final report

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Prime Lamb Finishing Options

Key profit drivers for a range of finishing systems

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Executive summary

The previous 12 years has seen an increase in the intensification and specialisation of the Australian lamb industry where lamb production has increased despite the reduction in size of the national flock.

The prime lamb finishing sector has responded to the need to overcome variation in seasonal pasture quality and availability by investing in more intensive lamb finishing systems. These investments include the establishment of high performance pasture in high rainfall zones, growing cereals for winter feed production, sowing short term fodder crops for summer feed production and the construction of intensive feeding systems for grain finishing. These investments have provided the market with access to year round, high quality lamb supply.

The development of a variety of feed bases to fill feed gaps at various times of the year has resulted in a finishing sector that can be described within four systems:

- Traditional breeder-finishing
- Specialist pasture finishing
- Specialist grain finishing
- Opportunistic grain finishing

Despite the growth within the lamb finishing sector the key profit drivers across these four finishing systems has not been clearly defined to date and for the lamb finishing sector to continue to grow as an industry, a clear understanding of the key profit drivers within each finishing system is essential to facilitate confidence and encourage ongoing investment.

The aims of this project were to:

- Determine the key profit drivers within each system and rank them in order of importance
- Compare the relative profitability of each system
- Conduct a sensitivity analysis of all the profit drivers to key business and management elements within each system

The most profitable lamb finishing system was the traditional breeder-finisher system due to the contribution of Merino wool from the breeding ewes to the profit margin and the low cost of production of finishing lambs produced on farm.
In order of profitability, the breeder-finisher system was followed by the specialist pasture finishing system, specialist grain based finishing and opportunistic finishing.

The least profitable pasture based system was where lambs were finished on fodder crops and the most profitable was the system where lambs were finished on cereal stubbles.

The most profitable grain based finishing system was the specialist feedlot system where the effect of scale was highly significant; scale in terms of throughput and turnover rather than capacity.

The key profit drivers, in order of importance to each system were found to be:

1. Traditional breeder-finisher system
    a. stocking rate
    b. weaning percentage below required replacement rate
    c. carcase price
    d. variation in weaning percentage of ±10%
    e. breed of lamb (crossbred vs. Merino)
    f. purchase cost of replacement ewes

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Strategic investment in research, development and extension activities to ensure that producers have the skills to appropriately manage key profit drivers will improve the viability and long term sustainability of their business and the lamb finishing sector as a whole.

A summary of findings and key profit drivers for each enterprise has been encapsulated in a separate Tips & Tools publication.

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Introduction

A progressive reduction in the size of the Australian sheep flock over the last two decades has seen a steady increase in enterprise diversification from predominantly wool production to dual purpose enterprises with an increasing emphasis on meat production.
This gradual shift in production has coincided with a significant investment in genetic tools such as LAMBPLAN and MERINOSELECT to provide the industry with appropriate selection criteria to meet market requirements and increase profitability.

An efficient and profitable lamb production system is one that is based on a high performance Merino ewe base, where lambs are sired by fast growing, lean terminal sires at a time of year when pasture growth and quality are optimised. The use of sires with high genetic potential for lean growth and early maturity ensures optimum weaning weights and hence survival.

The weaner lamb produced from such a system can either be sold as a feeder lamb to be finished on an alternative production system, sold into the domestic trade for slaughter or finished to a heavier weight on the property of origin.

The profitability of the production and finishing systems depends upon a range of factors and the interaction between many of those factors; although an extensive range of factors were included in the analyses not all of them have been published in the final report in order to limit the size of the document. The assumptions underpinning the sensitivity analyses are detailed in the scope of the report.

The aims of this project were to:

- determine the key profit drivers within each system and rank them in order of importance
- compare the relative profitability of each system
- conduct a sensitivity analysis of all the profit drivers to key business and management elements within each system

In order to achieve this, an analysis was conducted to investigate sensitivity of the profit margins of four finishing systems to each of those factors. The finishing systems investigated included:

- Traditional breeder-finisher system where the lambs were bred and finished on the one property
- Specialist pasture / fodder crop finishing where specialist crops and/or pastures were grown specifically for finishing purchased lambs
- Opportunistic grain based finishing where lambs were intensively fed only when margins appeared to be profitable
- Specialist grain based finishing in purpose-built facilities

The objectives of this analysis were to determine the following:

1. To review prime lamb finishing systems, their profitability and their sensitivity to production inputs, market and seasonal variability, including the effects of the scale of the operation
2. To identify the key influences of profit and areas of focus for specialist lamb breeders that can assist in maintaining and /or improving the viability and sustainability of these businesses including how these interact with the scale of the operation

3. to identify the key influences of profit and areas of focus for specialist lamb finishers that can assist in maintaining and/or improving the viability and long term sustainability of these businesses including how these interact with the scale of the operation

It could be argued that the sensitivity analyses between enterprises should have been compared on a per hectare or per dse (dry sheep equivalent) basis however the definition of a dse is no longer consistent nationally and comparison on a per hectare basis was not relevant to feedlot systems. It was therefore decided to run the sensitivities on a per head basis.

It could also be argued that the sensitivity analyses should have been reported on a gross margin basis rather than as profit per head however in consideration of the true profitability of opportunistic feedlot finishing the infrastructure cost had to be included.

1. Scope and assumptions

A series of analyses were completed to investigate profitability of lamb finishing operations to a range of key business and management elements. Below is a description of the base assumptions and model calculations used when analysing each of the sensitivities detailed in this report. Variations to the model used to investigate individual profit drivers are detailed in Section 6 of this report.

Broadly, profit drivers were analysed in four main lamb finishing systems:

1. Traditional breeder-finisher pasture/fodder crop finishing
2. Specialist pasture/fodder crop finishing
3. Specialist grain based finishing
4. Opportunistic grain based finishing

1.1 Traditional breeder-finisher pasture/fodder crop finishing

Traditional breeder-finisher systems were considered those that breed all lambs on the property to be finished. These lambs were then finished on pastures, fodder crops or stubbles after weaning. Producers running a traditional breeder-finisher system aimed to minimise production costs through breeding their own stock rather than purchasing lambs to finish.

ANNUAL BREEDING FLOCK MANAGEMENT AND COSTS

Breeding system

Profitability was analysed for each of the following three breeding systems:

1. Merino ewes joined to Merino rams producing **Merino lambs**
    a. Sufficient numbers of ewe lambs were retained to act as replacements; surplus ewe lambs were finished and sold with the wether portion of the flock
2. Merino ewes joined to Merino rams and terminal sires producing **Merino lambs** and **first cross lambs**
    a. A percentage of ewe flock was joined to Merino rams to produce sufficient numbers of Merino ewe lambs to act as flock replacements. Merino wether lambs produced from this joining were finished and sold with crossbred lambs. The remaining flock ewes were joined to a terminal sire with all lambs being finished on pasture and sold.
3. First cross ewes joined to terminal sires producing **second cross lambs**
    a. All replacement ewes were purchased rather than being bred on farm

Table 1 below describes the breeding flock parameters and assumptions of each breeding system.

Table 1 - Assumptions of each breeding flock.

Flock to produce:	Merino lambs	First cross lambs and Merino lambs ()	Second cross lambs
Ewe liveweight (kg)	65	65	65
Ram joining %	2	2	2
% mated to terminal sire	0	53	100
Weaning percentage (%)	115	125 (115)	125
Age at first lambing (yrs.)	2	2	2
No of lambings during ewe lifetime	5	5	5
Flock mortality rate (%)	4	4	4
Replacement ewe lamb mortality rate to 12 months of age (%)	5	5	5

Scale

Three different scales of operation were analysed with the following number of breeding ewes in the flock:

1. Small – 800 ewes (default flock size)
2. Medium – 1500 ewes
3. Large – 3600 ewes

Feed

A variety of pastures were analysed to determine if pasture type had an influence on profitability. Consideration was given to seasonal growth patterns and the suitability of particular pasture types to class of animal. In some instances grain supplementation was provided as it was assumed the nutritive value of pasture alone would not meet animal requirements.

Of the pastures investigated those that were assessed as suitable to carry breeding ewes through pregnancy and lactation were:

- High rainfall long term pasture (e.g. perennial ryegrass, clover, phalaris)
- High rainfall short term pasture (e.g. hybrid ryegrass)
- Grazing cereal (intended cost)
- Grazing cereal (opportunistic cost)
- Native pasture; with 200g/head/day barley supplementation for 8 weeks during peak nutritional demand (late pregnancy and early lactation)

While ewes were dry it was assumed they were grazing a low value native pasture.

The cost allocated to the system for feeding the ewe through the entire year was calculated from daily dry matter intake and the dry matter cost per tonne of each pasture.

Daily dry matter intake varied throughout the year and accounted for:

- Class/stage of pregnancy
- Age
- Breed

The pasture cost per tonne of dry matter accounted for:

- Establishment and maintenance costs for the life of the pasture
  - Seed (average commercial cost)
  - Fertiliser (establishment year [yr. 1] and maintenance [yr. 2+])
  - Pesticide (herbicide and insecticides for establishment and maintenance)
  - Irrigation costs where appropriate
  - Machinery operation and labour (contract rates)
- Dry matter production

The cost per kg of dry matter of cereal stubbles and grazing cereals opportunistically has largely been borne by the cropping enterprise however a small percentage of the costs have been allocated to the sheep enterprise to represent the cost and potential risk to the cropping enterprise of grazing these feeds.

Table 2 below describes fertiliser application and cost to each pasture type used in the analyses. The fertiliser cost per tonne of dry matter figure provides an indication of the level of investment required for fertiliser per tonne of dry matter produced. In these analyses, the chicory fodder crop required the highest level of investment in fertiliser to gain the same amount of dry matter production as the other pasture types.

Table 2 - Fertiliser application to individual pasture types and cost of fertiliser application per tonne dry matter production.

Pasture type	Super		Urea		DAP		Fertiliser cost per tonne of dry matter production
	Yr 1	Yr 2+	Yr 1	Yr 2+	Yr 1	Yr 2+	
High rainfall short term pasture			✓		✓		$ 18.86
Cereal stubbles			✓		✓		$ 1.75
Native pastures		✓					$ 5.60
Grazing cereal (opportunistic)			✓		✓		$ 3.50
High rainfall long term pasture	✓	✓		✓			$ 10.90
Dryland lucerne	✓	✓					$ 25.45
Grazing cereal (intended)			✓		✓		$ 17.82
Irrigated clover/ryegrass pasture	✓	✓					$ 22.21
Irrigated lucerne	✓	✓					$ 25.25
Fodder crop; chicory			✓	✓	✓	✓	$ 67.02
Irrigated fodder crop; chicory, forage rape, plantain			✓	✓	✓	✓	$ 44.35

Table 3 below shows the relative costs of each pasture type compared to a typical high rainfall short term pasture such as a hybrid ryegrass pasture.

Table 3 - Pasture costs (per tonne dry matter and total cost per ha) and dry matter production expressed as a percentage of a typical high rainfall short term pasture.

Pasture type	Relative cost per tonne DM	Relative cost per ha	Relative DM production
High rainfall short term pasture	100%	100%	100%
Cereal stubbles	14%	3%	25%
Native pastures	15%	3%	22%
Grazing cereal (opportunistic)	27%	7%	25%
High rainfall long term pasture	35%	24%	69%
Dryland lucerne	106%	61%	58%
Grazing cereal (intended)	107%	52%	48%
Irrigated clover/ryegrass pasture	169%	215%	127%
Irrigated lucerne	191%	171%	89%
Fodder crop; chicory	194%	127%	66%
Irrigated fodder crop; chicory, forage rape, plantain	230%	228%	99%

In addition to pasture, the breeding flock was provided with strategic supplementation to optimise weaning percentage and survival.
Ewes were provided with the following supplementation:

- Lupins for one week prior to joining to optimise ovulation rates
- Barley for one week prior to lambing to minimise the risk of pregnancy toxaemia

Rams were provided with the following supplementation:

- Lupins for eight weeks prior to joining to optimise body condition and semen production

Costs for this supplementation was factored into the model based on consumption and historical average prices for barley and lupin grain.

Mortality

Annual mortality of the breeding flock was fitted in the model at 4%. The number of breeding ewes required as replacements was accounted for in this annual mortality rate.

It was assumed there were no ram losses for the purposes of these analyses.

Stocking rate

Optimal stocking rate for each pasture type was determined by aligning pasture dry matter production (Table 3) with total flock dry matter intake for an 800 head flock.

Where sensitivities were run to analyse the effect of increased stocking rate, supplementary grain was provided in addition to pasture to ensure sufficient dry matter intake. The cost of this supplementary grain was sourced from the industry database, EZIGRAIN and was a representation of grain prices from the past 3 years.

Where sensitivities were run to analyse the effect of decreased stocking rate, pasture production was fixed to the feed requirements of 800 breeding ewes and this feed cost was spread across the reduced number of ewes as stocking rate decreased.

Wool

All mature ewes, rams and replacement hoggets were both shorn and crutched once annually. Shearing and crutching costs were based on Commonwealth award wages for shearers and shedhands. Additional costs were incurred for:

- Wool levy
- Agent commission
- Warehouse charges and testing
- Wool packs
- Transport

The value of the fleece was sourced from WOOLCHEQUE (2008-09, Southern markets). Prices were sourced for Merino and crossbred fleeces and crutchings.

Health

All ewes were given an annual 6-in-1 vaccination, pre-lambing. Ewes were also drenched with a broad spectrum drench (Cydectin LV) twice per annum. All products were administered at rates indicated by the manufacturers' instructions and costs were incurred for the product as well as associated labour. Vaccine and drench costs were sourced from a range of rural retailers (July 2009).

The analyses also included the cost of all breeding ewes being pregnancy scanned at typical contract rates.

Transport

Transport costs were included in the analyses at a flat rate of $2.00 per head for all mature sheep transported into and out of the system. This includes:

- Replacement ewes and rams
- Cast for age ewes and rams
- Cull ewe hoggets, surplus to replacements

LAMB MANAGEMENT AND COSTS – BIRTH TO WEANING

Feed

No feed cost has been attributed to the lamb as all feed costs have been attributed to the ewe at peak lactational demand until weaning at 14 weeks. While lamb dry matter intake will increase with age to weaning, ewe dry matter intake will equally decrease as milk production reduces.

Health

Costs were incurred in the model for lamb marking procedures which included:

- One NLIS tag per lamb, plus labour
- 3-in-1 vaccination, plus labour
- Labour associated with tailing

All lambs were vaccinated with a 6-in1 and treated with a broad spectrum drench at weaning. All products were administered at rates indicated by the manufacturers' instructions and costs were incurred for the product as well as associated labour.

Vaccine and drench costs were sourced from a range of rural retailers (July 2009).

LAMB MANAGEMENT AND COSTS – WEANING TO FINISHED WEIGHT

Lambs

Table 4 describes the assumptions made regarding lamb weights and growth rates of lambs from each breeding system analysed.

Table 4 - Lamb weight and growth rate assumptions in each breeder-finisher system.

	Merino lambs	First cross lambs (Merino lambs)	Second cross lambs
Entry weight	25	35 (25)	35
Finished weight	45	55 (45)	55
Growth rate	250	300 (250)	300

Feed

A variety of pastures were analysed to determine if pasture type had an influence on profitability. Consideration was given to seasonal growth patterns and the suitability of particular pasture types to finishing lambs. In some instances grain supplementation was provided as it was assumed the nutritive value of pasture alone would not meet animal requirements. In the case of utilising cereal stubbles it was assumed lambs only gained a total of 10kg as grain in the stubble was limiting or as is common practice the lambs were removed from stubbles at this point to be finished to heavier weights in a feedlot.

Pastures that were assessed as suitable for finishing lambs were:

- Dryland lucerne
- Irrigated lucerne
- Irrigated clover/ryegrass pasture
- High rainfall long term pasture; with 240g/head/day barley supplementation
- Grazing cereal (intended cost) as a standing crop
- Fodder crop; chicory
- Irrigated fodder crop; chicory, forage rape, plantain
- Cereal stubbles; lambs were limited to a total weight gain of 10kg

A total of 33 combinations of pasture available to ewes and lambs were analysed.

Feed intake requirement per head was calculated for lambs and accounted for:

- Age
- Breed
- Growth rate
- Weight

Total feed requirement for each type of lamb finished was calculated and a feed cost allocated for the finishing period. Relative costs of pastures can be seen in Table 3, page 9.

Wool

All lambs were crutched prior to sale/slaughter. Crutching cost was based on Commonwealth award wages for shearers and shedhands. Additional costs included were:

- Wool levy
- Agent commission
- Warehouse charges and testing
- Wool packs
- Transport

Representative prices for Merino and crossbred wool was sourced from WOOLCHEQUE (2008-09, Southern markets).

Mortality

The mortality rate of lambs within the finishing system was fitted at 1% with lamb deaths on average occurring in the first half of the finishing period. The cost of mortality included all costs to weaning and feed cost up to the time of death. Mortality cost was spread across all surviving lambs.

Overheads and fixed costs

During the lamb finishing phase a cost was incorporated into the model to account for fixed and overhead costs, these included:

1. *Machinery and infrastructure insurance*
   Insurance costs for infrastructure and vehicles used by the finishing system were included in the analysis. Machinery insurance was charged proportionally to the level of usage by the finishing system.
2. *Livestock insurance*
   Insurance costs were based on the industry average for lambs. Insurance levels have been fitted to cover the total number of lambs on the property. The cost of insurance was spread across all lambs finished in the system each year.
3. *Machinery registration*
   Registration cost for farm machinery and vehicles was based on state registration costs (July 09). As with machinery insurance, the cost borne by the finishing system is proportionate to usage. Registration costs were spread across all lambs finished in the system each year.
4. *Infrastructure*
   Infrastructure repairs and maintenance was charged to the system at 3% of infrastructure capital value. The cost of repairs was spread across all lambs finished in the system each year.
5. *Depreciation*
   As this is an analysis of profitability the depreciation cost of infrastructure has been included. A depreciation cost was spread across all lambs finished per year. Infrastructure was assumed to depreciate over a 15 year period and the capital cost included the following:
   a. Feeders
   b. Water troughs
   c. Fencing
   d. Handling yards
   e. Scales

Other costs

Costs were incurred by the system for regular checking of lambs during finishing. This was costed at award wages for a farmhand to monitor the lambs, feed and water supply daily. Costs were also included for feed analyses for nutritive value and mineral content.

SALE / SLAUGHTER OF LAMBS

Carcase price

Lambs were sold per kg carcase weight. Carcase prices were based on the average price for lambs over the hook for the past 5 years. Prices were sourced from National averages over 2005 to 2009, presented in MLA market reports. Sale prices accounted for differences between Merino and crossbred lambs. Prices also accounted for differences across markets (trade lamb vs export lamb).

Dressing percentage

Dressing percentage was based on industry guidelines for dressing percentage with Merino lambs assumed to have a 2% lower dressing percentage than crossbred lambs.

Agent commission

Agent commission was fitted at 5% of total carcase and skin returns.

Market penalties

Market penalties for lambs finished outside of market specifications was fitted to affect 1% of finished lambs. Penalty rates were sourced from processors nationally for lambs not meeting fat score and weight specifications (July 2009).

Skin prices

Skin prices were based on national averages for lamb skins over the past 5 years. Prices were sourced from MLA market reports. Skin value accounted for length of fleece and skin size.

Transport

Transport of lambs to sale/slaughter was included in the model at a flat rate of $2.00 per head. No other transport for lambs has been included in the model for the breeder-finisher model.

Sale fees

The current lamb levy fee was applied to all lambs sold.

1.2 Specialist pasture/fodder crop finishing

Specialist pasture/fodder crop finishing systems are those that purchase lambs to be finished on pastures, fodder crops or stubbles. Specialist pasture finishers aim to increase profits by taking advantage of seasonal conditions and lamb prices to finish lambs when pasture production permits.

LAMB FINISHING MANAGEMENT AND COSTS

All assumptions and costs relating to specialist pasture finishing were run in an identical manner to the finishing phase of the breeder-finisher system with the only differences being:

- lamb breed
- all lambs were purchased for finishing rather than bred on-farm. Therefore this system incurred a direct cost for the purchase and induction of lambs to the system.
- scale of operation
- stocking rate

Lambs

The specialist pasture finishing system was only analysed to run either Merino or crossbred lambs.
Table 5 below describes the assumptions made regarding lamb weights and growth rates of lambs for those lambs analysed in the specialist pasture based finishing system.

Table 5 - Lamb weight and growth rate assumptions in the specialist pasture based finishing system.

	Merino lambs	Crossbred lambs
Entry weight	25	35
Finished weight	45	55
Growth rate	250	300

Purchase costs

All lambs to be finished were purchased at average restocker / feeder lambs prices for the past 5 years. Prices were sourced from national averages over 2005 to 2009, presented in MLA market reports.

Health and induction

All lambs were vaccinated with a 6-in1 and drenched with a broad spectrum drench at induction. All products were administered at rates indicated by the manufacturers' instructions and costs incurred for the product as well as associated labour. Vaccine and drench costs were sourced from a range of rural retailers (July 2009).

Scale

Three different scales of operation were analysed with the following number of lambs finished per annum:

1. Small – 1000 lambs
2. Medium – 4500 lambs
3. Large – 10000 lambs

Stocking rate

Optimal stocking rate for each finishing pasture was determined by aligning pasture dry matter production (Table 3) with mob dry matter intake. The total area required was based on finishing 4500 lambs.

Where sensitivities were run to analyse the effect of increased stocking rate, supplementary grain was provided in addition to pasture to ensure sufficient dry matter intake of stock. The cost of this supplementary grain was sourced from industry database, EZIGRAIN and was a representation of grain prices from the past 3 years.

Where sensitivities were run to analyse the effect of decreased stocking rate, pasture production was fixed to the feed requirements of 4500 lambs and this feed cost was spread across the reduced number of lambs as stocking rate decreased.

1.3 Specialist grain based finishing systems

Specialist grain based finishing systems are those that finish lambs year round in a purpose built feedlot. Annual throughput is determined by the number of finishing cycles completed each year and the feedlot capacity. Producers running specialist grain based finishing systems aim to increase profits by maximising the system throughput.

1.4 Opportunistic grain based finishing systems

Opportunistic grain based finishing systems are where lambs are finished to take advantage of favourable conditions; these systems are limited by their capacity. Facilities within these systems range from small containment areas and sacrifice paddocks through to purpose built feedlots. They generally complement other farm enterprises. Producers running opportunistic grain based finishing systems aim to increase profits by maximising the profitability per head.

Large variations in capacity and throughput of specialist and opportunistic grain based finishing systems limits the ability to classify either for the purpose of this analysis. Therefore this analysis has been based on a grain based finishing system of multiple scales to incorporate both specialist and opportunistic grain finishing. Specialist grain based finishers are more likely to be based on large scale finishing systems with multiple cycles completed per year (large) whilst opportunistic finishers are more likely to have smaller feedlots which may only run one cycle per year in response to favourable markets (small).

Potential management differences of specialist and opportunistic grain based finishing systems are discussed throughout this report.

FEEDLOT SYSTEM

Scale

The scale of grain based finishing systems was defined by the system capacity and annual throughput of lambs. These analyses were run to 3 different feedlot scales shown below which were based on industry average sized operations.

Table 6 - Feedlot scale descriptions for capacity and annual throughput.

	Feedlot scale		
Scale	small	medium	large
Capacity	1000	2000	4000
Annual throughput	1000	4500	10000

Lambs

A range of lambs for finishing were analysed and varied by;

- Breed (2); Merino and crossbred lambs
- Maturity (2); 4 month and 8 month old lambs
- Entry weight (2); 35kg and 45kg liveweight
- Finished weight (2): 45kg and 55kg liveweight

Each combination, 16 in total, was analysed.

MANAGEMENT PRACTICES AT ENTRY

Purchase costs

Purchase prices ($/kg liveweight) was based on average restocker / feeder lambs prices for the past 5 years. Prices were sourced from national averages over 2005 to 2009, presented in MLA market reports.

Health

Lambs were given a broad spectrum drench (Cydectin LV) upon entering the feedlot. Dosage correlated to liveweight as per manufacturer's instructions. Lambs were also given a 3-in-1 vaccination at induction as per manufacturer's instructions. Drench and vaccine costs were sourced from a range of rural retailers (July 2009).

Wool

Lambs were shorn upon entering the feedlot. The cost of shearing was based on the Commonwealth award wage for shearers and shedhands. The value of the fleece was sourced from WOOLCHEQUE (2008-09, Southern markets). Prices were sourced for fleece and crutchings for both crossbred and Merino lambs.

MANAGEMENT OF FEEDLOT LAMBS

Ration Formulation

The total cost of feed was determined by the ration formulated to meet the nutritional requirements of each type of lamb above. The nutritional requirements were sourced from industry research compiled in *Nutrient requirements of small ruminants* (NRC, 2007). The nutritional demands of the lambs accounted for;

- Breed (Merino, late maturing; crossbreed, early maturing)
- Age of lamb entering feedlot
- Growth rate
- Entry and target weight

The ration was formulated for a feedlot system providing grain in allocated amounts through lick feeders and roughage *ad libitum.* The nutritive quality of feed was based on industry averages compiled by FEEDTEST between 1996 and 2001 and from the Productive Nutrition database.

Feed Costs

Grain price was sourced from industry database, EZIGRAIN and was a representation of grain prices from the past 3 years. Roughage prices were sourced from market reports provided by Rural Press Limited. Supplement prices and prices for sheep pellets were quoted from suppliers (July 2009). Relative costs of these feeds are shown in Table 7 below.

Table 7 - Feeds used in feedlot ration and cost expressed as a percentage of the cost of barley grain.

Available feed types	Used in base ration*	Cost of feed
Barley	✓	100% ($160/t)
Wheat	✓	152%
Faba Beans		197%
Lupins	✓	219%
Cereal straw	✓	75%
Wheaten hay	✓	127%
Sheep pellets		200%

* The base ration is the ration used in all sensitivity analyses except where investigating the profitability of different ration ingredients.

Labour

Labour was costed to the system at the Commonwealth award wage for a level 2 farm hand. Labour was charged to the system for feeding, checking stock and troughs, vaccinating, drenching, drafting and weighing stock and for administration and book keeping. The time allocated for each task was sourced from producers and industry publications such as *On Farm* (Holmes Sackett, 2009).

Machinery

Machinery was costed to the system at the hourly cost to run a 95hp tractor. The cost was sourced from the *Guide to tractor and implement costs,* (NSW Department of Primary Industries, 2009). This cost encapsulated maintenance, running and fuel costs. Machinery costs were charged to the system when the tractor was used for mixing and feeding out plus additional miscellaneous tasks throughout the year such as pen cleaning.

Mortality

The mortality rate of the finishing system was fitted at 2% with lamb deaths on average occurring in the first quarter of the finishing period. The cost of mortality included all purchase and input costs (feed, drench, vaccine, labour etc.) up to the time of death. Mortality cost was spread across all surviving lambs.

Shy feeders / poor doers

The rate of shy feeders / poor doers within the feedlot was fitted at 5% of lambs finished. The performance of these lambs was fitted at half the growth rate of the rest of the draft. Poor performing lambs were not managed separately and were sold with the rest of the lambs. The poor performing lambs were penalised for not meeting market specifications and received lower carcase returns due to the lighter finished weights. The cost of poor performing lambs was spread across all other lambs.

Transport

Transport of lambs was charged on a per kilometre basis for a 450 head capacity semi-trailer. Transport costs were charged for transporting lambs 200km from the market to feedlot and 200km from feedlot to slaughter.

The cost of feed transport was charged on a per kilometre rate for a 25 tonne capacity truck (grain/pellets) and for a 15 tonne capacity truck for hay and straw. Feed transport was charged at the cost to transport feed 150 km.

Prices were sourced from national transport companies.

Overheads and fixed costs

During the lamb finishing phase a cost was incorporated into the model to account for fixed and overhead costs, these included:

1. *Machinery and infrastructure insurance*
   Insurance costs for infrastructure and vehicles used by the finishing system were included in the analysis. Machinery insurance was charged proportionally to the level of usage by the finishing system. For example a 1000 head feedlot used a tractor for only 20% of its total on-farm use. Therefore only 20% of this tractors insurance premium was allocated to the finishing system.
2. *Livestock insurance*
   Insurance costs were based on the industry average for lambs. Insurance levels have been fitted to cover the total number of lambs on the property. The cost of insurance was spread across all lambs finished in the system each year.
3. *Machinery registration*
   Registration cost for farm machinery and vehicles was based on state registration costs (July 09). As with machinery insurance, the cost borne by the finishing system is proportionate to usage. Registration costs were spread across all lambs finished in the system each year.
4. *Infrastructure*
   Infrastructure repairs and maintenance was charged to the system at 3% of infrastructure capital value. The cost of repairs was spread across all lambs finished in the system each year.
5. *Depreciation*
   As this is an analysis of profitability rather than gross margin the depreciation cost of infrastructure has been included. A depreciation cost was spread across all lambs finished per year. Infrastructure was assumed to depreciate over a 15 year period and the capital cost included the following:
   a. Feeders
   b. Water troughs
   c. Fencing
   d. Shade
   e. Handling yards
   f. Scales
   g. Silos

SALE / SLAUGHTER OF LAMBS

Carcase price

Lambs were sold per kg carcase weight. Carcase prices were based on the average price for lambs over the hook for the past 5 years. Prices were sourced from National averages over 2005 to 2009, presented in MLA market reports. Sale prices accounted

for differences between Merino and crossbred lambs. Prices also accounted for differences across markets (trade lamb vs export lamb).

Dressing percentage

Dressing percentage was based on industry guidelines for dressing percentage with Merino lambs assumed to have a 2% lower dressing percentage than crossbred lambs.

Agent commission

Agent commission was fitted at 5.5% of total carcase and skin returns. Feedlots with a capacity greater than 4000 lambs were assumed to be able to negotiate a lower commission and therefore agent's commission was set at 3%.

Market penalties

Market penalties for lambs finished outside of market specifications was fitted to affect 5% of finished lambs. Penalty rates were sourced from processors nationally for lambs not meeting fat score and weight specifications (July 2009).

Skin prices

Skin prices were based on national averages for lamb skins over the past 5 years. Prices were sourced from MLA market reports. Skin value accounted for length of fleece and skin size.

Sale fees

The current lamb levy fee was applied to all lambs sold.

2. Profitability ranking of finishing systems

Introduction

Lamb finishing enterprises in Australia can broadly be divided into four main categories, these are:

1. Traditional breeder-finisher pasture / fodder crop finishing systems
2. Specialist pasture / fodder crop finishing systems (lambs bought in)
3. Specialist grain based finishing systems
4. Opportunistic grain based finishing systems

Whilst profitability is often compared within each of these systems, it is seldom compared between types of systems, which is the purpose of this analysis. A base set of parameters for each system was assigned and the profit margin per lamb sold was compared to determine the order of profitability of the above systems.

Method

A budget was developed and analysed to determine the profit margin of each finishing system.

The profit margin for each system was determined with the key assumptions and differences between systems listed below. All systems finished crossbred lambs from an entry/weaning weight of 35kg to a finished weight of 55kg.

<u>Traditional breeder-finisher pasture / fodder crop finishing systems</u>

- Lamb growth rate: 250 g / head / day
- 1000 lambs finished per annum
- Labour charged at the award wage for a casual farm hand
- Agent's commission was charged at 5% of sales
- Crossbred lambs produced from joining first cross ewes to terminal sires

<u>Specialist pasture / fodder crop finishing systems (lambs bought in)</u>

- Lamb growth rate: 250 g / head / day
- 4500 lambs finished per annum
- Labour charged at the award wage for a casual farm hand
- Agent's commission was charged at 5% of sales

For both pasture based systems a range of lamb finishing pasture types was analysed to measure their impact on profit margin per head. The pasture types assessed were:

1. High rainfall long term pasture - perennial phalaris, clover, cocksfoot
2. Fodder crop - chicory
3. Cereal stubbles

<u>Specialist grain based finishing systems</u>

- Lamb growth rate: 300 g / head / day
- Feedlot capacity: 2000 lambs
- Annual throughput: 8000 lambs
- Fixed costs, infrastructure costs and management expenses were spread over the total annual throughput
- Cost of labour was charged as an annual wage for one farm hand
- Agent's commission was charged at 3% of sales

Opportunistic grain based finishing systems

- Lamb growth rate: 300 g / head / day
- Feedlot capacity: 2000 lambs
- Annual throughput: 2000 lambs
- Feedlot infrastructure available but needing maintenance. The cost of maintenance was spread over 5 cycles of feedlot use.
- Feedlot constituted 40% of property's enterprises
- Labour charged at the award wage for a casual farm hand
- Agent's commission was charged at 5% of sales

Results

- Of the four systems analysed the order of most profitable per head to the least profitable was as follows (Table 8):
    1. Traditional breeder-finisher pasture / fodder crop finishing systems
    2. Specialist pasture / fodder crop finishing systems (lambs bought in)
    3. Specialist grain based finishing systems
    4. Opportunistic grain based finishing systems
- Increasing the cost of producing pastures ($/t DM) reduced profit margins significantly. Profit margins decreased by $5.53 per head where high rainfall long term pastures were utilised and $8.79 per head where chicory fodder crops were utilised rather than cereal stubbles.
- Increasing cost of pasture type resulted in a larger percentage change in profit margin in the specialist pasture based finishing system (33.4%) than in the traditional breeder-finisher system (16.4%).

Discussion

Profits of the breeder-finisher system were significantly higher than those of the other three systems for two key reasons:

1. the cost of production for lambs entering the finishing phase was lower than the purchase price of those that were bought in for the other systems
2. additional wool income from the breeding flock provided a further increase to profits received per lamb sold

These two factors represent a significant benefit to the system and provide a greater buffer for potential fluctuations in the price of inputs and carcase value over that of other finishing systems.

Specialist grain based finishers were able to achieve cost efficiencies through the effect of scale (annual throughput) on labour efficiency, feed management and input costs; all of these factors contributed to a higher profit margin per head than opportunistic grain based finishing.

Conclusion

Finishing lambs bred on-farm resulted in the highest profit margin of those systems analysed as the cost of production was lower and additional income could be gained from the wool clip of the breeding flock.

Table 8 – Profit margin per head of crossbred lambs finished from 35 – 55kg in various finishing systems.

Finishing system	*Pasture type (where applicable)*	Profit margin / head
Traditional breeder-finisher pasture / fodder crop finishing	*High rainfall long term pasture – Perennial phalaris, clover, cocksfoot*	$50.40
	Fodder crop - Chicory	$44.86
	Cereal stubbles	$53.65
Specialist pasture / fodder crop finishing	*High rainfall long term pasture – Perennial phalaris, clover, cocksfoot*	$23.03
	Fodder crop - Chicory	$17.50
	Cereal stubbles	$26.29
Specialist grain based finishing		$18.07
Opportunistic grain based finishing		$15.18

3. Comparison of specialist vs. opportunistic grain based finishing systems

Introduction

Producers who finish lambs in a feedlot can be broadly grouped into two major categories; opportunistic and specialist finishers. Opportunistic feedlot finishers are those who have a feedlot facility available but only finish lambs when they perceive that profit margins are satisfactory. Many opportunistic feedlot finishers will use the feedlot to value add to other enterprises such as a breeding ewe flock or a cropping enterprise. Specialist feedlot finishers are those whose entire enterprise is based upon finishing lambs, typically all year round.

The differences in profit margin of these two enterprises were analysed to investigate the value of each operation and the effect of differences in annual throughput on each system.

Method

A budget was developed and analysed to determine the profit margin of specialist and opportunistic grain based finishing systems.

For each system a range of variables were assessed to measure their impact on profit margin per head and annual profit. These included:

- Feedlot capacity
- Target weight
- Breed
- Annual throughput

The profit margin for each system was determined under the following key assumptions for each system.

<u>Specialist grain based finishing systems</u>

- Fixed costs, infrastructure costs and management expenses were spread over the total annual turnover.
- Cost of labour was charged as an annual wage for one farm hand
- Agent's commission was charged at 3% of sales
- All lambs and feed were bought in

<u>Opportunistic grain based finishing systems</u>

1. Opportunistic grain based finishing (lambs and feed bought in)
    - Feedlot infrastructure available but needing maintenance. The cost of maintenance was spread over 5 cycles of feedlot use.
    - Feedlot constituted 40% of the properties enterprises
    - Labour was charged at the award wage for a casual farm hand
    - Agent's commission was charged at 5% of sales
    - All lambs and feed were bought in
    - One cycle of the feedlot was run per annum

2. Opportunistic grain based finishing (lambs sourced from the breeding flock)
    - As per system 1 above except for,
    - Breeding flock was also part of the farm enterprise(s) which provided all lambs to the feedlot to be finished

3. Opportunistic grain based finishing (value adding to cropping enterprise)
    - As per system 1 above except for,
    - Feedlot used to value add to cropping enterprise; prices for hay and grain were costed to the system at the cost of production

Results

- Of the four systems analysed, the order of most profitable per head to least was as follows (Table 9):
    1. Opportunistic grain based finishing (lambs sourced from farm breeding flock)
    2. Specialist grain based finishing
    3. Opportunistic grain based finishing (value adding to cropping enterprise)
    4. Opportunistic grain based finishing (lambs and feed bought in)
- At the same capacity, specialist finishers received up to $7.61 higher profit margin per head than opportunistic finishers purchasing all lambs and feed (Table 9).
- Profitability of finishing Merino lambs was significantly higher when finishing lambs bred from the enterprise's own breeding flock (Table 9).
- Opportunistic finishers who were value adding to their cropping enterprise received up to 48% higher profit margins than opportunistic finishers purchasing grain at full cost (Table 9).

Discussion

The major difference between opportunistic and specialist grain based finishers was the annual turnover of the operation. Opportunistic finishing of lambs only occurred when producers perceived the profit margins to be high. This reduced the level of risk in the system simply through a larger margin for error. The advantage of high lamb turnover in specialist systems was the ability to spread the cost of overheads and fixed costs over a larger number of lambs and therefore improve profitability per head. This high lamb turnover also allowed for smaller profit margins per head to ultimately achieve a satisfactory total annual profit.

In these analyses it was assumed for an opportunistic system that 40% of the business was the lamb finishing enterprise. This figure will vary widely amongst producers and across regions from as little as 5% and likely as high as 60% in some instances. Variation in the percentage allocated for these analyses had a minor effect on profitability as it only affected the allocation of costs such as infrastructure, insurance, machinery and vehicle registration. Reducing this allocation to 20% affected profitability by approximately $0.20 per head.

The profitability of finishing lambs that are bred on-farm was significantly higher than those that purchased lambs as these operations received the additional income of the wool produced by the breeding ewe flock and a reduced cost for 'purchasing' the lamb as this was effectively only the cost of production.

Conclusion

In both finishing lambs bred on-farm and where grains are being value added through the feedlot, the potential value of the lamb at weaning and the grain should be considered and individually budgeted before allocation to a finishing system to ensure maximum profitability of both lambs and grain are achieved.

Opportunistically finishing lambs that are bred on-farm will return a higher profit margin than a specialist grain finishing system operating year round purchasing lambs. Where all lambs are purchased, the profit margin is higher in a specialist finishing operation compared to an opportunistic feedlot.

Table 9 – Profit margin per head of specialist versus opportunistic grain based finishing systems, presenting the annual throughput of lambs, profit margin per head and the annual profit of the feedlot finishing system.

	Capacity (lambs)	Finishing weights	Breed	Annual throughput (lambs)	Profit margin ($/head)	Annual profit ($)	Proportion of farming enterprise (%)
SPECIALIST	**2000**	**35 to 45 kg**	**Merino**	16000	$4.81	$77,022	100%
			Crossbred	16000	$16.21	$259,317	100%
		35 to 55 kg	**Merino**	8000	$1.27	$10,121	100%
			Crossbred	8000	$18.07	$144,576	100%
	4000	**35 to 45 kg**	**Merino**	32000	$6.45	$206,513	100%
			Crossbred	32000	$17.85	$571,104	100%
		35 to 55 kg	**Merino**	16000	$4.54	$72,712	100%
			Crossbred	16000	$21.35	$341,622	100%
OPPORTUNISTIC (lambs and feed bought in)	**2000**	**35 to 45 kg**	**Merino**	2000	-$2.80	-$5,597	40%
			Crossbred	2000	$10.40	$20,806	40%
		35 to 55 kg	**Merino**	2000	-$3.44	-$6,877	40%
			Crossbred	2000	$15.18	$30,353	40%
OPPORTUNISTIC (lambs from farm breeding flock)	**2000**	**35 to 45 kg**	**Merino**	2000	$41.87	$83,743	100%
			Crossbred	2000	$46.17	$92,346	100%
		35 to 55 kg	**Merino**	2000	$40.03	$80,063	100%
			Crossbred	2000	$50.95	$101,893	100%
OPPORTUNISTIC (Value adding to cropping enterprise)	**2000**	**35 to 45 kg**	**Merino**	2000	$1.19	$2,388	40%
			Crossbred	2000	$15.41	$30,811	40%
		35 to 55 kg	**Merino**	2000	$2.09	$4,189	40%
			Crossbred	2000	$19.74	$39,470	40%

4. Comparison of feedlot vs. pasture based finishing where all lambs are bought in

Introduction

Lamb finishing can be carried out on pasture or within a feedlot. The major differences in pasture finishing and feedlot finishing are brought about by the intensity of the finishing system. The advantage of feedlot finishing is the smaller area required (higher stocking rate) to finish lambs and the potential for greater control of growth rate through diet formulation. Pasture finishing is a less intensive finishing system which has lower establishment and management costs however there is an increased risk of lambs not meeting specifications due to variation in diet quality and potentially slower growth rate.

An analysis was conducted to determine the profitability of each system in relation to the above risk factors.

Methods

A budget was developed and analysed to determine the profit margin of specialist and opportunistic grain based finishing systems.

For each system a range of variables were assessed to measure their impact on profit margin per head and annual profit. These included:

- Feedlot capacity
- Target weight
- Breed
- Annual throughput

The profit margin for each system was determined with the key assumptions and differences between the systems as listed below. Both systems finished crossbred lambs from an entry/weaning weight of 35kg to a finished weight of 55kg.

<u>Feedlot Finishing</u>

Assumptions made within analysis;

- Lambs growth rate: 300 g / day
- Feedlot capacity
  - Feedlot cycle one per year @ 4500 lambs
  - Multiple cycles per year @ 2000 lambs
- Annual turnover 4500 lambs
- All lambs and feed purchased off-farm

<u>Pasture Based Finishing</u>

Assumptions made within analysis;

- Lambs growth rate: 250 g / day
- Annual turnover 4500 lambs
- Finishing carried out on three pasture types
  1. High rainfall long term pasture - perennial phalaris, clover and cocksfoot
  2. Fodder crop - chicory
  3. Cereal stubbles

Results

- Of the systems analysed the order of most profitable per head to least was as follows (Table 10):
    1. Pasture finishing
        1.1. Cereal stubbles
        1.2. High rainfall long term pasture – perennial phalaris, clover, cocksfoot
        1.3. Fodder crop - chicory

    2. Feedlot finishing
        1.1. Multiple cycles per year
        1.2. Single cycle per year

- Increasing the cost of producing pastures ($/t DM) reduced profit margins significantly. Profit margins decreased by $5.53 per head where high rainfall long term pastures were utilised and $8.79 per head where chicory fodder crops were utilised rather than cereal stubbles.
- Using feedlot facilities multiple times per year rather than once per year resulted in an increase in profit margin of $1.29 per head.

Discussion

While growth rates of lambs was assumed to be lower in pasture based systems, reduced feed, management and establishment costs when compared to feedlot systems resulted in a higher profit margin per head. Profitability was higher in pasture based systems however they were limited to finishing lambs only when pasture was available. Feedlot systems could be operated all year round depending on the availability of shelter or shedding for winter feeding and allowing for abattoir closures. The assumption was made in this analysis that lambs finished in the feedlot were finished over several cycles. Running a smaller feedlot system multiple times per year, when compared to once per year to finish the same number of lambs, provided a higher profit margin as costs (repairs and maintenance, depreciation etc) associated with operating a larger facility were reduced.

Conclusion

The capacity to finish year round was the greatest advantage to feedlot finishing due to the ability to access markets during periods of high demand. Pasture based systems tend to be more restricted in their ability to access markets due to the limitations of pasture availability and quality at the time of finishing. Pasture finishing was more cost efficient than feedlot finishing however feedlot finishing was not restricted by feed availability and therefore could take advantage of high lamb prices during periods of low pasture growth.

Table 10 - Profit margin of specialist lamb finishers finishing lambs in a feedlot and on three pasture options.

Finishing System		Profit margin / head
Feedlot Based Finishing	Single cycle per year	$11.36
	Multiple cycles per year	$12.65
Pasture Based Finishing	High rainfall long term pasture – Perennial phalaris, clover, cocksfoot	$23.03
	Fodder crop - Chicory	$17.50
	Cereal Stubbles	$26.29

5. Comparison of feedlot vs pasture based finishing for traditional breeder-finishers

Introduction

Commercial prime lamb breeders are reliant on lamb returns to drive the profitability of their breeding system. The producer has several options with regards to the markets in which these lambs are sold. The producer can sell their lambs at weaning as feeder lambs; finish lambs on-farm in either a pasture or grain based finishing system or retain the ewe lambs as breeders or to sell at a later date.

The profitability and key influences of these options, with the exception of retaining the ewe portion as breeders, was analysed to determine which system provided the highest return.

Method

Lamb costs incurred to weaning were based on the cost of running a breeding flock producing 1000 lambs per year. Income and expenses associated with the ewe flock were included in the profit margin per lamb sold. Costs after weaning were dependent on the finishing option and are detailed below.

<u>Lambs sold at weaning into feeder / restocker market</u>

- Lambs were sold at the 5yr average market price for feeder lambs (2004-2009)

<u>Feedlot finished lambs</u>

- Lambs were finished in a feedlot of 1000 head capacity used on opportunistic basis
- Feedlot infrastructure was considered to be in suitable condition and required no major repairs

<u>Pasture finished lambs</u>

- The profitability of finishing lambs on pasture was analysed for three pasture systems:
    1. High rainfall long term pasture - perennial phalaris, clover and cocksfoot
    2. Fodder crop - chicory
    3. Cereal stubbles

Results

- Ranking of profitability of lamb selling options for breeder-finishers:
    1. Pasture finishing
        1.1. Cereal stubbles
        1.2. High rainfall long term pasture
        1.3. Fodder crop
    2. Feedlot finishing
    3. Selling lambs as feeders

- The profitability of feedlot finishing was marginally higher than selling lambs at weaning with the exception of Merino lambs finished to 45kg (Table 11).
- Merino lambs returned a higher profit margin than crossbred lambs. This was greatest when lambs were sold at weaning ($11.60 higher for Merino lambs). Where lambs were finished, the price difference between Merino and crossbred lambs decreased.

Discussion

Higher profit margins of pasture based systems were largely due to lower input and overhead costs when compared to feedlot finishing. Pasture based finishing systems were the most profitable system when not limited by feed on offer. The higher returns of Merino lambs were due to the increased fleece value from the Merino ewe flock. This difference reduced as lambs were finished as crossbred lambs gained an advantage through faster growth rates and hence reduced total feed intake as they were turned off earlier.

Conclusion

Breeder finishing operations are in the best position to take advantage of fluctuations in lamb prices. When finishing returns are lower, lambs can be sold off as feeder lambs. In response to good lamb prices or high levels of available feed the producer has the option of finishing the lambs to heavier weights on pasture. The wool returns from the breeding ewe flock also provides an additional income to help safeguard against low carcase prices.

While feedlot finishing did not return the greatest profit margin in this analysis, access to a feedlot facility can potentially allow producers to run more ewes without limiting the number of lambs that can be finished on the property.

Table 11 - Profit margin of breeder-finisher system selling lambs as feeder stock at weaning, lambs finished in a feedlot and lambs finished on three pasture options.

MANAGEMENT			BREED	Target weight	Number of breeding ewes	Number of finished lambs	Profit margin / head
Sells lambs at weaning			Merino	35 kg	1135	1000	$36.66
			Crossbred	35 kg	870	1000	$25.06
Finishes lambs on property	Feedlot		Merino	45 kg	1135	1000	$33.11
				55 kg	1135	1000	$38.28
			Crossbred	45 kg	870	1000	$28.43
				55 kg	870	1000	$33.21
	Pasture	High rainfall long term pasture - Perennial phalaris, clover, cocksfoot	Merino	45 kg	1135	1000	$45.03
				55 kg	1135	1000	$54.18
			Crossbred	45 kg	870	1000	$38.12
				55 kg	870	1000	$50.40
		Fodder crop - Chicory	Merino	45 kg	1135	1000	$36.66
				55 kg	1135	1000	$40.20
			Crossbred	45 kg	870	1000	$35.48
				55 kg	870	1000	$44.86
		Cereal stubbles	Merino	45 kg	1135	1000	$45.12
				55 kg	1135	1000	$54.32
			Crossbred	45 kg	870	1000	$39.75
				55 kg	870	1000	$53.65

6. Key business and management elements of profitable lamb finishing enterprises

6.1 Ranking of key business and management elements across all lamb finishing systems

Table 12 shows the ranking of importance of each business and management element analysed across all finishing systems. In determining these rankings the analysis accounted for the element's effect on profit margin, the typical level of variance within each element as well as the influence of scale and interactions with other elements.

Table 12 - Sensitivity of the profit margin to key business and management elements across all finishing systems

Sensitivity rating	Traditional breeder-finisher pasture / fodder crop finishing	Specialist pasture / fodder crop finishing	Specialist grain based finishing	Opportunistic grain based finishing
Very High	Stocking rate Weaning percentage (below replacement) Market price for carcase ($ / kg cwt) Weaning percentage (± 10%)	Market price for carcase ($ / kg cwt) Purchase price of lamb ($ / kg lwt) Stocking rate	Purchase price of lamb ($ / kg lwt) Not achieving targeted growth rate (FCR) Market price for carcase ($ / kg cwt)	Market price for carcase ($ / kg cwt) Purchase price of lamb ($ / kg lwt) Availability of infrastructure (cost of investment) Not achieving targeted growth rate (FCR) Capacity of the feedlot Cost of managing shy feeders
High	Breed of lambs being finished Replacement ewe costs where purchased Growth rates achieved by lambs Cost of fertiliser treatment Value of fleece ($/kg gfwt) Cost of production of pasture used by breeding ewe Mortality rate of lambs (>10%) Cost of production of finishing pasture Mortality rate of breeding flock (>10%) Cost of shearing	Growth rate Mortality rate of lambs (>10%) Cost of fertiliser treatment Breed of lambs being finished Cost of production of finishing pasture Dressing percentage	Annual turnover of feedlot Cost of managing shy feeders Mortality rate of lambs (>10%) Targeted growth rate Breed of lambs being finished Cost of feed / ration Formulated ration Dressing percentage Cost of labour Price of skins Cost of transporting livestock	Mortality rate of lambs (>10%) Targeted growth rate Breed of lambs being finished Dressing percentage Cost of feed / ration Formulated ration Cost of infrastructure maintenance / repairs Cost of transporting livestock Price of skins
Moderate	Scale (number of breeding ewes) Cost of labour Dressing percentage Weaning weight of lambs Agent's commission at sale Cost of replacement rams Ewe liveweight Mortality rate of breeding flock (1 to 5%) Price of skins Mortality rate of lambs (1 to 5%)	Price of skins Agent's commission at sale Cost of labour Cost of transport Scale (number of lambs being finished) Mortality rate of lambs (1 to 5%) Value of fleece ($/kg gfwt) Not meeting market specifications	Capacity of the feedlot Mortality rate of lambs (1 to 5%) Agent's commission at sale Management decisions regarding fleece length Value of fleece ($/kg gfwt) Cost of transporting feeds Not meeting market specifications	Mortality rate of lambs (1 to 5%) Agent's commission at sale Cost of labour Cost of transporting feeds Management decisions regarding fleece length Value of fleece ($/kg gfwt) Not meeting market specifications
Low	Cost of transport Not meeting market specifications Cost of a professional consultancy Cost of vaccinating Cost of vet visit Cost of scanning Cost of feed analysis Cost of drenching	Cost of shearing Cost of a professional consultancy Cost of vet visit Cost of vaccinating Cost of drenching Cost of feed analysis	Cost of infrastructure maintenance / repairs Cost of shearing Cost of vet visit Cost of running machinery Animal maturity on entering feedlot Cost of vaccinating Cost of drenching Cost of feed analysis Cost of over heads (insurance / registration)	Cost of vet visit Cost of shearing Animal maturity on entering feedlot Cost of running machinery Cost of vaccinating Cost of drenching Cost of feed analysis Cost of over heads (insurance / registration)

6.2 Review of individual key business and management elements

6.2.1. The effect of scale

Introduction

The scale of the enterprise refers to the total number of lambs being finished. The scale of feedlot finishing systems is determined by the capacity of the feedlot and the annual throughput. The number of lambs being finished in breeder-finisher systems is driven by the number of ewes and the weaning percentage
.

The influence of scale on the profit margin was analysed by measuring the influence of the number of lambs finished across all four finishing systems.

The importance of scale as a profit driver

	Finishing System	Sensitivity
1.	Opportunistic grain based finishing	Very High
2.	Specialist grain based finishing	High
3.	Traditional breeder-finisher pasture finishing	Moderate
4.	Specialist pasture finishing	Moderate

Methods

A budget was developed and analysed to determine the sensitivity of the profit margin of all 4 finishing systems for Merino and crossbred lambs to the scale of the enterprise.

The pasture based finishing systems were analysed over a range of pasture systems the details of which are outlined in the scope with additional parameters as follows:

- The scale of breeder-finisher systems was based on the number of breeding ewes
- Sensitivities of the breeder-finisher systems to scale were compared for 800, 1500 and 3600 breeding ewes
- The scale of specialist pasture finishing systems was based on the number of lambs being finished
- Sensitivities of the specialist pasture finishing systems to scale were compared for 1000, 4500 and 10000 lambs
- Sensitivities of the feedlot finishing system to scale were compared for feedlots with a capacity of 500, 1000, 2000, 5000, 10000 and 20000 lambs.
- Sensitivities of the feedlot finishing system to scale were compared for feedlots with an annual throughput of 500, 1000, 5000, 10000, 20000 and 50000 lambs

Assumptions

- Stocking rate of the pasture based systems was constant across scales
- Lamb performance was not limited by scale
- Cost of feed and lambs was not influenced by scale
- Agents commission was discounted by 2% in systems where greater than 4000 lambs were finished

Results

- Profit margin was highly sensitive to pasture type within breeder-finisher systems however pasture type was only moderately sensitive to changes in scale (<$0.27 per head) (Table 14)
- An increase in scale from 800 ewes to 3600 ewes increased the per head profit margin of breeder-finisher systems by an average of:
  - Merino flocks: 15%
  - First cross system: 7%
  - Second cross system: 9%
- Across all systems profit margin was more highly sensitive to changes in scale from 800 to 1500 ewes than for changes from 1500 to 3600 ewes (Table 14)
- Profit margin was highly sensitive to pasture type in specialist pasture finishing systems (Table 15)
- Increasing scale in the specialist pasture finishing system from 1000 lambs to 4500 lambs increased profit margin by up to $3.07 per head compared to $0.48 per head for increasing scale from 4500 to 10000 lambs (Table 15)
- The difference in profit margin when changing scale from 1000 to 4500 lambs was on average 6.3 times greater than increasing from 4500 to 10000 lambs (Table 15)
- Increasing the throughput of a 500 head capacity feedlot from 500 to 1000 lambs per year increased profit margin per head by $4.81 (Table 16)
- Operation of a 5000 head capacity feedlot at 20% (i.e. 1000 lambs per year) resulted in a reduction in profit margin by $14.45 per head (Table 16)
- Grain based finishing systems of a 1000 head capacity finishing 1000 lambs per year were on average $5.07 per head less profitable than finishing systems of 5000 head capacity finishing 5000 lambs per year (Table 16)

Discussion

Increasing the scale of pasture based finishing systems assisted in lowering the cost of production as the cost associated with machinery, vehicles, insurance, maintenance and repairs was spread across a greater number of lambs.

Scale had a greater influence on the profitability of the Merino based finishing systems largely due to the influence of the wool return. Increasing the total wool clip as ewe (and lamb) numbers increased in addition to the higher value of Merino fleece compared to crossbred fleece resulted in higher profit margin sensitivity to scale.

While an increase in scale produced a negligible difference in profit margin (<$0.01 per head) when comparing Merino and crossbred specialist finishing systems, the relatively lower profit margin of Merino systems resulted in significant differences in profit margin between breeds as scale increased on a percentage change basis (108%).

Pasture types that returned lower profit margins were more sensitive to changes in scale than more profitable pasture systems. The profit margin of lambs finished on cereal stubbles was less sensitive to changes in scale than alternative pasture based systems due to lambs being finished to lighter weights on stubbles. The shorter feeding period and therefore lower feed requirements meant that the increased area required to finish additional lambs was smaller for stubble based finishing than alternative pasture based finishing systems.

The influence of scale on the feedlot finishing systems was driven by the relationship between capacity and annual throughput and the resulting efficiency of the system. Higher capacity feedlots were more sensitive to changes in annual throughput as the management costs increased with scale. When throughput was equal to capacity the larger feedlots were more profitable due to a higher level of efficiency. However, savings made by increasing throughput *above* capacity were greater than those achieved as a result of increasing feedlot capacity. As a result it was more profitable to finish the desired annual throughput by running multiple cycles within a smaller feedlot than to achieve the same annual throughput in one cycle from a feedlot at or below capacity.

The potential for on-going use of a feedlot should be considered prior to its establishment and return on investment assessed. This is especially important for opportunistic grain based finishing. Table 13 provides an example of costs per head to recoup establishment costs in a range of scenarios.

Table 13 - Infrastructure establishment costs per lamb for a 2000 head feedlot operated to capacity at various levels of infrastructure replacement and total number of feedlot cycles.

Number of cycles through feedlot	Proportion of infrastructure requiring establishment or replacement					
	100%	80%	60%	40%	20%	0%
1	$36.56	$29.24	$21.93	$14.62	$7.31	$0.00
5	$7.31	$5.85	$4.39	$2.92	$1.46	$0.00
10	$3.66	$2.92	$2.19	$1.46	$0.73	$0.00
15	$2.44	$1.95	$1.46	$0.97	$0.49	$0.00
20	$1.83	$1.46	$1.10	$0.73	$0.37	$0.00

Conclusion

Increasing the scale of the four finishing systems improved efficiency and profitability. In pasture based systems while increasing scale may return a higher profit margin, stocking rate must be managed appropriately to ensure animal welfare and environmental protection. Increasing the throughput of lambs in grain based systems has a greater influence on the profitability than increasing capacity.

Table 14 - Sensitivity of profit margin per head to changes in scale (breeding ewe numbers) of breeder-finisher systems across 3 different pasture types for ewes and 3 different pasture types for finishing Merino, first cross and second cross prime lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

Ewe breeding pasture	Lamb finishing pasture	Small (800 ewes)	Medium (1500 ewes)	Large (3600 ewes)
Merino Ewes crossed with Merino Sires				
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$38.85	$41.43	$43.17
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$37.52	$40.15	$41.88
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$34.48	$36.84	$38.42
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$22.50	$25.14	$26.86
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$21.23	$23.85	$25.58
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$18.13	$20.54	$22.12
Native Pasture	Cereal Stubbles	$34.09	$36.48	$38.06
Merino Ewes crossed with Terminal Sires				
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$61.15	$63.27	$64.69
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$59.78	$61.93	$63.34
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$54.44	$56.40	$57.68
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$47.82	$49.93	$51.34
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$46.44	$48.56	$49.99
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$41.11	$43.05	$44.34
Native Pasture	Cereal Stubbles	$54.17	$56.10	$57.40
First Cross Ewes crossed with Terminal Sires				
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$47.26	$49.22	$50.56
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$45.83	$47.84	$49.16
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$39.15	$40.95	$42.16
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$34.73	$36.73	$38.06
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$33.34	$35.35	$36.67
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$26.62	$28.44	$29.66
Native Pasture	Cereal Stubbles	$38.86	$40.68	$41.89

Table 15 - Sensitivity of profit margin per head to changes in scale (number of lambs finished) of specialist pasture finishing systems across 3 different pasture types for finishing Merino and crossbred prime lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

Breed	Lamb finishing pasture	Small (1000 lambs)	Medium (4500 lambs)	Large (10000 lambs)
Merino	Irrigated Clover / Ryegrass Pasture	-$1.35	$1.70	$2.18
	Fodder Crop - Chicory	-$2.63	$0.41	$0.89
	Cereal Stubbles	-$5.85	-$3.08	-$2.65
Crossbred	Irrigated Clover / Ryegrass Pasture	$17.71	$20.79	$21.26
	Fodder Crop - Chicory	$16.35	$19.39	$19.87
	Cereal Stubbles	$9.61	$12.38	$12.81

Table 16 - Sensitivity of profit margin per head to changes in annual throughput and capacity of feedlot based finishing systems finishing four month old crossbred lambs growing at 300 g/day.

Annual throughput of prime lambs	Capacity of feedlot					
	500	1000	2000	5000	10000	20000
Finishing system running lambs from a 35kg purchase and selling at 45kg						
500	$0.18	-$2.76	-$8.65	-$24.21	-$50.39	-$102.76
1000	$4.99	$3.52	$0.57	-$6.15	-$19.24	-$45.43
5000	-	$8.54	$7.95	$8.29	$5.68	$0.44
10000	-	-	$8.88	$10.11	$8.80	$6.18
20000	-	-	-	$11.01	$10.35	$9.04
50000	-	-	-	-	$11.29	$10.76
Finishing system running lambs from a 45kg purchase and selling at 55kg						
500	-$0.64	-$3.58	-$9.47	-$24.59	-$50.78	-$103.14
1000	$4.17	$2.70	-$0.25	-$6.54	-$19.63	-$45.81
5000	-	$7.72	$7.13	$7.91	$5.29	$0.05
10000	-	-	$8.06	$9.72	$8.41	$5.79
20000	-	-	-	$10.62	$9.97	$8.66
50000	-	-	-	-	$10.90	$10.38
Finishing system running lambs from a 35kg purchase and selling at 55kg						
500	$3.29	$0.35	-$5.54	-$20.67	-$46.85	-$99.21
1000	$8.10	$6.62	$3.68	-$2.61	-$15.70	-$41.88
5000	-	-	$11.06	$11.84	$9.22	$3.98
10000	-	-	-	$13.65	$12.34	$9.72
20000	-	-	-	$14.55	$13.90	$12.59
50000	-	-	-	-	-	$14.31

(Highlighted cells represent producers finishing lambs in more than one cycle per annum)

6.2.2. Stocking rate

Introduction

The stocking rate of the enterprise refers to the number of animals grazed per hectare. The influence of stocking rate on profit margin was analysed across specialist pasture finishing and traditional breeder-finisher pasture finishing systems.

The importance of stocking rate as a profit driver

	Finishing System	Sensitivity
1.	Traditional breeder-finisher pasture finishing	Very High
2.	Specialist pasture finishing	Very High
	Opportunistic grain based finishing	Not analysed
	Specialist grain based finishing	Not analysed

Methods

A budget was developed and analysed to determine the sensitivity of profit margins within pasture based finishing systems producing Merino and crossbred lambs to stocking rate.

Pasture based finishing systems were analysed over a range of pasture systems the details of which are outlined in the scope with additional parameters as follows:

- For breeder finishing systems, pasture production was fixed to the feed requirements of 800 breeding ewes. Profit margins were analysed by lowering or raising ewe numbers by increments of 100 ewes (12.5%).
- Sensitivities for the breeder-finisher systems were run from a stocking rate of 3 ewes/ha to 12 ewes/ha
- For specialist pasture finishing systems, pasture production was fixed to the feed requirements of finishing 4500 lambs (weight gain of 20kg). Profit margins were analysed by lowering or raising lamb numbers by increments of 500 lambs (11%).
- Sensitivities for the specialist pasture finishing systems were run from a stocking rate of 16 lambs/ha to 208 lambs/ha
- The influence of growth rate on the sensitivity of profit margins to stocking rate was analysed for growth rates of between 100 to 400 g/day

Assumptions

- Feed on offer (FOO) was not limited by seasonal variation
- When stocking rate exceeded feed on offer grain supplementation was implemented to meet requirements as per NRC (2007)
- Daily feed consumption of ewes and lambs was based on liveweight
- Mature liveweights of ewes were equal across breeds
- Feed demands of the animal were adjusted according to
    - breed
    - growth rate

- kgs of weight gain
- liveweight of lambs

Results

- Stocking rate was the most important profit driver for pasture based finishing systems
- An increase in stocking rate above optimum levels had a greater negative influence on profit margin than lowering stocking rates by the same magnitude
    - The higher the cost of production of pasture (per kg of DM) the greater the sensitivity of the profit margin to stocking rate
- When stocking rate was varied by ± 100 grazing ewes, profit margin sensitivity was greatest in the following breeder-finisher pasture systems;
    1. Cereals (Intended for grazing) – Barley (Figure 1)
    2. Native pasture (Figure 2)
    3. High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot (Figure 3)
- When stocking rate was varied by ± 100 grazing ewes the sensitivity of the profit margin was greatest in breeder-finisher systems grazing lambs on;
    1. Fodder Crop – Chicory (Figure 1)
    2. Irrigated Clover / Ryegrass Pasture (Figure 1)
    3. Cereal Stubbles (Figure 1)
- When the stocking rate was varied by ± 500 lambs the sensitivity of profit margin was greatest in specialist pasture finishing systems grazing lambs on;
    1. Fodder Crop – Chicory (Figure 4)
    2. Irrigated Clover / Ryegrass Pasture (Figure 4)
    3. Cereal Stubbles (Figure 4)
- Profit margins of self-replacing Merino breeder-finisher systems were more sensitive to changes in stocking rate than first cross ewe flocks (Figure 1).
- The profit margins of specialist pasture systems finishing Merino lambs were less sensitive to changes in stocking rate than crossbred lambs (Figure 4).
- Profit margin sensitivity of pasture based finishing systems to stocking rate was greatest within systems finishing lambs at slower growth rates.
    - Profit margin sensitivity in breeder-finisher systems was reduced by up to 30% as growth rate increased from 100 to 400 g/head/day.
    - Profit margin sensitivity in specialist pasture finishing systems was reduced by up to 55% as growth rate increased from 100 to 400 g/head/day.

Discussion

The analysis has shown that the profit margins of pasture based finishing systems were highly sensitive to variation in stocking rate however this effect was reduced with an increase in daily lamb growth rate.

The cost of pasture production was lower than the cost of purchasing the same level of supplementary feed. The lower cost of pasture production meant that stocking rates below optimum where FOO equalled feed demand, had less

influence on the profit margin than changes of the same magnitude above optimum stocking rate.

The influence of the pasture system on the sensitivity of the profit margin to stocking rate was dependent on the cost of production per ha and DM production per ha. Pasture systems with a high cost of production per ha such as fodder crops were more sensitive to stocking rate than perennial pasture systems with a lower cost of production per ha. Native pasture based systems and other pasture systems with low dry matter production per ha had a greater sensitivity to stocking rate change than more productive pastures.

The analysis showed that the profit margin of first cross ewe breeder-finisher systems were less sensitive to stocking rate than Merino ewes. As ewe feed demands were equal across breeds, the crossbred system had the advantage of higher weaning percentages and not having to feed replacement ewes to joining weights (analysis of weaning percentage is addressed in section 6.2.6 page 64 which varies feed intake for number of lambs weaned). The slower growth rate of the Merino lambs resulted in increased total feed consumption over the growing period. The higher the feed demands for the flock the greater the sensitivity of the profit margin to stocking rate.

Total feed demand of lambs increased as the genetic potential for growth declined. Increased feed demand increased the cost of production per lamb which increased the sensitivity of the profit margin to stocking rate, as it cannot be assumed that slow growing lambs are necessarily eating less.

Conclusion

Optimisation of stocking rates by matching feed production with feed requirements effectively lowered the cost of production per head and increased profit margins. Pasture utilisation, growth rate and reproductive rate were found to be the major profit drivers in a pasture based finishing system.

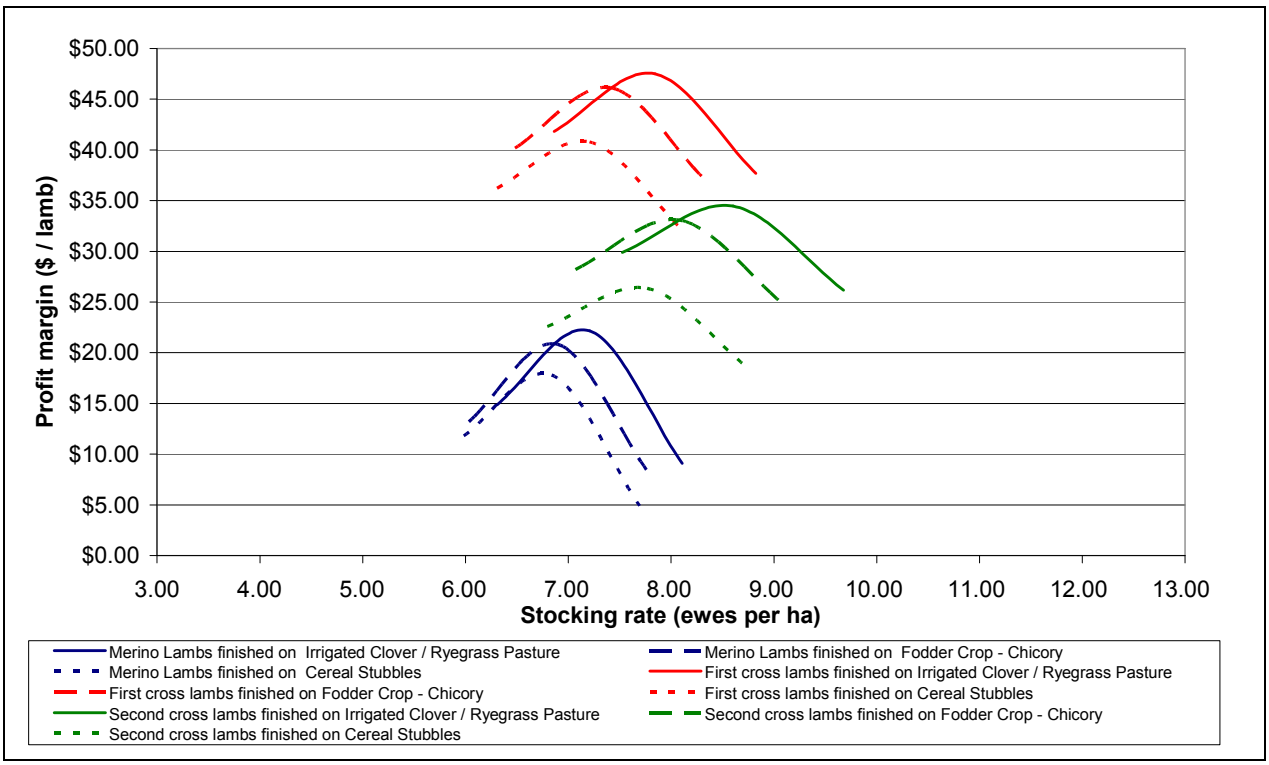

Figure 1 - Sensitivity of the profit margin per head to changes in stocking rate (breeding ewes / ha) in breeder-finisher systems where ewes grazed cereals during pregnancy and lactation with Merino (finished from 25 to 45kg) , first cross and second cross (finished from 35 to 55kg) lambs finished on a range of pasture types.

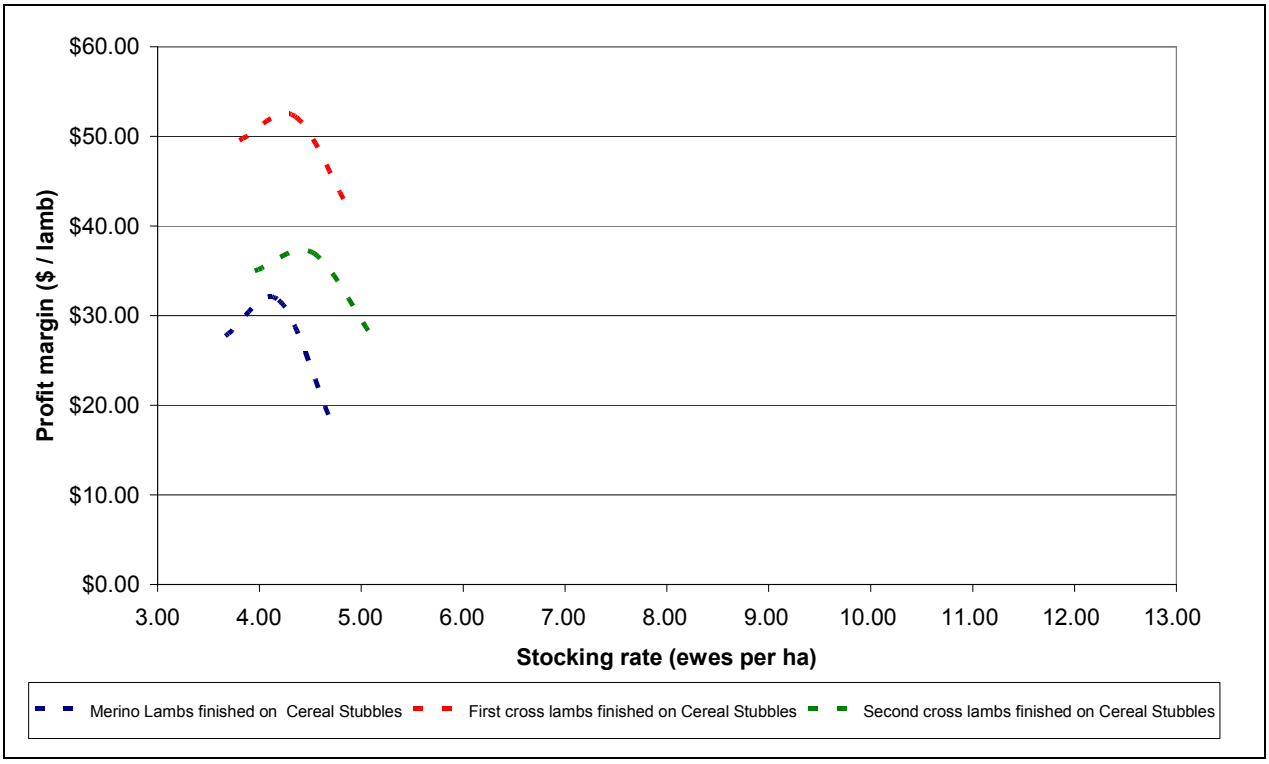

Figure 2 - Sensitivity of profit margin per head to changes in stocking rate (breeding ewes / ha) in breeder-finisher systems where ewes grazed native pastures during pregnancy and lactation with Merino (finished from 25 to 45kg) , first cross and second cross (finished from 35 to 55kg) lambs finished on cereal stubbles.

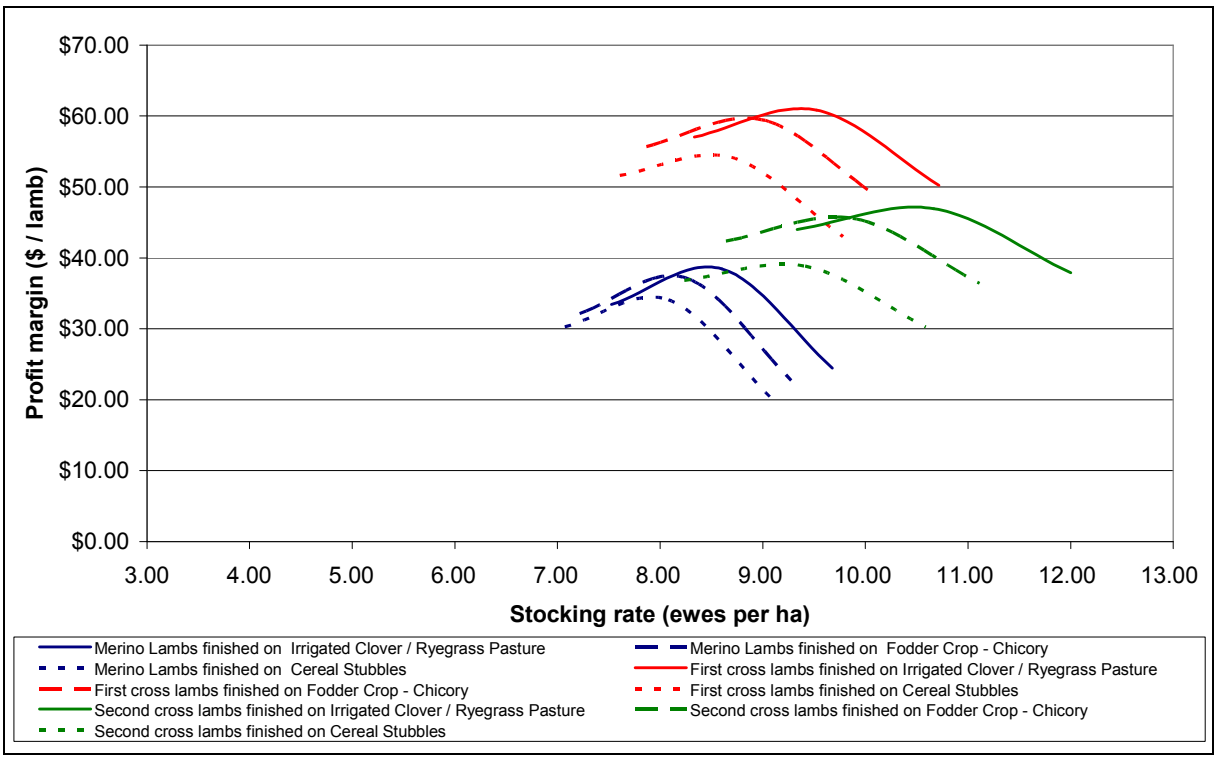

Figure 3 - Sensitivity of profit margin per head to changes in stocking rate (breeding ewes / ha) in breeder-finisher systems where ewes grazed a high rainfall long term pasture type during pregnancy and lactation with Merino (finished from 25 to 45kg) , first cross and second cross (finished from 35 to 55kg) lambs finished on a range of different pasture types.

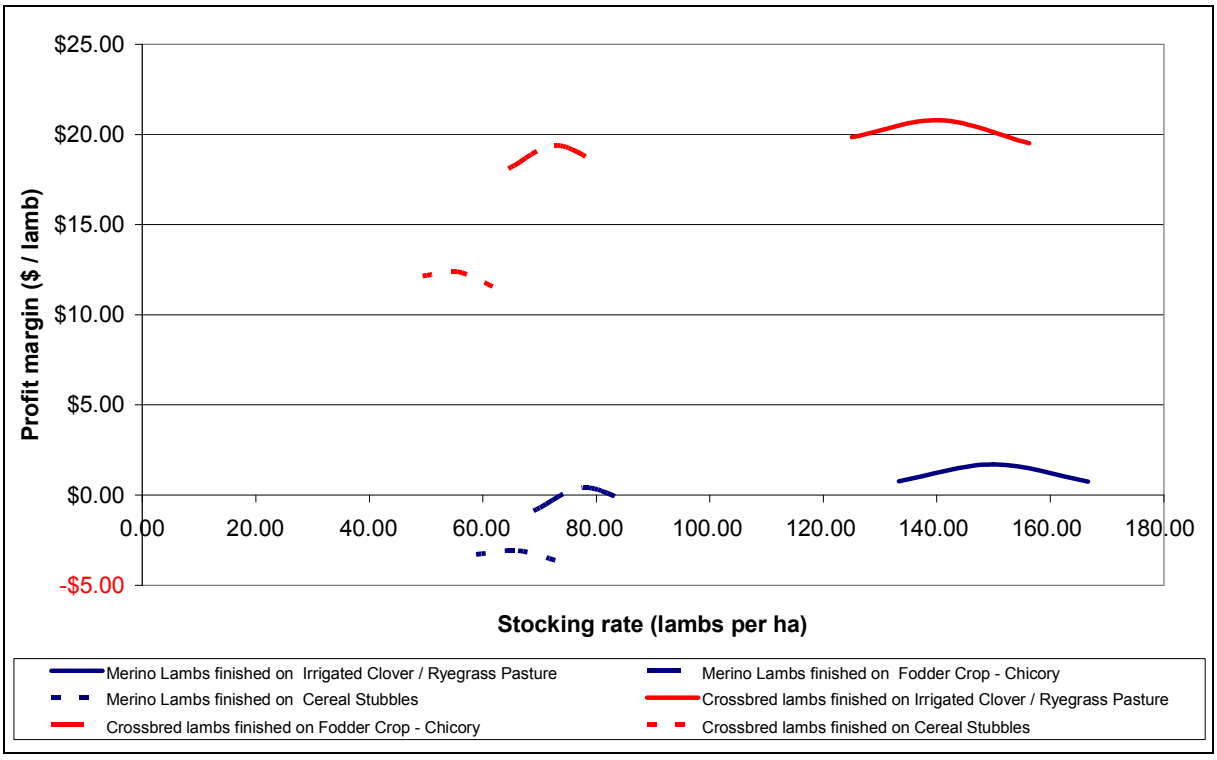

Figure 4 - Sensitivity of profit margin per head to changes in stocking rate (lambs/ha) in specialist pasture finishing systems producing Merino (finished from 25 to 45kg) and crossbred lambs (finished from 35 to 55kg) across 3 different lamb finishing pastures.

Table 17 - Sensitivity of profit margin per head to changes in stocking rate of breeder-finisher systems across three different pasture types and three different lamb finishing pastures for Merino, first cross and second cross lambs growing at four different growth rates. Merino lambs finished from 25-45kg (25-35kg on stubbles) and crossbred lambs finished from 35-55kg (35-45kg on stubbles).

		Stocking rate											
		-100 ewes				base				+100 ewes			
Ewe breeding pasture	**Lamb finishing pasture**	**100 g / day**	**200 g / day**	**300 g / day**	**400 g / day**	**100 g / day**	**200 g / day**	**300 g / day**	**400 g / day**	**100 g / day**	**200 g / day**	**300 g / day**	**400 g / day**
Merino Ewes crossed with Merino Sires													
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$18.41	$30.79	$33.42	$33.70	$25.41	$36.12	$38.45	$38.70	$9.60	$20.79	$24.46	$24.68
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$14.89	$29.20	$32.13	$32.42	$22.18	$34.53	$37.18	$37.43	$7.08	$18.97	$22.71	$22.93
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$27.50	$29.84	$30.26	$30.41	$31.85	$33.66	$34.08	$34.21	$16.73	$18.69	$20.13	$20.24
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	-$0.10	$12.28	$14.88	$15.17	$9.12	$19.83	$22.16	$22.41	-$5.77	$6.61	$9.09	$9.31
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	-$3.59	$10.28	$13.20	$13.48	$5.89	$18.19	$20.84	$21.08	-$8.29	$5.80	$8.46	$8.68
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$8.90	$11.04	$11.80	$11.94	$15.55	$17.32	$17.79	$17.91	$1.54	$4.57	$4.90	$5.01
Native Pasture	Cereal Stubbles	$25.29	$27.26	$27.72	$27.86	$29.55	$31.31	$31.73	$31.85	$13.96	$16.91	$17.96	$18.07
Merino Ewes crossed with Terminal Sires													
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$39.63	$53.35	$57.04	$58.90	$45.20	$57.29	$60.83	$62.26	$31.59	$45.43	$50.24	$51.73
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$34.84	$50.86	$55.69	$57.76	$41.38	$55.37	$59.50	$61.15	$28.24	$43.76	$48.67	$50.25
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$48.64	$50.91	$51.61	$51.85	$51.64	$53.58	$54.16	$54.40	$40.01	$42.70	$42.98	$44.03
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$24.08	$38.29	$41.84	$43.79	$31.82	$43.95	$47.49	$48.92	$20.06	$33.07	$37.69	$39.21
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$19.70	$35.70	$40.18	$42.34	$28.05	$42.04	$46.12	$47.77	$16.60	$32.13	$37.00	$38.64
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$33.44	$35.76	$36.22	$36.71	$38.31	$40.25	$40.79	$41.07	$27.52	$30.29	$32.10	$31.61
Native Pasture	Cereal Stubbles	$46.71	$48.85	$49.53	$49.79	$49.76	$51.65	$52.24	$52.48	$37.13	$40.50	$41.57	$42.30
First Cross Ewes crossed with Terminal Sires													
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$24.03	$39.19	$44.02	$46.46	$29.54	$42.61	$46.95	$49.15	$17.53	$32.28	$37.89	$39.20
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$19.37	$36.84	$42.38	$45.17	$25.38	$40.53	$45.57	$48.09	$13.20	$30.58	$36.40	$38.87
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$33.73	$36.16	$36.84	$37.27	$36.12	$38.18	$38.85	$39.18	$25.68	$28.31	$30.28	$30.43
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$9.89	$24.71	$29.89	$31.96	$17.05	$30.08	$34.47	$36.62	$5.84	$21.48	$26.16	$29.23
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$4.79	$22.38	$28.22	$30.97	$12.85	$28.01	$33.08	$35.60	$3.10	$19.70	$24.79	$27.99
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$19.49	$22.03	$22.59	$23.09	$23.63	$25.69	$26.36	$26.70	$14.03	$17.43	$18.58	$19.45
Native Pasture	Cereal Stubbles	$31.92	$34.23	$35.00	$35.37	$34.36	$36.37	$37.04	$37.38	$23.06	$26.92	$28.07	$28.85

Table 18 - Sensitivity of profit margin per head to changes in stocking rate of specialist pasture based finishing systems across three different pasture types for Merino and crossbred lambs growing at four different growth rates. Merino lambs finished from 25-45kg (25-35kg on stubbles) and crossbred lambs finished from 35-55kg (35-45kg on stubbles).

		Stocking rate											
		-500 lambs				base				+500 lambs			
Ewe breeding pasture	**Lamb finishing pasture**	**100 g / day**	**200 g / day**	**300 g / day**	**400 g / day**	**100 g / day**	**200 g / day**	**300 g / day**	**400 g / day**	**100 g / day**	**200 g / day**	**300 g / day**	**400 g / day**
Merino Lambs	Irrigated Clover / Ryegrass Pasture	-$12.05	-$1.45	$0.77	$0.81	-$9.66	-$0.22	$1.70	$1.74	-$12.65	-$1.83	$0.75	$0.79
	Fodder Crop - Chicory	-$15.76	-$3.30	-$0.88	-$0.84	-$12.88	-$1.83	$0.41	$0.45	-$15.32	-$3.01	-$0.45	-$0.42
	Cereal Stubbles	-$4.85	-$3.57	-$3.29	-$3.27	-$4.47	-$3.33	-$3.08	-$3.07	-$6.27	-$4.14	-$3.70	-$3.68
Crossbred Lambs	Irrigated Clover / Ryegrass Pasture	$1.34	$15.22	$19.85	$22.16	$4.57	$16.73	$20.79	$22.81	$0.88	$14.77	$19.50	$21.86
	Fodder Crop - Chicory	-$3.14	$12.84	$18.10	$20.82	$0.41	$14.65	$19.39	$21.76	-$2.83	$13.15	$18.37	$21.06
	Cereal Stubbles	$9.77	$11.56	$12.15	$12.45	$10.25	$11.85	$12.38	$12.64	$7.77	$10.64	$11.57	$12.13

6.2.3. Value of the lamb at purchase

Introduction

Variability in purchase price due to supply and demand, between seasons and across regions, has a large influence on the profitability of lamb finishing systems. Buying lambs in represents a significant initial investment.

The influence of the lamb's purchase value was analysed across specialist pasture finishing, opportunistic grain based finishing and specialist grain based finishing systems to determine profitability across a range of scenarios. The value of the lamb upon entering the finishing system was determined by the purchase price, breed and weight of the animal.

The importance of purchase price as a profit driver

	Finishing System	Sensitivity
1.	Opportunistic grain based finishing	Very High
2.	Specialist grain based finishing	Very High
3.	Specialist pasture finishing	Very High
	Traditional breeder-finisher pasture finishing	Not applicable

Methods

A budget was developed and analysed to determine the sensitivity of the profit margin of feedlot and specialist pasture finishing systems for Merino and crossbred lambs to purchase price. Specific analysis parameters were as follows:

- Profit margin sensitivities for feedlot and specialist pasture systems were determined over a purchase price range of $1.00 to $2.00/kg liveweight
- The influence of final carcase price on the sensitivity of the profit margin of feedlot finishing systems to purchase price was analysed for a carcase price of $3.00 to $4.50 /kg cwt
- The influence of entry weights on the sensitivity of the profit margin of feedlot finishing systems to purchase price was analysed for entry weights of 35 and 45kg
- The influence of pasture type on profit margin was analysed for specialist finishing systems

Assumptions

- Average dressing percentage for crossbred lambs was 45% to allow for lighter weights in some finishing systems and export trim
- Carcase weight (cwt) for lambs finished from 35kg to 45kg was 20.25 kg cwt
- Carcase weight for lambs finished from 45kg to 55kg or 35 kg to 55 kg was 24.75 kg cwt

Results

- Purchase price was found to be a major profit driver in feedlot finishing systems and specialist pasture finishing systems.
- Variation in purchase price of ± $1.00 ($/kg LW) resulted in a change in the profit margin by $25/head for pasture based systems finishing Merinos and $35/head when finishing crossbred lambs (Table 19).
- Variation in the purchase price ($/kg LW) of ± $1.00 resulted in a change in the profit margin of feedlot finishing systems of $35 to $45 per head (Table 20).
- The profit margin of feedlot finishing systems purchasing lambs at 45kg were 28.5% more sensitive to the purchase price than purchasing lambs at 35kg (Table 20).
- The sensitivity of the profit margin to purchase price was not influenced by the carcase price received (Table 20)

Discussion

The analysis showed that purchase price was a major profit driver in feedlot finishing systems with the profit margins being highly sensitive to changes in purchase price.

In specialist pasture finishing and feedlot systems the purchase price of the lamb had the greatest effect on profit margin. Where lambs were purchased on a per kg LW basis, each dollar per kg LW increase in the purchase price decreased profit margin by the change in price multiplied by the liveweight.

A heavier purchase weight meant that price fluctuations ($/kg LW) were multiplied by a greater liveweight. The effect multiplied as liveweight at purchase increased resulting in more sensitive profit margins when feeding to 55 kg rather than 45 kg LW.

Conclusion

Finishing lambs to heavy weights (>50kg LW) increased profit risk significantly and was highly sensitive to purchase price or value. The importance of profit margin analysis prior to purchase cannot be underestimated.

Table 19 - Sensitivity of profit margin per head to changes in purchase price ($/kg LW) of specialist pasture finishing systems across 3 different lamb finishing pasture types for Merino and crossbred prime lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles). Carcase price was constant across analyses.

		Lamb purchase price ($ / kg lwt)				
Breed	**Finishing pasture**	**$1.00**	**$1.25**	**$1.48**	**$1.75**	**$2.00**
Merino	Irrigated Clover / Ryegrass Pasture	$13.70	$7.45	$1.70	-$5.05	-$11.30
	Fodder Crop - Chicory	$12.41	$6.16	$0.41	-$6.34	-$12.59
	Cereal Stubbles	$8.92	$2.67	-$3.08	-$9.83	-$16.08
Crossbred	Irrigated Clover / Ryegrass Pasture	$37.59	$28.84	$20.79	$11.34	$2.59
	Fodder Crop - Chicory	$36.19	$27.44	$19.39	$9.94	$1.19
	Cereal Stubbles	$29.18	$20.43	$12.38	$2.93	-$5.82

Table 20 - Sensitivity of profit margin per head to changes in purchase price ($/kg lwt) and carcase price ($/kg cwt) for finishing four month old crossbred lambs growing at 300 g/day in a feedlot system with a capacity of 2000 lambs and annual throughput of 4500 lambs.

Purchase price for a crossbred lamb ($/kg lwt)	Lamb carcase price ($/kg cwt)				
	$3.00	**$3.50**	**$3.65**	**$4.00**	**$4.50**
Finishing system running lambs from a 35kg purchase and selling at 45kg					
Dressing %: 45%. 20kg carcase weight					
$1.00	12.56	22.04	24.89	31.53	41.01
$1.25	3.63	13.11	15.96	22.60	32.08
$1.48	-4.58	4.90	7.75	14.38	23.87
$1.75	-14.23	-4.74	-1.90	4.74	14.23
$2.00	-23.16	-13.67	-10.83	-4.19	5.30
Finishing system running lambs from a 45kg purchase and selling at 55kg					
Dressing %: 45%. 24kg carcase weight					
$1.00	13.88	25.48	28.97	37.09	48.69
$1.25	2.40	14.00	17.49	25.61	37.21
$1.48	-8.16	3.44	6.92	15.05	26.65
$1.75	-20.56	-8.95	-5.47	2.65	14.26
$2.00	-32.04	-20.43	-16.95	-8.83	2.78
Finishing system running lambs from a 35kg purchase and selling at 55kg					
Dressing %: 45%. 24kg carcase weight					
$1.00	12.99	24.53	28.00	36.08	47.62
$1.25	4.06	15.60	19.07	27.15	38.69
$1.48	-4.16	7.39	10.85	18.93	30.48
$1.75	-13.80	-2.25	1.21	9.29	20.84
$2.00	-22.73	-11.18	-7.72	0.36	11.91

6.2.4. Value of the carcase after finishing

Introduction

Carcase value or final sale price is often a focal point for producers because of its perceived effect on profit margin. The value of the carcase is driven by carcase weight, market price, dressing percentage and market penalties.

Carcase prices can be highly variable throughout the year and across regions. Variations in carcase prices are driven by supply and demand pressures within the lamb industry.

The dressing percentage refers to the relationship between the live finishing weight and the carcase weight; payments are received on a hot standard carcase weight basis or on a liveweight basis.

The influence of the lamb's carcase value was analysed by measuring the influence of dressing percentage and carcase price on profit margin, across traditional breeder-finisher, specialist pasture finishing and feedlot finishing systems.

The importance of carcase price as a profit driver

	Finishing System	Sensitivity
1.	Opportunistic grain based finishing	Very High
2.	Specialist grain based finishing	Very High
3.	Specialist pasture finishing	Very High
4.	Traditional breeder-finisher pasture finishing	Very High

The importance of dressing percentage as a profit driver

	Finishing System	Sensitivity
1.	Opportunistic grain based finishing	High
2.	Specialist pasture finishing	High
3.	Specialist grain based finishing	High
4.	Traditional breeder-finisher pasture finishing	Moderate

Methods

A budget was developed and analysed to determine the sensitivity of profit margins within all finishing systems for Merino and crossbred lambs to carcase price and dressing percentage.

Pasture based finishing systems were analysed over a range of pasture systems the details of which are outlined in the scope. Additional specific parameters were as follows:

- Sensitivities for the 4 finishing systems were determined over carcase prices ranging from $3.00 to $4.50/kg cwt.

- The influence of purchase price on the profit margins of feedlot finishing systems to final carcase price was analysed for a purchase price of $1.00 to $2.00 /kg LW.
- Sensitivities for all finishing systems were run over a range of dressing percentages from 43 to 47% reflective of industry export standards.

Assumptions

- The carcase price was adjusted for breed differences which resulted in a discounted price for Merino lambs
- Crossbred lamb prices were determined by carcase weight (heavy trade lamb vs export lamb)
- In the pasture based finishing system, the dressing percentage of the Merino lambs was fitted 2% below the dressing percentage of the crossbred lambs

Results

- Carcase price was found to be a major profit driver in all systems although the effect was less in lambs from the pasture-based production system
- Variation in carcase price of ± $1.00 ($/kg LW) resulted in a change in the profitability of $15.75 to $24.75 per head for both specialist pasture finishing systems (Table 21) and breeder-finisher systems (Table 22)
- Variation in carcase price of ± $1.00 ($/kg cwt) resulted in a change in the profitability of feedlot finishing systems of $18.07 to $24.19 per head (Table 23)
- The profitability of feedlot finishing systems was 21.7% more sensitive to carcase price when lambs were finished to 55kg compared to finishing lambs to 45kg
- Dressing percentage was found to be an influential profit driver in all finishing systems
- Variation in dressing percentage of ± 2% resulted in a change in the profitability of feedlot finishing systems of up to $4.40 per head (Table 23)
- Variation in dressing percentage of ± 2% resulted in a change in the profitability of specialist pasture finishing systems of up to $4.02 per head (Table 24)
- Variation in dressing percentage of ± 2% resulted in a change in the profitability of breeder finishing systems of up to $4.02 per head (Table 25)
- The sensitivity of the profit margin in feedlot finishing systems to dressing percentage was influenced by weight/size of the lamb purchased (Table 23)
    - The profit margin of feedlot finishing systems were approximately 20.7% more sensitive to changes dressing percentage when finishing lambs to 55kg LW compared to 45kg LW
- The sensitivity of the profit margin in feedlot finishing systems to dressing percentage was influenced by the carcase price (Table 23)
    - The profit margin of feedlot finishing systems finishing crossbred lambs at $3.00 /kg cwt were approximately 25% less sensitive to dressing percentage than when crossbred lambs at $4.00 /kg cwt
- The sensitivity of the profit margin in feedlot finishing systems to dressing

percentage was influenced by the breed of the lamb purchased (Table 23)

- For each 2% change in dressing percentage the profitability of crossbred lambs was up to 34.5% more sensitive than for finishing Merino lambs

Discussion

The analysis highlighted that carcase price was a major profit driver in all finishing systems, with profitability highly sensitive to changes in carcase price.

The returns from the carcase made up the majority of the income in feedlot and specialist pasture finishing systems. For every increase in the carcase price ($/kg cwt) the profitability increased by the change in price times by the carcase weight.

A heavier sale weight meant that price fluctuations ($/kg cwt) were multiplied by a larger carcase. The multiplier effect meant the profit margins were more sensitive to changes in carcase price when lambs were finished to 55kg compared to 45kg liveweight. Cost of production increased where lambs were finished to heavier weights which increased the profit risk associated with variation in carcase price.

The profitability of all the finishing systems showed moderate to high sensitivity to a 2% change in dressing percentage. As the dressing percentage can vary by more than 2%, especially if bruising or seed contamination occurs, the profit margins can become highly sensitive to dressing percentage.

The link between dressing percentage and carcase weight meant that dressing percentage and carcase price were also linked; enterprise profitability was more sensitive to changes in dressing percentage when carcase prices were high.

The lower carcase value and finishing weights of the Merino meant that the profit margin of Merinos was less sensitive to dressing percentage than for crossbred lambs.

Conclusion

Researching different markets for finished lambs and securing forward contracts after carrying out a profit margin analysis prior to purchasing is the best management tactic to control the risk associated with carcase price. Maximising dressing percentage by careful management (fat score, bruising, seed contamination) had a positive influence on profitability.

Table 21 - Sensitivity of profit margin per head to changes in carcase price ($/kg cwt) in specialist pasture finishing systems across 3 different pasture types for finishing Merino and crossbred prime lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Carcase price ($/kg cwt)				
Breed	**Lamb finishing pasture**	**$3.00**	**$3.50**	**$3.65**	**$4.00**	**$4.50**
Merino Lambs	Irrigated Clover / Ryegrass Pasture	-$8.87	$1.26	$4.29	$11.38	$21.51
	Fodder Crop - Chicory	-$10.16	-$0.04	$3.00	$10.09	$20.21
	Cereal Stubbles	-$11.31	-$3.43	-$1.07	$4.44	$12.32
Crossbred Lambs	Irrigated Clover / Ryegrass Pasture	$4.70	$17.07	$20.79	$29.45	$41.82
	Fodder Crop - Chicory	$3.31	$15.68	$19.39	$28.06	$40.43
	Cereal Stubbles	-$0.79	$9.34	$12.38	$19.46	$29.59

Table 22 - Sensitivity of profit margin per head to changes in carcase price ($/kg cwt) in breeder-finisher systems across 3 different breeding ewe pastures and 3 different lamb finishing pastures for Merino, first cross and second cross prime lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Carcase price ($/kg cwt)				
Ewe breeding pasture	**Lamb finishing pasture**	**$3.00**	**$3.50**	**$3.65**	**$4.00**	**$4.50**
Merino Ewes crossed with Merino Sires						
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$28.27	$38.40	$41.44	$48.52	$58.65
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$26.95	$37.07	$40.11	$47.20	$57.32
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$26.25	$34.13	$36.49	$42.00	$49.88
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$11.93	$22.05	$25.09	$32.18	$42.30
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$10.66	$20.78	$23.82	$30.91	$41.03
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$9.91	$17.78	$20.15	$25.66	$33.53
Native Pasture	Cereal Stubbles	$25.87	$33.75	$36.11	$41.62	$49.50
Merino Ewes crossed with Terminal Sires						
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$47.18	$58.69	$62.15	$70.20	$81.71
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$45.81	$57.32	$60.77	$68.83	$80.34
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$43.18	$52.44	$55.22	$61.70	$70.96
Grazing Cereal (Intended) – Barley	Irrigated Clover / Ryegrass Pasture	$33.85	$45.36	$48.81	$56.87	$68.38
Grazing Cereal (Intended) – Barley	Fodder Crop - Chicory	$32.48	$43.99	$47.44	$55.50	$67.01
Grazing Cereal (Intended) – Barley	Cereal Stubbles	$29.85	$39.11	$41.88	$48.37	$57.63
Native Pasture	Cereal Stubbles	$42.91	$52.17	$54.95	$61.43	$70.69
First Cross Ewes crossed with Terminal Sires						
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$31.17	$43.54	$47.26	$55.92	$68.29
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$29.74	$42.12	$45.83	$54.49	$66.87
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$25.99	$36.11	$39.15	$46.24	$56.36
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$18.64	$31.02	$34.73	$43.39	$55.77
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$17.26	$29.63	$33.34	$42.01	$54.38
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$13.46	$23.59	$26.62	$33.71	$43.84
Native Pasture	Cereal Stubbles	$25.69	$35.82	$38.86	$45.94	$56.07

Table 23 - Sensitivity of profit margin per head to changes in dressing percentage and carcase price ($/kg cwt) of four month old crossbred and Merino lambs growing at 300 g/day in a feedlot finishing system with a capacity of 2000 lambs and a throughput of 4500 lambs per annum.

Dressing percentage of carcase	Carcase price ($/kg cwt)					
	$3.00		$3.65		$4.00	
	Merino	Crossbred	Merino	Crossbred	Merino	Crossbred
Finishing system running lambs from a 35kg purchase and selling at 45kg						
43%	-$17.04	-$7.33	-$5.30	$4.42	$1.03	$10.74
44%	-$16.01	-$5.96	-$3.97	$6.08	$2.51	$12.56
45%	-$14.97	-$4.58	-$2.64	$7.75	$4.00	$14.38
46%	-$13.94	-$3.21	-$1.31	$9.41	$5.48	$16.21
47%	-$12.90	-$1.84	$0.01	$11.08	$6.97	$18.03
Finishing system running lambs from a 45kg purchase and selling at 55kg						
43%	-$23.10	-$11.46	-$8.73	$2.91	-$0.99	$10.65
44%	-$21.87	-$9.81	-$7.14	$4.92	$0.79	$12.85
45%	-$20.64	-$8.16	-$5.56	$6.92	$2.57	$15.05
46%	-$19.42	-$6.51	-$3.97	$8.93	$4.34	$17.25
47%	-$18.19	-$4.86	-$2.39	$10.94	$6.12	$19.45
Finishing system running lambs from a 35kg purchase and selling at 55kg						
43%	-$22.10	-$7.46	-$7.80	$6.84	-$0.11	$14.53
44%	-$20.87	-$5.81	-$6.22	$8.85	$1.67	$16.73
45%	-$19.64	-$4.16	-$4.63	$10.85	$3.45	$18.93
46%	-$18.42	-$2.51	-$3.05	$12.86	$5.22	$21.13
47%	-$17.19	-$0.86	-$1.47	$14.87	$7.00	$23.33

Table 24 - Sensitivity of profit margins per head to changes in dressing percentage of specialist pasture finishing systems across 3 different lamb finishing pastures for Merino and crossbred prime lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Dressing percentage				
Breed	**Lamb finishing pasture**	**43%**	**44%**	**45%**	**46%**	**47%**
Merino Lambs	Irrigated Clover / Ryegrass Pasture	-$0.89	$0.41	$1.70	$3.00	$4.29
	Fodder Crop - Chicory	-$2.18	-$0.89	$0.41	$1.71	$3.00
	Cereal Stubbles	-$5.10	-$4.09	-$3.08	-$2.08	-$1.07
Crossbred Lambs	Irrigated Clover / Ryegrass Pasture	$16.77	$18.78	$20.79	$22.79	$24.80
	Fodder Crop - Chicory	$15.38	$17.39	$19.39	$21.40	$23.41
	Cereal Stubbles	$9.09	$10.73	$12.38	$14.02	$15.66

Table 25 - Sensitivity of profit margin per head to changes in dressing percentage of breeder-finisher systems across 3 different pastures types and 3 different lamb finishing pastures Merino, first cross and second cross prime lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Dressing Percentage				
Ewe breeding pasture	**Lamb finishing pasture**	**43%**	**44%**	**45%**	**46%**	**47%**
Merino Ewes crossed with Merino Sires						
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$36.25	$37.55	$38.85	$40.14	$41.44
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$34.93	$36.22	$37.52	$38.82	$40.11
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$32.46	$33.47	$34.48	$35.48	$36.49
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$19.91	$21.20	$22.50	$23.80	$25.09
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$18.64	$19.93	$21.23	$22.53	$23.82
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$16.11	$17.12	$18.13	$19.14	$20.15
Native Pasture	Cereal Stubbles	$32.08	$33.08	$34.09	$35.10	$36.11
Merino Ewes crossed with Terminal Sires						
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$57.68	$59.41	$61.15	$62.88	$64.62
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$56.31	$58.04	$59.78	$61.51	$63.25
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$51.65	$53.04	$54.44	$55.84	$57.24
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$44.35	$46.08	$47.82	$49.55	$51.28
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$42.98	$44.71	$46.44	$48.18	$49.91
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$38.31	$39.71	$41.11	$42.51	$43.91
Native Pasture	Cereal Stubbles	$51.38	$52.77	$54.17	$55.57	$56.97
First Cross Ewes crossed with Terminal Sires						
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$43.24	$45.25	$47.26	$49.26	$51.27
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$41.81	$43.82	$45.83	$47.84	$49.84
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$35.86	$37.51	$39.15	$40.79	$42.43
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$30.71	$32.72	$34.73	$36.74	$38.74
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$29.33	$31.34	$33.34	$35.35	$37.36
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$23.34	$24.98	$26.62	$28.27	$29.91
Native Pasture	Cereal Stubbles	$35.57	$37.21	$38.86	$40.50	$42.14

6.2.5. Weaning weight

Introduction

High weaning weights are a critical component of lamb survival. Merino lambs are more likely to have sub-optimal weaning weights and higher levels of mortality post weaning than their crossbred counterparts. This analysis investigated the effect on profitability of varying weaning weight which was used as the weight at which these lambs entered a finishing system.

The importance of weaning weight as a profit driver

	Finishing System	Sensitivity
1.	Traditional breeder-finisher pasture finishing	Moderate
	Opportunistic grain based finishing	Not applicable
	Specialist grain based finishing	Not applicable
	Specialist pasture finishing	Not applicable

Methods

A budget was developed and analysed to determine the sensitivity of profit margin within breeder-finisher systems producing Merino and crossbred lambs to weaning weight.

Breeder-finisher systems were analysed over a range of pasture systems, details of which are outlined within the scope, with additional parameters as follows:

- Sensitivities for the breeder-finisher systems were determined across a weaning weight range of 25 to 35kg for crossbred lambs and 15 to 25kg for Merino lambs
- The influence of growth rate on the sensitivity of the profit margin to weaning percentage and weaning weight was analysed for growth rates from 100 to 400 g/day

Assumptions

- Merino lambs were weaned 10kg lighter than crossbred lambs
- Lambs were weaned at 14 weeks of age
- Mortality rates were equal across all analyses

Results

- Variation in weaning weight of ± 5kg resulted in a change in the profit margin for breeder-finisher systems of $1 to $10 per head (Table 26)
- When varying the weaning weight the sensitivity of the profit margins were greatest in breeder-finisher systems grazing lambs on (Table 26):
    1. Fodder Crop – Chicory
    2. Irrigated Clover / Ryegrass Pasture
    3. Cereal Stubbles
- When varying the weaning weight the sensitivity of the profit margins were greatest in breeder-finisher systems based on (Table 26):
    1. First cross ewes crossed with a terminal sire
    2. Self-replacing Merino ewe flock crossed to a terminal sire

3. Self-replacing Merino flock

- The profit margin's sensitivity in breeder-finisher systems to weaning weight was greatest in the pasture based systems finishing lambs at lower growth rates

Discussion

The sensitivity of the profit margin to weaning weight increased as the cost of production of pasture increased. Breeder-finisher systems producing lambs on pastures with a high cost of production, for example fodder crops, were more sensitive to lower weaning weight than native pasture systems. The increased sensitivity was driven by the higher cost of production per lamb.

Breeder-finisher systems producing crossbred lambs were more sensitive to changes in weaning weight than when finishing Merino lambs. This was brought about by the heavier liveweights, which increased feed consumption and increased the cost of production above that of Merino lambs.

Conclusion

Increasing the weaning weight of breeder finisher systems improved the efficiency of the breeding system and as a result the cost of production per lamb was minimised.

Table 26 - Sensitivity of profit margin per head to changes in weaning weight of breeder-finisher systems across 3 breeding ewe pastures and 3 lamb finishing pastures for Merino, first cross and second cross prime lambs. Merino lambs finished from to 45kg (25-35kg on stubbles) and crossbred lambs finished to 55kg (35-45kg on stubbles). Merino lambs were weaned 10kg lighter than crossbreds.

		Weaning weight											
Ewe breeding pasture	**Lamb finishing pasture**	**25 kg for crossbred lambs**				**30 kg for crossbred lambs**				**35 kg for crossbred lambs**			
	Growth rate	**100 g / day**	**200 g / day**	**300 g / day**	**400 g / day**	**100 g / day**	**200 g / day**	**300 g / day**	**400 g / day**	**100 g / day**	**200 g / day**	**300 g / day**	**400 g / day**
Merino Ewes crossed with Merino Sires													
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$17.95	$32.39	$35.60	$35.97	$21.68	$34.26	$37.03	$37.34	$25.41	$36.12	$38.45	$38.70
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$13.70	$30.27	$33.88	$34.25	$17.94	$32.40	$35.53	$35.84	$22.18	$34.53	$37.18	$37.43
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$29.26	$32.31	$33.12	$33.37	$30.55	$32.99	$33.60	$33.79	$31.85	$33.66	$34.08	$34.21
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$1.65	$16.10	$19.25	$19.62	$5.39	$17.96	$20.71	$21.02	$9.12	$19.83	$22.16	$22.41
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	-$2.59	$13.98	$17.59	$17.96	$1.65	$16.08	$19.21	$19.52	$5.89	$18.19	$20.84	$21.08
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$12.97	$16.02	$16.83	$17.08	$14.26	$16.67	$17.31	$17.50	$15.55	$17.32	$17.79	$17.91
Native Pasture	Cereal Stubbles	$26.91	$30.02	$30.83	$31.07	$28.23	$30.66	$31.28	$31.46	$29.55	$31.31	$31.73	$31.85
Merino Ewes crossed with Terminal Sires													
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$34.92	$52.12	$57.27	$59.34	$40.06	$54.70	$59.05	$60.80	$45.20	$57.29	$60.83	$62.26
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$29.54	$49.43	$55.35	$57.77	$35.46	$52.40	$57.43	$59.46	$41.38	$55.37	$59.50	$61.15
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$48.75	$52.09	$53.13	$53.59	$50.20	$52.83	$53.65	$54.00	$51.64	$53.58	$54.16	$54.40
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$21.55	$38.79	$43.93	$46.01	$26.69	$41.37	$45.71	$47.47	$31.82	$43.95	$47.49	$48.92
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$18.88	$36.10	$42.02	$44.40	$23.47	$39.07	$44.07	$46.08	$28.05	$42.04	$46.12	$47.77
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$35.37	$38.76	$39.80	$40.26	$36.84	$39.50	$40.29	$40.66	$38.31	$40.25	$40.79	$41.07
Native Pasture	Cereal Stubbles	$47.27	$50.21	$51.25	$51.71	$48.51	$50.93	$51.75	$52.09	$49.76	$51.65	$52.24	$52.48
First Cross Ewes crossed with Terminal Sires													
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$17.40	$36.52	$42.91	$46.08	$23.47	$39.57	$44.93	$47.61	$29.54	$42.61	$46.95	$49.15
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$11.30	$33.49	$40.87	$44.59	$18.34	$37.01	$43.22	$46.34	$25.38	$40.53	$45.57	$48.09
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$32.89	$36.54	$37.76	$38.37	$34.50	$37.36	$38.30	$38.77	$36.12	$38.18	$38.85	$39.18
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$4.92	$24.04	$30.43	$33.60	$10.99	$27.06	$32.45	$35.11	$17.05	$30.08	$34.47	$36.62
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	-$1.19	$21.01	$28.39	$32.06	$5.83	$24.51	$30.74	$33.83	$12.85	$28.01	$33.08	$35.60
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$20.41	$24.06	$25.27	$25.88	$22.02	$24.87	$25.82	$26.29	$23.63	$25.69	$26.36	$26.70
Native Pasture	Cereal Stubbles	$31.13	$34.78	$36.00	$36.60	$32.74	$35.58	$36.52	$36.99	$34.36	$36.37	$37.04	$37.38

6.2.6. Weaning percentage

Introduction

In breeder-finisher systems the number of lambs finished is determined by the number of lambs weaned from the breeding flock. This analysis investigated the effect of weaning percentage on total profit margin. Total profit margin was used in this analysis rather than profit per lamb sold to provide a more accurate representation of the effect of weaning percentage.

The importance of weight as a profit driver

	Finishing System	Sensitivity
1.	Traditional breeder-finisher pasture finishing	Very high
	Opportunistic grain based finishing	Not applicable
	Specialist grain based finishing	Not applicable
	Specialist pasture finishing	Not applicable

Methods

A budget was developed and analysed to determine the sensitivity of profit margin within breeder-finisher systems producing Merino and crossbred lambs to weaning percentage.

Breeder-finisher systems were analysed over a range of pasture systems, details of which are outlined within the scope, with additional parameters as follows:

- Profit margins were determined across a range of weaning percentages and with two levels of difference between the Merino and crossbred weaning percentage; 10% and 20% difference. The weaning percentages analysed were as follows:
  - 10% difference

	Weaning %					
Merino	65	85	105	115	125	145
Crossbred	75	95	115	125	135	155

  - 20% difference

	Weaning %					
Merino	65	85	105	115	125	145
Crossbred	85	105	125	135	145	165

- The influence of lamb growth rate on the sensitivity of the profit margin to weaning percentage and weaning weight was analysed for growth rates from 100 to 300 g/day

Assumptions

- Merino lambs were weaned 10kg lighter than crossbred lambs
- Merino ewes were 10kg lighter than crossbred ewes
- Lambs were weaned at 14 weeks of age from the commencement of lambing

- For the self-replacing Merino flock with a percentage joined to terminal sires, as weaning percentage increased the number of Merino ewes that can be sustainably joined to terminal sires was increased.

Results

- Weaning percentage was found to be a major profit driver in breeder-finisher systems
- Variation in weaning percentage of ±20% resulted in a median change in total profit margin of $10,592 or 40% with a range of $4,724 to $13,252 or 21% - 620%
- Increasing weaning percentage often resulted in a substantial increase in profit margin as a percentage increase (up to 620%); on average the actual dollar increase in profit margin as weaning percentage increased, was relatively stable
- For example in a purebred Merino flock, across all pasture types and lamb growth rates, increasing weaning percentage from 65% to 85% increased total profit margin by an average of 128% ($6,169).
- Increasing weaning percentage from 125% to 145% represented a 25% increase in total profit however the dollar value in profit ($6329) was similar (Table 27).
- Profit margin sensitivity to changes in weaning percentage had the greatest influence (in order) on the following breeding systems (Table 27):
    1. Self-replacing Merino ewe flock crossed to a terminal sire
    2. First cross ewes crossed with a terminal sire
    3. Self-replacing Merino flock
- Profit margin sensitivity was slightly higher for pastures with a higher cost of production. Profit margin of systems where lambs grazed chicory fodder crops were overall 0.5% more sensitive to changes to weaning percentage than systems where lambs grazed the irrigated clover/ryegrass pasture which was approximately 13% cheaper than the chicory.
- The total profit margin of breeder finisher systems less sensitive to changes in weaning percentage as lamb growth rate increased. For example the benefit of increasing from 100 to 200g/hd/d was up to $3,809 whilst increasing from 200 to 300 g/hd/d in the same system returned a benefit of $762, a $3,047 difference.
- The above trends remained identical where the difference in weaning percentage between pure Merino and non-pure Merino joinings was increased from 10 to 20% (Table 28)

Discussion

The analysis showed that weaning percentage was a major profit driver in breeder-finisher systems. The number of lambs finished was determined by the weaning percentage of the breeding ewes. The more lambs finished the greater the enterprise income and the lower the cost of production per lamb.

Profit margins in self-replacing flocks were at increased risk of significant losses when weaning percentages fell below replacement levels, as ewes needed to be brought into the system at a potentially higher cost than the cost of production for replacements.

The higher profit margin sensitivity to weaning percentage of systems utilising high cost pasture such as improved pasture or fodder crops compared to native pasture or stubbles, reinforces the need to ensure animal health and production is optimised particularly when investing in high cost pastures.

Conclusion

Breeder-finisher systems are reliant on the breeding system to provide lambs for finishing at a relatively low cost compared to market prices. Increasing the weaning percentage is critical to increasing total profit and reducing cost of production of these lambs.

Table 27 - Sensitivity of profit margin to changes in weaning percentage of breeder-finisher systems across 3 pasture types grazed by ewes and 3 lamb finishing pastures for Merino, first cross and second cross prime lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35-55kg (35-45kg on stubbles) produced from a breeding flock of 800 ewes. Note in these results there is 10% difference in weaning percentage between pure Merino and non-pure Merino joining's.

		Weaning percentage																	
Ewe breeding pasture	**Lamb finishing pasture**	**Merino - 65%, Crossbred - 75%**			**Merino - 85%, Crossbred - 95%**			**Merino - 105%, Crossbred - 115%**			**Merino - 115%, Crossbred - 125%**			**Merino - 125%, Crossbred - 135%**			**Merino - 145%, Crossbred - 155%**		
	Growth rate	**100 g / day**	**200 g / day**	**300 g / day**	**100 g / day**	**200 g / day**	**300 g / day**	**100 g / day**	**200 g / day**	**300 g / day**	**100 g / day**	**200 g / day**	**300 g / day**	**100 g / day**	**200 g / day**	**300 g / day**	**100 g / day**	**200 g / day**	**300 g / day**
Merino Ewes crossed with Merino Sires																			
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$1,738	$10,859	$12,683	$4,788	$17,226	$19,714	$7,872	$23,629	$26,780	$9,426	$26,841	$30,324	$10,986	$30,060	$33,875	$14,123	$36,515	$40,993
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$334	$10,390	$12,402	$2,646	$16,512	$19,285	$4,994	$22,669	$26,204	$6,179	$25,759	$29,675	$7,370	$28,855	$33,152	$9,770	$35,064	$40,123
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$10,757	$11,351	$11,470	$16,888	$17,519	$17,645	$23,054	$23,721	$23,854	$26,148	$26,834	$26,971	$29,249	$29,953	$30,093	$35,467	$36,207	$36,355
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	-$643	$2,777	$3,461	$4,449	$9,114	$10,047	$9,649	$15,557	$16,739	$12,283	$18,814	$20,120	$14,937	$22,090	$23,521	$20,297	$28,694	$30,373
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	-$1,346	$2,426	$3,180	$3,378	$8,578	$9,618	$8,209	$14,838	$16,163	$10,659	$18,002	$19,471	$13,129	$21,186	$22,798	$18,120	$27,606	$29,503
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$1,535	$2,129	$2,248	$7,221	$7,851	$7,977	$13,013	$13,680	$13,814	$15,944	$16,629	$16,766	$18,895	$19,598	$19,739	$24,847	$25,587	$25,735
Native Pasture	Cereal Stubbles	$10,857	$11,450	$11,569	$17,064	$17,694	$17,820	$23,294	$23,961	$24,094	$26,416	$27,101	$27,238	$29,543	$30,246	$30,387	$35,806	$36,546	$36,694
Merino Ewes crossed with Terminal Sires																			
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$11,569	$15,477	$16,407	$21,907	$27,824	$29,405	$31,936	$39,793	$42,005	$36,885	$45,699	$48,221	$41,820	$51,583	$54,413	$51,619	$63,267	$66,709
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$10,722	$15,053	$16,090	$20,465	$27,103	$28,888	$29,919	$38,785	$41,293	$34,586	$44,549	$47,413	$39,239	$50,293	$53,511	$48,480	$61,697	$65,618
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$14,094	$14,714	$14,848	$25,581	$26,281	$26,449	$36,721	$37,496	$37,697	$42,217	$43,031	$43,248	$47,696	$48,546	$48,780	$58,573	$59,498	$59,763
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$2,347	$6,255	$7,185	$12,240	$18,156	$19,738	$21,895	$29,752	$31,964	$26,681	$35,494	$38,017	$31,466	$41,229	$44,059	$40,999	$52,647	$56,089
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$1,500	$5,832	$6,868	$10,798	$17,436	$19,220	$19,878	$28,744	$31,252	$24,381	$34,345	$37,209	$28,885	$39,938	$43,157	$37,860	$51,077	$54,998
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$4,872	$5,492	$5,626	$15,914	$16,613	$16,782	$26,680	$27,456	$27,657	$32,013	$32,827	$33,044	$37,342	$38,192	$38,425	$47,953	$48,878	$49,143
Native Pasture	Cereal Stubbles	$14,193	$14,813	$14,948	$25,757	$26,456	$26,625	$36,960	$37,736	$37,937	$42,485	$43,298	$43,515	$47,989	$48,840	$49,073	$58,912	$59,837	$60,102
First Cross Ewes crossed with Terminal Sires																			
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$8,852	$16,765	$19,203	$18,297	$28,039	$31,072	$27,776	$39,350	$42,976	$32,527	$45,015	$48,939	$37,283	$50,687	$54,908	$46,810	$62,044	$66,859
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$6,819	$15,748	$18,516	$15,722	$26,752	$30,202	$24,659	$37,791	$41,923	$29,139	$43,321	$47,795	$33,624	$48,858	$53,672	$42,609	$59,944	$65,440
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$13,829	$14,624	$14,844	$24,321	$25,187	$25,438	$34,848	$35,787	$36,068	$40,122	$41,097	$41,394	$45,403	$46,413	$46,726	$55,977	$57,060	$57,403
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	-$1,598	$6,314	$8,752	$7,412	$17,155	$20,187	$16,531	$28,105	$31,731	$21,124	$33,613	$37,536	$25,735	$39,138	$43,359	$34,997	$50,232	$55,046
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	-$3,631	$5,298	$8,066	$4,837	$15,868	$19,318	$13,414	$26,546	$30,679	$17,736	$31,919	$36,392	$22,075	$37,309	$42,123	$30,796	$48,131	$53,628
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$3,378	$4,173	$4,393	$13,437	$14,303	$14,554	$23,603	$24,542	$24,824	$28,720	$29,694	$29,992	$33,854	$34,865	$35,177	$44,164	$45,247	$45,590
Native Pasture	Cereal Stubbles	$14,139	$14,933	$15,154	$24,705	$25,572	$25,823	$35,294	$36,233	$36,514	$40,596	$41,570	$41,867	$45,901	$46,912	$47,224	$56,520	$57,603	$57,946

Table 28 - Sensitivity of profit margin to changes in weaning percentage of breeder-finisher systems across 3 pasture types grazed by ewes and 3 lamb finishing pastures for Merino, first cross and second cross prime lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35-55kg (35-45kg on stubbles) produced from a breeding flock of 800 ewes. Note in these results there is 20% difference in weaning percentage between pure Merino and non-pure Merino joining's.

		Weaning percentage																	
Ewe breeding pasture	**Lamb finishing pasture**	**Merino - 65%, Crossbred - 85%**			**Merino - 85%, Crossbred - 105%**			**Merino - 105%, Crossbred - 125%**			**Merino - 115%, Crossbred - 135%**			**Merino - 125%, Crossbred - 145%**			**Merino - 145%, Crossbred - 165%**		
	Growth rate	**100 g / day**	**200 g / day**	**300 g / day**	**100 g / day**	**200 g / day**	**300 g / day**	**100 g / day**	**200 g / day**	**300 g / day**	**100 g / day**	**200 g / day**	**300 g / day**	**100 g / day**	**200 g / day**	**300 g / day**	**100 g / day**	**200 g / day**	**300 g / day**
Merino Ewes crossed with Merino Sires																			
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$8,579	$11,999	$12,683	$14,117	$18,781	$19,714	$19,690	$25,598	$26,780	$22,487	$29,018	$30,324	$25,292	$32,444	$33,875	$30,917	$39,314	$40,993
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$7,876	$11,648	$12,402	$13,046	$18,246	$19,285	$18,250	$24,878	$26,204	$20,864	$28,206	$29,675	$23,484	$31,540	$33,152	$28,741	$38,226	$40,123
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$10,757	$11,351	$11,470	$16,888	$17,519	$17,645	$23,054	$23,721	$23,854	$26,148	$26,834	$26,971	$29,249	$29,953	$30,093	$35,467	$36,207	$36,355
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	-$643	$2,777	$3,461	$4,449	$9,114	$10,047	$9,649	$15,557	$16,739	$12,283	$18,814	$20,120	$14,937	$22,090	$23,521	$20,297	$28,694	$30,373
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	-$1,346	$2,426	$3,180	$3,378	$8,578	$9,618	$8,209	$14,838	$14,838	$10,659	$18,002	$19,471	$13,129	$13,129	$22,798	$18,120	$27,606	$29,503
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$1,535	$2,129	$2,248	$7,221	$7,851	$7,977	$13,013	$13,680	$13,814	$15,944	$16,629	$16,766	$18,895	$19,598	$19,739	$24,847	$25,587	$25,735
Native Pasture	Cereal Stubbles	$10,857	$11,450	$11,569	$17,064	$17,694	$17,820	$23,294	$23,961	$24,094	$26,416	$27,101	$27,238	$29,543	$30,246	$30,387	$35,806	$36,546	$36,694
Merino Ewes crossed with Terminal Sires																			
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$12,404	$16,471	$17,452	$23,682	$29,935	$31,626	$34,292	$42,596	$44,953	$39,456	$48,757	$51,438	$44,572	$54,856	$57,856	$54,657	$66,881	$70,510
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$11,510	$16,024	$17,119	$22,140	$29,164	$31,075	$32,143	$41,522	$44,196	$37,012	$47,535	$50,581	$41,836	$53,489	$56,901	$51,347	$65,226	$69,361
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$15,020	$15,646	$15,783	$27,549	$28,261	$28,435	$39,333	$40,126	$40,334	$45,068	$45,900	$46,125	$50,746	$51,617	$51,859	$61,941	$62,889	$63,163
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$3,182	$7,249	$8,230	$14,014	$20,268	$21,959	$24,251	$32,555	$34,912	$29,252	$38,553	$41,233	$34,218	$44,502	$47,502	$44,037	$56,261	$59,890
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$2,288	$6,802	$7,897	$12,473	$19,497	$21,407	$22,102	$31,481	$34,155	$26,808	$37,331	$40,377	$31,482	$43,135	$46,547	$40,727	$54,606	$58,741
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$5,798	$6,424	$6,562	$17,882	$18,594	$18,768	$29,292	$30,085	$30,294	$34,863	$35,696	$35,921	$40,392	$41,263	$41,505	$51,321	$52,268	$52,543
Native Pasture	Cereal Stubbles	$15,119	$15,745	$15,883	$27,724	$28,437	$28,611	$39,572	$40,365	$40,574	$45,335	$46,168	$46,393	$51,039	$51,911	$52,152	$62,280	$63,227	$63,502
First Cross Ewes crossed with Terminal Sires																			
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$13,569	$22,397	$25,132	$23,032	$33,691	$37,020	$32,527	$45,015	$48,939	$37,283	$50,687	$54,908	$42,045	$56,364	$60,881	$51,578	$67,728	$72,839
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$11,266	$21,245	$24,354	$20,186	$32,268	$36,059	$29,139	$43,321	$47,795	$33,624	$48,858	$53,672	$38,114	$54,399	$59,554	$47,106	$65,491	$71,329
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$19,070	$19,901	$20,136	$29,580	$30,483	$30,749	$40,122	$41,097	$41,394	$45,403	$46,413	$46,726	$50,688	$51,735	$52,063	$61,269	$62,388	$62,746
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$2,892	$11,720	$14,455	$11,960	$22,618	$25,947	$21,124	$33,613	$37,536	$25,735	$39,138	$43,359	$30,360	$44,679	$49,197	$39,643	$55,793	$60,905
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$588	$10,568	$13,677	$9,114	$21,195	$24,986	$17,736	$31,919	$36,392	$22,075	$37,309	$42,123	$26,430	$42,714	$47,870	$35,171	$53,557	$59,395
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$8,392	$9,223	$9,459	$18,508	$19,411	$19,677	$28,720	$29,694	$29,992	$33,854	$34,865	$35,177	$39,003	$40,050	$40,378	$49,334	$50,453	$50,812
Native Pasture	Cereal Stubbles	$19,419	$20,249	$20,485	$29,997	$30,900	$31,166	$40,596	$41,570	$41,867	$45,901	$46,912	$47,224	$51,209	$52,256	$52,584	$61,833	$62,952	$63,311

6.2.7. Feed conversion ratio

Introduction

The feed conversion ratio (FCR) refers to the level of feed intake (kg) in proportion to resultant liveweight gain (kg). Feed conversion ratios most commonly used by producers when conducting profit margin budgets average 6:1 (6 kg feed intake on an as fed basis per kg liveweight gain) however in many cases true FCR is closer to 13:1. It is hypothesised that inaccurate assumptions about FCR have profound effects on profit margin estimates under feedlot conditions.

The influence of feed conversion ratio on profit margin was analysed across specialist grain based finishing and opportunistic grain based finishing systems.

The importance of feed conversion ratio as a profit driver

	Finishing System	Sensitivity
1.	Specialist grain based finishing	Very High
2.	Opportunistic grain based finishing	Very High
	Traditional breeder-finisher pasture finishing	Not analysed
	Specialist pasture finishing	Not analysed

Methods

A budget was developed and analysed to determine the sensitivity of the profit margins within feedlot finishing systems for Merino and crossbred lambs to the feed conversion ratio (FCR). Specific analysis parameters were as follows:

- Sensitivities for the feedlot finishing systems were run from a FCR of 4:1 up to a FCR of 40:1.
- The influence of target growth rates on the sensitivity of the profit margin of feedlot finishing systems to FCR were analysed for growth rates of 250g/day, 300g/day and 400g/day.
- The influence of finishing weights on the sensitivity of the profit margins of feedlot finishing systems to FCR were analysed for finishing weights of 35kg to 45kg, 45kg to 55kg and 35kg to 55kg.

Assumptions

- Ration was formulated to take into account the nutrient requirements of the lamb, accounting for;
  - Breed (Merino, late maturing; crossbred, early maturing)
  - Age of lamb entering feedlot
  - Growth rate
  - Entry and target weight
- Daily feed consumption was limited to the formulated ration and by the liveweight of the lamb

Results

- Feed conversion ratio was found to be a major profit driver in feedlot finishing systems
- Variation in the FCR from 5:1 to 10:1 resulted in a change in the profit margin in feedlot finishing systems of $15 per head (Figure 5)
- The sensitivity of the profit margin in feedlot finishing systems to FCR was influenced by the target growth rate of the lamb (Figure 5)
  - The profitability of feedlot finishing systems were approximately 15% more sensitive to FCR if the ration was formulated to a growth rate of 300g/day compared to 400g/day
- The sensitivity of the feedlot profit margin to FCR was influenced by the start and finish weights of the lamb
  - The profitability of feedlot finishing systems was approximately 8% more sensitive to FCR with lambs finished from 45kg to 55kg (Figure 6) compared with 35kg to 45kg (Figure 5)
  - The profitability of feedlot finishing systems was approximately 86% more sensitive to FCR with lambs finished from 35kg to 55kg (Figure 7) compared with 35kg to 45kg (Figure 5)
  - Increased growth rate from 300g/d to 400g/d decreased the profit margin in this analysis (Figure 7)

Discussion

As FCR is determined by intake as a proportion of liveweight gain it followed that as lambs grew more slowly and hence spent a longer period of time in a finishing system that FCR increased and the profit margin declined.

The relationship between profit margin and FCR improved where lambs were fed to heavier weights and grew at a rate of 300g/day. Increasing growth rate to 400 g/d did not result in an improved FCR or profit margin because in this analysis, the ration was formulated to meet the higher daily growth requirements and was hence more expensive.

Lambs growing at 400g/d when fed a ration to meet the requirements of a growth rate of 300g/d would be far more efficient; this will be addressed in the following section on genetic potential.

Daily feed consumption was limited by liveweight and, as a result, the heavier average liveweight of lambs finished from 45kg to 55kg compared to lambs finished from 35kg to 45kg led to a greater response within the profit margin to FCR.

The risk of low profit margins due to poor FCR can be limited by;

1. Matching nutrient levels of feed to the nutrient requirements of the lamb
2. Selecting the most cost efficient growth rate
3. Early identification of poor performing lambs

Conclusion

FCR has a major impact on the profitability of feedlot systems as has the genetic potential of the lamb for rapid growth and efficient conversion of feed to gain.

It is important to ensure the diet is cost-effectively formulated to meet requirements and that slow growing lambs are removed from the system early and managed differently.

The importance of FCR also highlights the need to monitor feed growth rate on a regular basis.

Lambs with high feed conversion ratios (low feed efficiency) spend longer in the feedlot adding to the total cost structure and have a negative effect on profitability.

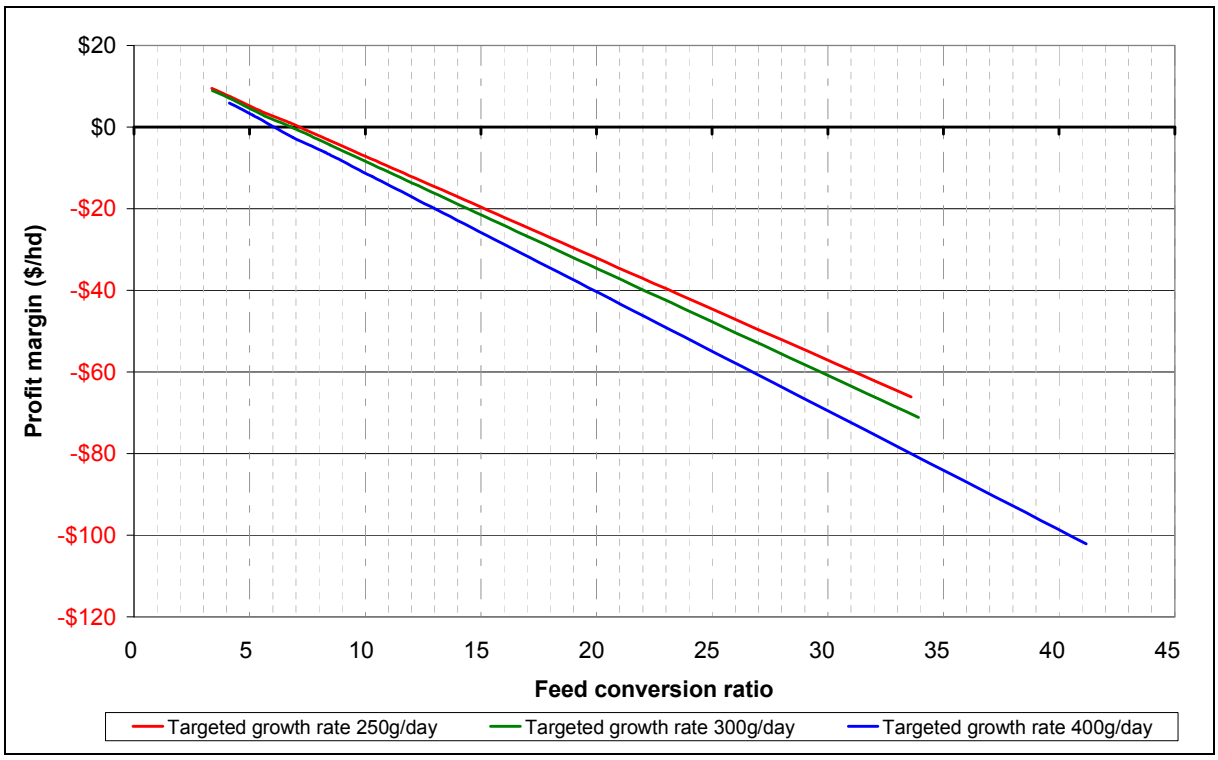

Figure 5 - Sensitivity of profit margin to changes in the feed conversion ratio of four month old crossbred lambs on a cereal grain, lupin and roughage diet finished from *35kg to 45kg* in a feedlot with a capacity of 2000 lambs and an annual turnover of 4500 lambs.

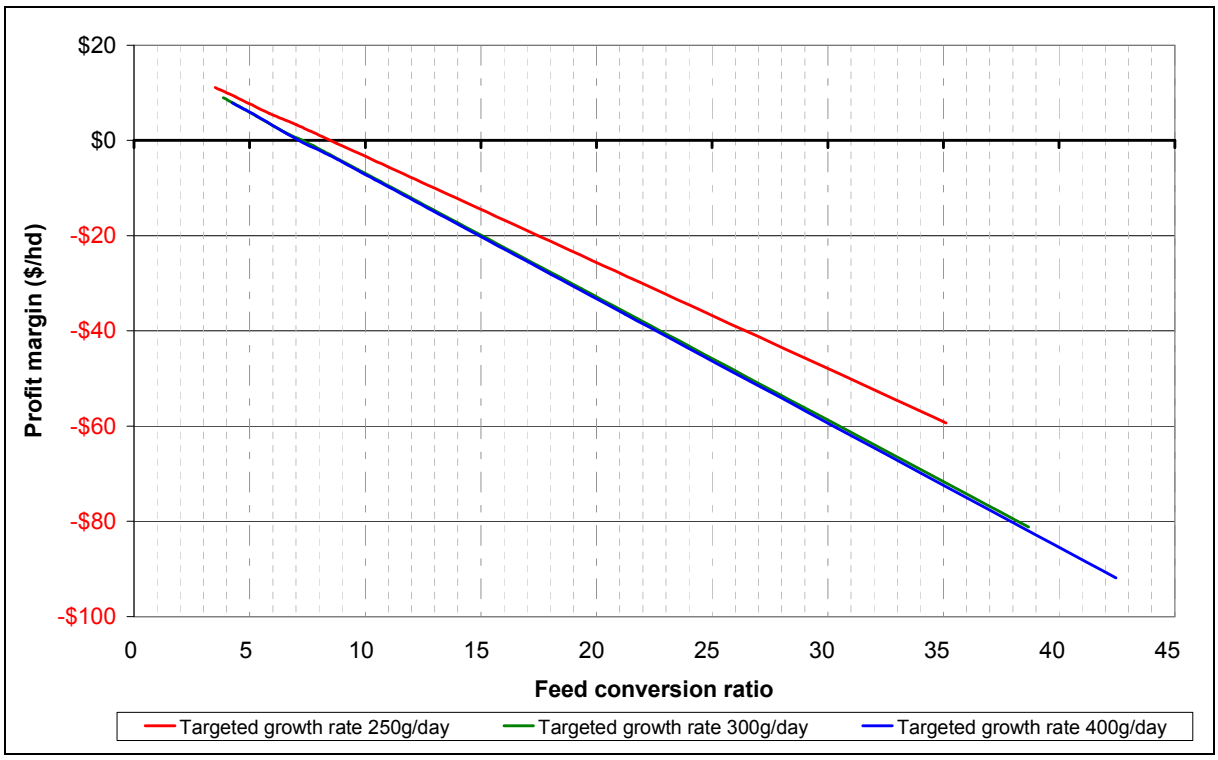

Figure 6 - Sensitivity of profit margin to changes in the feed conversion ratio of four month old crossbred lambs on a cereal grain, lupin and roughage diet finished from *45kg to 55kg* in a feedlot with a capacity of 2000 lambs and an annual turnover of 4500 lambs.

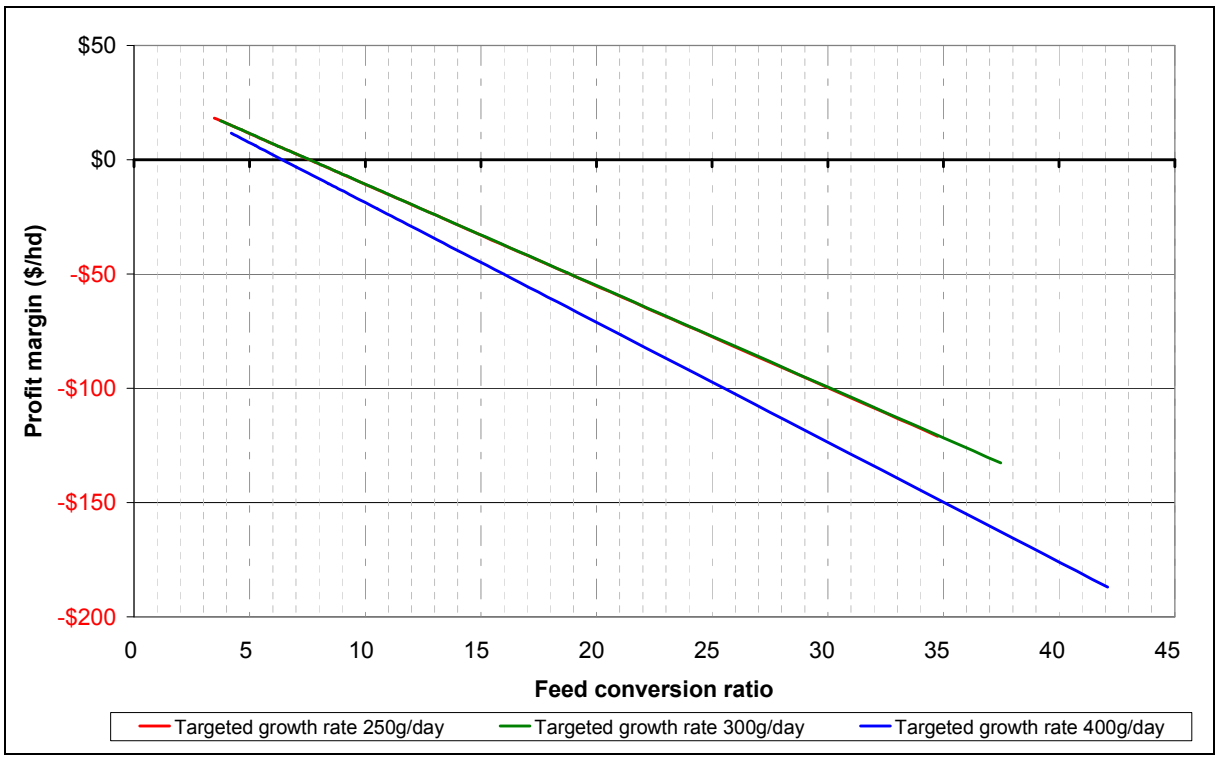

Figure 7 - Sensitivity of profit margin to changes in the feed conversion ratio of four month old crossbred lambs on a cereal grain, lupin and roughage diet finished from *35kg to 55kg* in a feedlot with a capacity of 2000 lambs and an annual turnover of 4500 lambs.

6.2.8. Genetic potential for growth

Introduction

The ability of lambs to meet growth rate targets is determined by genetic potential, nutritional history and the quality and quantity of available feed. Other factors that will not be analysed here influence growth rate which include environmental conditions, management and animal welfare practices (Jolly & Wallace, 2007).

The genetic selection criteria of the breeding flock from which lambs are sourced has the potential to influence the growth rates lambs can achieve.

Pasture quality was assumed to be constant for pasture finishing however the feedlot rations were formulated to take into account the difference in maturity patterns and hence nutritional requirements between Merino and crossbred lambs. It was assumed that with the rations formulated to meet demands the growth targets for both breeds would be met. For the Merino lambs to achieve the same growth rates as the crossbred lambs a more nutrient dense ration and therefore more expensive ration would be required.

The importance of the breed of lamb (Merino vs crossbred) as a profit driver

	Finishing System	Sensitivity
1.	Traditional breeder-finisher pasture finishing	High
2.	Opportunistic grain based finishing	High
3.	Specialist pasture finishing	High
4.	Specialist grain based finishing	High

The importance of the targeted growth rate of lambs as a profit driver

	Finishing System	Sensitivity
1.	Traditional breeder-finisher pasture finishing	High
2.	Opportunistic grain based finishing	High
3.	Specialist pasture finishing	High
4.	Specialist grain based finishing	High

Methods

A budget was developed and analysed to determine the sensitivity of the profit margins within all four finishing systems to the breed of lamb being finished and the growth rate of lambs. Specific analysis parameters were as follows:

- The analysis of the breeder-finisher systems was based on three breeding systems designed to assist in determining the sensitivity of enterprise profitability to breed. The breeding systems were;
  - Self-replacing Merino flock producing Merino lambs
  - Self-replacing Merino flock crossed to a terminal sire to produce first cross lambs (excess replacement Merino ewe lambs also finished)

- First cross ewe flock crossed to a terminal sire to produce second cross lambs

- The sensitivities for growth rate in feedlot finishing systems were run from 250g/day to 400g/day
- The sensitivities for growth rate in pasture based finishing systems were run from 100g/day to 400g/day
- Profit margin sensitivity was analysed over a range of pasture types for the breeding flock and finishing lambs

Assumptions

- Merino lambs grew at a slower rate (g/day) than crossbred lambs
- Ration of lambs in feedlot finishing systems was influenced by growth rate and breed
- Feed demands (consumption) in pasture based finishing systems was driven by liveweight with quality fixed to meet daily requirements
- Merinos were finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs from 35kg to 55kg (25-35kg on stubbles) in pasture based finishing systems

Results

- Ranking of profitability across the three breeder-finisher systems;
    1. Self-replacing Merino flock crossed to a Terminal sire to produce first cross lambs (excess Merino lambs also finished)
    2. First cross ewe flock crossed to a Terminal sire to produce second cross lambs
    3. Self-replacing Merino flock producing Merino lambs
- Increasing the growth rate of the lambs in a breeder-finisher system from 100 g/day to 200 g/day resulted in an increase in returns per head by up to $15.15/head (Table 29)
- Increasing the growth rate of the lambs in a breeder-finisher system from 200 g/day to 300 g/day increased returns by up to $5.04/head (Table 29)
- The profitability of breeder-finisher systems producing Merino lambs on irrigated pastures was up to 20% less sensitive to changes in growth rate than when finishing crossbred lambs
- The breeding ewe pasture had no influence on profit margin sensitivity of breeder-finisher systems to growth rate
- An increase in growth rate within breeder-finisher systems for lambs grazing the pastures below, increased the sensitivity of the profit margin in the following order:
    1. Fodder crop – chicory
    2. Irrigated clover / ryegrass pasture
    3. Cereal stubbles
- Increasing the growth rate of the lambs in a specialist pasture finishing system from 100 g/day to 200 g/day increased returns per head by up to $14.24 (Table 30)
- Increasing the growth rate of the lambs in a specialist pasture finishing system from 200 g/day to 300 g/day lead to an increase in returns by up to $4.74 per head (Table 30)
- The profit margin of specialist pasture finishing system finishing Merino lambs was 20% more sensitive to changes in growth rate than finishing

crossbred lambs

- An increase in growth rate within specialist pasture finishing systems for lambs grazing the pastures below, increased the sensitivity of the profit margin in the following order:
    1. Fodder crop – chicory
    2. Irrigated clover / ryegrass pasture
    3. Cereal stubbles
- Feedlot finishing systems where Merino lambs grew at the same rate as their crossbred counterparts produced an average profit margin $11.17/head lower (Table 31)
- The profitability of feedlot finishing systems finishing crossbred lambs was 6% more sensitive to changes in growth rate than finishing Merino lambs (Table 32)
- Increasing the growth rate of the lambs in a feedlot finishing system from 300 g/day to 400 g/day improved returns per head on average by $5.08. This increase in profit was greatest in systems finishing lambs for longer periods.
- Crossbred feedlot finishing systems were more sensitive to growth rate differentials than those systems finishing Merino lambs

Discussion

The quality and value of the wool clip had a substantial effect on the profitability of the breeder-finisher system and contributed significantly to the profit margins of the first cross lamb production system.

The lower weaning percentage of Merino ewes meant that the Merino ewe based breeding systems were less sensitive to the growth rates than the breeding systems with higher weaning percentages and hence more lambs to finish.

Pasture type had a large influence on the sensitivity of the pasture based finishing systems to growth rate. The higher the cost of production of the pasture the more sensitive the system became to growth rate as a reduction in growth rate increased total feed intake across the finishing period.

The sensitivity of feedlot finishing systems to growth rate was linked to the cost of the ration. The higher the cost of the ration the more sensitive the finishing system's profitability was to growth rate. The cost of the ration was driven by the nutrient requirements of the lamb. The ability to meet nutrient demands had a greater effect on profit margin than did breed effect.

Merino lambs had lower intakes than their crossbred counterparts as the liveweight of Merino lambs was generally less than crossbred lambs of an equivalent age. To be able to grow at similar daily rates of gain, Merino lambs required a more "nutrient dense" ration which was more costly.

Conclusion

Growth rate potential varies between individual animals which has a significant effect on profit margin. Therefore it is advantageous to regularly monitor lamb performance and act accordingly.

The quality of the feed on offer determines whether the nutrient requirements of lambs is met on pasture based systems whereas feedlot rations can be formulated to meet requirements resulting in higher growth potential.

Merino lambs can be finished opportunistically and profitably however potential profit margins should be calculated prior to finishing and growth rates monitored closely.

Table 29 - Sensitivity of profit margins per head to changes in growth rate of Merino, first cross and second cross prime lambs in breeder-finisher systems across 3 pasture types being grazed by breeding ewes and 3 lamb finishing pastures. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Growth rate			
Ewe breeding pasture	**Lamb finishing pasture**	**100 g / day**	**200 g / day**	**300 g / day**	**400 g / day**
Merino Ewes crossed with Merino Sires					
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$25.80	$36.52	$38.85	$39.09
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$22.57	$34.87	$37.52	$37.77
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$32.24	$34.00	$34.48	$34.60
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$9.46	$20.17	$22.50	$22.75
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$6.28	$18.58	$21.23	$21.48
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$15.95	$17.71	$18.13	$18.25
Native Pasture	Cereal Stubbles	$31.86	$33.67	$34.09	$34.22
Merino Ewes crossed with Terminal Sires					
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$45.48	$57.56	$61.15	$62.58
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$41.70	$55.70	$59.78	$61.43
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$51.96	$53.86	$54.44	$54.72
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$32.15	$44.23	$47.82	$49.24
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$28.32	$42.32	$46.44	$48.09
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$38.63	$40.52	$41.11	$41.35
Native Pasture	Cereal Stubbles	$51.69	$53.59	$54.17	$54.41
First Cross Ewes crossed with Terminal Sires					
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$29.84	$42.87	$47.26	$49.41
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$25.64	$40.79	$45.83	$48.39
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$36.42	$38.44	$39.15	$39.48
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$17.31	$30.39	$34.73	$36.92
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$13.15	$28.31	$33.34	$35.86
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$23.89	$25.95	$26.62	$26.96
Native Pasture	Cereal Stubbles	$36.13	$38.18	$38.86	$39.19

Table 30 - Sensitivity of profit margins per head to changes in growth rate of specialist pasture finishing systems across 3 lamb finishing pastures for Merino and crossbred prime lambs. Merino lambs finished from 25kg to 45kg (35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Growth Rate			
Ewe Breeding system	**Lamb Finishing system**	**100 g / day**	**200 g / day**	**300 g / day**	**400 g / day**
Merino Lambs					
	Irrigated Clover / Ryegrass Pasture	-$9.66	-$0.22	$1.70	$1.74
	Fodder Crop - Chicory	-$12.88	-$1.83	$0.41	$0.45
	Cereal Stubbles	-$4.47	-$3.33	-$3.08	-$3.07
Crossbred Lambs					
	Irrigated Clover / Ryegrass Pasture	$4.57	$16.73	$20.79	$22.81
	Fodder Crop - Chicory	$0.41	$14.65	$19.39	$21.76
	Cereal Stubbles	$10.25	$11.85	$12.38	$12.64

Table 31 - Sensitivity of profit margin per head to breed effect on across growth rates and finishing weights for four month old lambs in a feedlot with a capacity of 2000 lambs and a throughput of 4500 lambs.

	35kg to 45kg		45kg to 55kg		35kg to 55kg	
Growth rate	crossbred	Merino	crossbred	Merino	crossbred	Merino
250g	$6.06	-$3.45	$8.29	-$6.45	$7.78	-$6.71
300g	$7.75	-$2.64	$6.92	-$5.56	$10.85	-$4.63
400g	$7.87	$0.77	$10.10	-$2.17	$11.11	$1.76

Table 32 - Sensitivity of profit margin per head to growth rate of four month old lambs in a feedlot with a capacity of 2000 lambs and a throughput of 4500 lambs. Rations were formulated to a growth rate of 300g/day.

	Crossbred			Merino		
Growth rate	35kg - 45kg	45kg - 55kg	35kg - 55kg	35kg - 45kg	45kg - 55kg	35kg - 55kg
50 g/day	-$71.14	-$81.24	-$132.65	-$79.53	-$84.16	-$153.76
100 g/day	-$26.62	-$31.13	-$49.46	-$37.33	-$40.93	-$68.30
200 g/day	-$4.36	-$6.08	-$7.86	-$16.23	-$19.31	-$25.57
250 g/day	$0.09	-$1.07	$0.46	-$12.01	-$14.99	-$17.02
300 g/day	$2.77	$1.94	$5.87	-$9.47	-$12.39	-$11.46
400 g/day	$6.76	$6.45	$12.94	-$5.68	-$8.50	-$4.20
500 g/day	$8.99	$8.95	$17.10	-$3.57	-$6.34	$0.07

6.2.9. Influence of poor performing lambs

Introduction

Within all finishing systems there exist a proportion of lambs which fail to grow at a profitable rate; this can be for a range of reasons. Poor performing lambs are recognised by their slower growth rates and poorer condition. The poor performance of the lambs can be brought about by an apprehension to feed (shy feeders) or an inability to readily convert feed into growth (poor doers).

Shy feeders may increase in numbers as the intensity of the feeding system increases. Increased competition for feed and water means that the flock hierarchy may influence the individual lamb's access to feed. Some lambs fail to acclimatise to the type of feed on offer and/or the feeding system.

Poor doers are lambs which, as a result of poor nutritional history, suboptimal genetic potential for growth, or disease, are unable to readily convert feed into liveweight gain. The assumption that these lambs are not eating may be erroneous and costly.

The importance of shy feeders / poor doers as a profit driver

	Finishing System	Sensitivity
1.	Opportunistic grain based finishing	Very High
2.	Specialist grain based finishing	High
	Traditional breeder-finisher pasture finishing	Not analysed
	Specialist pasture finishing	Not analysed

Methods

A budget was developed and analysed to determine the sensitivity of profit margins within feedlot finishing systems for Merino and crossbred lambs to the cost of poor performing lambs under the following parameters:

- The sensitivities of the feedlot finishing systems were analysed from 0% to 30% of the pen being shy feeders/poor doers
- Four management options were assessed to measure the influence of shy feeders:
    1. drafted from the pen at 14 days and sold for the same purchase price
    2. drafted from the pen at 14 days and sold for half their purchase price
    3. left alone and sold at the same time as the rest of the pen
    4. separated and drafted into a separate pen where they were finished up to weight and sold at targeted finished weight at a later date
- The influence of growth rate on the sensitivity of profit margins to poor performance was analysed for growth rates from of 250 to 400 g/day
- The influence of entry and finished weights on the profit margin for poor performing lambs was analysed for finishing weights of 35kg to 45kg, 45kg to 55kg and 35kg to 55kg

Assumptions

- Poor performing lambs grew at half the growth rate of the main pen
- Daily feed consumption of shy feeders /poor doers was the same as the main pen
- The cost of shy feeders was calculated for 4 month old crossbred lambs with a target growth rate of 300g/d

Results

- The management of poor performing lambs had a substantial influence on the profitability of the feedlot finishing system
- As the level of poor doers increased the profit margin effect was ranked as follows (Figure 8) from greatest effect to least effect:
    1. separated and drafted into a separate pen where they were finished to target weight and sold at a later date
    2. drafted from the pen at 14 days and sold for half their purchase price
    3. left alone and sold at the same time as the rest of the pen
    4. drafted from the pen at 14 days and sold for the same purchase price
- The profitability of feedlot finishing systems were more sensitive to poor performance when finishing lambs from 35kg to 55kg compared to finishing lambs from 35kg to 45kg and 45kg to 55kg.
- The influence of the length of the finishing period (35kg to 55kg) on the sensitivity of the feedlot finishing systems' profit margins was greatest when poor performing lambs were fed through to original target weights

Discussion

The influence of poor performing lambs on profit margin was affected more by management decisions than by the performance per se.
The most profitable option of those analysed was to sell the lambs as soon as they were identified. Lambs that were retained in the system and fed to original target weights had the greatest negative effect on profit margin.

As the number of shy feeders increased the sensitivity of their effect on profit margin increased exponentially across all management options with the effect being greatest for those lambs that were retained in the feeding system (Figure 8).

Conclusion

Poor performing lambs can incur a significant cost to intensive finishing systems and have the potential to reduce profit margins. Close monitoring and early identification and removal of these lambs early in the feeding period will have a positive effect on feedlot profitability.

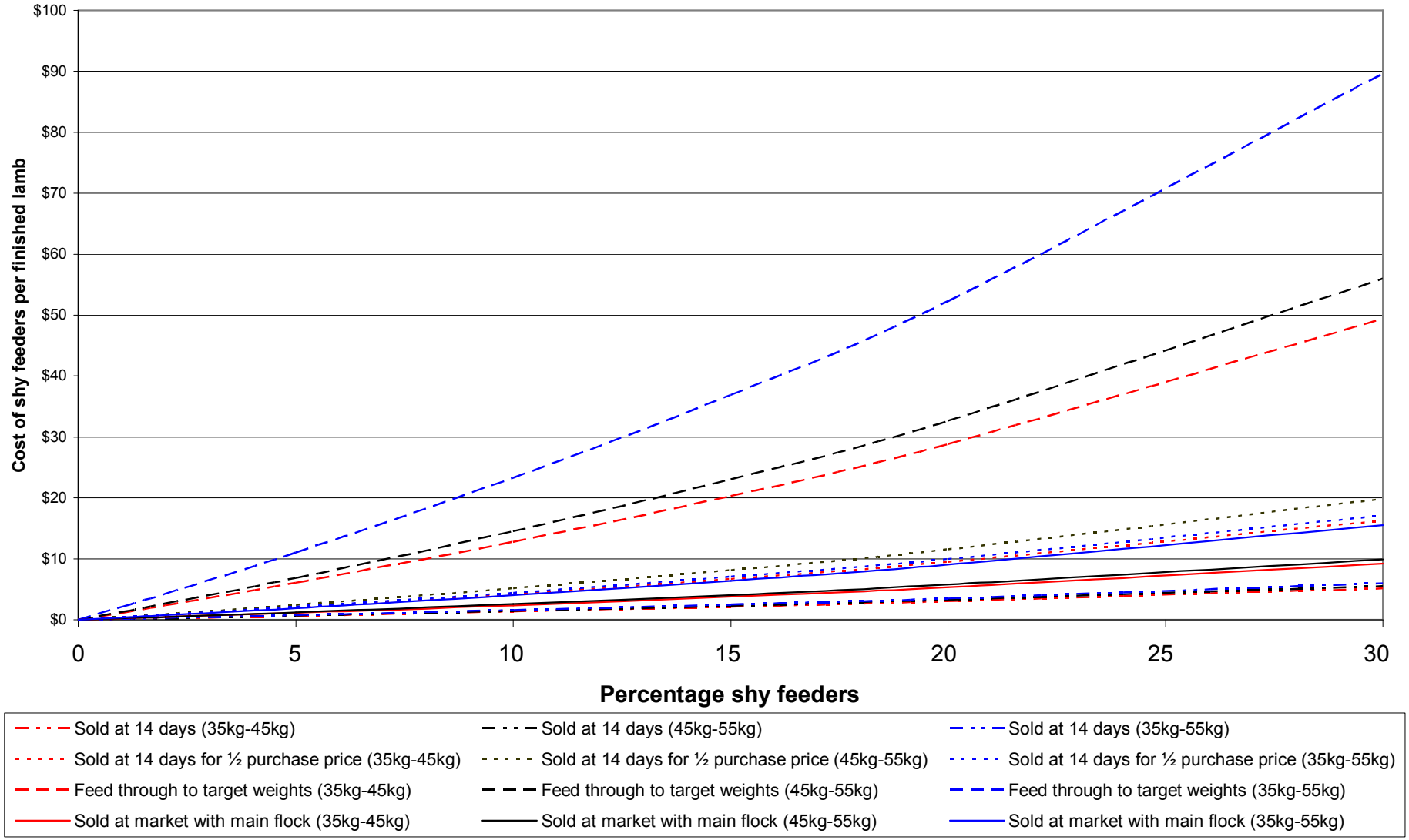

Figure 8 - The cost of shy feeders to each finished lamb in a feedlot finishing system with a capacity of 2000 lambs and an annual throughput of 4500 lambs.

6.2.10. Replacement breeding stock

Introduction

Within the breeder-finisher system the cost of production included the cost associated with the breeding flock. This included the cost of growing out ewe weaners as replacement breeding stock for cull cast for age ewes. This reduced the number of lambs available for finishing from this system.

The first cross ewe system purchased all ewe replacements and therefore all lambs were available for finishing.

All three breeder-finisher systems purchased new rams every year with a quarter of the rams turned over each year.

The true value of replacement stock is their genetic potential to improve the performance and profitability of the system through their effect on key profit drivers. The replacement stock can influence weaning percentages, growth rates, weaning weights, fleece value and the ability to meet market specifications.

The importance of the cost of replacement breeding stock as a profit driver

	Finishing System	Sensitivity
1.	Traditional breeder-finisher pasture finishing	High (ewe), Moderate (ram)
	Specialist pasture finishing	Not applicable
	Opportunistic grain based finishing	Not applicable
	Specialist grain based finishing	Not applicable

Methods

A budget was developed and analysed to determine the sensitivity of the enterprise profit margins within breeder-finisher systems for Merino and crossbred lambs to the cost of replacement breeding stock.

Breeder-finisher systems were analysed over a range of pasture systems the details of which are outlined in the scope with additional parameters as follows:

- Sensitivities for the breeder-finisher systems were run from a ram purchase cost of $0 to $1000
- Sensitivities for the breeder-finisher systems were run from a ewe purchase cost of $60 to $220

Assumptions

- Ram joining rate was 2%
- The productive life of the ram was fixed at 4 years
- 25% of rams were replaced each year
- Purchased replacement ewes incurred a cost

Results

- The cost of replacement breeding stock was a key profit driver in particular in the systems purchasing replacement ewes
- Increasing the cost of the replacement rams from $400 per ram to $700 per ram (75% price increase) reduced profitability by an average of $1.47 ($1.30 - $1.70) across all breeding systems
- The profitability of a breeder-finisher system finishing Merino lambs was 22% more sensitive to the cost of replacement rams than breeder-finisher systems primarily finishing first cross lambs which were 7% more sensitive than systems finishing second cross lambs (Table 33)
- The pasture system being used by the breeder-finisher system had no influence on the sensitivity of the profit margin to the cost of replacement rams
- Increasing the cost of replacement ewes in the first cross ewe breeding flock by $20 per head resulted in a $3.77 reduction in profit margin per lamb (Table 34)
- The pasture system being used by the breeder-finisher system had no influence on the sensitivity of the profit margin to the cost of replacement ewes

Discussion

Purchasing rams is seen as a major investment in all breeding systems. The sensitivity of the breeder-finisher system to the cost of the ram was minimal as the cost was spread across a number of lambs. The value of saving a few hundred dollars by buying a lower quality ram are outweighed by the potential losses due to poor growth rates, weaning weights and weaning percentages.

The cost of replacement ewes had no influence on self-replacing breeding systems except when replacement levels exceeded the number of ewe lambs available. The larger the number of replacement ewes required the more sensitive the system became to the purchase price. As with the replacement rams the quality of the purchase was more likely to influence the profitability of the system than the purchase price.

Conclusion

When sourcing replacement stock the focus should be to improve the current performance of flock rather than the cost of replacements. The genetics of the breeding flock can influence growth rates, weaning weights, weaning percentages and the ability for lambs to meet market specifications, all of which have a greater influence on profitability than the cost of replacement rams. This is particularly important in rams because of the effect single rams can have across a large number of ewes.

Table 33 - Sensitivity of profit margins per head to changes in the cost of replacement rams of breeder-finisher systems across 3 breeding ewe pasture systems with Merino, first cross and second cross prime lambs finished on cereal stubbles. Merino lambs finished from 25kg to 35kg and crossbred lambs finished from 35kg to 45kg.

		REPLACEMENT RAMS			
Ewe Breeding system	**Lamb Finishing system**	**$0.00**	**$400.00**	**$700.00**	**$1,000.00**
Merino Ewes crossed with Merino Sires					
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$38.45	$36.18	$34.48	$34.39
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$22.10	$19.83	$18.13	$18.05
Native Pasture	Cereal Stubbles	$38.06	$35.79	$34.09	$34.01
Merino Ewes crossed with Terminal Sires					
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$57.69	$55.84	$54.44	$54.37
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$44.36	$42.50	$41.11	$41.04
Native Pasture	Cereal Stubbles	$57.42	$55.57	$54.17	$54.10
First Cross Ewes crossed with Terminal Sires					
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$42.19	$40.45	$39.15	$39.08
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$29.67	$27.93	$26.62	$26.56
Native Pasture	Cereal Stubbles	$41.90	$40.16	$38.86	$38.79

Table 34 - Sensitivity of profit margins per head to changes in the cost of replacement ewes across 3 different breeding ewe pastures with second cross prime lambs finished on cereal stubbles from 35kg to 45kg.

		REPLACEMENT EWES								
Ewe breeding pasture	**Lamb finishing pasture**	**$60.00**	**$80.00**	**$100.00**	**$120.00**	**$140.00**	**$160.00**	**$180.00**	**$200.00**	**$220.00**
First Cross Ewes crossed with Terminal Sires										
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$46.68	$42.92	$39.15	$35.38	$31.61	$27.84	$24.07	$20.30	$16.53
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$34.16	$30.39	$26.62	$22.86	$19.09	$15.32	$11.55	$7.78	$4.01
Native Pasture	Cereal Stubbles	$46.39	$42.62	$38.86	$35.09	$31.32	$27.55	$23.78	$20.01	$16.24

6.2.11. Ewe liveweight

Introduction

Many sheep enterprises have increased the liveweight of their ewe flock in search of faster growth rates, higher returns per head (meat and wool) and often a sense of "bigger is better". Breeders of larger sheep also promote their breed as having higher conception and weaning percentages which has led to many producers changing breeds, sometimes without consideration of the effect of liveweight on profitability.

This analysis reviews the effect of ewe liveweight on profit margin per lamb sold for the breeder finisher system.

The importance of ewe liveweight as a profit driver

	Finishing System	Sensitivity
1.	Traditional breeder-finisher pasture finishing	Moderate
	Specialist pasture finishing	Not applicable
	Specialist grain based finishing	Not applicable
	Opportunistic grain based finishing	Not applicable

Methods

A budget was developed and analysed to determine the sensitivity of profit margins within pasture based finishing systems for Merino and crossbred lambs to the liveweight of breeding ewes.

Pasture based finishing systems were analysed over a range of pasture systems the details of which are outlined in the scope with additional parameters as follows:

- Sensitivities for the breeder-finisher system were run for Merino ewe liveweights of 55, 65 and 75kg and for corresponding crossbred ewe liveweights of 65, 75 and 85kg
- The influence of lamb growth rate on the sensitivity of profit margin was also analysed for lamb growth rates from 100 to 400g/hd/d per ewe liveweight category

Assumptions

- Where both Merino and crossbred ewes existed in the same system, crossbred ewes were 10kg heavier
- Sufficient feed was available for all ewes regardless of liveweight and hence dry matter intake was not limiting. Therefore variation in ewe liveweight did not affect stocking rate. This analysis was designed to assess the effect on profit margin of liveweight independent of stocking rate. The effect of stocking rate was addressed in section 6.2.2, page 42.

Results

- Increasing ewe liveweight by 10kg resulted in a decrease in profitability of up to $2.76 per lamb sold (Table 35)
- Profit margin sensitivity to ewe liveweight was greatest (in order) in the following breeding systems:
    1. Self-replacing Merino flock (average ±$1.61 per lamb sold for each 10kg change in liveweight)
    2. Self-replacing Merino flock with a percentage crossed to terminal sires (average ±$1.52 per lamb sold for each 10kg change in liveweight)
    3. First cross ewes crossed to a terminal sire (average ±$1.07 per lamb sold for each 10kg change in liveweight)
- Profit margin sensitivity to ewe liveweight increased as pasture cost increased resulting in grazing cereals (highest cost per tonne DM investigated for ewes) being most sensitive (±$2.76) to change in liveweight and native pasture (lowest cost) being the least sensitive (±$0.45) to changes in liveweight (Table 35)
- For the self-replacing Merino flock and self-replacing Merino flock with a percentage joined to terminal sires, as ewe liveweight increased from 55kg to 65kg then from 65kg to 75kg, profit margin sensitivity to these changes in liveweight was reduced on average by $0.24 and $0.23 respectively per head
- For the first cross ewe joined to terminal sire system, as ewe liveweight increased profit margin sensitivity to changes in liveweight remained similar ($-0.02)
- Increasing growth rate increased profit margin per head by $0.13 to $28.05 per head across all pasture types and breeding systems
- The sensitivity of profit margin per lamb sold to growth rate per ewe liveweight category was greatest where pasture cost was highest
- The reduction in profit margin as liveweight increased was the same across all lamb growth rates investigated per ewe liveweight category (Table 35)
- Increase in profitability as a result of increased growth rate was reduced as growth rate increased.

Discussion

This analysis has shown that as ewe liveweight increases, profitability decreases. As such in any system where ewe liveweight is considered heavy or for systems considering changing to larger breed sheep, other production and management factors such as health and productivity (i.e. weaning percentage) must at least counteract the reduction in profitability as a result of increased liveweight.

This analysis has not accounted for a potential reduction in stocking rate as a result of increased ewe liveweight as this is covered in section 6.2.2, page 42. Where feed is limiting and hence stocking rate reduced as a result of increasing ewe liveweight, the negative effect on profitability will be increased.

Production systems adopting improved pastures, feed crops or fodder crops must also account for of the effects of ewe liveweight on their system as profit margin sensitivity is much higher where feed cost is increased.

Reduction in profitability as a result of increasing liveweight was directly proportional to the increase in dry matter intake of animals across all systems. As liveweight increased, the effect on profit decreased, due to the fact that the relationship between liveweight and dry matter intake was not linear.

In the crossbred ewe system whilst dry matter intake increased at a reducing level from 65 to 75kg than 75kg to 85kg, the decrease in profitability per lamb sold was similar. This highlights the fact that crossbred ewe systems relying on lamb income and typically consuming a higher level of feed are more sensitive to changes in liveweight than self-replacing Merino systems

Conclusion

Where feed is a limiting resource and stocking rate is affected by an increase in liveweight and hence dry matter intake, other productivity factors must increase to counteract the reduction in profitability. As profit margin is highly sensitive to stocking rate a significant return must be achieved from increased production or cost reduction to counteract the effect of decreasing stocking rate.
Where feed is not limiting and hence stocking rate is not affected, profit margin is not as sensitive to liveweight and more flexibility is afforded to the system to vary ewe liveweight.

Table 35 - Sensitivity of profit margins per head of breeder-finishers systems to changes in the liveweight of ewes across 3 breeding ewe pastures and 3 lamb finishing pastures for Merino, first cross and second cross lambs growing at 100, 200, 300 and 400g/day. Merino lambs finished from 25kg to 45kg (25 to 35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35 to 45kg on stubbles).

		Ewe liveweight											
Ewe breeding pasture	**Lamb finishing pasture**	**Merino - 55kg, Crossbred - 65kg**				**Merino - 65kg, Crossbred - 75kg**				**Merino - 75kg, Crossbred - 85kg**			
	Growth rate	**100 g / day**	**200 g / day**	**300 g / day**	**400 g / day**	**100 g / day**	**200 g / day**	**300 g / day**	**400 g / day**	**100 g / day**	**200 g / day**	**300 g / day**	**400 g / day**
Merino Ewes crossed with Merino Sires													
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$14.54	$39.49	$44.48	$46.18	$13.51	$38.46	$43.45	$45.15	$12.62	$37.57	$42.56	$44.27
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$9.88	$37.94	$43.55	$45.46	$8.85	$36.91	$42.52	$44.43	$7.97	$36.02	$41.63	$43.54
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$36.53	$39.15	$39.67	$39.83	$35.50	$38.12	$38.64	$38.80	$34.61	$37.23	$37.76	$37.92
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$1.64	$26.60	$31.59	$33.29	-$1.12	$23.84	$28.83	$30.53	-$3.49	$21.46	$26.45	$28.16
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	-$3.01	$25.05	$30.66	$32.57	-$5.77	$22.29	$27.90	$29.81	-$8.15	$19.91	$25.52	$27.43
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$23.64	$26.26	$26.78	$26.94	$20.88	$23.50	$24.02	$24.18	$18.50	$21.12	$21.64	$21.81
Native Pasture	Cereal Stubbles	$36.62	$39.24	$39.76	$39.92	$35.88	$38.50	$39.03	$39.19	$35.25	$37.87	$38.39	$38.56
Merino Ewes crossed with Terminal Sires													
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$43.46	$61.49	$66.12	$67.88	$42.49	$60.52	$65.15	$66.91	$41.65	$59.68	$64.31	$66.07
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$39.68	$59.83	$65.03	$67.00	$38.71	$58.85	$64.06	$66.03	$37.87	$58.02	$63.22	$65.19
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$56.46	$58.85	$59.40	$59.57	$55.49	$57.88	$58.43	$58.60	$54.65	$57.04	$57.60	$57.76
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$31.30	$49.33	$53.97	$55.72	$28.70	$46.73	$51.36	$53.12	$26.46	$44.49	$49.12	$50.88
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$27.52	$47.67	$52.88	$54.84	$24.92	$45.07	$50.27	$52.24	$22.68	$42.82	$48.03	$50.00
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$44.31	$46.70	$47.25	$47.41	$41.70	$44.09	$44.65	$44.81	$39.46	$41.85	$42.40	$42.57
Native Pasture	Cereal Stubbles	$56.54	$58.93	$59.49	$59.65	$55.85	$58.24	$58.79	$58.96	$55.26	$57.65	$58.20	$58.36
First Cross Ewes crossed with Terminal Sires													
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$31.37	$45.75	$50.06	$51.76	$30.74	$45.12	$49.43	$51.14	$30.10	$44.48	$48.79	$50.50
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$27.94	$44.04	$48.91	$50.83	$27.32	$43.41	$48.28	$50.20	$26.68	$42.77	$47.64	$49.56
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$40.10	$41.97	$42.44	$42.57	$39.47	$41.34	$41.81	$41.94	$38.83	$40.70	$41.17	$41.30
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$20.91	$35.29	$39.60	$41.31	$19.22	$33.60	$37.92	$39.62	$17.50	$31.88	$36.19	$37.90
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$17.49	$33.58	$38.45	$40.37	$15.80	$31.89	$36.76	$38.68	$14.08	$30.17	$35.04	$36.96
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$29.64	$31.51	$31.98	$32.11	$27.95	$29.82	$30.29	$30.42	$26.23	$28.10	$28.57	$28.70
Native Pasture	Cereal Stubbles	$40.39	$42.26	$42.74	$42.87	$39.95	$41.81	$42.29	$42.42	$39.49	$41.36	$41.84	$41.97

6.2.12. Influence of fertiliser price

Introduction

The cost of fertiliser is associated with the cost of pasture production, as part of the establishment process and the ongoing management of the pasture. Fertiliser costs are dependent on the type of fertiliser used and the requirements of the pasture.

The cost of fertiliser has been high in recent years increasing cost of production and hence feed cost within pasture based systems. As many producers state that they have reduced fertiliser applications in an attempt to control costs, the sensitivity of that relationship will be investigated in this section.

The importance of fertiliser cost as a profit driver

	Finishing System	Sensitivity
1.	Traditional breeder-finisher pasture finishing	High
2.	Specialist pasture finishing	High
	Specialist grain based finishing	Not applicable
	Opportunistic grain based finishing	Not applicable

Methods

A budget was developed and analysed to determine the sensitivity of profit margins within pasture based finishing systems for Merino and crossbred lambs to the cost of fertiliser.

Pasture based finishing systems were analysed over a range of pasture systems the details of which are outlined in the scope with additional parameters as follows:

- Sensitivities for the pasture based finishing systems were run to a low, medium and high fertiliser cost for the past 3 years;

Fertiliser	Low	Medium	High (Aug 08)
Super	$350 / t	$560 / t	$900 / t
DAP	$600 / t	$950 / t	$1600 / t
Urea	$500 / t	$750 / t	$1200 / t

- The type of fertilisers used and the costs attributed to each pasture system can also be found in the scope

Assumptions

- Fertiliser application was influenced by pasture type
- Combinations of fertilisers used were determined by the pasture system
- Fertiliser application rate was determined by best practice for pasture system and fertiliser type

Results

- The price of fertiliser was found to be a major profit driver in pasture based finishing systems
- The effect of a 60% increase in fertiliser price was less significant where pasture dry matter production response was likely to be high
- The sensitivity of the profit margin to fertiliser price was greatest in pasture systems requiring high fertiliser inputs
- The influence of fertiliser cost on the profitability of breeder-finisher systems (Table 36) was greatest when the breeding ewes were grazed on;
    1. Cereals (Intended) - Barley
    2. High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot
    3. Native pasture
- The influence of fertiliser costs on the profitability of breeder-finisher systems (Table 36) was greatest when lambs were finished on;
    1. Fodder Crop – Chicory
    2. Irrigated Clover / Ryegrass Pasture
    3. Cereal Stubbles
- The profitability of breeder-finisher systems was reduced by up to $18.79 per head as a result of an increase in fertiliser costs from the medium cost to the high cost and up to $29.31 per head as a result of an increase in fertiliser costs from the low cost to the high cost (Table 36)
- Profit margins from short term pastures were highly sensitive to reductions in daily lamb growth rate when fertiliser price was high (Table 37)
- The influence of fertiliser cost on the profitability of specialist pasture based finishing systems (Table 38) was greatest when finishing lambs on;
    1. Fodder Crop – Chicory
    2. Irrigated Clover / Ryegrass Pasture
    3. Cereal Stubbles
- When lambs grew at 400g/day compared to 200g/day, the profitability of the specialist pasture based finishing system increased between $1.76 and $2.28 for Merino lambs and $5.44 and $6.21 for crossbred lambs when irrigated clover / ryegrass pasture was grazed

Discussion

Increases in the cost of fertilisers to levels such as those seen in August 2008 significantly reduced profit margins on a per head basis. The sensitivity of the pasture based finishing systems to fertiliser price was induced by the increase in cost of feed production.

The higher the fertiliser demands of the pasture system the greater the profit margin sensitivity to the price of the fertiliser. However, the more efficient the fertiliser use, the smaller the influence fertiliser cost had on the profit margin; increased efficiencies were gained from lowering the cost of fertiliser per tonne of dry matter produced.

High rainfall pastures were less sensitive to fertiliser costs than systems where cereal crops were grazed, even though the volume of the fertiliser used was higher. This was due to the lower dry matter production of a cereal crop under the same growing conditions.

Lamb growth rate had a significant effect on profit margins particularly in high cost finishing systems such as chicory; Merino lamb production systems were vulnerable to negative gross margins when fertiliser prices were high due to their slower growth potential.

Conclusion

Volatility in fertiliser costs increased profit risk in pasture based lamb finishing systems. The risk associated with fertiliser costs can be limited by efficient and effective application of fertilisers. The greater the response in pasture production to the fertiliser treatments the smaller the influence fluctuations in fertiliser price has on profitability.

Table 36 - Sensitivity of profit margins per head of breeder-finishers systems to changes in the cost of fertiliser across 3 breeding ewe pasture systems and 3 lamb finishing pastures for Merino, first cross and second cross lambs growing at 100, 200 and 400g/day. Merino lambs finished from 25kg to 45kg (25 to 35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35 to 45kg on stubbles).

Breeder finisher

		Fertiliser price								
		low			medium			high (Aug 08)		
Ewe Breeding system	**Lamb Finishing system**	**100 g / day**	**200 g / day**	**400 g / day**	**100 g / day**	**200 g / day**	**400 g / day**	**100 g / day**	**200 g / day**	**400 g / day**
Merino Ewes crossed with Merino Sires										
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$31.18	$40.90	$43.28	$25.41	$36.12	$38.70	$16.00	$28.32	$31.22
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$31.53	$41.10	$43.44	$22.18	$34.53	$37.43	$5.83	$23.27	$27.18
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$35.69	$37.47	$38.01	$31.85	$33.66	$34.21	$25.54	$27.42	$27.97
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$16.07	$25.78	$28.16	$9.12	$19.83	$22.41	-$2.73	$9.60	$12.50
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$16.41	$25.93	$28.27	$5.89	$18.19	$21.08	-$12.90	$4.48	$8.39
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$20.57	$22.31	$22.90	$15.55	$17.32	$17.91	$6.81	$8.64	$9.24
Native Pasture	Cereal Stubbles	$32.60	$34.33	$34.86	$29.55	$31.31	$31.85	$24.60	$26.42	$26.98
Merino Ewes crossed with Terminal Sires										
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$49.87	$60.78	$65.28	$45.20	$57.29	$62.26	$37.59	$51.57	$57.31
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$50.28	$60.98	$65.43	$41.38	$55.37	$61.15	$25.57	$45.57	$53.75
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$54.04	$55.94	$56.74	$51.64	$53.58	$54.40	$47.69	$49.70	$50.55
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$37.46	$48.41	$52.90	$31.82	$43.95	$48.92	$22.21	$36.25	$41.98
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$37.91	$48.61	$53.02	$28.05	$42.04	$47.77	$10.24	$30.24	$38.38
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$41.67	$43.57	$44.37	$38.31	$40.25	$41.07	$32.36	$34.37	$35.22
Native Pasture	Cereal Stubbles	$51.51	$53.36	$54.17	$49.76	$51.65	$52.48	$46.91	$48.88	$49.73
First Cross Ewes crossed with Terminal Sires										
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$33.65	$45.43	$51.32	$29.54	$42.61	$49.15	$22.84	$38.00	$45.58
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$34.12	$45.67	$51.42	$25.38	$40.53	$48.09	$9.70	$31.43	$42.27
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$37.74	$39.75	$40.74	$36.12	$38.18	$39.18	$33.42	$35.56	$36.61
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$22.06	$33.80	$39.70	$17.05	$30.08	$36.62	$8.48	$23.60	$31.18
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$22.49	$34.04	$39.84	$12.85	$28.01	$35.60	-$4.70	$17.03	$27.92

Table 37 - Effect of lamb growth rate on percentage reduction in profit margin in response to an increase in fertiliser price from low to medium and medium to high

		Fertiliser price					
		60% price increase			120% price increase		
Ewe Breeding system	**Lamb Finishing system**	**100 g / day**	**200 g / day**	**400 g / day**	**100 g / day**	**200 g / day**	**400 g / day**
Merino Ewes crossed with Merino Sires		**Percentage reduction in profit margin per head**					
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	19%	12%	11%	37%	22%	19%
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	30%	16%	14%	74%	33%	27%
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	11%	10%	10%	20%	19%	18%
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	43%	23%	20%	130%	52%	44%
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	64%	30%	25%	319%	75%	60%
Grazing Cereal (Intended) - Barley	Cereal Stubbles	24%	22%	22%	56%	50%	48%
Native Pasture	Cereal Stubbles	9%	9%	9%	17%	16%	15%
Merino Ewes crossed with Terminal Sires							
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	9%	6%	5%	17%	10%	8%
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	18%	9%	7%	38%	18%	12%
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	4%	4%	4%	8%	7%	7%
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	15%	9%	8%	30%	18%	14%
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	26%	14%	10%	63%	28%	20%
Grazing Cereal (Intended) - Barley	Cereal Stubbles	8%	8%	7%	16%	15%	14%
Native Pasture	Cereal Stubbles	3%	3%	3%	6%	5%	5%
First Cross Ewes crossed with Terminal Sires							
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	12%	6%	4%	23%	11%	7%
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	26%	11%	6%	62%	22%	12%
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	4%	4%	4%	7%	7%	7%
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	23%	11%	8%	50%	22%	15%
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	43%	18%	11%	137%	39%	22%
Grazing Cereal (Intended) - Barley	Cereal Stubbles	10%	9%	8%	19%	17%	17%
Native Pasture	Cereal Stubbles	3%	3%	2%	5%	4%	4%

Table 38 - Sensitivity of profit margins per head of specialist pasture finishing system to changes in the price of fertiliser across 3 different lamb finishing pastures for finishing Merino and crossbred lambs growing at 100, 200 and 400g/day. Merino lambs finished from 25kg to 45kg (25 to 35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35 to 45kg on stubbles).

		Fertiliser price								
		low			medium			high		
	Daily Growth rate (g/d):	100	200	400	100	200	400	100	200	400
	Lamb Finishing system									
Merino Lambs	Irrigated Clover / Ryegrass Pasture	-$7.67	$0.78	$2.54	-$9.66	-$0.22	$1.74	-$12.89	-$1.83	$0.45
	Fodder Crop - Chicory	-$7.31	$0.95	$2.68	-$12.88	-$1.83	$0.45	-$23.05	-$6.91	-$3.62
	Cereal Stubbles	-$4.41	-$3.30	-$3.04	-$4.47	-$3.33	-$3.07	-$4.59	-$3.39	-$3.11
Crossbred Lambs	Irrigated Clover / Ryegrass Pasture	$7.15	$18.02	$23.46	$4.57	$16.73	$22.81	$0.40	$14.65	$21.77
	Fodder Crop - Chicory	$7.62	$18.25	$23.57	$0.41	$14.65	$21.76	-$12.74	$8.07	$18.48
	Cereal Stubbles	$10.35	$11.89	$12.66	$10.25	$11.85	$12.64	$10.09	$11.76	$12.60

6.2.13. Influence of pasture system

Introduction

The range and selection of pasture species are driven primarily by the climate and topography of the area. The availability, access, cost and quality of water are governing factors behind the ability to irrigate and can also influence pasture choice and dry matter production. The goal within all pasture systems is to maximise dry matter production whilst limiting the cost of production.

A wide range of pasture systems have been analysed within this study encompassing the diversity across pasture finishing systems within predominantly southern Australia.

When selecting the pastures to be grazed by the breeding flock and weaner or purchased lambs the following factors were taken into account;

- The nutritional requirements of the different classes of stock
- The seasonal growth curve of the pasture
- Alignment of pasture production with the requirements of the stock

The importance of pasture system for the breeding ewe as a profit driver

	Finishing System	Sensitivity to Profit Driver
1.	Traditional breeder-finisher pasture finishing	High
	Specialist pasture finishing	Not applicable
	Specialist grain based finishing	Not applicable
	Opportunistic grain based finishing	Not applicable

The importance of pasture system for finishing lambs as a profit driver

	Finishing System	Sensitivity to Profit Driver
1.	Traditional breeder-finisher pasture finishing	High
2.	Specialist pasture finishing	High
	Specialist grain based finishing	Not applicable
	Opportunistic grain based finishing	Not applicable

Methods

A budget was developed and analysed to determine the sensitivity of profit margins within pasture based finishing systems for Merino and crossbred lambs to the type of pasture system being grazed.

The pasture based finishing systems were analysed over a range of pasture systems the details of which are outlined in the scope with additional parameters as follows:

- The breeding ewes in the breeder-finisher systems were grazed on five different pastures during pregnancy and lactation. The pastures analysed were;
  - High rainfall short term pasture – hybrid ryegrass
  - High rainfall long term pasture - perennial phalaris, clover and cocksfoot
  - Grazing cereal (opportunistic) – barley
  - Grazing cereal (intended) – barley
  - Native pasture
    - Supplementation of barley for 8 weeks during peak nutritional demand (late pregnancy and early lactation) at 200g/head/day
- Lambs in the pasture based finishing systems were finished on eight different types of pasture which included;
  - Dryland lucerne
  - Irrigated lucerne
  - Irrigated clover / ryegrass pasture
  - High rainfall long term pasture – perennial phalaris, clover and cocksfoot
    - Includes barley supplementation of 240g/head/day as required
  - Grazing cereal (intended) – barley
    - Standing crop
  - Fodder crop – chicory
  - Irrigated fodder crop – chicory, rape, plantain
  - Cereal stubbles where lambs were limited to a total weight gain of 10kg

Assumptions

- Feed on offer (FOO) met requirements of ewes and lambs with additional supplementation provided on native pastures
- Daily feed consumption of ewes and lambs was based on liveweight
- Mature liveweights of ewes were equal across breeds
- Feed demands of the animal accounted for;
  - breed of lamb (early/late maturing)
  - growth rate
  - start and finished weight of lambs
  - stage of pregnancy for ewes

Results

- The type of pasture system being grazed by the ewes and lambs had a major influence on the profitability of the finishing system
- Enterprise profitability for different pastures grazed by the breeding ewe for breeder-finisher systems was ranked in order of highest to lowest profit margin per head (Table 39) as follows;
  1. High rainfall long term pasture - perennial phalaris, clover and cocksfoot
  2. Native pasture
  3. Grazing cereal (opportunistic) – barley
  4. High rainfall short term pasture – hybrid ryegrass
  5. Grazing cereal (intended) – barley

- Enterprise profitability for different lamb finishing pasture types for breeder-finisher systems (Table 39) and specialist pasture based finishing systems (Table 40) was ranked in order of highest to lowest profit margin per head as follows;
    1. High rainfall long term pasture – perennial phalaris, clover and cocksfoot
    2. Dryland lucerne
    3. Grazing cereal (intended) – barley
    4. Irrigated clover / ryegrass pasture
    5. Irrigated lucerne
    6. Fodder crop – chicory
    7. Irrigated fodder crop – chicory, rape, plantain
    8. Cereal stubbles

Discussion

The profitability of each pasture based finishing systems was directly linked to the cost of production of the pasture. The cost of pasture production was determined by the costs required for establishment and maintenance divided by the level of dry matter production. The most profitable pasture systems had the lowest cost of production per kg of dry matter.

Although the provision of irrigation increased dry matter production, the cost of irrigating increased cost of pasture production beyond that of non-irrigated pastures; however, irrigated long term pastures were more profitable than short term dryland fodder crops. Irrigated feed allows out of season production and lamb finishing and in some years may be a more profitable alternative to selling lambs off early or grain finishing; assessment of gross margins would determine the position on an annual basis.

The advantage of opportunistic grazing of cereal crops is that unless they are sown to be intentionally grazed by the lambs the majority of production costs are accounted to the cropping enterprise although for the purposes of this analysis a proportion of the production costs were allocated to the lamb finishing system.

Cereal stubbles provided the lowest cost feed available ($/kg DM) however the low quality of the feed meant that lambs were finished to lighter weights reducing the returns per head.

Conclusion

It was clear that those pastures that had the lowest cost of production were the most profitable on a per head basis. As producers will be limited in their choice of pasture system, the efficiency of pasture production with optimal pasture utilisation and strategic supplementation should optimise profitability.

Producers should carefully select appropriate pasture types that suit their environment and have the highest level of dry matter production and quality.

It should be noted that the profit sensitivities for this analysis have been conducted on a per head basis and the results may be different when analysed on a per hectare basis.

Table 39 - Sensitivity of profit margins per head of breeder-finisher systems producing Merino, first cross and second cross lambs to the pasture systems grazed by ewes during pregnancy and lactation and finishing lambs. Merino lambs finished from 25kg to 45kg (25kg to 35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35kg to 45kg on stubbles).

	Lamb Finishing System							
Ewe Breeding System	Dryland Lucerne	Irrigated Lucerne	Irrigated Clover / Ryegrass Pasture	High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	Irrigated Fodder Crop - Chicory, Rape, Plantain	Cereal Stubbles
Merino Ewes crossed with Merino Sires								
High Rainfall Short Term Pasture - Hybrid Ryegrass	$28.06	$24.70	$25.74	$31.17	$27.91	$24.47	$23.12	$21.37
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	$41.16	$37.81	$38.85	$44.27	$41.01	$37.52	$36.17	$34.48
Grazing Cereal (Opportunistic) - Barley	$38.67	$35.26	$36.30	$41.78	$38.52	$35.03	$33.68	$31.93
Grazing Cereal (Intended) - Barley	$24.87	$21.46	$22.50	$27.93	$24.72	$21.23	$19.88	$18.13
Native Pasture	-	-	-	-	-	-	-	$34.09
Merino Ewes crossed with Terminal Sires								
High Rainfall Short Term Pasture - Hybrid Ryegrass	$52.88	$49.36	$50.42	$54.50	$52.75	$49.10	$47.68	$43.76
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	$63.61	$60.04	$61.15	$65.22	$63.43	$59.78	$58.37	$54.44
Grazing Cereal (Opportunistic) - Barley	$61.57	$58.00	$59.11	$63.18	$61.39	$57.74	$56.33	$52.40
Grazing Cereal (Intended) - Barley	$50.23	$46.71	$47.82	$51.89	$50.10	$46.44	$45.03	$41.11
Native Pasture	-	-	-	-	-	-	-	$54.17
First Cross Ewes crossed with Terminal Sires								
High Rainfall Short Term Pasture - Hybrid Ryegrass	$39.73	$36.09	$37.21	$40.41	$39.56	$35.83	$34.36	$29.11
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	$49.77	$46.13	$47.26	$50.46	$49.60	$45.83	$44.40	$39.15
Grazing Cereal (Opportunistic) - Barley	$47.86	$44.22	$45.31	$48.55	$47.69	$43.92	$42.45	$37.20
Grazing Cereal (Intended) - Barley	$37.25	$33.64	$34.73	$37.97	$37.12	$33.34	$31.88	$26.62
Native Pasture	-	-	-	-	-	-	-	$38.86

Table 40 - Sensitivity of profit margins per head within specialist pasture finishing systems producing Merino, and crossbred lambs to the lamb finishing pasture system. Merino lambs finished from 25kg to 45kg (25kg to 35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35kg to 45kg on stubbles).

Lamb finishing system	Merino Lambs	Crossbred Lambs
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	$7.13	$24.01
Dryland Lucerne	$4.05	$23.31
Grazing Cereal (Intended) - Barley	$3.89	$23.15
Irrigated Clover / Ryegrass Pasture	$1.70	$20.79
Irrigated Lucerne	$0.67	$19.66
Fodder Crop - Chicory	$0.41	$19.39
Irrigated Fodder Crop - Chicory, Rape, Plantain	-$0.94	$17.94
Cereal Stubbles	-$3.08	$12.38

6.2.14. Feed cost and ration formulation for feedlot systems

Introduction

Feed costs are the largest management expense within feedlot systems. The ability to formulate the ration to meet nutrient demands is just as important to the finishing system as the cost of feed. When formulating the ration the aim should be to meet the nutrient demands of the lamb by the most cost effective means.

Many producers will source feed based on its cost per tonne however this can be very misleading as it doesn't account for quality or inclusion rate in a feed ration. The quality of the feed is as important as the cost as it will have a significant impact on growth rate and hence profitability.

Four different ration types were used in this analysis. Each of these was based on common rations within the industry. With all rations, the key to cost effective formulation was to make greater use of the cheapest feed sources.

The importance of feed cost and ration formulation as profit drivers

	Finishing System	Sensitivity
1.	Opportunistic grain based finishing	High
2.	Specialist grain based finishing	High
	Specialist pasture finishing	Not analysed
	Traditional breeder-finisher pasture finishing	Not analysed

Methods

A budget was developed and analysed to determine the sensitivity of the profit margins within feedlot based finishing systems for Merino and crossbred lambs to the cost of feed and ration formulation. This analysis was run for a 2000 head capacity feedlot finishing 4500 lambs per annum with the following additional parameters:

- Sensitivities for feedlot finishing systems were run for 4 different rations;
    1. Cereal grains and roughage
    2. Cereal grains, lupins and roughage
    3. Cereal grains, faba beans and roughage
    4. Lamb finishing pellets
- Sensitivities were run at high, medium and low grain prices. Grain prices were increased by 30% and decreased by 43% from the medium price. This was based on a variation in the price of barley of approximately $50 above and below the medium price of $160/t.
- The price of hay and straw was not varied.
- The influence of growth rate on the sensitivity of profitability of feedlot finishing systems to feed costs was analysed for growth rates from of 250 to 400 g/day
- The influence of finishing weights on the sensitivity of the profitability of feedlot finishing systems to growth rate was analysed for finishing weights of 35kg to 45kg, 45kg to 55kg and 35kg to 55kg

Assumptions

- Rations were formulated on a least cost basis
- Rations were formulated to take into account the nutrient requirements of the lamb (NRC, 2007), accounting for;
  - Maturity pattern (breed effect)
  - Feedlot entry weight
  - Target weight
  - Growth rate
- Daily feed consumption was limited by the formulated ration and the liveweight of the lamb

Results

- The cost of the ration, the type of ration and its formulation influenced the profitability of feedlot based finishing systems
- The ranking of enterprise profitability (highest to lowest) for different ration types for feedlot finishing systems was;
  1. Cereal grains, lupins and roughage
  2. Cereal grains, beans and roughage
     - $0.40 less per lamb compared to lupin based ration
  3. Cereal grains and roughage
     - $3.30 less per lamb compared to lupin based ration
  4. Sheep pellets
     - $10.00 less per lamb compared to lupin based ration
- The average ranking of profit margin sensitivity (highest to lowest) to changes in the cost of feed for different ration types was as follows:
  1. Cereal grains and roughage
  2. Cereal grains, beans and roughage
  3. Cereal grains, lupins and roughage
- The profit margin of feedlot finishing systems where lambs were growing at a rate of 400g/day was up to 40% less sensitive to changes in feed costs than a finishing system with growth rates of 300 g/day (Table 41)
- Profit margin sensitivity to changes in feed cost was up to 2.72 times greater for finishing lambs from 35 to 55kg compared to 35-45kg (Table 41)
- Pellet-based rations were consistently less profitable than all grain options at a medium price (Table 41)

Discussion

The most profitable rations were those that included legumes in the grain mix with lupin based rations more cost-effective than those which included beans. Although legumes were generally more expensive than cereal grains the nutrient density of the legume means that a lower quantity is required to achieve the same supply of nutrients.

Whist growth rate was a major profit driver within feedlot systems the cost efficiency of feeding to high growth rates should be assessed as a higher ration cost may not be covered by improved profits from increased growth rate.

The ranking of profit margin sensitivity to ration cost shown in the results was greatly influenced by the cost of the grain and the growth rate of the lambs (Table 29). The value of pellet based feeding systems arose when the cost of grains in

the region was high or where there was no grain storage or handling equipment available for short term feeding.

Grain prices vary significantly across states due to demand from competing industries and in these areas the pellet based finishing systems can be more competitive. Hay based pelleting plants tend to be located where access to hay and grain is relatively cheap such that pellets can be transported interstate at prices competitive with local, higher grain prices. Hay-based pellets are generally a safer feed source than grain-based pellets due to their slower rate of digestion and lower grain content however feeding pellets is likely to result in significant financial losses where high growth rates are not maintained as highlighted in Table 29.

While the cost of roughage was not investigated it could be inferred from these results that the cost of roughage may also have an influence.

Conclusion

The key to ration formulation is to meet the nutritional demands of the lamb taking into account breed, nutritional history, growth rates and finishing weights in the most cost effective manner. The relationship between the cost of the feed and the nutrient density has the greatest influence on producing a cost effective ration. Ration and feed costs need to be assessed on a seasonal basis in comparison with contract prices for lambs to determine the breakeven point for feed costs and growth rate to ensure optimum returns.

Table 41 - Sensitivity of profit margins per head of a feedlot based finishing system to the formulated ration and the cost of feed for four month old crossbred lambs finished in a feedlot with a 2000 head capacity and an annual throughput of 4500 lambs.

	35kg to 45kg			45kg to 55kg			35kg to 55kg		
Ration cost	250 g/day	300 g/day	400 g/day	250 g/day	300 g/day	400 g/day	250 g/day	300 g/day	400 g/day
Legume free ration									
high	$1.63	$2.88	$5.19	$0.63	$1.62	$6.04	-$7.13	-$2.80	$3.40
medium	$4.78	$5.97	$7.30	$4.29	$5.26	$8.25	$0.03	$3.84	$7.68
low	$7.93	$9.06	$9.41	$7.96	$8.90	$10.45	$7.19	$10.47	$11.96
Ration including lupins									
high	$3.22	$5.13	$5.92	$5.78	$3.74	$7.40	$2.86	$6.25	$5.79
medium	$6.06	$7.75	$7.87	$8.29	$6.92	$10.10	$7.78	$10.85	$11.11
low	$8.91	$10.36	$9.83	$10.80	$10.11	$12.79	$12.70	$15.45	$16.44
Ration including beans									
High	$2.94	$4.79	$5.55	$5.11	$3.36	$7.10	$1.70	$5.21	$5.08
medium	$5.88	$7.51	$7.59	$7.82	$6.66	$9.88	$6.97	$10.11	$10.60
low	$8.82	$10.22	$9.63	$10.51	$9.95	$12.66	$12.21	$15.00	$16.11
Pellet based ration									
	$1.43	$5.82	$6.74	-$6.84	-$2.21	$4.71	-$17.88	-$8.68	$3.35

6.2.15. Labour

Introduction

The cost of feedlot labour will depend on whether the labour unit is fully utilised by the feedlot or elsewhere within a farming operation and the scale of the feedlot enterprise.

The effect of the cost of labour was analysed across all four finishing systems to determine the sensitivity of each system to labour costs.

The importance of the cost of labour as a profit driver

	Finishing System	Sensitivity
1.	Specialist grain based finishing	High
2.	Specialist pasture finishing	Moderate
3.	Traditional breeder-finisher pasture finishing	Moderate
4.	Opportunistic grain based finishing	Moderate

Methods

A budget was developed and analysed to determine the sensitivity of the profit margins of all four finishing systems for Merino and crossbred lambs to the cost of labour.

Feedlot finishing systems were analysed to a range of feedlot scales varying in capacity and throughput, and pasture based finishing systems were analysed over a range of pasture systems the details of which are outlined in the scope with additional parameters as follows:

- The cost of labour was analysed from $15.65/hr to $31.30/hr paid as a casual wage and from $30,000 to $50,000 paid as a full time wage.
- The cost of labour in feedlot finishing systems took into account the time required to:
  - Drench lambs
  - Vaccinate lambs
  - Feed out roughage and grain
  - Check livestock and troughs
  - Mix the ration
  - Maintain records and general administration

- The cost of labour in pasture based finishing systems took into account the time required to:
  - Establish and maintain pastures
  - Drench lambs and ewes
  - Vaccinate lambs and ewes
  - Mark (tailing and tagging)
  - Check livestock and troughs
  - Maintain records and general administration

Assumptions

- All labour costs were attributed to the finishing operation

Results

- Increasing the cost of labour in breeder-finisher systems from $15.65/hr to $31.30/hr reduced profit margins between $0.66 and $0.88 per head (Table 42)
- Breeder-finisher systems which produced Merino lambs were up to 30% more sensitive to the cost of labour than crossbred lamb finishing systems (Table 42)
- Increasing the cost of labour in specialist pasture based finishing systems from $15.65/hr to $31.30/hr resulted in a fall in profitability by only $0.12 to $0.13 per head (Table 43)
- The profitability of specialist pasture based finishing systems was sensitive to paying a full time wage instead of a casual wage. Paying staff a $50,000 per annum salary resulted in a decline in profits of $4.32 per head compared to paying a casual wage of $15.65/hr, and was unprofitable in Merino finishing systems (Table 43)
- Increasing the cost of labour in feedlot finishing systems from $15.65/hr to $31.30/hr resulted in a profit reduction of between $1.22 and $1.88 per head (Table 44)
- There was a 54% increase in the sensitivity of the profit margin to the cost of labour when finishing lambs from 35 to 55kg compared to finishing lambs from 35 to 45kg in a feedlot finishing system (Table 44)
- Profit margins in feedlot finishing systems were highly sensitive to scale in relation to labour costs (Table 44)
- A high wage structure of $50,000 per annum was offset by the effect of scale in a crossbred feedlot (Table 44)

Discussion

Profit margins in feedlot finishing systems were highly sensitive to scale in relation to labour costs, particularly where scale helped achieve labour efficiencies through year round operation or creating full days work for employees.

A “free” labour cost was investigated as in operations where no outside labour was employed and all the profits were returned to the producer whether the labour cost was accounted for within the gross margin or the profit margin, was a moot point.

The larger finishing systems were able to fully utilise a full time labour unit whereas a smaller operation would require additional work to absorb some of the wages cost. Hence casual labour was more cost-effective if it was available when required.

The increased level of sensitivity in the feedlot finishing systems compared to pasture based systems was brought about by the higher demand for labour due to the need to put out feed regularly and attend to daily operations within the feedlot system.

Suboptimal growth rates within finishing systems increased the length of time that lambs were on feed and hence increased labour costs and reduced profitability

Profit margins within breeder-finisher systems were comparable with larger scale feedlot systems due to ability to spread the cost of labour across a wider range of

activities and the lower cost of the lamb at the commencement of the finishing period.

Conclusion

The cost of labour to the finishing system will vary with the type of finishing system, scale and the payment of casual or full time wages. Wage structures should be minimised where systems feed lambs for longer periods, i.e. large weight gain or slower growing lambs. Increasing the scale of an operation may improve labour efficiencies through attracting permanent labour.

Table 42 - Sensitivity of profit margins per head of breeder-finisher systems to part time and full time labour costs across 3 breeding ewe pasture systems and 3 lamb finishing pastures finishing Merino, first cross and second cross prime lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Labour				
		Part time / casual rates			Full time	
Ewe Breeding system	**Lamb Finishing system**	**no cost**	**$15.65 / hr**	**$31.30 / hr**	**$50000/year**	**$30000/year**
Merino Ewes crossed with Merino Sires						
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$39.78	$38.91	$38.04	$11.41	$21.16
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$38.46	$37.59	$36.71	$10.09	$19.83
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$35.41	$34.54	$33.67	$7.04	$16.79
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$23.44	$22.57	$21.69	-$4.93	$4.81
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$22.17	$21.29	$20.42	-$6.20	$3.54
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$19.07	$18.20	$17.32	-$9.30	$0.44
Native Pasture	Cereal Stubbles	$35.03	$34.16	$33.28	$6.66	$16.40
Merino Ewes crossed with Terminal Sires						
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$61.94	$61.20	$60.46	$38.72	$46.65
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$60.57	$59.83	$59.09	$37.35	$45.28
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$55.23	$54.50	$53.76	$32.02	$39.94
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$48.61	$47.87	$47.13	$25.39	$33.32
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$47.24	$46.50	$45.76	$24.02	$31.95
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$41.90	$41.16	$40.42	$18.68	$26.61
Native Pasture	Cereal Stubbles	$54.97	$54.23	$53.49	$31.75	$39.67
First Cross Ewes crossed with Terminal Sires						
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$47.97	$47.31	$46.64	$26.23	$33.70
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$46.55	$45.88	$45.21	$24.81	$32.27
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$39.87	$39.20	$38.53	$18.13	$25.59
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$35.45	$34.78	$34.11	$13.71	$21.17
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$34.06	$33.39	$32.72	$12.32	$19.79
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$27.34	$26.67	$26.00	$5.60	$13.07
Native Pasture	Cereal Stubbles	$39.57	$38.90	$38.24	$17.83	$25.30

Table 43 - Sensitivity of profit margins per head of specialist pasture finishing systems to the cost of labour across 3 lamb finishing pasture systems finishing Merino and crossbred lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Labour cost				
Breed	**Lamb finishing pasture system**	**no cost**	**$15.65 / hr**	**$31.30 / hr**	**$50,000 / year**	**$30,000 / year**
Merino lambs	Irrigated Clover / Ryegrass Pasture	$1.83	$1.70	$1.58	-$2.62	-$0.84
	Fodder Crop - Chicory	$0.53	$0.41	$0.28	-$3.91	-$2.13
	Cereal Stubbles	-$2.96	-$3.08	-$3.21	-$7.40	-$5.63
Crossbred lambs	Irrigated Clover / Ryegrass Pasture	$20.91	$20.79	$20.66	$16.47	$18.24
	Fodder Crop - Chicory	$19.52	$19.39	$19.27	$15.08	$16.85
	Cereal Stubbles	$12.50	$12.38	$12.25	$8.06	$9.83

Table 44 - Sensitivity of profit margins per head of a feedlot finishing system to the cost of labour finishing four month old crossbred lambs to a range of finishing weights and scales

	Scale								
	Small			Medium			Large		
Labour costs	**35kg to 45kg**	**45kg to 55kg**	**35kg to 55kg**	**35kg to 45kg**	**45kg to 55kg**	**35kg to 55kg**	**35kg to 45kg**	**45kg to 55kg**	**35kg to 55kg**
No labour charged	$4.73	$3.91	$8.51	$8.96	$8.14	$12.74	$11.62	$11.23	$15.83
Hourly rate									
Award wage level 2 farm hand	$3.52	$2.70	$6.62	$7.75	$6.92	$10.85	$10.40	$10.01	$13.94
Double award wage	$2.30	$1.48	$4.74	$6.53	$5.71	$8.97	$9.18	$8.80	$12.06
Full time staff member									
$30,000	-$25.88	-$26.70	-$22.10	$2.16	$1.34	$5.94	$8.55	$8.17	$12.77
$50,000	-$46.29	-$47.11	-$42.51	-$2.38	-$3.20	$1.40	$6.51	$6.13	$10.73

6.2.16. Mortality

Introduction

Mortality rates within breeding flocks is a difficult statistic to accurately determine but anecdotally a figure of approximately 5% -10% of breeding ewes per annum across southern Australia could be assumed. Mortality rates in lamb finishing systems vary from 0.5 – 2% in feedlot systems and up to 5-10% following a disease outbreak such as acidosis, enterotoxaemia or salmonella.

The cost to the system depends on how long the animal has been in the system prior to its death and the input costs to that point. In the case of breeding ewes, mortality also increases the cost of replacement ewes and the opportunity cost of dead or mismothered lambs.

The cost of disease prevention methods such as vaccination, drench and the use of professional advice, is very low in comparison to the effect on profit margins of morbidity and mortality.

The importance of mortality within the breeding flock as a profit driver

	Finishing System	Sensitivity
1.	Traditional breeder-finisher pasture finishing	Moderate
2.	Specialist grain based finishing	Not applicable
3.	Specialist pasture finishing	Not applicable
4.	Opportunistic grain based finishing	Not applicable

The importance of mortality of lambs as a profit driver

	Finishing System	Sensitivity
1.	Specialist grain based finishing	High (> 10%mortality) Moderate (1 to 5% mortality)
2.	Opportunistic grain based finishing	High (> 10%mortality) Moderate (1 to 5% mortality)
3.	Specialist pasture finishing	High (> 10%mortality) Moderate (1 to 5% mortality)
4.	Traditional breeder-finisher pasture finishing	High (> 10%mortality) Moderate (1 to 5% mortality)

Methods

A budget was developed and analysed to determine the sensitivity of the profit margin within breeder-finisher systems for Merino and crossbred lambs to the cost of mortality in the breeding ewe flock and in lambs.

Feedlot finishing systems were analysed for a 2000 head feedlot finishing 4500 lambs per year and pasture based finishing systems were analysed over a range of pasture systems the details of which are outlined in the scope with additional parameters as follows:

- Sensitivities for all finishing systems were run from a lamb mortality rate of 0% to 30%
- Sensitivities for the breeder-finisher systems were run from a ewe flock mortality rate of 0% to 10%

Assumptions

- The cost of lamb mortality included the cost of purchase, expenses incurred upon entry (drenching, vaccinating) and the cost of feeding and management until death
- Lamb deaths were assumed to have occurred within the first quarter of the finishing period
- Ewe flock mortality was taken into account when calculating replacement ewe numbers

Results

- The profit margin of breeder-finisher systems (Table 45) was affected as follows:
  - 0% mortality to 5% mortality, loss of up to $3.88 /head
  - 0% mortality to 10% mortality, loss of up to $8.18 /head
  - 0% mortality to 30% mortality, loss of up to $31.56 /head
- The profit margin of specialist pasture based finishing systems (Table 46) was affected as follows:
  - 0% mortality to 5% mortality, loss of up to $3.44 /head
  - 0% mortality to 10% mortality, loss of up to $7.26 /head
  - 0% mortality to 30% mortality, loss of up to $28.00 /head
- The profit margin of feedlot finishing systems was affected as follows:
  - 0% mortality to 5% mortality, loss up to of $4.25 /head (Figure 9)
  - 0% mortality to 10% mortality, loss of up to $8.97 /head (Figure 10)
  - 0% mortality to 30% mortality, loss of up to $34.60 /head (Figure 10)
- A 5% mortality rate resulted in a drop in profit margin by:
  - 7.8% in a self-replacing Merino flock
  - 3.9% in a first cross lamb production system
  - 6.4% in a second cross lamb production system
  - 16% crossbred specialist pasture finishing
  - 118% Merino specialist pasture finishing
- The profitability of lambs finished in feedlot finishing systems from 45kg to 55kg was more sensitive to mortality than lambs finished from 35kg to 55kg which was in turn, more sensitive than finishing lambs from 35 to 45kg
- The profitability of breeder-finisher systems based on self-replacing Merino ewe flocks were between 48 and 67% less sensitive to mortality in the breeding flock than breeding systems producing second cross lambs (Table 47)
- The effect of breeding flock mortality rate on profit margin varied across pasture types. Profit margin sensitivity from highest to lowest was ranked as follows:
  1. Grazing Cereals (Intended) – Barley
  2. High rainfall long term pasture – Perennial phalaris, clover, cocksfoot
  3. Native pasture

Discussion

The cost of mortality was significant especially if mortality rates were high or if deaths occurred later in the finishing period.

In most cases fluctuations in mortality rates below 5% did not influence the ability to return a profit. However, producers who finished to tighter margins carried more risk in regards to high mortality as only a small increase resulted in the producer finishing lambs at a loss.

A mortality rate of 10% in a feedlot system would in effect eliminate any profit margin; the cost of morbidity in terms of reduced growth rate in response to acidosis is more difficult to estimate.

The higher intensity and proximity of the lambs in a feedlot can assist disease spread within the flock leading to outbreak levels more often than what is seen in pasture based finishing systems.

The cost of flock mortality was greatly determined by the time of death. The purchase of replacement ewes or the cost of feeding replacement ewe lambs was reimbursed once the ewe began to produce lambs. The cost of the mortality was greatest if the ewe was lost prior to weaning a lamb.

Conclusion

Mortality was a cost to the system which directly influenced profitability. Small fluctuations in mortality rate of 2 to 5% were often not great enough to directly influence the profitability of the finishing system. However, if a disease outbreak arose and mortality rates became high finishing lambs profitably is difficult. Prevention was considered the best method of controlling mortality rates and assisted with risk management.

Table 45 - Sensitivity of profit margins per head of breeder-finisher systems to changes in the mortality rate of lambs across 3 breeding ewe pasture systems and 3 lamb finishing pastures for Merino, first cross and second cross prime lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Mortality rate				
Ewe breeding pasture	**Lamb finishing pasture**	**0%**	**2.5%**	**5%**	**10%**	**30%**
Merino Ewes crossed with Merino Sires						
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$39.03	$37.56	$36.01	$32.66	$14.46
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$37.77	$36.28	$34.72	$31.33	$12.93
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$34.62	$33.25	$31.81	$28.68	$11.73
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$22.90	$21.03	$19.06	$14.79	-$8.38
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$21.58	$19.69	$17.70	$13.40	-$9.98
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$18.49	$16.72	$14.85	$10.82	-$11.11
Native Pasture	Cereal Stubbles	$32.27	$30.90	$29.47	$26.35	$9.43
Merino Ewes crossed with Terminal Sires						
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$61.27	$60.14	$58.94	$56.36	$42.32
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$59.95	$58.80	$57.59	$54.96	$40.72
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$54.57	$53.54	$52.45	$50.10	$37.34
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$48.07	$46.61	$45.07	$41.73	$23.63
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$46.71	$45.23	$43.67	$40.30	$21.98
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$41.32	$39.96	$38.53	$35.43	$18.59
Native Pasture	Cereal Stubbles	$52.64	$51.61	$50.53	$48.18	$35.45
First Cross Ewes crossed with Terminal Sires						
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$47.53	$46.06	$44.51	$41.15	$22.93
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$46.15	$44.66	$43.09	$39.69	$21.25
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$39.39	$38.02	$36.58	$33.46	$16.53
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$35.17	$33.39	$31.52	$27.46	$5.43
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$33.79	$31.99	$30.10	$26.00	$3.75
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$27.02	$25.34	$23.58	$19.76	-$0.98
Native Pasture	Cereal Stubbles	$37.58	$36.21	$34.78	$31.66	$14.76

Table 46 - Sensitivity of profit margins per head of specialist pasture finishing type to the mortality rate in lambs across 3 lamb finishing pastures for Merino and crossbred lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Mortality rate				
	Lamb finishing pasture	**0%**	**2.5%**	**5%**	**10%**	**30%**
Merino Lambs	Irrigated Clover / Ryegrass Pasture	$2.20	$0.93	-$0.41	-$3.31	-$19.04
	Fodder Crop - Chicory	$0.92	-$0.37	-$1.72	-$4.66	-$20.59
	Cereal Stubbles	-$2.62	-$3.80	-$5.03	-$7.71	-$22.27
Crossbred Lambs	Irrigated Clover / Ryegrass Pasture	$21.44	$19.78	$18.04	$14.26	-$6.26
	Fodder Crop - Chicory	$20.05	$18.37	$16.61	$12.79	-$7.95
	Cereal Stubbles	$12.99	$11.43	$9.79	$6.24	-$13.04

Table 47 - Sensitivity of profit margins per head of traditional breeder-finisher systems to breeding flock mortality rate across 3 different ewe breeding pastures and 3 lamb finishing pastures, for Merino and crossbred lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles)

		Flock mortality rate				
Ewe breeding pasture	**Lamb finishing pasture**	**0%**	**2%**	**5%**	**6%**	**10%**
Merino Ewes crossed with Merino Sires						
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$39.85	$39.33	$38.85	$38.29	$37.13
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$38.59	$38.06	$37.52	$37.02	$35.85
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$35.48	$34.96	$34.48	$33.92	$32.82
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$23.92	$23.22	$22.50	$21.79	$20.19
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$22.61	$21.95	$21.23	$20.46	$18.91
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$19.55	$18.85	$18.13	$17.42	$15.83
Native Pasture	Cereal Stubbles	$35.16	$34.63	$34.09	$33.59	$32.43
Merino Ewes crossed with Terminal Sires						
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$61.69	$61.41	$61.15	$60.88	$60.32
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$60.36	$60.08	$59.78	$59.51	$58.95
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$55.04	$54.76	$54.44	$54.17	$53.58
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$48.46	$48.14	$47.82	$47.44	$46.74
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$47.14	$46.77	$46.44	$46.12	$45.41
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$41.82	$41.44	$41.11	$40.77	$40.05
Native Pasture	Cereal Stubbles	$54.73	$54.44	$54.17	$53.90	$53.31
First Cross Ewes crossed with Terminal Sires						
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$49.37	$48.33	$47.26	$46.15	$43.86
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$47.95	$46.90	$45.83	$44.73	$42.43
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$41.27	$40.22	$39.15	$38.05	$35.75
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$36.85	$35.80	$34.73	$33.63	$31.33
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$35.46	$34.42	$33.34	$32.24	$29.95
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$28.74	$27.70	$26.62	$25.52	$23.22
Native Pasture	Cereal Stubbles	$40.97	$39.93	$38.86	$37.75	$35.46

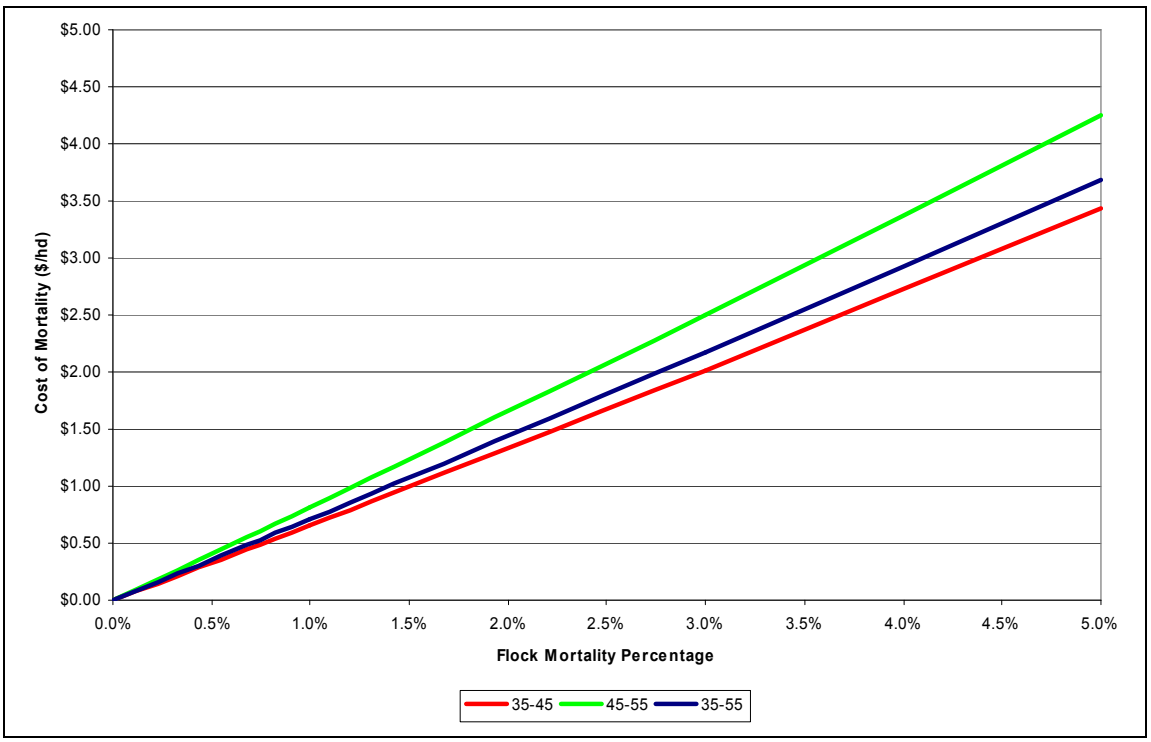

Figure 9 - Cost of mortality per finished lamb for four month old crossbred lambs finished at 300g / day in a feedlot with a capacity of 2000 lambs and an annual turnover of 4500 lambs.

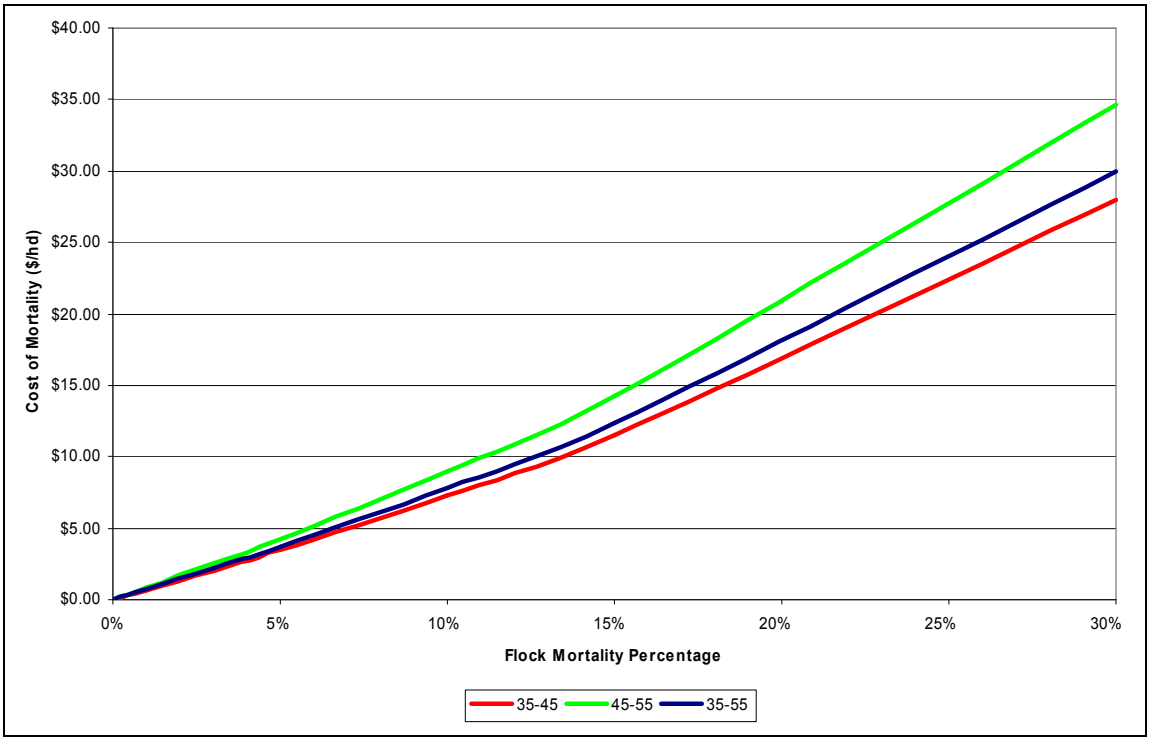

Figure 10 - Cost of mortality as a result of a disease outbreak per finished lamb for four month old crossbred lambs finished at 300g / day in a feedlot with a capacity of 2000 lambs and an annual turnover of 4500 lambs.

6.2.17. Fleece value, skin price and shearing

Introduction

Wool value is of great significance to a wool producing enterprise which comprises the majority of self-replacing, breeder finisher flocks. The higher profit margin of breeder-finisher systems is largely related to the contribution of the fleece value.

The income from wool sales in a specialist feedlot or pasture finishing system is dependent on fleece length and potential value at purchase. The potential value was determined by the fleece length and quality.

There is clear evidence that shearing increases the energy requirements of sheep in hot (>30° C) and cold (<5°C) weather however this factor has not been accounted for in running these sensitivities.

The importance of fleece value as a profit driver

	Finishing System	Sensitivity to
1.	Traditional breeder-finisher pasture finishing	High
2.	Specialist grain based finishing	Moderate
3.	Specialist pasture finishing	Moderate
4.	Opportunistic grain based finishing	Moderate

The importance of shearing cost as a profit driver

	Finishing System	Sensitivity
1.	Traditional breeder-finisher pasture finishing	High
2.	Specialist grain based finishing	Low
3.	Opportunistic grain based finishing	Low
4.	Specialist pasture finishing	Low

The importance of skin price as a profit driver

	Finishing System	Sensitivity
1.	Traditional breeder-finisher pasture finishing	Moderate
2.	Specialist grain based finishing	Moderate
3.	Opportunistic grain based finishing	High
4.	Specialist pasture finishing	High

Methods

A budget was developed and analysed to determine the sensitivity of the profit margin of four Merino and crossbred lamb finishing systems to the management of the fleece encapsulating the returns from fleece and skins and the cost of shearing.

Feedlot finishing systems were analysed for a 2000 head capacity feedlot finishing 4500 lambs per annum and pasture based systems were analysed over a range of pasture systems the details of which are outlined in the scope with additional parameters as follows:

- Sensitivities of pasture based finishing systems were determined from a fleece value of $5.24 plus or minus 10%
- Sensitivities of pasture based finishing systems were determined from a shearing cost at award rates plus or minus 20% per ewe or lamb
- Sensitivities of feedlot finishing systems were run to 4 different fleece management practices affecting skin price:
    1. Lambs purchased bare shorn
    2. Lambs purchased with fleece and not shorn
    3. Lambs crutched upon entering the feedlot
    4. Lambs shorn upon entering the feedlot
- In analyses where lambs are shorn sensitivities of feedlot finishing systems were run from a base fleece price for Merino and crossbred lambs sourced from Woolcheque and varied by ±$1.00/kg gfwt
- Skin price for feedlot lambs was investigated and varied due the above shearing and purchase options as well as discounts for vegetable matter contamination and no market availability. Therefore skin value varied over a range of $0 to $12.50 per head

Assumptions

- Merino wool received a price premium compared with crossbred wool
- Fleece price premiums were allocated to lower micron wool
- Shearing costs accounted for all wool handling costs including labour
- The value of the skin took into account the time of shearing in relation to sale (fleece length and liveweight of the lamb)

Results

- A change in wool value in breeder-finisher systems by 10% resulted in (Table 48):
    i. A change in profit margin by up to 26% in self-replacing Merino flocks
    ii. A change in profit margin in first cross lamb production systems by up to 7%
    iii. A change in profit margin in second cross lamb production systems by up to 6%

- A change in wool value by 10% in specialist pasture finishing systems resulted in a change in profit margin of $0.13 per head (Table 49). However, due to the lower profit margin of Merino lambs compared to crossbred lambs, changes in wool value by 10% had a much larger effect on Merino lambs when compared on a % change in profit basis, i.e.:
    i. A change in profit margin of Merino lambs by up to 45%
    ii. A change in profit margin of crossbred lambs by up to 1%
- A change in shearing cost by ±20% affected profit margins in breeder-finisher systems (Table 50) by between 1.7% to 7.7%
- A change in shearing cost in breeder-finisher systems by 20% resulted in (Table 50):

i. A change in profit margin of $1.40 per head in self-replacing Merino flocks
ii. A change in profit margin of $1.06 per head in first cross lambs production systems
iii. A change in profit margin of $0.90 per head in second cross lamb production systems

- A change in shearing cost by ±20% affected profit margins in specialist pasture finishing systems for Merino lambs by up to 45.9% and up to 1.5% for crossbred lambs (Table 51). The dollar difference for a ±20% change in shearing for both Merino and crossbred lambs was $0.19.
- Changes in shearing cost of ±20% affected profit margin of specialist pasture finishing systems for both Merino and crossbred lambs on the following pasture types in order of highest to lowest sensitivity as follows (Table 51) :
    1. Fodder crop - chicory
    2. Irrigated clover / ryegrass pasture
    3. Cereal stubbles
- The highest profit margin within each range of growth rates and finishing weights was achieved by shearing crossbred lambs at the point of entry to a feedlot finishing system (Table 52)
- The profit margin of Merino lambs in feedlot systems was negative in the vast majority of analyses (Table 53) however the most profitable result was gained by shearing on entry to the feedlot and a growth rate of 400g/day
- An increase in fleece value by $1.00 per kg gfwt increased Merino feedlot profitability by $3.48 per head (Table 53)
- The influence of fleece management decisions was ranked in order of effect on profit margins as follows:
    - Shorn at feedlot entry
    - Lambs purchased with fleece and not shorn
    - Crutched on feedlot entry
    - Lambs purchased bare shorn

Discussion

The profit margins in Merino ewe production systems and lamb finishing systems were more sensitive to fleece value and shearing costs than crossbred ewe and lamb production systems. This was attributable to the increased dependence of a Merino system to returns from wool to compensate for lower lamb production numbers from the breeding system and lower carcase value of Merino lambs.

Profit margins per head were reduced by a greater amount in Merino flocks as shearing costs increased than crossbred flocks for the same reason.

As short term pasture systems were established at a higher cost than perennial pastures these systems were more sensitive to changes in fleece price and value in specialist pasture finishing systems.

Merino lambs within specialist finishing systems were found to be generally unprofitable unless they achieved consistent growth rates of at least 400g/day which would be considered unlikely in most cases.

The most profitable option for both crossbred and Merino lambs intended for feedlot finishing was shearing at feedlot entry to allow fleece growth to optimise

skin value at point of sale. The least profitable option was to purchase bare shorn lambs which reduced the income potential from the lambs' wool. Lambs would need to be purchased at a significant discount for this option to be profitable.

Profit margins increased as the sale weight of lambs increased in response to an increase in skin value.

Conclusion

Wool value is integral to the profitability of Merino production systems but less important in crossbred ewe and lamb production systems. Purchasing lambs with a fleece will increase profitability from a specialist finishing system as greater flexibility is available in terms of fleece returns and skin value at the completion of the finishing period.

Table 48 - Sensitivity of profit margins per head of breeder-finisher systems to changes in the value of the wool across 3 breeding ewe pasture types and 3 lamb finishing pastures finishing Merino, first cross and second cross prime lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Wool value		
Ewe breeding pasture	**Lamb finishing pasture**	**-10%**	**base**	**+ 10%**
Merino Ewes crossed with Merino Sires				
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$35.07	$38.85	$42.62
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$33.74	$37.52	$41.30
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$30.70	$34.48	$38.25
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$18.72	$22.50	$26.28
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$17.45	$21.23	$25.01
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$14.35	$18.13	$21.91
Native Pasture	Cereal Stubbles	$30.31	$34.09	$37.87
Merino Ewes crossed with Terminal Sires				
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$58.32	$61.15	$63.98
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$56.95	$59.78	$62.61
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$51.61	$54.44	$57.27
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$44.99	$47.82	$50.64
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$43.62	$46.44	$49.27
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$38.28	$41.11	$43.94
Native Pasture	Cereal Stubbles	$51.34	$54.17	$57.00
First Cross Ewes crossed with Terminal Sires				
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$45.68	$47.26	$48.83
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$44.25	$45.83	$47.40
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$37.57	$39.15	$40.73
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$33.15	$34.73	$36.31
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$31.77	$33.34	$34.92
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$25.05	$26.62	$28.20
Native Pasture	Cereal Stubbles	$37.28	$38.86	$40.43

Table 49 - Sensitivity of profit margins per head of specialist pasture finishing systems to the value of the wool across 3 pastures systems finishing Merino and crossbred lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Wool value		
Breed	**Lamb finishing pasture**	**-10%**	**base**	**+ 10%**
Merino Lambs	Irrigated Clover / Ryegrass Pasture	$1.57	$1.70	$1.83
	Fodder Crop - Chicory	$0.28	$0.41	$0.54
	Cereal Stubbles	-$3.21	-$3.08	-$2.96
Crossbred Lambs	Irrigated Clover / Ryegrass Pasture	$20.66	$20.79	$20.91
	Fodder Crop - Chicory	$19.27	$19.39	$19.52
	Cereal Stubbles	$12.25	$12.38	$12.50

Table 50 - Sensitivity of profit margins per head of breeder-finisher systems to changes in the cost of shearing across 3 breeding ewe pasture types and 3 lamb finishing pastures for Merino, first cross and second cross prime lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Shearing cost			
Ewe breeding pasture	**Lamb finishing pasture**	**Unshorn**	**-20%**	**base**	**+ 20%**
Merino Ewes crossed with Merino Sires					
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$45.85	$40.25	$38.85	$37.44
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$44.52	$38.92	$37.52	$36.12
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$41.48	$35.88	$34.48	$33.07
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$29.50	$23.90	$22.50	$21.10
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$28.23	$22.63	$21.23	$19.83
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$25.13	$19.53	$18.13	$16.73
Native Pasture	Cereal Stubbles	$41.10	$35.49	$34.09	$32.69
Merino Ewes crossed with Terminal Sires					
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$66.43	$62.20	$61.15	$60.09
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$65.06	$60.83	$59.78	$58.72
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$59.72	$55.50	$54.44	$53.39
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$53.10	$48.87	$47.82	$46.76
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$51.73	$47.50	$46.44	$45.39
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$46.39	$42.17	$41.11	$40.05
Native Pasture	Cereal Stubbles	$59.45	$55.23	$54.17	$53.12
First Cross Ewes crossed with Terminal Sires					
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$51.75	$48.15	$47.26	$46.36
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$50.32	$46.73	$45.83	$44.93
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$43.64	$40.05	$39.15	$38.25
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$39.22	$35.63	$34.73	$33.83
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$37.84	$34.24	$33.34	$32.45
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$31.11	$27.52	$26.62	$25.73
Native Pasture	Cereal Stubbles	$43.35	$39.75	$38.86	$37.96

Table 51 - Sensitivity of profit margins per head of specialist pasture finishing systems to changes in the cost of shearing across 3 lamb finishing pasture systems for Merino and crossbred lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Shearing cost			
Breed	**Lamb finishing pasture**	**Unshorn**	**-20%**	**base**	**+ 20%**
Merino Lambs	Irrigated Clover / Ryegrass Pasture	$2.64	$1.89	$1.70	$1.51
	Fodder Crop - Chicory	$1.35	$0.60	$0.41	$0.22
	Cereal Stubbles	-$2.14	-$2.90	-$3.08	-$3.27
Crossbred lambs	Irrigated Clover / Ryegrass Pasture	$21.73	$20.97	$20.79	$20.60
	Fodder Crop - Chicory	$20.33	$19.58	$19.39	$19.21
	Cereal Stubbles	$13.32	$12.56	$12.38	$12.19

Table 52 - Sensitivity of profit margins per head of a feedlot based finishing systems to changes in fleece management, fleece prices, shearing cost and for penalties to skin value for producers finishing four month old crossbred lambs in a feedlot with a capacity of 2000 lambs and annual throughput of 4500 lambs.

	35kg to 45kg			45kg to 55kg			35kg to 55kg		
Growth rate	**250 g/day**	**300 g/day**	**400 g/day**	**250 g/day**	**300 g/day**	**400 g/day**	**250 g/day**	**300 g/day**	**400 g/day**
Fleece management									
Bare shorn purchase	$1.62	$3.30	$3.42	$3.84	$2.48	$5.65	$3.33	$6.40	$6.66
Shorn on entry to feedlot	$6.06	$7.75	$7.87	$8.29	$6.92	$10.10	$7.78	$10.85	$11.11
Lambs purchased in fleece and not shorn	$3.50	$5.18	$5.31	$4.78	$3.42	$6.59	$4.27	$7.35	$7.61
Crutched on entry to feedlot	$3.47	$5.15	$5.28	$4.76	$3.39	$6.56	$4.24	$7.32	$7.58
Fleece prices									
- $1.00	$4.71	$6.39	$6.51	$6.93	$5.57	$8.74	$6.42	$9.49	$9.76
base	$6.06	$7.75	$7.87	$8.29	$6.92	$10.10	$7.78	$10.85	$11.11
+ $1.00	$9.59	$11.27	$11.40	$11.82	$10.45	$14.64	$11.30	$14.38	$14.64
Cost for shearing lambs									
- 50%	$7.26	$8.94	$9.07	$9.49	$8.12	$11.30	$8.97	$12.05	$12.31
base	$6.06	$7.75	$7.87	$8.29	$6.92	$10.10	$7.78	$10.85	$11.11
+ 50%	$4.87	$6.55	$6.67	$7.09	$5.73	$8.90	$6.58	$9.65	$9.92
Skin price penalties									
Vegetable matter contamination (shorn on entry)	$4.65	$6.33	$6.46	$5.93	$4.57	$7.74	$5.42	$8.50	$8.76
Vegetable matter contamination (crutched on entry)	$3.23	$4.91	$5.04	$5.92	$4.56	$7.73	$5.41	$8.49	$8.75
No market for skins	-$2.89	-$1.21	-$1.08	-$2.55	-$3.91	-$0.74	-$3.06	$0.01	$0.28

Table 53 - Sensitivity of profit margins per head of a feedlot based finishing systems to changes in fleece management, fleece prices, shearing cost and for penalties to skin value for producers finishing four month old Merino lambs in a feedlot with a capacity of 2000 lambs and annual throughput of 4500 lambs.

	35kg to 45kg			45kg to 55kg			35kg to 55kg		
Growth rate	**250 g/day**	**300 g/day**	**400 g/day**	**250 g/day**	**300 g/day**	**400 g/day**	**250 g/day**	**300 g/day**	**400 g/day**
Fleece management									
Bare shorn purchase	-$10.95	-$10.14	-$6.73	-$13.95	-$13.06	-$9.67	-$14.21	-$12.13	-$5.74
Shorn on entry to feedlot	-$3.45	-$2.64	$0.77	-$6.45	-$5.56	-$2.17	-$6.71	-$4.63	$1.76
Lambs purchased in fleece and not shorn	-$9.07	-$8.26	-$4.85	-$13.01	-$12.12	-$8.73	-$13.27	-$11.19	-$4.80
Crutched on entry to feedlot	-$8.77	-$7.96	-$4.55	-$12.70	-$11.81	-$8.43	-$12.96	-$10.89	-$4.50
Fleece prices									
- $1.00	-$4.86	-$4.05	-$0.64	-$7.85	-$6.96	-$3.58	-$8.11	-$6.04	$0.35
base	-$3.45	-$2.64	$0.77	-$6.45	-$5.56	-$2.17	-$6.71	-$4.63	$1.76
+ $1.00	$0.03	$0.84	$4.25	-$2.97	-$2.08	$1.31	-$3.23	-$1.15	$5.24
Cost for shearing lambs									
- 50%	-$2.25	-$1.44	$1.97	-$5.25	-$4.36	-$0.97	-$5.51	-$3.44	$2.96
base	-$3.45	-$2.64	$0.77	-$6.45	-$5.56	-$2.17	-$6.71	-$4.63	$1.76
+ 50%	-$4.65	-$3.84	-$0.43	-$7.65	-$6.76	-$3.37	-$7.91	-$5.83	$0.56
Skin price penalties									
Vegetable matter contamination (shorn on entry)	-$4.87	-$4.06	-$0.65	-$8.80	-$7.91	-$4.53	-$9.06	-$6.99	-$0.60
Vegetable matter contamination (crutched on entry)	-$8.49	-$7.68	-$4.27	-$11.01	-$10.12	-$6.74	-$11.28	-$9.20	-$2.81
No market for skins	-$12.41	-$11.60	-$8.19	-$17.29	-$16.40	-$13.01	-$17.55	-$15.47	-$9.08

6.2.18. Agents commission

Introduction

The value of the agent to many producers is the assistance they provide in securing lamb supply and the marketing of lambs ready for sale. Marketing can be a time consuming process for the inexperienced and/or busy producers and the value of an efficient and well informed agent should not be underestimated. Agents also have extensive networks and are, on some occasions, able to negotiate and or have access to a wide range of contract prices, which can benefit producers.

When selling lambs agents will guarantee payment and in some cases they are able to provide finance options for the purchase of stock for finishing.

The average commission paid to stock agents in the lamb industry is currently 5.5% although larger producers are able to negotiate commission to as low as 3%.

Many producers have direct supply arrangements with processors and wholesalers however, the development and maintenance of these arrangements is not always without risk.

The importance of agent's commission as a profit driver

	Finishing System	Sensitivity
1.	Specialist pasture finishing	Moderate
2.	Opportunistic grain based finishing	Moderate
3.	Specialist grain based finishing	Moderate
4.	Traditional breeder-finisher pasture finishing	Moderate

Methods

A budget was developed and analysed to determine the sensitivity of the profit margins of all finishing systems for Merino and crossbred lambs to the agent's commission.

Feedlot and pasture based finishing systems were analysed for the following parameters:

- Sensitivities of the four finishing systems were run with the agent's commission being from 0% to 6% of the sale price
- The influence of final carcase price on the profit margin of feedlot finishing systems to the agent's commission was analysed from a carcase price of $3.00 to $4.50 /kg cwt
- The sensitivity of finishing weights on the profit margin of feedlot finishing systems to the agent's commission was analysed for sale weights of 45kg and 55kg

Assumptions

- Agent's commission was fitted to the total carcase and skin returns
- Agent's commission was not influenced by feedlot scale

Results

- The profitability of feedlot finishing systems was more sensitive to changes in the agent's commission as carcase price increased
- Profitability was reduced by the following margins when covering the cost of an agent's commission at 5.5% in breeder-finisher systems (Table 54):
  - First cross ewes crossed with terminal sires: up to $5.12/head
  - Merino ewes crossed with terminal sires: up to $4.40/head
  - Self-replacing Merino flock: up to $3.22/head
- The profitability of breeder-finisher systems grazing lambs on cereal stubbles was 17-21% less sensitive to changes in agent's commission than when lambs were finished in alternative pasture systems (Table 54)
- An increase in the agent's commission by 1% resulted in a decline in the profitability of the specialist pasture finishing systems by up to $0.93 per head (Table 55). This directly related to the value of the carcase.
- Where the carcase price was $58.50 and the profit margin was $3.21 (Merino) the decline in profitability of $0.58 per 1% increase in commission represented 18% of the profit for each 1% change in commission(Table 55)
- Where the carcase price was $93.00 and the profit margin was $20.40 (cross bred) the decline in profit was $0.93 per 1% commission represented 4.6% of the profit for each 1% of commission (Table 55)
- The profitability of Merino lambs specialist pasture based finishing systems was generally 10-20% more sensitive to 1% changes in agent's commission than crossbred lamb systems (Table 55)
- The profitability of specialist pasture finishing systems based on finishing on cereal stubbles were 17-21% less sensitive to changes in the agent's commission than finishing lambs on alternative pasture based systems (Table 55)
- An increase in the agent's commission by 1% resulted in a decline in the profitability of the feedlot finishing systems by between $0.71 to $1.11 per head which effected profitability by between 5.1% and 42.8% (Table 56)
- The profitability of feedlot finishing systems selling lambs at $4.00 /kg cwt were 26-29% more sensitive to 1% changes in the agent's commission than when lambs were sold at $3.00 (Table 56)
- The sensitivity of the profit margins of feedlot finishing systems were 19-22% more sensitive to changes in the agents commission when lambs were finished to 55kg compared with 45kg (Table 56)

Discussion

As the agent's commission was a percentage of the sale price, it followed that as the value of the end product increased so did the return to the agent. Although the reduction in profit margin per head attributed to commission ranged from $2.54 to $6.11 on a per head basis, this often represented a large percentage of the profit margin.

An increase in commission of 1% resulted in an average reduction in profit margin of 25% in specialist pasture finishing systems for Merino production systems and 5% for crossbred production systems. This was because the profit margins in Merino production systems were smaller.

Conclusion

Agent's play a critical role in all lamb production systems, the impact of agent's commission on profitability varies in relation to profit generated. In some instances the agent's commission can mean the difference between a modest profit and returning a loss however the impact of commission is reduced as profit increases.

Producers should be aware of the effect of the sale weight of lambs on the agent's commission and ensure that feeding to heavier weights will be more profitable than earlier turn off. Reduction in commission rates may also be negotiable as turnover increases.

Although direct marketing arrangements can significantly increase profit margins they are not without risk therefore it is worth thoroughly investigating all options.

Table 54 - Sensitivity of profit margins per head of breeder-finisher systems to changes in the agent commission across 3 breeding ewe pasture types and 3 lamb finishing pastures finishing Merino, first cross and second cross prime lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Agent commission							
Ewe breeding pasture	**Lamb finishing pasture**	**0.0%**	**3.0%**	**3.5%**	**4.0%**	**4.5%**	**5.0%**	**5.5%**	**6.0%**
Merino Ewes crossed with Merino Sires									
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$43.57	$41.82	$41.53	$41.23	$40.94	$40.65	$40.36	$40.06
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$42.25	$40.49	$40.20	$39.91	$39.62	$39.32	$39.03	$38.74
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$38.38	$36.99	$36.76	$36.53	$36.30	$36.07	$35.83	$35.60
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$27.23	$25.48	$25.19	$24.89	$24.60	$24.31	$24.02	$23.73
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$25.96	$24.21	$23.92	$23.62	$23.33	$23.04	$22.75	$22.46
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$22.04	$20.65	$20.42	$20.19	$19.96	$19.73	$19.50	$19.27
Native Pasture	Cereal Stubbles	$38.00	$36.61	$36.38	$36.15	$35.91	$35.68	$35.45	$35.22
Merino Ewes crossed with Terminal Sires									
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$65.88	$63.48	$63.08	$62.68	$62.28	$61.88	$61.48	$61.08
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$64.51	$62.11	$61.71	$61.31	$60.91	$60.51	$60.11	$59.71
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$58.35	$56.39	$56.07	$55.74	$55.41	$55.09	$54.76	$54.43
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$52.54	$50.15	$49.75	$49.35	$48.95	$48.55	$48.15	$47.75
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$51.17	$48.78	$48.38	$47.98	$47.58	$47.18	$46.78	$46.38
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$45.02	$43.06	$42.74	$42.41	$42.09	$41.76	$41.43	$41.11
Native Pasture	Cereal Stubbles	$58.08	$56.12	$55.80	$55.47	$55.14	$54.82	$54.49	$54.16
First Cross Ewes crossed with Terminal Sires									
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$51.98	$49.19	$48.72	$48.26	$47.79	$47.33	$46.86	$46.40
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$50.56	$47.76	$47.30	$46.83	$46.37	$45.90	$45.43	$44.97
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$43.06	$40.75	$40.36	$39.98	$39.60	$39.21	$38.83	$38.44
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$39.46	$36.67	$36.20	$35.74	$35.27	$34.81	$34.34	$33.88
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$38.07	$35.28	$34.82	$34.35	$33.89	$33.42	$32.96	$32.49
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$30.53	$28.23	$27.84	$27.46	$27.08	$26.69	$26.31	$25.92
Native Pasture	Cereal Stubbles	$42.76	$40.46	$40.07	$39.69	$39.30	$38.92	$38.53	$38.15

Table 55 - Sensitivity of profit margins per head of specialist pasture finishing systems to the agent's commission across 3 lamb finishing pasture systems, for Merino and crossbred lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Agent commission							
Breed	**Lamb finishing pasture**	**0.0%**	**3.0%**	**3.5%**	**4.0%**	**4.5%**	**5.0%**	**5.5%**	**6.0%**
Merino Lambs	Irrigated Clover / Ryegrass Pasture	$6.43	$4.67	$4.38	$4.09	$3.79	$3.50	$3.21	$2.91
	Fodder Crop - Chicory	$5.14	$3.38	$3.09	$2.79	$2.50	$2.21	$1.92	$1.62
	Cereal Stubbles	$0.82	-$0.57	-$0.80	-$1.03	-$1.27	-$1.50	-$1.73	-$1.96
Crossbred Lambs	Irrigated Clover / Ryegrass Pasture	$25.52	$22.72	$22.26	$21.79	$21.33	$20.86	$20.40	$19.93
	Fodder Crop - Chicory	$24.12	$21.33	$20.87	$20.40	$19.94	$19.47	$19.00	$18.54
	Cereal Stubbles	$16.28	$13.98	$13.59	$13.21	$12.83	$12.44	$12.06	$11.67

Table 56 - Sensitivity of profit margins per head of a feedlot finishing system to changes in agent's commission at various carcase prices for producers finishing four month old crossbred lambs growing at 300 g/day in a feedlot with a capacity of 2000 lambs and annual throughput of 4500 lambs.

Agents commission	Lamb Sale Price ($/kg cwt)		
	$3.00	$3.65	$4.00
Finishing system running lambs from a 35kg purchase weight and selling at 45kg LW			
0.0%	-$0.66	$12.39	$19.42
3.0%	-$2.80	$9.86	$16.67
3.5%	-$3.16	$9.43	$16.21
4.0%	-$3.52	$9.01	$15.76
4.5%	-$3.87	$8.59	$15.30
5.0%	-$4.23	$8.17	$14.84
5.5%	-$4.58	$7.75	$14.38
6.0%	-$4.94	$7.32	$13.93
Finishing system running lambs from a 45kg purchase weight and selling at 55kg LW			
0.0%	-$3.45	$12.53	$21.13
3.0%	-$6.02	$9.47	$17.81
3.5%	-$6.45	$8.96	$17.26
4.0%	-$6.88	$8.45	$16.71
4.5%	-$7.30	$7.94	$16.15
5.0%	-$7.73	$7.43	$15.60
5.5%	-$8.16	$6.92	$15.05
6.0%	-$8.59	$6.42	$14.50
Finishing system running lambs from a 35kg purchase weight and selling at 55kg LW			
0.0%	$0.56	$16.45	$25.01
3.0%	-$2.01	$13.40	$21.70
3.5%	-$2.44	$12.89	$21.14
4.0%	-$2.87	$12.38	$20.59
4.5%	-$3.30	$11.87	$20.04
5.0%	-$3.73	$11.36	$19.49
5.5%	-$4.16	$10.85	$18.93
6.0%	-$4.58	$10.34	$18.38

6.2.19. Genetic potential of lambs to meet market specifications

Introduction

Lamb returns are ultimately driven by consumer demand however the price received by the lamb producer is largely determined by the processing sector. Unless selling on a liveweight basis under the saleyard auction system, most processors provide producers and agents with a set of market specifications and a price grid that reflects market demand.

The ability of lamb producers to consistently market lambs that meet a set of weight and fat specifications, and/or lean meat yield specifications, is determined by the diet of the lamb from conception to market and the genetic potential of the lamb.

In some cases there are significant financial penalties for lambs that fall out of the required range of specifications.

The importance of meeting market specifications as a profit driver

	Finishing System	Sensitivity
1.	Specialist grain based finishing	Moderate
2.	Opportunistic grain based finishing	Moderate
3.	Specialist pasture finishing	Moderate
4.	Traditional breeder-finisher pasture finishing	Low

Methods

A budget was developed and analysed to determine the sensitivity of the profit margins of four finishing systems for Merino and crossbred lambs to carcase price penalties for lambs failing to meet market specifications.

Feedlot finishing systems were analysed to a range finishing weights; pasture based finishing systems were analysed over a range of pasture systems the details of which are outlined in the scope with additional parameters as follows:

- Sensitivities of four finishing systems were determined from a carcase price penalty of 0% to 30% of finished lambs.
- The influence of final carcase price on the profit margin of feedlot finishing systems to carcase price penalty was analysed from a carcase price of $3.00 to $4.50 /kg cwt.

Assumptions

- The penalty rate for carcases failing to meet specifications was $0.40/ kg cwt

Results

- The profitability of breeder-finisher systems was reduced by less than $0.33 per head for Merino breeding systems, $0.56 per head for first cross breeding systems and $0.70 per head for second cross breeding systems in response to an increase in numbers of lambs that failed to meet market specifications from 0% to 5% (Table 57)

- For Merino breeding systems, profitability was reduced for out of specification lambs as follows:
  - up to 2% profit for 5% out of specification
  - up to 4% profit for 10% out of specification
  - up to 8% profit for 30% out of specification
- For Merino ewes crossed with terminal sire breeding systems, profitability was reduced for out of specification lambs as follows:
  - up to 1% profit for 5% out of specification
  - up to 3% profit for 10% out of specification
  - up to 6% profit for 30% out of specification
- For first cross ewes crossed with terminal sire breeding systems, profitability was reduced for out of specification lambs as follows:
  - up to 3% profit for 5% out of specification
  - up to 5% profit for 10% out of specification
  - up to 11% profit for 30% out of specification
- The profitability of first cross lambs finished within specialist pasture based systems was reduced by $0.70 per head in response to an increase in lambs outside specifications from 0% to 5% (Table 58)
- Merino based specialist pasture finishing systems profit was reduced by $0.25 per head in response to an increase in lambs outside specifications from 0% to 5% (Table 58)
- Merino based specialist pasture finishing systems were therefore 64.3% less sensitive to lambs failing to meet market specifications than systems finishing crossbred lambs (Table 58)
- The profitability of feedlot finishing systems was reduced by between $0.41 and $0.50 in response to an increase in the number of lambs failing to meet market specifications from 0% to 5% (Table 59)
- The profitability of feedlot finishing systems was 18% less sensitive to a 5% change in number of lambs failing to meet market specifications when the lambs were finished to 45kg instead of 55kg (Table 59)

Discussion

The effect of lambs failing to meet market specifications on enterprise profitability is dependent on the severity of the price penalty. The sensitivity of profit margins to a penalty of $0.40 per kg cwt was low in breeder-finisher systems however the sensitivity increased to moderate levels within specialist pasture and feedlot finishing systems.

As finishing weight increased, profit margins became more sensitive to price penalties. The effect of lambs failing to meet market specifications within breeder-finisher systems was 70% higher in first cross lamb production systems than Merino systems and the penalty for 2nd cross production systems was 25% higher than 1st cross operations.

Conclusion

If a significant number of lambs are failing to meet specifications, the feed ration should be reviewed to ensure it is meeting and not exceeding requirements. If the ration is correctly formulated and prenatal and pre-weaning nutrition were not compromised, then it is likely that the lambs do not have the required genetic potential to meet target market specifications and ram selection should be reviewed.

Table 57 - Sensitivity of profit margins per head of breeder-finisher systems to changes in the number of lambs failing to meet market specifications across 3 breeding ewe pasture systems and 3 lamb finishing pastures finishing Merino, first cross and second cross prime lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Percentage of lambs out of specification					
Ewe breeding pasture	**Lamb finishing pasture**	**0%**	**1%**	**2%**	**5%**	**10%**	**30%**
Merino Ewes crossed with Merino Sires							
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$37.59	$37.53	$37.46	$37.27	$36.94	$36.29
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$36.32	$36.26	$36.19	$36.00	$35.67	$35.02
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$33.37	$33.31	$33.24	$33.05	$32.72	$32.07
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$21.30	$21.24	$21.17	$20.97	$20.65	$20.00
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$19.98	$19.91	$19.85	$19.65	$19.32	$18.67
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$17.08	$17.01	$16.95	$16.75	$16.43	$15.78
Native Pasture	Cereal Stubbles	$31.02	$30.95	$30.89	$30.69	$30.37	$29.71
Merino Ewes crossed with Terminal Sires							
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$59.97	$59.86	$59.74	$59.41	$58.85	$57.74
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$58.64	$58.53	$58.42	$58.08	$57.53	$56.42
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$53.45	$53.34	$53.23	$52.90	$52.34	$51.23
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$46.63	$46.52	$46.41	$46.08	$45.52	$44.41
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$45.26	$45.15	$45.04	$44.71	$44.15	$43.04
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$40.08	$39.97	$39.85	$39.52	$38.96	$37.85
Native Pasture	Cereal Stubbles	$51.53	$51.42	$51.31	$50.97	$50.42	$49.30
First Cross Ewes crossed with Terminal Sires							
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$46.09	$45.95	$45.81	$45.39	$44.69	$43.29
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$44.71	$44.57	$44.43	$44.01	$43.31	$41.91
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$38.14	$38.00	$37.86	$37.44	$36.74	$35.34
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$33.61	$33.47	$33.33	$32.91	$32.21	$30.81
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$32.22	$32.08	$31.94	$31.52	$30.82	$29.42
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$25.65	$25.51	$25.37	$24.95	$24.25	$22.85
Native Pasture	Cereal Stubbles	$36.33	$36.19	$36.05	$35.63	$34.93	$33.53

Table 58 - Sensitivity of profit margins per head of specialist pasture finishing systems to the percentage of animals failing to meet market specifications across 3 lamb finishing pasture types finishing Merino and crossbred lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Percentage of lambs out of specification					
Breed	**Lamb finishing pasture**	**0%**	**1%**	**2%**	**5%**	**10%**	**30%**
Merino lambs	Irrigated Clover / Ryegrass Pasture	$0.84	$0.79	$0.74	$0.59	$0.34	-$0.16
	Fodder Crop - Chicory	-$0.45	-$0.50	-$0.55	-$0.70	-$0.95	-$1.45
	Cereal Stubbles	-$3.80	-$3.85	-$3.90	-$4.05	-$4.30	-$4.80
Crossbred lambs	Irrigated Clover / Ryegrass Pasture	$19.93	$19.79	$19.65	$19.23	$18.53	$17.13
	Fodder Crop - Chicory	$18.53	$18.39	$18.25	$17.83	$17.13	$15.73
	Cereal Stubbles	$11.67	$11.53	$11.39	$10.97	$10.27	$8.87

Table 59 - Sensitivity of profit margins per head of feedlot based finishing systems to changes in the percentage of lambs failing to meet market specifications to carcase price for producers finishing four month old crossbred lambs growing at 300 g/day in a feedlot with a capacity of 2000 lambs and annual throughput of 4500 lambs.

Percentage of lambs out of specification	Lamb carcase price ($/kg cwt)		
	$3.00	$3.65	$4.00
Finishing system running lambs from a 35kg purchase weight and selling at 45kg liveweight			
0%	-$4.18	$8.15	$14.79
2%	-$4.34	$7.99	$14.63
5%	-$4.58	$7.75	$14.38
10%	-$4.99	$7.34	$13.98
15%	-$5.39	$6.94	$13.57
Finishing system running lambs from a 45kg purchase weight and selling at 55kg liveweight			
0%	-$7.67	$7.42	$15.54
2%	-$7.86	$7.22	$15.35
5%	-$8.16	$6.92	$15.05
10%	-$8.66	$6.43	$14.55
15%	-$9.15	$5.93	$14.06
Finishing system running lambs from a 35kg purchase weight and selling at 55kg liveweight			
0%	-$3.66	$11.35	$19.43
2%	-$3.86	$11.15	$19.23
5%	-$4.16	$10.85	$18.93
10%	-$4.65	$10.36	$18.44
15%	-$5.15	$9.86	$17.94

6.2.20. Nutritional history of the lamb

Introduction

There is clear evidence in the published literature that a period of nutritional restriction during pregnancy can have significant implications for a range of outcomes in postnatal lambs (Jolly & Wallace, 2007). Lambs that have been subjected to a period of nutritional restriction during foetal life exhibit suboptimal development of the small and large intestine (Trahair *et al.*, 1997), deposit less bone, less muscle and more fat to weaning (Greenwood & Bell, 2003; Greenwood *et al.*, 1998), and may have a lifetime penalty in wool growth (Schinckel & Short, 1961).

The effect of a period of nutritional restriction in pregnancy on bone growth and development appears to be more severe than the effect on lean tissue deposition although synthesis of muscle protein appears to be inhibited in the growth-retarded newborn (Greenwood *et al.*, 1999). Lambs of higher birth weight tend to have reduced feed intake, reach market weight faster, have leaner carcases, and as a result are more efficient and profitable.

Merino wether lambs born to ewes maintained on a low plane of nutrition during pregnancy have been found to have significantly lower birth weights and weaning weights (Thompson, 2006) and significantly increased fat deposition.

The importance of the lambs' nutritional history as a profit driver

	Finishing System	Sensitivity
1.	Specialist grain based finishing	Low
2.	Opportunistic grain based finishing	Low
	Specialist pasture finishing	Not analysed
	Traditional breeder-finisher pasture finishing	Not analysed

Methods

A budget was developed and analysed to determine the sensitivity of the profit margins of feedlot finishing systems for Merino and crossbred lambs to the maturity of the lamb entering the feedlot. Sensitivities of feedlot finishing systems were run for an entry age of the lamb of 4 months or 8 months.

Assumptions

- Entry weight was not influenced by age at entry
- Ration of lambs in feedlot finishing systems were influenced by the age of the lamb when entering the feedlot
- Weight for age determined the plane of nutrition earlier in life and the maturity pattern for ration formulation
- No account was taken of the ability of lambs to express compensatory growth response following a short period of nutritional restriction prior to feedlot entry

Results

- Lambs which entered the feedlot finishing system at 4months of age on average were $1.38 more profitable than lambs entering the feedlot at 8 months of age (Table 60)
- The sensitivity of the profit margin to lamb maturity was greatest in feedlot

systems finishing crossbred lambs from 35 to 55kg at a growth rate of 300 g compared with 35 to 45kg for the same growth rate (lambs at 8 months were 47% more sensitive) (Table 60)

- The profit margin of finishing crossbred lambs from 35 to 55kg was 13% less sensitive for 8 month old lambs and 17% less sensitive for 4 month old lambs than finishing lambs from 45 to 55kg (Table 60)
- The profit margin of finishing both crossbred and Merino lambs at 4 months of age was higher than 8 months in all analyses; however, this difference in margin was 53% lower for Merino lambs (Table 60)

Discussion

Early maturing lambs at 4 months of age that have not suffered nutritional restriction during their pre and postnatal life were the most profitable under the scenarios that were run.

Merino lambs were mostly unprofitable to finish as they were considered to be a later maturing animal and therefore feed costs were higher to achieve similar rates of growth to their earlier maturing counterparts.

Conclusion

It is important for the nutritional history and weight for age of lambs to be available to intensive finishers as a risk management strategy, but in the absence of such information, poor performing lambs should be identified and removed from the finishing system early in the feeding period.

Development of supply chain alliances can alleviate some of the purchase risk when feeding older lambs where stubble backgrounding is unavailable. However early maturing young lambs are likely to be the most profitable on a consistent basis.

Table 60 - Sensitivity of profit margins per head of a feedlot based finishing systems to the nutritional history of the lamb (based on weight for age) when finishing lambs in a feedlot with a capacity of 2000 lambs and annual throughput of 4500 lambs.

		Crossbred			Merino		
Maturity	**Growth rate**	**35kg - 45kg**	**45kg - 55kg**	**35kg - 55kg**	**35kg - 45kg**	**45kg - 55kg**	**35kg - 55kg**
4 months	**250g**	$6.06	$8.29	$7.78	-$3.45	-$6.45	-$6.71
	300g	$7.75	$6.92	$10.85	-$2.64	-$5.56	-$4.63
	400g	$7.87	$10.10	$11.11	$0.77	-$2.17	$1.76
	Average	**$7.23**	**$8.44**	**$9.91**	**-$1.78**	**-$4.73**	**-$3.20**
8 months	**250g**	$6.78	$7.27	$5.88	-$3.44	-$6.47	-$6.59
	300g	$4.51	$7.68	$5.70	-$3.66	-$5.48	-$4.30
	400g	$4.95	$5.49	$11.59	-$0.89	-$3.58	-$2.69
	Average	**$5.41**	**$6.82**	**$7.72**	**-$2.66**	**-$5.18**	**-$4.53**

6.2.21. Transport

Introduction

Factors influencing transport costs include distance travelled, goods being transported, the mode of transport and the relationship between the volume of goods and the capacity of the transport. Transport costs can be minimised within breeder-finisher systems, depending on the size of the operation, where lambs do not have to be trucked to the finishing area and in all systems by locating the finishing operation within close proximity to processing facilities.
Feed grown on farm will reduce the cost of transport although if grain and/or hay needs to be purchased, the transport cost of grain is a more cost efficient than pellets due to its lower bulk density and large squares of hay are cheaper to transport than round bales or silage.

The importance of the cost of transporting feed as a profit driver

	Finishing System	Sensitivity
1.	Specialist grain based finishing	Moderate
2.	Opportunistic grain based finishing	Moderate
	Specialist pasture finishing	Not analysed
	Traditional breeder-finisher pasture finishing	Not analysed

The importance of the cost of transporting livestock as a profit driver

	Finishing System	Sensitivity
1.	Specialist grain based finishing	High
2.	Opportunistic grain based finishing	High
3.	Specialist pasture finishing	Moderate
4.	Traditional breeder-finisher pasture finishing	Low

Methods

A budget was developed and analysed to determine the sensitivity of the profit margins of four finishing systems for Merino and crossbred lambs to the cost of transport associated with livestock and feed with additional parameters as follows:

- Sensitivities of the pasture based finishing systems were run for the cost of transporting lambs from 0km to 350km
- Sensitivities of feedlot finishing systems were run for the cost of transporting lambs from 0km to 500km
- Sensitivities of feedlot finishing systems were run for the cost of transporting feed from 0km to 300km
- All transport costs were based on the truck being used at full capacity, except where stated otherwise

Results

- An increase in the distance travelled by the lambs by 100km per trip in a breeder-finisher system resulted in a decline in profitability of between $0.40 and $0.48 per lamb (Table 61)
- The first cross ewe based breeder-finisher system was 20% more sensitive to an increase in distance travelled (Table 61)
- An increase in the distance travelled by the lambs of 100km per trip in a specialist pasture finishing system resulted in a decline in profitability of $0.80 per lamb (Table 62)
- Specialist pasture finishing systems were up to twice as sensitive to the distance stock were transported than breeder-finisher systems (Table 62)
- Inability to fill a truck for transportation of lambs increased the cost of transportation per head by 34% for a large truck at 75% capacity (300 lambs) (Table 63)
- Inability to fill a truck for transportation of lambs increased the cost of transportation per head by 150% for a small truck filled to 40% capacity (100 lambs) or by 34% at 75% capacity (187 lambs) (Table 63)
- An increase in the distance lambs were carted per 100km per trip to or from a feedlot finishing system resulted in a decline in profitability of $0.61 per lamb (Table 64)
- A 100km increase in the distance feed was carted to a feedlot finishing system resulted in a decline in profitability of $0.93 to $1.01 per lamb where lamb liveweight increased 10 kgs and a decline in profitability of $1.95 where lamb liveweight increased 20 kgs (Table 64)
- The sensitivity of feed transportation cost increased by 9% when finishing lambs from 45 kg to 55kg rather than 35kg to 45 kg; and by a further 93% when finishing lambs from 35kg to 55 kg rather than 45kg to 55kg
- As the distance feed was carted increased from nil to 300 km profit margins fell by:
    - 29% when finishing lambs from 35 to 45kg liveweight (lwt)
    - 34% when finishing lambs from 45 to 55 kg lwt
    - 39% when finishing lambs from 35 to 55kg lwt

Discussion

The further the finishing system was located from markets and feed sources the higher the impact the cost of transport had on profit margin.
The effect of scale was highlighted by the cost of transport as larger scale operations are more likely to be able to fill a truck and hence reduce costs. Smaller scale operations depend on uniformity of growth rate to enable larger numbers of lambs to be turned off at the same time.

The first cross ewe production system was more sensitive to transport costs due to purchased replacement ewes having to be transported into the system. Specialist pasture and feedlot finishing systems also incurred higher transport costs due to purchased lambs having to be transported in and out of the finishing system.

Feed transportation costs only had a moderate effect on profit margins however the further the feed was transported and the higher the daily feed consumption the more significant the effect on profit margin.

Conclusion

Efficiencies in transport have the ability to improve profit margins across all finishing systems. These can be achieved through reducing distance travelled for transporting feed or lambs and/or ensuring trucks are filled to capacity.

Table 61 - Sensitivity of profit margins per head of breeder-finisher systems to changes in the cost of livestock transport across 3 breeding ewe pasture systems and 3 lamb finishing pastures for Merino, first cross and second cross prime lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Transport distance			
Ewe breeding pasture	**Lamb finishing pasture**	**0 km**	**250 km**	**300 km**	**350 km**
Merino Ewes crossed with Merino Sires					
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$40.86	$39.05	$38.85	$38.64
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$39.53	$37.72	$37.52	$37.32
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$36.49	$34.68	$34.48	$34.27
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$24.51	$22.70	$22.50	$22.30
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$23.24	$21.43	$21.23	$21.03
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$20.14	$18.33	$18.13	$17.93
Native Pasture	Cereal Stubbles	$36.10	$34.29	$34.09	$33.89
Merino Ewes crossed with Terminal Sires					
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$63.16	$61.35	$61.15	$60.95
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$61.79	$59.98	$59.78	$59.58
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$56.45	$54.64	$54.44	$54.24
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$49.82	$48.02	$47.82	$47.61
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$48.45	$46.65	$46.44	$46.24
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$43.12	$41.31	$41.11	$40.91
Native Pasture	Cereal Stubbles	$56.18	$54.37	$54.17	$53.97
First Cross Ewes crossed with Terminal Sires					
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$49.64	$47.49	$47.26	$47.02
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$48.21	$46.07	$45.83	$45.59
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$41.53	$39.39	$39.15	$38.91
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$37.12	$34.97	$34.73	$34.49
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$35.73	$33.58	$33.34	$33.11
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$29.01	$26.86	$26.62	$26.38
Native Pasture	Cereal Stubbles	$41.24	$39.09	$38.86	$38.62

Table 62 - Sensitivity of profit margins per head of specialist pasture finishing systems to the cost of livestock transport across 3 lamb finishing pasture systems for Merino and crossbred lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Transport distance			
Breed	**Lamb finishing pasture**	0 km	250 km	300 km	350 km
Merino Lambs	Irrigated Clover / Ryegrass Pasture	$5.70	$2.10	$1.70	$1.30
	Fodder Crop - Chicory	$4.41	$0.81	$0.41	$0.01
	Cereal Stubbles	$0.92	-$2.68	-$3.08	-$3.48
Crossbred lambs	Irrigated Clover / Ryegrass Pasture	$24.79	$21.19	$20.79	$20.39
	Fodder Crop - Chicory	$23.39	$19.79	$19.39	$18.99
	Cereal Stubbles	$16.38	$12.78	$12.38	$11.98

Table 63 - The effect of distance travelled and number of lambs on the per-head cost of transportation per head.

Distance (km)	Number of lambs					
	250 lamb capacity truck				*400 lamb capacity truck*	
	50	100	187	250	300	400
50	$1.50	$0.75	$0.40	$0.30	$0.42	$0.32
100	$3.00	$1.50	$0.80	$0.60	$0.84	$0.63
150	$4.50	$2.25	$1.20	$0.90	$1.26	$0.95
200	$6.00	$3.00	$1.60	$1.20	$1.68	$1.26
300	$9.00	$4.50	$2.41	$1.80	$2.52	$1.89

Table 64 - Sensitivity of profit margins per head of a feedlot based finishing systems to changes in transport costs of feed and livestock for producers finishing four month old crossbred lambs growing at 300 g/day in a feedlot with a capacity of 2000 lambs and annual throughput of 4500 lambs**.**

Distance travelled	35kg to 45kg	45kg to 55kg	35kg to 55kg
Transportation of lambs			
0 km	$10.17	$9.35	$13.28
100 km	$9.56	$8.74	$12.67
200 km	$8.96	$8.14	$12.06
300 km	$8.35	$7.53	$11.46
400 km	$7.75	$6.92	$10.85
500km	$7.14	$6.32	$10.25
600km	$6.53	$5.71	$9.64
Transportation of feed			
0 km	$9.61	$8.94	$14.75
100 km	$8.68	$7.93	$12.80
200 km	$7.75	$6.92	$10.85
300 km	$6.81	$5.92	$8.90

6.2.22. Sourcing professional advice

Introduction

There is a widespread culture within the lamb feedlot finishing sector of having to "work things out by trial and error" and seldom is professional advice sought. Within pasture based breeder-finisher and specialist pasture finishing systems the majority of information is provided by consulting or sales agronomists, who may or may not have livestock expertise. For these reasons the sensitivity of profit margins to the cost of professional advice was investigated.

Participants in the lamb industry assume that the quality of green pasture will generally meet the nutrient requirements of lambs however extensive pasture testing has revealed that this is often not the case.
As the growth rate of lambs is a major profit driver and that growth is largely determined by the quality of the feed available, the sensitivity of the profit margin to feed analysis was investigated.

The importance of the cost of feed analyses as a profit driver

	Finishing System	Sensitivity to Profit Driver
1.	Traditional breeder-finisher pasture finishing	Low
2.	Opportunistic grain based finishing	Low
3.	Specialist grain based finishing	Low
4.	Specialist pasture finishing	Low

The importance of the cost of short term consultancy as a profit driver

	Finishing System	Sensitivity to Profit Driver
1.	Traditional breeder-finisher pasture finishing	Low
2.	Opportunistic grain based finishing	Low
3.	Specialist grain based finishing	Low
4.	Specialist pasture finishing	Low

The importance of the cost of annual consultancy as a profit driver

	Finishing System	Sensitivity to Profit Driver
1.	Traditional breeder-finisher pasture finishing	Low
2.	Specialist pasture finishing	Low
	Opportunistic grain based finishing	Low
	Specialist grain based finishing	Low

Methods

A budget was developed and analysed to determine the sensitivity of profit margins of finishing systems to the cost of obtaining professional advice. Professional advice includes the cost associated with feed analysis, obtaining an on farm visit from a consultant and engaging year round professional advice.

Feedlot finishing systems were analysed for a range of feedlot scales varying in capacity and throughput, and pasture based finishing systems were analysed over a range of pasture systems the details of which are outlined in the scope with additional parameters as follows:

- Sensitivities of breeder-finisher and specialist pasture finishing systems were run to assess the effect of no pasture analyses versus two rounds of pasture analyses for nutritive value.
    - Each round; 5 relative feed values (Dry matter %, crude protein%, metabolisable energy (per kg DM), NDF%, dry matter digestibility%) and 2 relative feed values (RFV) plus minerals
- Sensitivities of feedlot systems were run to determine the effect of 1-10 tests for both RFV and mineral analyses
- Sensitivities across all systems were run to assess the effect of up to 2 farm visits from a professional consultant
- Sensitivity to a professional consultancy was run to determine the effect of an annual consultancy

Assumptions

- Feed analysis costs were derived from the SGS laboratory, Toowoomba, Qld as at March 2009
- The cost of an on farm consultancy visit was not influenced by the number of visits
- Professional consultancy was spread across the year

Results

- The cost of professional advice reduced the profitability of breeder-finisher systems from between $0.49 and $0.64 per head per on-farm visit and from between $2.72 and $3.55 per head for an annual consultancy (Table 65)
- Within breeder-finisher systems the increased number of crossbred lambs finished versus Merino lambs (due to higher weaning percentage) reduced the sensitivity to consultancy costs by 23% (Table 65)
- Specialist on farm advice reduced the profit margin in specialist pasture finishing systems by $0.10 per head per visit (Table 66)
- Increasing the number of pasture samples analysed for nutritive value in a breeder-finisher system from 0 to 2 reduced profitability per head from between $0.69 and $0.90 (Table 67)
- The profit margins of breeder-finishers were 23% less sensitive to the cost of feed tests when finishing second cross lambs compared with Merino lambs (Table 67)
- Increasing the number of rounds of pasture analyses in a specialist pasture finishing system from 0 to two reduced profitability by $0.14 per head (Table 68).
- Specialist on farm advice reduced the profit margin per head in feedlot finishing systems by $0.46 per head in a small scale operation (Table 69)
- The effect of scale of a feedlot operation reduced consultancy costs to $0.10 per head for medium scale operations and to $0.05 per head for large scale operations which is by up to 90% (Table 69)
- The inclusion of mineral profile in the cost of feed analysis reduced the profit margin per head by $0.79 where 10 analyses were completed in small scale feedlot operations however this effect was reduced by 90% for a large scale feedlot operation (Table 69)

Discussion

The cost of professional advice on-farm had little effect on the profitability of lamb finishing however all systems analysed were more sensitive to the cost of a consultant on an annual basis. This cost was significantly minimised by the effect of scale.

In a breeder-finisher system, Merino lambs were more sensitive to the cost of professional advice on a per head basis as fewer lambs were produced.

Conclusion

The cost to all systems of seeking professional advice to optimise productivity is likely to be outweighed by the associated benefits.

All finishing systems had low sensitivity to the cost of pasture and feed analysis on a per head basis such that it would be difficult not to recommend that feed should be routinely tested to ensure the growth opportunity of lambs was optimised at all times.

Table 65 - Sensitivity of profit margins per head of breeder-finisher systems to the cost of professional advice across 3 breeding ewe pasture systems and 3 lamb finishing pastures for Merino, first cross and second cross prime lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Farm visits (short term consultancy)			Annual consultancy
Ewe breeding pasture	**Lamb finishing pasture**	**0**	**1**	**2**	
Merino Ewes crossed with Merino Sires					
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$38.85	$38.21	$37.57	$35.30
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$37.52	$36.88	$36.24	$33.97
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$34.48	$33.84	$33.20	$30.93
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$22.50	$21.86	$21.22	$18.95
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$21.23	$20.59	$19.95	$17.68
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$18.13	$17.49	$16.85	$14.58
Native Pasture	Cereal Stubbles	$34.09	$33.45	$32.82	$30.54
Merino Ewes crossed with Terminal Sires					
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$61.15	$60.63	$60.10	$58.24
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$59.78	$59.26	$58.73	$56.87
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$54.44	$53.92	$53.40	$51.54
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$47.82	$47.29	$46.77	$44.91
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$46.44	$45.92	$45.40	$43.54
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$41.11	$40.59	$40.06	$38.20
Native Pasture	Cereal Stubbles	$54.17	$53.65	$53.13	$51.27
First Cross Ewes crossed with Terminal Sires					
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$47.26	$46.77	$46.28	$44.54
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$45.83	$45.34	$44.85	$43.11
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$39.15	$38.66	$38.17	$36.43
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$34.73	$34.24	$33.75	$32.01
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$33.34	$32.85	$32.37	$30.62
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$26.62	$26.13	$25.65	$23.90
Native Pasture	Cereal Stubbles	$38.86	$38.37	$37.88	$36.14

Table 66 - Sensitivity of profit margins per head of specialist pasture finishing systems to the cost of professional advice across 3 lamb finishing pasture systems, for Merino and crossbred lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles)

		Farm visits			Professional consultancy
Breed	**Lamb finishing pasture**	**0**	**1**	**2**	
Merino Lambs	Irrigated Clover / Ryegrass Pasture	$1.70	$1.60	$1.50	$1.15
	Fodder Crop - Chicory	$0.41	$0.31	$0.21	-$0.15
	Cereal Stubbles	-$3.08	-$3.18	-$3.28	-$3.64
Crossbred Lambs	Irrigated Clover / Ryegrass Pasture	$20.79	$20.69	$20.59	$20.23
	Fodder Crop - Chicory	$19.39	$19.29	$19.19	$18.84
	Cereal Stubbles	$12.38	$12.28	$12.18	$11.82

Table 67 - Sensitivity of profit margins per head of breeder-finisher systems to the cost of analysing pasture for nutritive value across 3 breeding ewe pasture systems and 3 lamb finishing pastures for Merino, first cross and second cross prime lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Feed analysis		
Ewe breeding pasture	**Lamb finishing pasture**	**no test**	**once**	**twice**
Merino Ewes crossed with Merino Sires				
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$38.90	$38.45	$38.00
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$37.63	$37.18	$36.73
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$34.53	$34.08	$33.63
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$22.61	$22.16	$21.71
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$21.28	$20.84	$20.39
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$18.24	$17.79	$17.34
Native Pasture	Cereal Stubbles	$32.18	$31.73	$31.28
Merino Ewes crossed with Terminal Sires				
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$61.19	$60.83	$60.46
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$59.87	$59.50	$59.13
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$54.53	$54.16	$53.80
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$47.86	$47.49	$47.13
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$46.49	$46.12	$45.76
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$41.15	$40.79	$40.42
Native Pasture	Cereal Stubbles	$52.61	$52.24	$51.87
First Cross Ewes crossed with Terminal Sires				
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$47.30	$46.95	$46.61
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$45.91	$45.57	$45.22
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$39.19	$38.85	$38.50
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$34.81	$34.47	$34.13
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$33.43	$33.08	$32.74
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$26.71	$26.36	$26.02
Native Pasture	Cereal Stubbles	$37.39	$37.04	$36.70

Table 68 - Sensitivity of profit margins per head of specialist pasture finishing systems to the cost of testing pasture quality across 3 lamb finishing pasture systems for Merino and crossbred lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Feed analysis		
Breed	**Lamb finishing pasture**	**no test**	**once**	**twice**
Merino Lambs	Irrigated Clover / Ryegrass Pasture	$1.77	$1.70	$1.63
	Fodder Crop - Chicory	$0.48	$0.41	$0.34
	Cereal Stubbles	-$3.01	-$3.08	-$3.15
Crossbred Lambs	Irrigated Clover / Ryegrass Pasture	$20.86	$20.79	$20.72
	Fodder Crop - Chicory	$19.46	$19.39	$19.32
	Cereal Stubbles	$12.45	$12.38	$12.31

Table 69 - Sensitivity of profit margins per head within feedlot finishing systems to the cost of professional advice plus feed analysis for finishing four month old crossbred lambs growing at 300 g/day in a feedlot with a capacity of 2000 lambs and annual throughput of 4500 lambs.

	Small			Medium			Large		
	35kg to 45kg	45kg to 55kg	35kg to 55kg	35kg to 45kg	45kg to 55kg	35kg to 55kg	35kg to 45kg	45kg to 55kg	35kg to 55kg
No Professional Advice	$3.52	$2.70	$6.62	$7.75	$6.92	$10.85	$10.40	$10.01	$13.94
Feed Tests									
Relative feed values (5 tests)	$3.36	$2.54	$6.46	$7.71	$6.89	$10.82	$10.38	$10.00	$13.93
Relative feed values (10 tests)	$3.20	$2.38	$6.31	$7.67	$6.85	$10.78	$10.37	$9.98	$13.91
Relative feed values + minerals (5 tests)	$2.96	$2.14	$6.07	$7.62	$6.80	$10.73	$10.34	$9.96	$13.89
Relative feed values + minerals (10 tests)	$2.41	$1.59	$5.52	$7.50	$6.68	$10.61	$10.29	$9.90	$13.83
On Farm visit (vet, consultant etc.)									
1 visit	$3.06	$2.24	$6.16	$7.64	$6.82	$10.75	$10.35	$9.97	$13.90
2 visits	$2.60	$1.78	$5.71	$7.54	$6.72	$10.65	$10.31	$9.92	$13.85

6.2.23. Animal health and disease prevention

Introduction

It is difficult to determine the number of lambs that receive preventative health care prior to entering an intensive finishing system however it is clear that morbidity and mortality have a highly significant effect on profit margins.

Less than 50% of all feedlot finishers vaccinate lambs prior to commencement on feed although between 80 and 100% of all lambs are routinely drenched (Gaison & Wallace, 2006); the reasons for the low level of vaccination may vary widely and have not been determined.

The importance of the cost of drench as a profit driver

	Finishing System	Sensitivity to Profit Driver
1.	Traditional breeder-finisher pasture finishing	Low
2.	Opportunistic grain based finishing	Low
3.	Specialist grain based finishing	Low
4.	Specialist pasture finishing	Low

The importance of the cost of vaccine as a profit driver

	Finishing System	Sensitivity to Profit Driver
1.	Traditional breeder-finisher pasture finishing	Low
2.	Opportunistic grain based finishing	Low
3.	Specialist grain based finishing	Low
4.	Specialist pasture finishing	Low

Methods

A budget was developed and analysed to determine the sensitivity of the profit margins of four finishing systems for Merino and crossbred lambs to the cost of vaccine and drench with the following additional parameters:

- Profit margin sensitivity was investigated against the cost of a 3-in-1 vaccination at marking and 6-in-1 at weaning and a broad spectrum drench at weaning in a breeder-finisher system
- Profit margin sensitivity was investigated against the cost of treating lambs with a 6-in-1 vaccination and a broad spectrum drench upon entering specialist pasture finishing systems
- Profit margin sensitivity was investigated against the cost of vaccinating and drenching lambs prior to entering feedlot finishing systems
- Sensitivities for vaccine cost were run from $42 per 500ml to $180 per 500ml
- Sensitivities for drench costs were run from $36 per litre to $53 per litre
- The type of drench was analysed for feedlot finishing system comparing Cydectin LV and Cydectin +Se

- Sensitivity of profit margin per head to the type of vaccine was analysed for feedlot finishing systems comparing a 3-in-1 and 3-in-1 with +Vitamin B_{12} vaccine

Assumptions

- The dosage rates of all treatments were based on animal liveweights per manufacturer's instructions
- Where the cost of no vaccine or drench was investigated, no vaccine or labour cost was attributed to the system, including the treatment of the breeding flock in breeder-finisher systems

Results

- The cost of vaccination in a breeder-finisher system reduced the profit margin by up to $1.40/head (Table 70)
- Crossbred lamb production systems were up to 23% less sensitive to the cost of vaccine than Merino breeder-finisher systems (Table 70)
- Vaccination costs reduced the profit margin of Merino and crossbred lambs in specialist pasture finishing systems by up to $0.60 per head (Table 71)
- Drench costs in a Merino breeder-finisher system reduced the profit margin per head by up to $1.45 per lamb (Table 72)
- Drench costs in a first cross breeder-finisher system reduced the profit margin per head by up to $1.21 per lamb (Table 72)
- Drench costs in a second cross breeder-finisher system reduced the profit margin per head by up to $1.11 per lamb (Table 72)
- Breeder-finisher systems finishing second cross lambs were 23% less sensitive to the cost of drench than Merino systems (Table 72)
- The profit margins per head of lambs in Merino breeder-finisher systems were 17% more sensitive to the cost of drench than first cross production systems (Table 72)
- Drenching lambs in a specialist pasture finishing system reduced profit margins by up to $0.34 per lamb (Table 73)
- The use of a drench containing additional selenium reduced the profit margin of feedlot lambs by less than 0.5% (Table 74)
- The use of a vaccination containing additional vitamin B_{12} reduced the profit margin per head for feedlot lambs by up to 2.6% (Table 74)

Discussion

The cost of both drench and vaccine had a low impact on profitability of finishing systems particularly when considering the potential risk of high mortality rates without such protection.

The addition of selenium to a broad-spectrum drench or vitamin B_{12} to a vaccination had minimal effect on the profit margin of any of the four finishing systems investigated, despite these additives substantially increasing the purchase price of the drench or vaccine product.

With parasite resistance a significant problem in the industry faecal egg monitoring for parasite infestation is highly recommended. Although the profit margin sensitivity was not run to assess the impact of faecal testing it is expected to be a cost effective tool given the effect on profit of other similar monitoring tests such as feed testing.

Conclusion

Routine vaccination should be encouraged in all intensive lamb finishing systems as the reduction in profitability is low while the impact that would result in the event of a disease outbreak would likely be high.

Routine monitoring for the presence of worm larvae should be encouraged in pasture-based finishing systems however when drenching is required it is unlikely to have a significantly negative effect on profitability. The requirement for routine drenching of feedlot lambs prior to entry is worthy of further investigation although the procedure itself will have minimal effect on profit margins.

Table 70 - Sensitivity of profit margins per head of breeder-finisher systems to the cost of vaccination and changes in cost across 3 breeding ewe pasture systems and 3 lamb finishing pastures for Merino, first cross and second cross prime lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Vaccination			
Ewe breeding pasture	**Lamb finishing pasture**	**No treatment**	**-10% cost**	**Base**	**+ 10% cost**
Merino Ewes crossed with Merino Sires					
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$40.16	$38.93	$38.85	$38.76
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$38.83	$37.60	$37.52	$37.44
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$35.79	$34.56	$34.48	$34.39
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$23.81	$22.58	$22.50	$22.42
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$22.54	$21.31	$21.23	$21.14
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$19.44	$18.21	$18.13	$18.05
Native Pasture	Cereal Stubbles	$35.41	$34.18	$34.09	$34.01
Merino Ewes crossed with Terminal Sires					
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$62.26	$61.22	$61.15	$61.08
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$60.89	$59.85	$59.78	$59.71
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$55.55	$54.51	$54.44	$54.37
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$48.92	$47.89	$47.82	$47.74
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$47.55	$46.52	$46.44	$46.37
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$42.22	$41.18	$41.11	$41.04
Native Pasture	Cereal Stubbles	$55.28	$54.24	$54.17	$54.10
First Cross Ewes crossed with Terminal Sires					
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$48.26	$47.32	$47.26	$47.19
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$46.83	$45.89	$45.83	$45.76
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$40.16	$39.21	$39.15	$39.08
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$35.74	$34.79	$34.73	$34.67
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$34.35	$33.41	$33.34	$33.28
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$27.63	$26.69	$26.62	$26.56
Native Pasture	Cereal Stubbles	$39.86	$38.92	$38.86	$38.79

Table 71 - Sensitivity of profit margins per head of specialist pasture finishing systems to the cost of vaccination and changes in cost across 3 lamb finishing pastures, for Merino and crossbred lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Vaccination			
Breed	**Lamb finishing pasture**	**No treatment**	**-10% cost**	**Base**	**+ 10% cost**
Merino Lambs	Irrigated Clover / Ryegrass Pasture	$2.08	$1.56	$1.52	$1.48
	Fodder Crop - Chicory	$0.78	$0.27	$0.23	$0.19
	Cereal Stubbles	-$2.71	-$3.22	-$3.26	-$3.31
Crossbred Lambs	Irrigated Clover / Ryegrass Pasture	$21.16	$20.65	$20.61	$20.56
	Fodder Crop - Chicory	$19.77	$19.26	$19.21	$19.17
	Cereal Stubbles	$12.75	$12.24	$12.20	$12.15

Table 72 - Sensitivity of profit margins per head of breeder-finisher systems to the cost of drenching and changes in drench cost across 3 breeding ewe pasture systems and 3 lamb finishing pastures for Merino, first cross and second cross lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Drench			
Ewe breeding pasture	**Lamb finishing pasture**	**No treatment**	**-10% cost**	**Base**	**+ 10% cost**
Merino Ewes crossed with Merino Sires					
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$39.78	$38.54	$38.43	$38.33
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$38.46	$37.21	$37.11	$37.00
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$35.41	$34.17	$34.06	$33.96
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$23.44	$22.19	$22.09	$21.98
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$22.17	$20.92	$20.82	$20.71
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$19.07	$17.82	$17.72	$17.61
Native Pasture	Cereal Stubbles	$35.03	$33.78	$33.68	$33.57
Merino Ewes crossed with Terminal Sires					
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$61.92	$60.88	$60.79	$60.71
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$60.54	$59.51	$59.42	$59.34
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$55.21	$54.17	$54.09	$54.00
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$48.58	$47.55	$47.46	$47.37
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$47.21	$46.18	$46.09	$46.00
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$41.88	$40.84	$40.75	$40.67
Native Pasture	Cereal Stubbles	$54.94	$53.91	$53.82	$53.73
First Cross Ewes crossed with Terminal Sires					
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Irrigated Clover / Ryegrass Pasture	$47.97	$47.02	$46.94	$46.86
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Fodder Crop - Chicory	$46.55	$45.59	$45.51	$45.43
High Rainfall Long Term Pasture - Perennial Phalaris, Clover, Cocksfoot	Cereal Stubbles	$39.87	$38.91	$38.83	$38.75
Grazing Cereal (Intended) - Barley	Irrigated Clover / Ryegrass Pasture	$35.45	$34.49	$34.41	$34.33
Grazing Cereal (Intended) - Barley	Fodder Crop - Chicory	$34.06	$33.11	$33.03	$32.95
Grazing Cereal (Intended) - Barley	Cereal Stubbles	$27.34	$26.39	$26.31	$26.23
Native Pasture	Cereal Stubbles	$39.57	$38.62	$38.54	$38.46

Table 73 - Sensitivity of profit margins per head of specialist pasture finishing systems to the cost of drenching and change in drench cost across 3 lamb finishing pastures, for Merino and crossbred lambs. Merino lambs finished from 25kg to 45kg (25-35kg on stubbles) and crossbred lambs finished from 35kg to 55kg (35-45kg on stubbles).

		Drench			
Breed	**Lamb finishing pasture**	**No treatment**	**-10% cost**	**Base**	**+ 10% cost**
Merino Lambs	Irrigated Clover / Ryegrass Pasture	$1.70	$1.40	$1.38	$1.36
	Fodder Crop - Chicory	$0.41	$0.11	$0.09	$0.07
	Cereal Stubbles	-$3.08	-$3.38	-$3.40	-$3.42
Crossbred Lambs	Irrigated Clover / Ryegrass Pasture	$20.79	$20.49	$20.47	$20.45
	Fodder Crop - Chicory	$19.39	$19.10	$19.08	$19.06
	Cereal Stubbles	$12.38	$12.08	$12.06	$12.04

Table 74 - Sensitivity of profit margins per head of within a feedlot finishing system to the cost and type of drench and vaccine for four month old crossbred lambs growing at 300 g/day in a feedlot with a capacity of 2000 lambs and annual throughput of 4500 lambs.

	Finishing weights		
	35kg to 45kg	**45kg to 55kg**	**35kg to 55kg**
No drench	**$8.07**	**$7.30**	**$11.38**
Cydectin LV drench			
-$50 to purchase cost	$7.77	$6.95	$10.87
base	$7.75	$6.92	$10.85
+$50 to purchase cost	$7.72	$6.90	$10.83
Cydectin +Se drench			
-$50 to purchase cost	$7.75	$6.95	$10.85
base	$7.72	$6.92	$10.83
+$50 to purchase cost	$7.69	$6.89	$10.80
No Vaccine	**$8.06**	**$7.24**	**$11.17**
3 in 1 Vaccine			
-$50 to purchase cost	$7.85	$7.03	$10.95
base	$7.75	$6.92	$10.85
+$50 to purchase cost	$7.64	$6.82	$10.75
3 in 1 Vaccine + B12			
-$50 to purchase cost	$7.67	$6.85	$10.77
base	$7.57	$6.75	$10.67
+$50 to purchase cost	$7.46	$6.64	$10.57

7. References

Gaison, A. and Wallace A, (2006). Lamb Feedlot Stocktake. Meat & Livestock Australia

Greenwood, C.F. Allen, J.A. Leong, A.S. Pallot, T.N. Golder, T.M. and Golebiowski, T. (1999). In An Investigation of the Stability of NIRS Calibrations for the Analysis of Oil Content in Whole Seed Canola. Paper presented at the Proceedings of the 10th International Rapeseed Congress, Canberra. The Regional Institute Ltd.

Greenwood, P.L. and Bell, A.W. (2003). Prenatal nutritional influences on growth and development of ruminants. *Recent Advances in Animal Nutrition in Australia* **(14)**, 57-73.

Greenwood, P.L. Hunt, A.S. Hermanson, J.W. and Bell, A.W. (1998). Effects of birth weight and post natal nutrition on neonatal sheep: 1. Body growth and composition and some aspects of energetic efficiency. *Journal of Animal Science*, **76**, 2354-2367.

Holmes Sackett. (2009). Planning for improved labour efficiency. *On Farm* **(119)**, 2-4.

Jolly, S. and Wallace, A. (2007). Best practice for production feeding of lambs: A review of the literature: Meat & Livestock Australia.

NRC. (2007). Nutrient Requirements of Small Ruminants: sheep, goats, cervids, and New World camelids. Washington, D.C.: National Research Council, National Academies Press.

NSW Department of Primary Industries. (2009). Guide to tractor and implement costs.

Schinckel, P.G. and Short, B.F. (1961). Influence of nutritional level during pre-natal and early post-natal life on adult fleece and body characters. *Australian Journal of Agricultural Research*, **12 (1)**, 176-202.

Thompson, A. (2006). Poor ewe nutrition during pregnancy increases fatness of their progeny. *Sheep Updates 2006*.

Trahair, J.F. deBarro, T.M. Robinson, J.S. and Owens, J.A. (1997). Restriction of nutrition in utero selectively inhibits gastrointestinal growth in fetal sheep. *Journal of Nutrition*, **127**, 637-641.