iSHEEP - DATA DRIVING MANAGEMENT

PROJECT CASE STUDY

CASE STUDY: McMahon Brothers Pty Ltd
LOCATION: Lameroo, SA
ENTERPRISE: Self-replacing Merino flock
PROJECT OBJECTIVE: To demonstrate the use and value of technologies which utilise electronic tags in sheep enterprises.

BACKGROUND

The McMahon family operate an integrated farming enterprise near Lameroo in South Australia. In addition to cropping and piggery operations, they run a self-replacing Merino flock with a strong focus on both wool and meat production. With the aim of increasing the ability to identify individual animal performance within the flock, they trialled the use of electronic (eID) tags across one mob to assess the information and value that could be gained.

WHAT WAS DONE

All ewes in the trial mob were tagged with eID (RFID) tags to allow easier recording of individual animal performance. Two key areas of data collection were established:

1. Total wool income
2. Total lamb income

Total wool income per ewe was determined via measuring fleece weight and micron of each ewe at shearing. Using current market values for each micron grade and the total fleece weight allowed a total wool income per head to be calculated.

Total lamb income per ewe was determined via Pedigree Matchmaker which utilises eID to match ewes to their lamb(s). All ewes and lambs were weighed at weaning to allow a total kg of lamb weaned per ewe and total lamb income per ewe (based on current market prices) to be calculated.
All ewes were pregnancy scanned to determine which had conceived but failed to rear a lamb.

Figure 1 - All ewes and lambs were weighed at weaning.

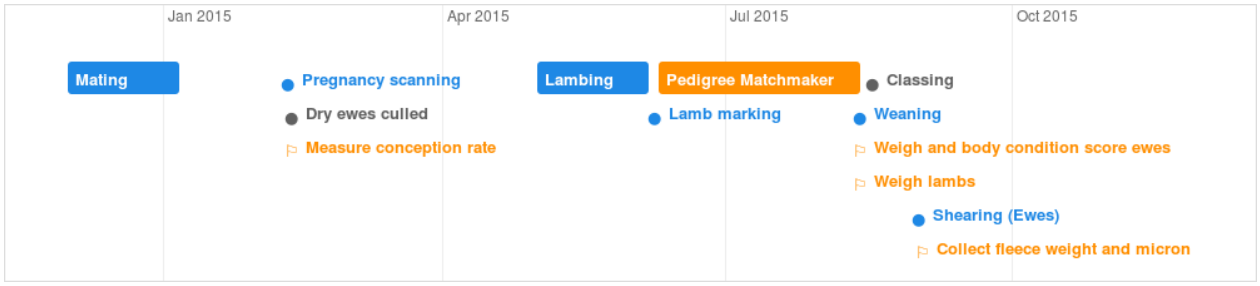

Figure 2 - Timeline of farm activities and data recording points.

As the trial mob was run under the farm's normal operating procedures, ewes were culled from the mob in two situations:

1. Ewes that had failed to conceive via pregnancy scanning (dry)
2. Ewes with wool/visual faults were culled from the mob at classing (post weaning and prior to shearing).

As these animals were removed from the mob, they did not contribute to the final data set and would have likely generated a much wider range in productivity/income of individual animals.

WHAT WAS FOUND

WOOL INCOME

A wide range in total wool income generated by each individual ewe was observed across the trial mob from a minimum of $42.79 to a maximum of $79.18.

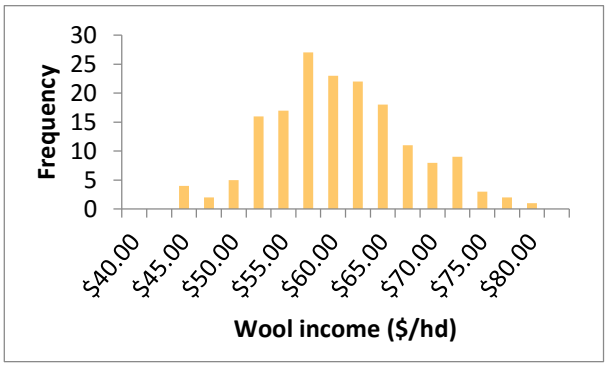

Figure 4 - Histogram of total wool income per ewe across the trial mob.

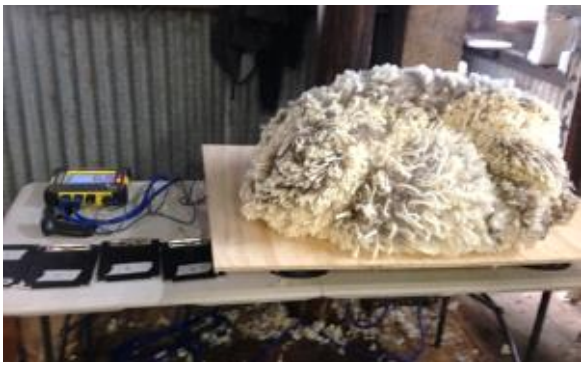

Figure 3 - Fleece weighing at the demonstration property.

LAMB INCOME

Total lamb income ranged from $37.13 to $246.38 at weaning. Interestingly, the ewe that generated the highest lamb income of $246.38 was culled from the mob for wool faults prior to shearing.

Figure 5 shows that whilst there is a general trend of heavier ewes rearing more kilograms of lamb, there are still a significant number of ewes that rear high total kilograms of lamb at modest adult liveweights.

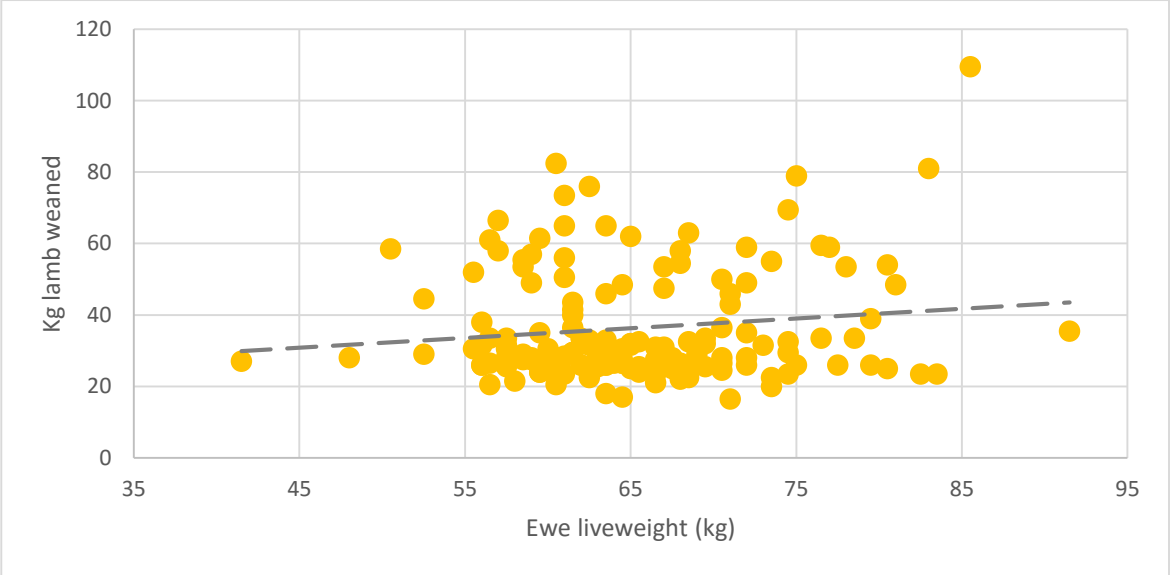

Figure 5 - Scatterplot showing total kg lamb weaned per ewe for varying liveweight ewes.

Lamb income contributed a significant proportion of the total income per ewe (57%). Results showed the lowest total income generated by a ewe that reared a lamb was $90.25 (Table 1). This was $13.82 greater than the highest total income generated by a ewe that did not rear a lamb (scanned pregnant, lost lamb, therefore wool income only).

TOTAL INCOME

Table 1 shows the range in total income for varying groups of animals in the trial mob. It should be noted that had the culled animals remained in the mob the income of the poorest performers would be significantly lower.

Table 1 - Range in total income per ewe.

Lowest	$90.25
Bottom 25%	$107.51
Average [ALL]	$138.34
Average [TOP 75%]	$148.47
Top 25%	$191.92
Maximum	$248.51

More accurately determining and culling the lowest performing 25% of a mob can increase to the overall income per head by $10.13 per ewe (Table 2). This has the ability to significantly increase overall income of a sheep enterprise, for example this would generate and extra $25,320 each year for a typical 2500 head breeding flock.

Table 2 - Difference in the average total income per ewe for all animal in the trial mob compared to the top 75%.

Average [ALL]	$138.34
Average [TOP 75%]	$148.47
Difference	$10.13
Extra income per 100 ewes	$1,012.81
Extra income 2500 breeding ewes	$25,320.14

Whilst lamb income is a significant component of total income generated by each ewe, it is important to consider the efficiency at which each animal can achieve this. Simply selecting for ewes that wean higher total kg of lamb will result in a higher average ewe liveweight. Increasing the average ewe liveweight will increase ewe feed intake and reduce the number of ewes that can be sustainably run on a property, effectively offsetting any gain that was made in the total kg lamb weaned per ewe. For this reason, reproductive efficiency (% of ewe liveweight lamb weaned) is a far more effective way to identify highly productive animals. Table 3 shows that the ewe that weaned the highest total kg of lamb was not the most efficient due to her high liveweight.

Table 3 - Details of top 10 ewes based on reproductive efficiency.

Ewe ID	Ewe liveweight (kg)	Total kg lamb weaned	Reproductive efficiency (% of ewe liveweight of lamb weaned)	Total Income / DSE (lamb and wool income)
1	60.5	82.5	136%	$98.73
2	85.5	109.5	128%	$85.14
3	62.5	76	122%	$108.09
4	61	73.5	120%	$87.24
5	57	66.5	117%	$77.56
6	50.5	58.5	116%	$83.87
7	56.5	61	108%	$84.89
8	61	65	107%	$100.81
9	75	79	105%	$97.90
10	59.5	61.5	103%	$109.20

COSTS INVOLVED

The costs of collecting this information through using a contractor to conduct much of the work involved in measuring wool and lamb income was $15.05 per ewe. This included the cost of the electronic tag for all ewes and lambs as well as utilising the services of a contractor to assist with collecting fleece weights, micron samples and conducting the Pedigree Matchmaker process.

Increasing the total income generated by each ewe by $10.13 per year results in a total gain of $40.52 per ewe over her lifetime in the flock (four lambings) for a cost of $15.05. This net gain of $25.47 per ewe could represent a net benefit of $63,675 for a typical 2,500 head breeding flock, or $15,919 each year/generation.

Figure 6 - Pedigree Matchmaker panel and race used to identify maternal pedigree of lambs.

CONCLUSION

This demonstration mob has highlighted there is a significant opportunity to utilise the individual animal performance within a flock to increase total income and profit for sheep flocks. The relative benefit and costs involved for other flocks will vary depending on local costs and existing variance within a flock.

The importance of identifying ewes that do not rear a lamb was demonstrated in the result that the lowest income generating ewe with a lamb still made more than the highest ewe that did not have a lamb (i.e. wool income only).

RECOMMENDATIONS

Significant opportunities exist to increase profitability through identifying the performance of individual animals within a flock. However, before embarking on this process it is critical to have a clear plan and objective for conducting this data collection. Sheep producers should have a breeding objective that details their flock production targets which will assist in determining the required information to be collected. Once the data that is necessary to be collected is identified, then appropriate equipment and processes can be investigated. It is critical that all data collected is utilised in a decision making process as there is a cost involved in any form of data collection.

FURTHER INFORMATION

For details regarding the type and use of equipment to record the information discussed in this case study see the following technical guide publications related to this project:

1. Collecting fleece production data
2. Collecting lamb production data
3. Pedigree Matchmaker; Setup and operation

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