$	\$
GROSS MARGIN	\$	\$

WHAT ARE THE LIKELY RISKS?

List the risks involved with early weaning into a feedlot and identify how they can be managed in your business.

What are the risks associated with early weaning into a feedlot?	How is this risk managed?

WHAT ELSE IS THERE TO CONSIDER?

Address any other factors to consider for each option in the following table.

What to consider?	Option 1	Option 2
WHS		
Labour		
Ease of implementation		
Time taken to implement		
Other		

CONTRIBUTORS

Rural Directions Pty Ltd would like to acknowledge to contribution of James Robertson, Chowilla Station and Hamish Dickson of AgriPartner Consulting.

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