Assessing Economic Benefits of Confinement Feeding

Confinement Feeding Ewes, i$ it worth it?

Background

Stirlings to Coast Farmers, located in the Great Southern Region of Western Australia (WA), participated in a two-year MLA Producer Demonstration Site (PDS) project from 2021-2023, with six active confinement feeding producers participating in the PDS (three each season). Confinement feeding is an intensive feeding system where livestock are confined to a relatively small area and are hand fed rations including grain, hay, straw, pellets etc. Feeding stock in a confined area allows producers to provide full or partial rations while pastures are rested. It is a valuable management strategy, providing numerous benefits.

The purpose of this project was to demonstrate a range of sheep confinement feeding systems that optimised sheep management and supplementary feeding programs that delivered profitable and sustainable sheep enterprises with appropriate pregnant ewe condition scores and increased food on offer (FOO) in deferred pastures, supported by an assessment of the economic benefits.

"We choose to confinement feed to give the emerging pastures the best possible chance to establish and build up prior to stocking. Confinement feeding is a more professional way to monitor livestock when supplementary feeding, and we get better value out of the supplementary food." John Howard said.

The Benefits

The economic value of confinement feeding sheep is a concern for producers in WA, especially when systems and producer strategies are highly variable. Results gathered over the two-year PDS show that livestock producers are affected by late seasonal breaks and often struggle to get annual pastures established.

Confinement feeding can remove early-season grazing pressure to aid pasture growth and establishment. Producers can also maintain stock numbers through the autumn feed gap, maintain optimum ewe condition scores (and thus lamb survival and thrift) by implementing confinement feeding. Stock energy requirements, supplement wastage, labour costs and stock feeding times were reduced on the producer properties that practiced confinement feeding systems as part of the project.

Producers with mixed farming enterprises found confinement feeding also benefitted cropping enterprises where the use of confinement allowed cropping paddocks to be destocked earlier.

Overall, the producers' livestock enterprises benefit as confinement feeding allows stock to be more closely monitored and, as a result, more effectively managed. Confinement feeding enables livestock to follow an optimal nutrition profile that maximises the trade-off between feed costs and reproduction while maintaining paddock ground cover, which reduces erosion and maximises rain infiltration.

The Economics

Confinement feeding does come at a cost. Particularly in infrastructure set-up and feed costs. As a result, confinement feeding may only be profitable some of the time and likely depends on other management aspects of the farm and the season. In particular, those producers with low stocking rates may find that early-season pasture growth is less limiting and, therefore, increasing pasture production due to deferment or reducing animal energy requirements will not be as valuable.

"The cost of setting up a confinement feeding system and the feed costs involved pay out in the long run – it is going to give the farm more opportunities to get the best possible outcomes in achieving the best results out of the livestock operation. It will enable us to have a better whole farm approach and have timelier early-season crop and pasture growth." John Howard said.

The economic value of confinement feeding also varies due to both external market and climate conditions and internal management practices, including time of lambing, stocking rate, pasture area, grazing management prior to adopting confinement feeding, confinement set up and confinement period.

An economic analysis was conducted for all six PDS sites involved with the project to better understand the influence these factors had on the profitability of confinement feeding.

The Producers

Six producers took part in the MLA funded PDS project led by Stirlings to Coast Farmers, three in 2022 and three in 2023. Table 1 describes details of each operation and confinement set-up.

Table 1: PDS site host producers

Producer	Location	Details
Jeremy Walker	Green Range, WA	A 2,400ha mixed farm running a merino flock. 4,179 ewes were confined for 41 days, March to mid-May 2022, feeding a full mixed ration and ad-lib hay, three times a week into a communal feed trough.
Clare Webster	Tenterden, WA	A 2,500ha mixed farm running a self-replacing merino flock. 2,100 head were confined for 56 days, April until mid-June and another 2,277 head were confined for 76 days, April to late-June 2022. Ewes were trail fed daily a lupin-barley-oats mix that had been treated with 'Home n' Dry alkasystems' product and provided with ad-lib hay, topped up twice a week.
Jason Griffiths	Gairdner, WA	A 7,500ha mixed farm running a self-replacing merino flock. 600 head were confined for 25 days and 1,400 head were confined for 43 days, from the start of April until mid-May 2022. They were fed a grain mix daily into fence-mounted troughs in each pen. Ad-lib straw was given three times a week.
John Howard	South Stirlings, WA	A 4,800ha mixed farm running a 70% cropping enterprise with a Merino and Dohne flock. 1,740 ewes were confined for 19 days, from end of May until mid-June 2023. Ewes were rationed pellets daily, via mounted troughs on each pen. In addition, barley hay and calcium lick blocks were placed on the ground in each pen four times a week.
Greg Hyde	Ongerup, WA	A 5,600ha mixed farm running 73% cropping enterprise with a self-replacing Merino flock. 1,500 ewes were confined for 28 days, from the end of April till late-May 2023. Ewes were fed pellets into communal troughs twice a day, whilst adding barley straw on the ground to each pen three times a week.
Mark Zadow	Kojonup, WA	A 1,431ha mixed farm running a 41% cropping enterprise with Merino and Dohne flock. 7,410 ewes, ewe lambs and wether lambs were confined for 76 days, from mid-April until late-June 2023. Sheep were trail fed barley and lupins three times a week. In addition, they added lime and salt mix into half tyres and fed barley straw on the ground in each pen once a week.

Note: All producers were supplying fresh water through water troughs situated in each individual pen.

"I would have sheep in two big mobs and be rotating them around pastures by April if I did not have a confinement set-up" Clare Webster said.

The Economics, looking at $$$

Farm data collection was conducted to acquire crucial information about each farm's structure, including pasture area and stocking rate, to assess dollar benefits resulting from confinement feeding practices. This data served as the foundation for calculating the additional supplement requirements during confinement (accounting for factors such as waste reduction and the decreased energy needs of livestock in confinement), and labour efficiency gains associated with supplement feeding in confinement versus paddock feeding. To determine the quantity of extra FOO at the conclusion of the confinement period, the SCF project manager conducted eight repetitions of pre- and post-pasture cuts across two paddocks on each producer's property.

The economic value of the additional FOO resulting from deferment during the confinement period was determined for each of the case study properties using the advanced whole-farm model known as 'The Australian Farm Optimisation Model' or 'AFO'. AFO is a whole farm linear programming model that supersedes the popular MIDAS **(Model of an Integrated Dryland Agricultural System)** model. The AFO model represents the economic and biological details of a farming system including modules for rotations, crops, pastures, sheep, crop residue, supplementary feeding, machinery, labour and finance. Furthermore, it includes land heterogeneity by considering enterprise rotations on any number of soil classes. Using this model to analyse the data from each of the host producers allowed for a comprehensive whole-farm, whole-year feed budget, that considered the economic and biological aspects of pasture growth and quality, livestock energy requirements, farm management and stocking rates (Table 2).

Table 2: Economic analysis completed for each of the host producers using the AFO model, 2022 – 2023.

Performance Metrics in Confinement	**Producer 1**	**Producer 2**	**Producer 3**	**Producer 4**	**Producer 5**	**Producer 6**
Condition score in	2.8	2.7	2.6	3.3	4	2.8
Condition score out	3	3.1	3	3.4	4.2	2.8
Reduced feeding time	35%	75%	54%	61%	50%	30%
Labour efficiency gains (hrs/week)	10.75	16.4	24	11	3.75	3.75
Hectares deferred (ha)	960	550	570	350	274	851
Pasture production gains (kg/DM/ha)	64	67	241	410	350	1507
Energy efficiency gains (mj/d/head)	0.8	0.76	0.73	0.78	0.8	0.76
Mortality rate reduction	1%	0.50%	no change	no change	no change	no change
Costs (-) and Benefits (+) in Confinement						
(-) Supplement/feed	$0	-$13,750	-$30,591	-$13,134	-$16,940	-$102,300
(+) Pasture deferment	$19,034	$19,449	$32,376	$26,101	$25,150	$126,797
(+) Labour reduction (@$40/hr inc super & wc)	$2,520	$4,040	$4,800	$1,280	$600	$800
(+) Mortality reduction	$739	$369	$0	$0.00	$0.00	$0.00
Gross Margin	**$22,293**	**$10,108**	**$6,585**	**$14,200**	**$8,800**	**$25,300**
*Wgha - winter grazing hectares	**$3.6/DSE**	**$3.4/DSE**	**$1.0/DSE**	**$1.14/DSE**	**$0.83/DSE**	**$2.3/DSE**
*wc – workers compensation	**$23.20/Wgha**	**$5.62/Wgha**	**$11.90/Wgha**	**$8.00/Wgha**	**$5.80/Wgha**	**$30.00/Wgha**

The economic analysis conducted showed that confinement feeding was profitable for all host producers participating in the PDS, varying from $6,585 to $25,300. Importantly, pasture deferment made up >95% of the economic value of confinement feeding. This shows that the economic value of confinement feeding is significantly linked to autumn and winter growing conditions, and confinement feeding before the break of season is less profitable because pasture is not being deferred.

The benefits of confinement feeding in this PDS were primarily due to:

- deferment of pasture paddocks resulting in increased leaf area and growth rates – increased pasture production
- increased energy efficiency of stock – reduces stock energy requirements by 8-15% (less walking for feed and water)
- reduced supplement wastage (5-10%)
- stock health and weight could be easily monitored, and sale stock more easily separated, and
- reduced labour and cost of supplementary feeding.

After discussion with the host producers, there were some other factors, not included in the economic analysis, that increased the value of confinement feeding for producers, including:

- benefits to the cropping enterprise where confinement allowed the cropping paddocks to be destocked earlier
- benefits to the livestock enterprise where confinement feeding allowed stock to be monitored more closely and hence managed more optimally (i.e., following an optimal nutrition profile that maximised the trade-off between feed costs and reproduction), and
- maintained paddock groundcover, reduced erosion, and maximised early-season rain infiltration.

Looking to the future

This MLA-funded Producer Demonstration Site project really highlighted to producers in the Great Southern region of WA the economic value of confinement feeding. Going forward, particularly considering climate change, it will be an important tool to maintain the productivity and profitability of mixed farming enterprises in the region.

Figure 1 Ewes in confinement at Mark Zadow's property in Kojonup, WA

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