Monitoring and benchmarking farm performance

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Summary

StockCARE has become recognised as a programme that can add value to sheep and beef farm businesses. The recognition is most likely built on some of the key features and benefits:

- A systems based programme which has been proven to add value
- Monitoring and benchmarking are the platform, but the intensity of the collection, interpretation and utilisation of information related to key drivers of every production system, is unique
- StockCARE has a proven framework for a disciplined approach to the collection and analysis of production information.
- The initial emphasis is on identifying, understanding and defining the factors that may limit performance, before solutions are considered
- Farmers are encouraged to create a strong business team and develop strong relationships with people such as bankers, agronomists, fertiliser representatives and stock agents
- StockCARE is about helping farmers optimise their business performance because not every farmer can be the "best"
- StockCARE is long term, with on-going support for continuous improvement.

Background

Benchmarking is an important tool to compare individual business performance. Most benchmarking systems show the "best" and "worst" for key performance indicators. But who is the better farmer in the comparison in Table 1? And does the information help the farmer identify opportunities for business improvement?

By definition improvement must involve change. Change management requires a structured approach with a focus on the "human factor" which includes an understanding of the culture, values and behaviours of the individual person. A plan does not capture value. Value comes from the people who are responsible for designing, executing and living the change. The decision for change will only be made when there is confidence the change will add value.

The reason most adults enter a learning experience is to create change. The principles for learning are different between children and adults. Adults are more motivated to learn but only after they identify the need themselves. Adults want to be respected for their experience and knowledge. They need to be engaged in the learning process and to stay self-directed. They need to start the process with goals and objectives in mind.

Monitoring and benchmarking on their own do not improve business. It is what is done with the information that makes the difference. The best advice comes from asking the right questions and to do that requires a very good understanding of the issues.

While every farm is different, the principles of sheep and beef farm businesses depend on the same drivers and outcomes which can be affected by the individual farmer and by the farm itself.

Business improvement requires a sound understanding of the key drivers of performance. On sheep and beef farms the core business is the efficient and effective conversion of pasture to meat and wool. The performance of the animal production systems is an important driver of profitability, as shown in Table 2.

The finding that 80% of sheep farmers see themselves

Table 1 Comparison of some key performance indicators between two farms.

	Farm A	Farm B
Lambing performance (%)	135	155
GFI $/ha[1]	662	1084
FWE $/ha[2]	340	583
Cash surplus $/ha	321	501
Effective area (ha)	2600	780
SU/ha	4.2	11
Ave. rainfall (mm/year)	500	1100

[1]Gross Farm Income (total revenue less stock purchases)
[2]Farm working expenses (excluding interest and tax)

Table 2 Comparison of lamb production between the top 20% and bottom 20-40% of farms (from Beef & Lamb NZ Economic Service, Sheep and Beef Farm Survey, 2011).

Farm quartile (Profit/ha)	Lamb price ($/lamb)	Lamb sales (kg/ha)	Lamb sales ($/ha)
Top 20%	94.23	103	522.01
Bottom 20-40%	91.70	44	222.2
Difference (%)	+3%	+134%	+135%

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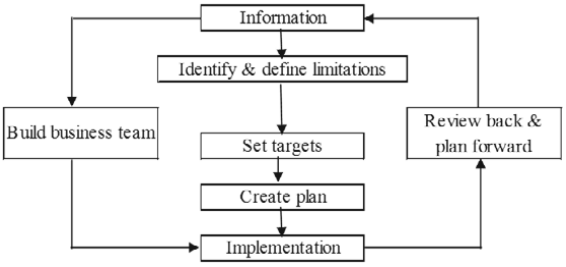

Figure 1 Model for business improvement.

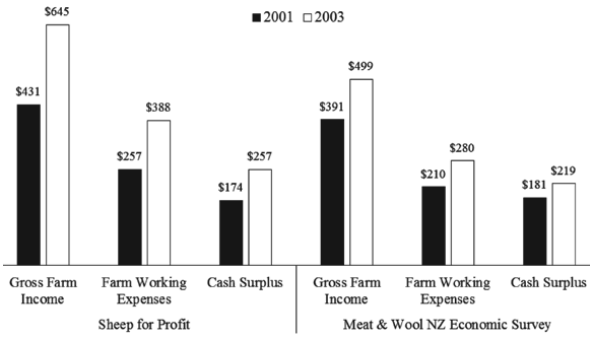

Figure 2 Comparison of average financial performance of Sheep for Profit farms and the Meat & Wool NZ Economic Survey farms in the same regions.

as being in the top 20% (from Red Meat Sector Key Insights 2014, The ANZ Privately Owned Business Barometer) suggests that most farmers have little understanding of what is happening on their own farms. Business improvement is all about knowing where you are starting from, knowing where you want to be and knowing how to get there. A good understanding of where we starting from helps to set realistic and achievable targets.

StockCARE

StockCARE was developed after recognition that no other farm improvement programmes or consultancy services with a focus on animal production systems, had successfully been developed as a national service under the same management. The framework was based on the typical business improvement model (Figure 1).

In 2000 the programme (then called Sheep for Profit) was tested over 3 years (2001-2003) on 48 farms throughout New Zealand to find out how farmers perceived its value, before going commercial. The financial performance of the pilot farms were compared with the farms in the same regions that were in the Meat & Wool NZ (now called Beef & Lamb NZ) Economic Survey (Figure 2), which we regarded as the "control" farms. The cash surplus for the pilot farms increased by 48% compared to 21% for the "control" farms. The increase was driven by a 50% increase in gross farm income in association with a 51% increase in farm working expenses.

On some farms the change in financial performance was not solely related to the sheep enterprise. A fairer indicator of the value is an average increase of 16 462 kg of lamb and 1 830 kg of wool sold/farm.

This outcome clearly demonstrated that the programme had potential to add value to the farm business. The key finding was the majority of participating farmers were able to develop confidence to make some major changes and investments towards the improvement of their businesses.

StockCARE has been designed to foster a higher discipline level around the way information is collected, analysed and reported:

- Protocols are used that outline why and how the information is collected to ensure consistency within and between farms
- Standard recording forms are used
- A management plan is used to create fortnightly reminders for StockCARE tasks throughout the year
- A StockCARE advisor, who checks all data within 24 hours of entry, will have some form of communication with the farmer regarding the information
- Farm visits by the StockCARE advisor are carried out.

The reminder system and regular contact with the StockCARE advisor helps to provide some degree of accountability. At the start of the programme all the production systems are clearly defined with start and end points, specific outcomes and drivers which can all be objectively measured (Figure 3).

It is important to take a whole farm approach by monitoring all the production systems to ensure awareness of any impact a strong focus on one may be having on others.

In the first year a large amount of information is collected and used to define the starting point, and to identify opportunities for improvement.

The aim is to never "tell" a farmer, but to create tension for change. The information is presented so the farmer can identify factors that may be limiting performance: *"I have not been told what to do in 3 years. All my problems have become obvious through the monitoring done each year"* comments one farmer.

The first stage is to compare the performance of the drivers against the top quartile, average and lower quartile for that driver in the Between Farm reports.

An example for mating performance is shown in Figure 4. The farms that make up the top and lower quartiles for the driver (scanning %) are the same farms making up the top and lower quartiles for the sub-drivers. In the example, the top 25% scanned 162% with a 4.3% dry rate, a scanning index of 2.7 and a ewe mating weight of 62 kg. It should be obvious to the farmer that scanning % is only average, scanning

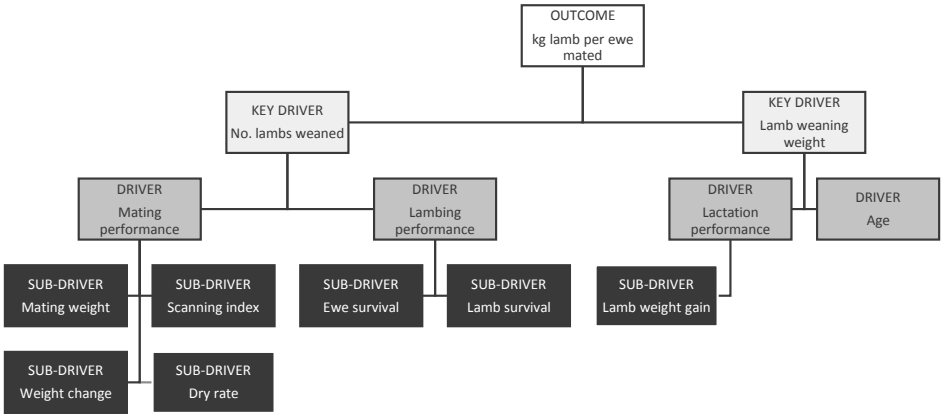

Figure 3 Outcome, key drivers, drivers and sub-drivers of the ewe flock production system.

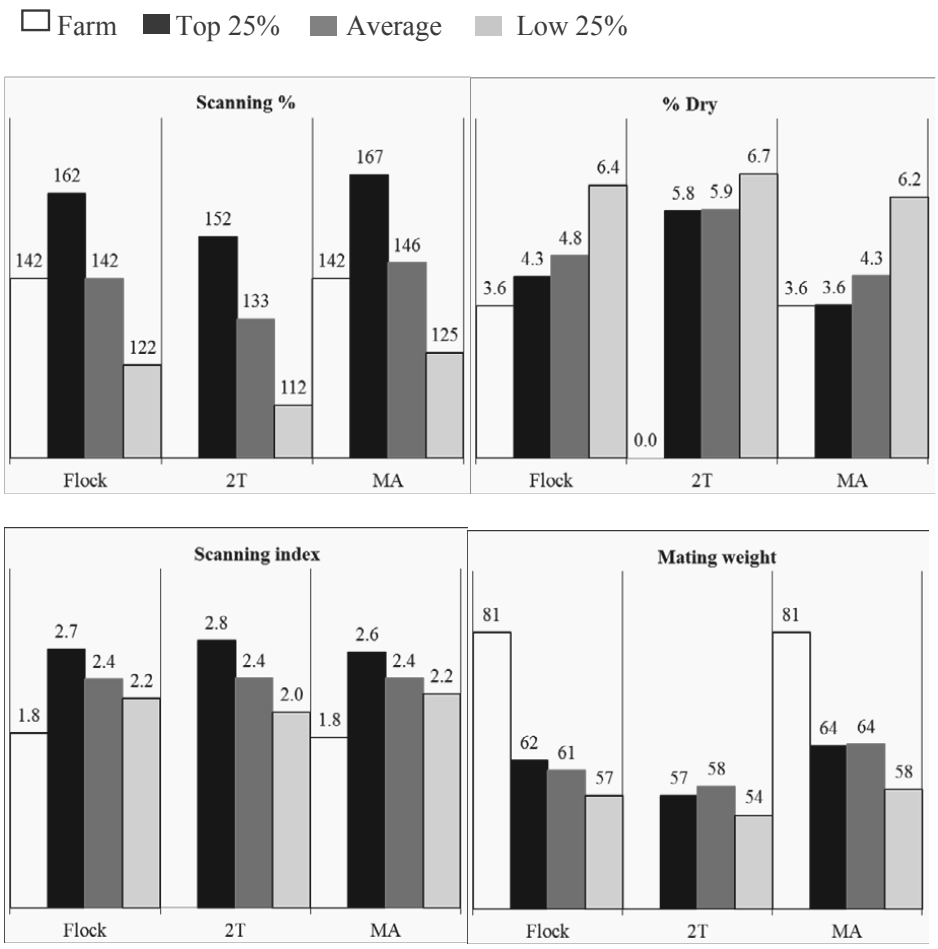

Figure 4 Ewe flock mating performance – Between Farms, 2001. ("2T" = two - tooth ewes; "MA" = four - tooth and older.)

index is low and mating weight is high.

The first 2-3 years generally involves three to four annual farm visits to help the farmer understand what the information is saying and to review the past and plan for the future.

There is a strong focus on helping the farmer define and understand the factors that may be limiting performance. The more the farmer learns about these opportunities the more effective the decision for change will be. Outside specialists are bought in to provide specific knowledge and expertise once the right questions have been identified.

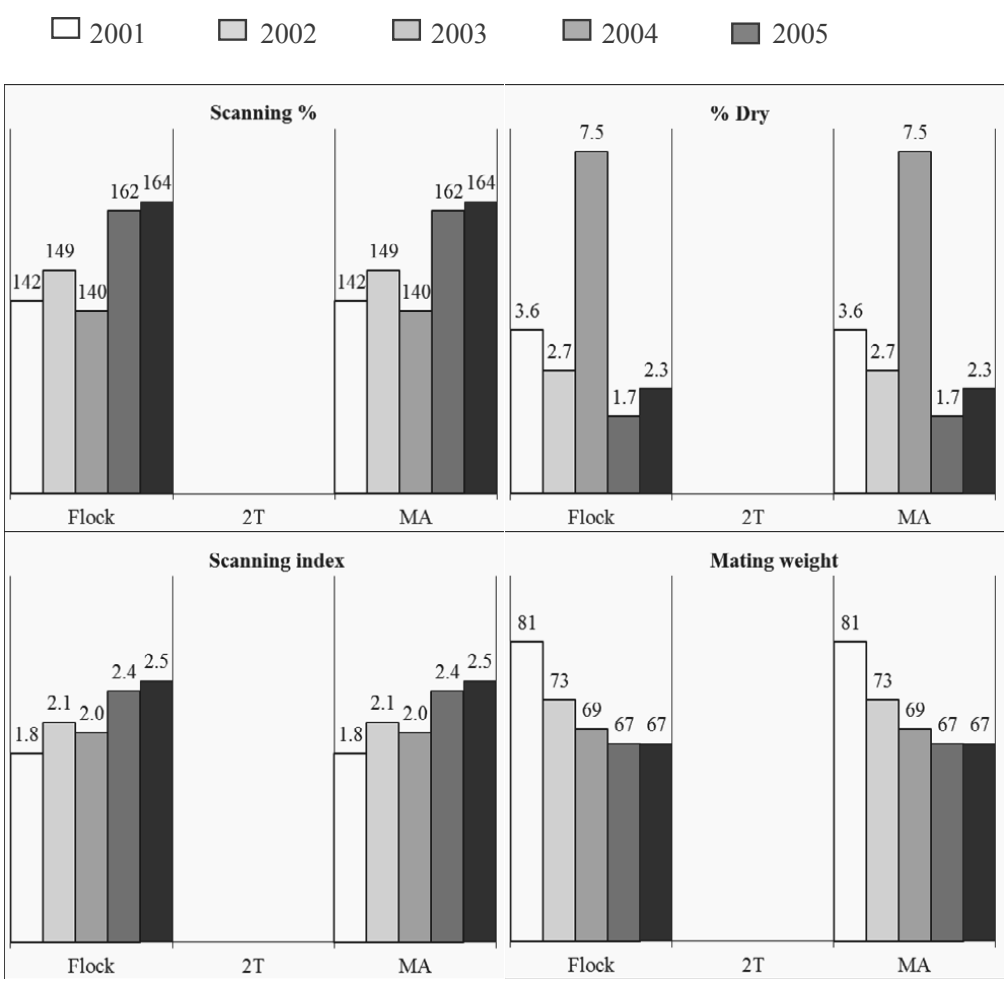

Figure 5 Ewe flock mating performance – Between Years, 2001-2005. ("2T" = two - tooth ewes; "MA" = four - tooth and older.)

One important outcome is to create targets and goals that are realistic and achievable. This can only be done when there is a clear understanding of the starting point and what opportunities exist to achieve goals.

This usually results in a better appreciation of how the priorities for the different production systems may need to be changed throughout the year. An important benefit is the ability to improve the consistency of performance by identifying issues earlier.

In the following years, benchmarking is focussed on the individual farm and its targets over time reported as Between Year comparisons.

An example of mating performance for the same farm used in Figure 4 is shown in Figure 5. Initially, the farmer was reluctant to change the genotype of the ewes so the major change was the management of the ewes between weaning and mating.

In 2004 a different sheep genotype was introduced. This farm is still in StockCARE and now has a high performance self-replacing ewe flock, consistently weaning 50-55 kg lamb/ewe with ewes weighing 66-70 kg at mating.

As a rule, farmers do not like being told they are not feeding their animals well. StockCARE is designed so farmers can work it out for themselves. Perhaps the most important component of StockCARE is the disciplined approach towards monitoring body condition and weight gain to help farmers understand the way they are feeding and managing their livestock. Good science, some of which is 30-40 years old, is used to help convince the farmers that body condition and weight gain are the most important drivers of ewe performance and young growing sheep, respectively. Once the farmers have a good understanding of the role of ewe body condition they can readily identify where their flock is at from the reports showing distribution curves (Figure 6). The farmers soon learn to estimate what proportion of their flock should be targeted for preferential management.

The most common feedback from farmers during the

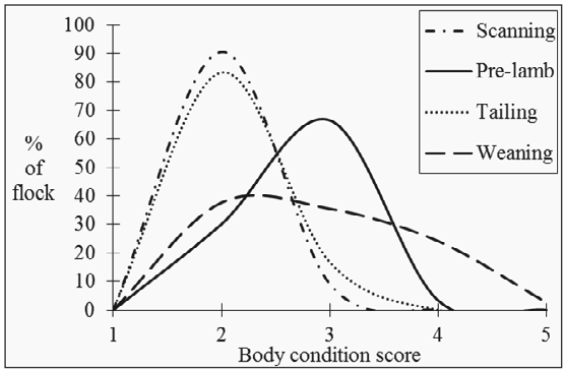

Figure 6 Example of body condition score profile for mixed age multiple lamb bearing ewes after scanning, pre-lamb, tailing and weaning.

first year is the recognition that: "*I had no idea how light my ewes were until I put my hands on them*".

The quote from Tim Rhodes (Country Wide Sheep, 2015) sums up the concept *"Another game-changer for the flock was the StockCARE programme based on condition scoring which taught me how to feed stock better to exploit their productive potential. It has meant we had to drop our stocking rate considerably to try to maintain a condition score of around three. However, it has made a huge difference to profit"*.

Since commercialisation in 2003, more than 500 farms have been involved, with 105 active farms in 2015. Approximately 30% of the current farms have been using StockCARE for more than 10 years.

In the early days, our target tended to be the low to average performers but over the past few years there has been an increasing number of top performers becoming involved. Initially this presented a challenge as to how we could add value, but feedback told us these farmers see value in a variety of ways:

- "*I knew I was a top performer but StockCARE has helped me understand how I do it*"
- "*StockCARE is great at helping me involve my staff and to get them on the same page in terms of where we want to be and how we get there*"
- "*After every visit I get some value.*"

For example, a high performance farmer decided to break his scanning record in a year with excess feed going into mating. At pre-mating only 20% of the ewes were condition score 2 but the whole flock was fed to gain 8 kg/ewe by start of mating. We estimated this would have taken 450 000 kg DM. Scanning % improved (+5) and lambing % (+2). If the condition score 2 ewes had been fed to gain 8 kg and the rest to gain only 2 kg (i.e. ensure they were not losing weight) the feed saved would have been 300 000 kg DM.

Our greatest challenge has been the number of farmers who exit after 3-5 years because they have "learnt everything". However, good business depends on continuous improvement which will always be under-pinned by constant measurement. All the long-term farmers continue to collect information but the frequency of farm visits varies from none to 3-4 per year. It is quite apparent that most of these farmers have developed the disciplines of regular monitoring, have an understanding of how to analyse the information and know their StockCARE advisor is always able to respond when data comes in.

The value of StockCARE is determined by the attitude of the farmers. They must have the desire to improve, be prepared to collect information and to be prepared to plan and implement change.

There have been some common factors that compromise success. Inadequate information is still the most common constraint and this most likely is a demonstration that the farmer, for some reason, does not perceive value. Perhaps of more concern has been the number of issues associated with succession, where the next generation see the potential value of StockCARE, become actively involved but at some stage become compromised by the previous generation. However, this is offset by a greater number of farms where the older generation has initiated participation as part of their succession plan.

The following production systems give an idea of how StockCARE works with the farmer.

1. Ewe flock

The Ewe Flock production system starts the day after weaning and ends the day of weaning the following year. The outcomes are weight of lamb weaned per ewe mated and percentage of ewe weight weaned.

Ewe flock performance is broken down into seven events during the production year:

- Weaning
- Pre-mating (4-6 weeks before start of mating)
- Mating
- Ram removal (end of mating)
- Scanning
- Pre-lamb (2-3 weeks before start of lambing)
- Tailing.

Ewe liveweight and body condition

A representative random sample of at least 50 ewes from every mob is weighed and condition scored at every event (only condition score at tailing).

Ewe mating performance

Ewe mating performance is measured as number of lambs scanned per ewe.

The Mating Performance report shows for flock, two-tooth and mixed-age ewes:

- Scanning percentage (Outcome)
- Dry rate (%)

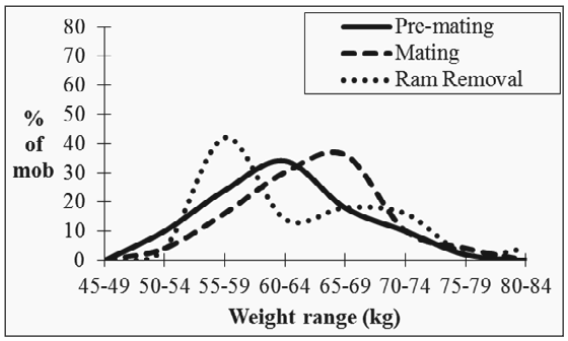

Figure 7 Liveweight profiles for mixed-age ewes at pre-mating, mating and ram removal.

- Scanning index
- Average mating weight (kg).

Liveweight and condition score profiles at pre-mating, mating and ram removal are used to understand the scanning result.

Experience shows liveweight change during mating can affect mating performance to a greater degree than liveweight change before mating.

Many farmers find it difficult to explain unexpected scanning results.

For example, an early case study involved a flock of mixed age ewes that scanned 10% less than the predicted target. The mob average liveweight at pre-mating, mating and ram removal were 63, 64 and 63 kg, respectively, suggesting the ewes were fed well. However, liveweight profiles (Figure 7) show a bi-modal profile at ram removal suggesting the ewes may have been in two mobs during mating. This was confirmed at the post-scanning farm visit. The mob had been split in half with one on good pasture and the other used to "*clean up some gullies*". The latter scanned 20% less than the former.

In the first year the trace element programme is discussed, and if need be, the two-tooths and mixed-aged ewes are checked for selenium, copper and vitamin B_{12} levels at pre-mating, as well as faecal egg counts.

Ewe lambing performance

Performance is measured as lamb wastage percentage from scanning until tailing which is a function of ewe deaths and lamb survival.

The lambing performance report shows for flock, two-tooth and mixed-aged ewes:

- Lambing percentage (Outcome)
- Lamb wastage percentage
- Ewe death rate percentage.

Additional information is obtained by:

- Perinatal lamb death investigation.

Twenty lambs that have died within 48 h are submitted for autopsy. Farmers are asked to select lambs that "appear normal", avoiding obvious dystocia and undersize. The aim is not to diagnose why each lamb died but to provide a bigger picture to help understand why lambs are dying. Veterinarians were asked to follow a protocol and record details as reported in Table 3.

Trace element deficiencies were rarely found, but infectious abortion and iodine deficiency were not uncommon. By far the majority of farms have the typical picture which can be used to ask the question "why do you think so many lambs are born alive, get up and walk but don't get a decent feed?" The aim is to get the farmer to think about what may be overriding the ewe's innate mothering ability to start the bonding process. Many farmers do not understand the bonding process which is initiated by the activity of the lamb, which in turn is a factor of its birth weight. Ewe maternal behaviour is largely a factor of her body condition when she lambs.

"Three years ago we always blamed the weather for our lamb and ewe losses. We have now found that the weather just finished off a problem that started well before lambing with our ewes being too skinny. We now have systems and plans to reduce the impact of the weather."

Paddock lamb survival

Ewe numbers in each paddock are recorded when they are set-stocked for lambing; ewe and lamb numbers at tailing are used to estimate ewe and lamb wastage at the paddock level. Often what the farmer regards as a "safe" lambing paddock is not supported by reliable information. Some common findings include: lambing two-tooths, scanned as bearing twins, close to sources of disturbance such as dog kennels and farm tracks, or lambing in a large paddock with a single water source at one end.

Improving lamb survival is now recognised as a major opportunity for the sheep industry and more funding is being invested in new research. Many opportunities

Table 3 Results from StockCARE perinatal lamb death investigation (2997 lambs).

Lamb factors		Animal health factors	
	% of all lambs		% of all farms
Birth weight < 3kg	22	Selenium deficiency	1
Birth weight > 5kg	14	Copper deficiency	0
Born alive	80	Cobalt deficiency	0
Walked	65	Iodine deficiency	15
Fed	21	Toxoplasmosis	11
Fat depletion	60	Campylobacter	7
Exposure	19		
Dystocia	25		

related to some old science and common sense are not being implemented. The main one is ewe nutrition during pregnancy, shown as condition score profiles between scanning and pre-lamb periods (Figure 6).

Ewe lactation performance

Performance is measured by the average lamb weaning weight as shown in the final ewe flock performance report:

- Weight of lamb weaned/ewe mated
- % ewe weight weaned
- Average lamb weaning weight (kg)
- Average lamb weaning age (days)
- Average lamb weight gain (g/day)
- Flock lambing percentage
- Flock mating liveweight (kg).

2. Ewe replacements

The system outcome is identification of two-tooths pre-mating that meet targets related to liveweight (minimum and average) and condition score. The report shows target and average liveweight for the flock from weaning until pre-mating. Where hoggets are mated, monitoring is the same as for the ewe flock from mating until weaning.

3. Sale lambs

The sale lamb performance report shows:

- Profit per lamb ($)
- Average days to sale
- Average sale liveweight (kg)
- Average sale value ($)
- Average liveweight value (cents/kg liveweight)
- Average daily weight gain
- Percentage lambs sold pre-weaning.

Profit per lamb is reported to provide an indication of the cost of production (COP) for this system.

$$COP = WV + AH + S/C + DR + F$$

(WV value of the lamb if sold store at weaning (average weaning weight x $1.45); AH = animal health expenses at 1 cent/lamb/day; S/C = shearing/crutching at $3.00/lamb; DR = death rate at 2%; F = cost of feed at 9c/kg DM and a daily feed intake of 1.1 kg DM/day).

It is accepted the value shown as "profit" is not real as some assumptions are made and the values have been the same since 2001, but the aim is to try and provide an indication of the effectiveness of the system by comparing it to other farms. Many farmers believe if they do not finish all their lambs they are failures. But on many properties a poorly performing lamb finishing system has the potential to compromise both the ewe flock and ewe replacement systems. This reporting method has convinced many farmers to move to selling store lambs and focus on successfully improving their ewe flock performance.

The sale lamb analysis report shows monthly data for:

- Percentage of total of lambs sold
- Average carcass yield (%)
- Average value per kg liveweight ($/kg)
- Average value per lamb ($).

Average value per kg liveweight highlights the seasonal nature of lamb values as well as factors that may affect grading which can be investigated from information provided by the meat processor. It is also apparent that carcass yield can vary during the season.

4. Beef enterprise

StockCARE provides similar reporting for the beef cow herd, heifer replacements and finishing cattle. However, there is little demand for such an intensive monitoring approach for the beef cattle, but it is important to monitor two key outcomes for the cows to provide an indication of how they may be affected by changes in the sheep systems.

The beef cow performance report shows:

- Weight of calf weaned per pregnant cow wintered (Outcome)
- Average weaning weight (kg)
- Percentage calves weaned per pregnant cow wintered
- Mating performance
  - % in-calf for herd, mixed-age, rising 3-year old, rising 2-year old
  - % in-calf 1st 6 weeks for herd, mixed-age, rising 3-year old, rising 2-year old.