Assessing economic benefits of confinement feeding

Hosts: Various – Hyde, Webster/Beech, Zadow, Howard, Walker, Griffiths

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KEY MESSAGES:

- Six producer hosts worked with Stirlings to Coast Farmers to closely record costs, measure pasture growth and monitor their individual confinement feeding systems to establish whether confinement feeding was economically beneficial.
- Confinement feeding was profitable in all six cases, varying from $6,500 to $25,300 profit in the year it was implemented, analysis not including any infrastructure costs.
- Pasture deferment makes up approximately 80 – 90% of the economic value of confinement feeding.
- Labour saved from confinement feeding offsets approximately 17-31% of the cost of additional supplement.
- Confinement feeding before the break of season is less profitable because pasture is not being deferred.

Workshop and field walk, Howard Family Farm and confinement set-up, March 2023.

Background

Late winter breaks are becoming more frequent in the Albany region of Western Australia and stubbles are depleted before the next growing season starts. As such, livestock producers identify the importance in providing feed for livestock in late autumn and immediately after the season break. Confinement feeding allows producers to maintain ewe condition score by reducing energy expenditure and allowed pasture growth to be maximised.

The purpose of this MLA-funded, Producer Demonstration Site (PDS) project was to demonstrate a range of sheep confinement feeding systems that optimise sheep management and supplementary feeding programs, by achieving appropriate pregnant ewe condition scores and increasing food on offer (FOO) in deferred pastures, for a profitable and sustainable sheep enterprise. The condition scores measured were used to show the sheep were not declining in confinement, and pasture cuts were used to demonstrate how pastures that were allowed to establish produced more feed, other than those immediately stocked at the break of season.

Methodology

A core producer group was created, consisting of 11 SCF producer members who had already or were interested in developing a confinement feeding program for their sheep production system. Three core producers were asked to host PDS's in each year of the project, with six sites across the two years (Table 1).

Table 1. Details of the six producer demonstration sites confinement and utilised different rations to feed their sheep.

Producer	Location	PDS year	Confinement feeding set up	Number of sheep confined	Period of confinement
1	Green Range, WA	2022	Communal feed troughs	4179	41 days
2	Tenterden, WA	2022	Trail feeding	2100	56 days
3	Gairdner, WA	2022	Fence mounted feed troughs	600 1400	25 days 43 days
4	Kojonup, WA	2023	Trail feeding	7000	76 days
5	Ongerup, WA	2023	Communal feed troughs	1500	28 days
6	South Stirlings, WA	2023	Fence mounted feed troughs	1740	19 days

Producer 1 runs a 2400ha mixed farm operation, running a merino flock. 4179 ewes were confined for 41 days, March-mid May 2022. Feeding a full mixed ration and ad-lib hay, three times a week into a communal feed trough pen.

Producer 2 has a 2500ha mixed farm operation, running a self-replacing merino flock. 2100 head were confined for 56 days, April-mid-June and another 2277 head were confined for 76 days, April to end of June 2022. Ewes were trail feed a lupin-barley-oats mix that had been treated with Home n' Dry alkasystems product and ad-lib hay, three times a week.

Producer 3 runs a 7500ha mixed farm operation, running a self-replacing merino flock. 600 head were confined for 25 days and 1400 head were confined for 43 days, from the start of April until mid-May 2022. Feeding a grain mix daily into fence mounted troughs in each pen. Ad-lib straw was given three times a week.

Producer 4 runs a 1431ha mixed farm operation, running 41% crop with Merino and Dohne flock. 7410 ewes, ewe lambs and wether lambs were confined (all livestock numbers) for 76 days, from mid-April – late-June 2023. Sheep were trail fed barley and lupins three times a week, in addition they added lime and salt mix into half tires and fed barley straw on the ground in each pen once a week.

Producer 5 runs a 5600ha mixed farm running 73% crop with a self-replacing Merino flock. 1500 ewes were confined for 28 days, from the end of April to end of 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.

Producer 6 runs a 4800ha mixed farm operation, running 69% crop with Merino and Dohne flock. 1740 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.

All producers were supplying water through water troughs in each pen. The confining periods varied mainly due to lambing dates, producer farming schedules (seeding, spreading etc.), and variation of the season between locations.

Data Collection

All information was collected from the host producers by the project facilitator. This included existing confinement feeding setups such as pen size, stocking density and class, shade type, water supply, feeding schedule, ration type and feeding method. The producer hosts decided how many, what kind of sheep, and the duration of confinement.

Hosts supplied an outline of their feed schedule (frequency, type, volume) and a final value of the total feed fed for the confinement period for both the contained and control (if applicable) mobs. Any hay, straw or silage fed was measured on a "number of bales" basis. Hosts feeding through feeders (lick/self/adlib feeders) recorded how much feed was provided through the feeders to give a total weight fed.

SCF conducted pasture cuts of the paddocks that were set aside for grazing when the sheep were released from confinement. For producers who had confined all their sheep, the first cuts were performed when the producer indicated they would generally have to put sheep on winter

grazed pastures if they were not confinement feeding. For those with a control mob, the first cuts were done when the control mob were moved on to their winter grazed pasture paddocks. The second cut was taken as sheep were released from confinement and put onto their winter grazed pasture paddocks.

When the producer was ready to remove sheep from confinement, a minimum of 10% of the animals were conditioned scored to give a mob average.

Economic Analysis

Data for the PDS was collected from producers by the SCF Project Officer and used by Michael Young at Youngs Farm Analysis to perform the economic analysis.

The analysis used a whole farm economic model to evaluate the profitability of confinement feeding on six mixed sheep and crop farm businesses in Western Australia. The economic analysis provided an understanding of the economics behind confinement feeding strategies and provided an understanding of how factors within the farming system effect the economics of confinement feeding.

Farm data collection was conducted to acquire crucial information about each farm's structure, including pasture area and stocking rate, and to assess its alterations 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 feed on offer (FOO) at the conclusion of the confinement period, SFC conducted eight repetitions of pre- and post-pasture cuts across two paddocks on each producer's property. For the 2022 analysis, regional expected pasture production data was used to examine the FOO increase for the three producer host sites as there was limited pasture cuts data for this round of analysis.

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 AFO, Australian Farm Optimising model documentation. This calculation necessitated a comprehensive whole-farm, whole-year feed budget, that considered the biological aspects of pasture growth and quality, as well as livestock energy requirements and farm management, including factors such as stocking rates.

Results and Discussion

The confinement feeding set ups/systems saved at between 3.75 to 24 hours a week on labour compared to running their livestock under a conventional pastures/trail feeding system (Figure 1). This time saved could enable mixed producers to spend more time on their cropping program, other jobs or allowing them to maintain a better work/life ratio.

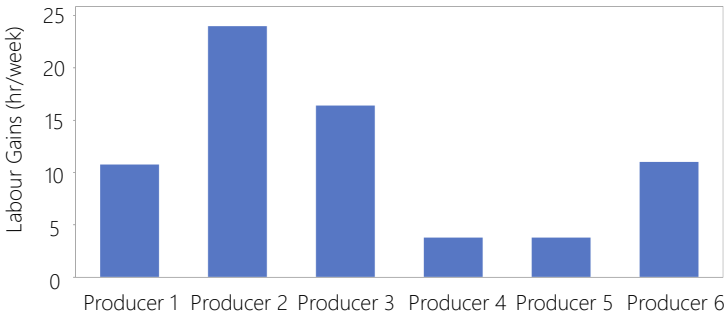

Figure 1. PDS host increases in individual labour gains (hrs/week).

Each host confined their livestock for different periods of time and at different times of the season. Pasture was productive in all cases varying from 64kg/DM/ha to 1507kg/DM/ha (Figure 2). By confining their stock, all producers were able to defer large amounts of pasture hectares. On a whole farm scale with the deferred hectares, pasture production over the confining period can be quite substantial, enabling livestock to benefit majorly when released from confinement.

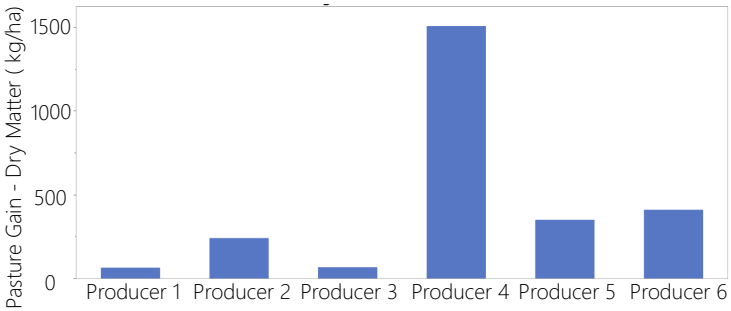

Figure 2. PDS host increases in individual pasture gains (kg DM/ha).

The performance metrics for each PDS host for the period of confinement is shown in Table 2. Livestock condition was either maintained or slightly increased, due to less energy expenditure, resulting in energy efficiency gains to vary between 0.73-0.8 megajoules/day/head (mj/d/head). Time spent feeding livestock in confinement compared to

Table 2. All PDS host performance metrics.

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

a non-confinement practice was reduced in all scenarios and varied in reduction between 30%-75%. This directly correlated with labour efficiency, with an increase across all demonstration sites varying between 3.75hours/week (hrs/week) – 24hrs/week. Therefore, producers could better spend their time elsewhere on their farm by reducing their time spent feeding livestock.

Economic Analysis

The value of confinement feeding is primarily due to, reduced labour and cost of supplementary feeding, reduced supplement wastage, increased energy efficiency of stock, increased pasture production due to deferring.

The economic value of confinement feeding varies due to both external market and climate conditions and internal management practices including: (i) time of lambing; (ii) stocking rate; (iii) pasture area; (iv) grazing management prior to adopting confinement feeding; (v) confinement set up; (vi) confinement period. For example, Table 3 shows that the value of deferred pasture varies by up to 72% depending on seasonal conditions in 2022 and Table 4, shows that the value of deferred pastures varies by up to 99% depending on seasonal conditions in 2023.

The reason the value of deferment changes by season type is because of the inflexible nature of farming systems. For example, farmers must feed a similar number of stock irrelevant of the seasonal conditions. So, in a poor year, when the grazing pressure is high, additional feed has a higher value.

Table 3. Value of pasture deferment in different seasons for 2022/23 host farms. Results show average of case study farms.

	Good season	**Medium season**	**Poor season**
Pasture deferment 2022	$5,854	$16,834	$20,683
Pasture deferment 2023	$584	$36,278	$82,420

In this analysis, we did not complete any sensitivity analysis (other than the season type sensitivity) to examine how varying the above factors affects the profitability of confinement feeding.

However, some key findings include the fact that confinement feeding was profitable in all cases, pasture deferment makes up approximately 80-90% of the economic value of confinement feeding, labour saved from confinement feeding offsets approximately 17-31% of the

cost of additional supplement, and confinement feeding before the break of season is less profitable because pasture is not being deferred.

Conclusions

Confinement feeding systems have allowed local producers to retain stock whilst deferring grazing. This in turn, maximised the value of improved pastures by also having the option to produce high-quality conserved fodder such as hay, straw, or silage and to feed this out during confinement.

Allowing pasture deferment by confinement feeding enables a sustainable amount of ground cover to grow without disturbance from sheep grazing. This ensures that land degradation and soil erosion is at a minimum in these deferred paddocks. When paddocks are bare (by not deferring pastures) the soil surface is exposed and loosened and at risk of wind and water erosion. Higher dust levels in the air can pose a health risk to humans and animals.

Energy expenditure for livestock is decreased when placed in a confinement system, by preventing sheep 'chasing the green pick' they are expending less energy, and more easily maintaining their condition. In scenarios where 'green pick' is low, sheep can drastically lose condition when in larger paddocks. In addition, monitoring of stock is much harder to do, however, when in confinement closer observations of stock (especially those in poorer condition) is enabled.

Confinement feeding systems can also be used as the most cost-effective way of finishing out-of-season lambs and ewes to meet market specifications.

Acknowledgements

Grateful acknowledgement goes towards MLA for funding this project through the Producer Demonstration Sites (PDS) program. Stirlings to Coast Farmers would also like to acknowledge Bridie Luers (Nutrien Ag Solutions) for her assistance with the extension of the project, Michael Young (Farm Optimisation Group) for his work on the economic anaylsis and all the host farmers for the generous contribution of their time.

Confinement feeding set up in Kojonup.

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