

Optimising sheep systems for Better Returns



Contents

- 3 Introduction**
- 4 Working smarter**
- 5 What to change and when**
- 6 The right system**
- 8 Labour**
- 10 The right sheep**
- 12 Options to reduce feed costs**
- 14 Flock health**
- 16 Handling systems**
- 17 The tale of two systems**
- 18 Recording data**
- 21 EID terminology explained**
- 22 Analysis of data**

The information in this booklet was compiled by Dr Liz Genever, Nerys Wright and Katie Thorley, AHDB Beef & Lamb.

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Introduction

The philosophy of any business should be about working smarter. It is important to ensure that your sheep system is appropriate for the resources you have available to optimise productivity and maximise profitability. Achieving this could mean you have more time to spend off the farm or doing something else on the farm.

In the UK, there is wide variation in systems and genetics, which can influence the farm and the management of the business.

Increasingly, sheep farmers are investing time in developing grazing systems and monitoring performance on forage-based systems.

Some find it easier to select animals through a breeding programme, or to buy in stock from breeders with a similar philosophy.

In recent years there has been significant interest in the use of technology to assist sheep farmers in making decisions, particularly with electronic identification (EID). Smartphones and apps have the potential to help collect information and share data. There is more data being collected on sheep farms than ever before, but we need to make sure it is being used effectively.



Dr Liz Genever
Beef & Lamb Senior Scientist
AHDB

Working smarter

Most sheep farmers do not value their time, or ask the question, “If I wasn’t doing this, what else could I be doing?” By assessing current activity and considering alternatives, sheep farmers could be earning extra money or improving their quality of life.

Most sheep systems have evolved over time based on resources and people’s preferences. It is important to evaluate the current system to see if improvements can be made. This does not necessarily mean making big changes, like changing lambing systems or completely changing the breed, but looking at smaller changes that could make a big difference to the performance of the enterprise.

Analyse what you are doing

A benchmark report can be a very useful place to start. Using a benchmarking service such as Farmbench provides a summary of information on the physical and financial performance of a business.

A full business benchmark (including variable and overhead costs) does require access to the farm’s financial data. At first, it can seem like a significant amount of work, but the outcomes can help highlight the business strengths, weaknesses and opportunities. It will help farmers understand what should be prioritised to improve a certain aspect of their business.

See the BRP manual **Assessing the business for Better Returns** for more information.



Identify the areas you can improve

Sheep systems using Farmbench have shown the key areas that can be improved within most enterprises are feed costs and paid labour, each contributing 15–20 per cent of total costs.

Irrespective of the system used, profitability is driven by the balance between costs and output. It is not as simple as stripping out costs to achieve higher profit. Higher cost systems can be highly profitable if managed correctly and vice versa.

It is worthwhile considering the following questions with everyone involved in the farm:

- Can you make better use of genetics for better performance?
- Can you make more use of grass and forage?
- Can you look at alternatives to your current purchased feeds?
- Can you lamb with less labour input?
- Can you spread or reduce your overheads?
- Can you use your time better?

FARBENCH

Why not benchmark with Farmbench? Understand and compare your full costs of production at both enterprise and whole-farm level and compare performance against a national database.

More information available at farmbench.ahdb.org.uk or email farmbench@ahdb.org.uk

What to change and when?

Set changes

Evolution, not revolution, is at the heart of easier management. It is important to gather a list of ideas for action from a variety of people who know your business and rank how important these ideas are.

Table 1. A template for gathering ideas for action

	Action	How important? (A = very, B = fairly, C = not)
1	Find a business discussion group	A
2	Select rams with positive fat depth EBVs	B
3	Review seed mixtures being used in the silage fields	B

Gather the best ideas into an action plan with timescales. This will help break down jobs into manageable chunks.

Table 2. A template for generating an action plan

No.	Action	Timing
Short term (within one month)		
1	Attend next meeting of Vale discussion group	15 Jan
2	Go through rams and identify requirement for new rams	Late Jan
Medium term (next two to three months)		
1	Look at silage yields and quality for last year	End of Feb
2	Collect data for benchmarking group	End of Feb
Longer term (next three to six months)		
1	Host a visit from discussion group	May
2	Assess silage fields and record yields	Jun
3	Discuss ram requirements with a Signet Breeding Services consultant	Jun

Lean management techniques

Many manufacturing companies are being challenged to do more with fewer resources. One way they have approached this is to adopt 'lean' management techniques to reduce waste and increase efficiency and value. It is based on doing what the customer values and identifying and eliminating waste. This philosophy has been applied on many pig and beef farms and it could be used to identify area of improvements.

The right system

How to define a system

Sheep systems can be defined by:

- Timing of lambing
- Lambing indoors or outdoors
- Lambing and rearing percentage
- Selling stores or finished lambs
- Proportion of grass and forage fed to ewes and growing lambs

All systems are driven by various factors, such as early grass availability, target market, shed space, stocking rate, region, land type, scanning percentage and breed.

It is not always easy to clearly define a system because there may be a mixture of systems on the same farm, eg, older ewes lambing indoors earlier in the year and younger ewes lambing later outdoors. Analyse what is best for your set-up and aim to keep it as simple and efficient as possible, eg, having only the necessary number of management groups.

For more information on best practice for indoor and outdoor lambing systems, see the BRP manual **Reducing lamb losses for Better Returns**.



Think about grass

Over 90 per cent of the energy for sheep systems comes from grass, hay or silage. Effective utilisation of grass and good grassland management is at the heart of easier management concepts. Well-managed grass could sustain more than 250g per day liveweight gain through to weaning (90 days) without high levels of supplements.

The date of lambing is always a balance between availability of spring grass and lamb prices. Figure 1 provides guidance on which month lambing could start, based on geographical location for outdoor lambing systems.

Systems that involve housing, away wintering or forage crops result in grass being saved over the winter and will allow earlier lambing.

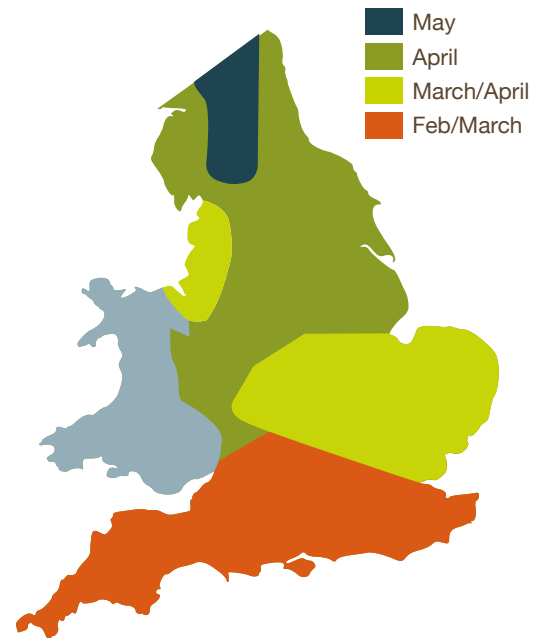


Figure 1. Lambing start date for outdoor lambing

For more information on managing soils and nutrients to encourage spring grass, see the BRP manuals **Improving soils for Better Returns** and **Managing nutrients for Better Returns**.

Learnings from Ireland

Teagasc is encouraging sheep farmers to grow 10 tonnes of dry matter (t DM) per hectare from rotational grazing systems.

Key messages:

- A paddock grazing system is required. This can be established using temporary electric fencing systems
- Grass for early spring: aim to have fields shut up for 120 days over the winter. Make sure paddocks are grazed well in the autumn with 15–20 per cent of paddocks closed by the end of October, 40 per cent by mid-November, 60 per cent by the end of November and 80 per cent by mid-December
- The paddocks closed first should be the ones used first in the spring. Think about shelter and access to those fields from the lambing shed. Aim to have sward heights of 6–8cm in the spring to maximise intakes and ensure rotations can start quickly
- Apply nitrogen fertiliser (around 30kg N per hectare) to encourage early grass growth, with the aim of getting a response rate of 12kg DM per 1kg of N applied
- Establish targets for the amount of the farm grazed in the spring, for example, 20 per cent by mid-March and 40 per cent by the end of March, which is then rested ready for the second rotation. The remaining 60 per cent will be grazed during the first two weeks of April
- The paddocks should be grazed down to 3.5–4cm (1,500kg DM per ha) to ensure leafy regrowth
- Have five permanent divisions per group of sheep; this may encourage larger groups and reduce the need for divisions. The permanent divisions can be divided further by electric fencing during periods of rapid growth

For more information on measuring grass and feed budgeting see the BRP manual **Managing grazing strategies for Better Returns**.



Labour

For most sheep systems, paid labour is one of the biggest costs. It is important sheep farmers know the cost for their business. Don't forget to factor in a cost for 'free' labour from family or friends.

Consider whether the labour requirement per ewe can be reduced, or whether more ewes can be kept with the same amount of labour.

Also look at whether changing practices can make routine jobs easier and more efficient.

Average hours per ewe (total of paid and unpaid) = 2.48 hours per ewe. Top 25 per cent = 1.97 hours per ewe. Bottom 25 per cent = 3.93 hours per ewe.

Lambing

During lambing additional staff are usually brought in to help, either in the form of family labour, students or additional paid labour such as night lambers.

Using teasers can help to tighten the lambing period to reduce the amount of time that extra labour is required, however, it can also lead to a very busy lambing period. This is where using raddles can help plan labour for those busy peak times.



Always be prepared. Equipment and colostrum supplies should be ready, along with enough labour, sufficient indoor lambing pens (one pen for every 5–8 ewes) and a 'hospital area'.

Choose your lambing or turnout fields based on the best shelter, or place straw bales or equipment in the fields to provide shelter for newborn lambs, especially if the weather is poor.

Record data during the lambing period that will help make future management decisions, such as details of lambing ease, mothering ability, lamb vigour and identify ewes for culling. This information will aid decisions on selecting replacements and reduce costs associated with unproductive ewes.

Examples of timesaving equipment

- Baby bottle warmers – you can do something else while the milk is warming to the right temperature
- Buckets/automatic machines for orphan lambs – these save hours of labour time as groups of lambs can be fed together
- Feeding a total mixed ration (TMR) can save time, although there can be a higher cost to the business in terms of the machinery and fuel
- Water pipe device for lambing pens to reduce the need to manually fill buckets of water. Ewes in early lactation can drink up to eight litres of water a day
- Have several pieces of the same equipment so some can be cleaned and disinfected while the others are being used, or divide the equipment between different sheds to reduce the amount of walking needed to fetch kit

- Lambing-pen boards – ensure that individual pens are marked with information so everyone knows the status of the ewes and lambs, eg, when they were born, colostrum intake or when they can be turned out. This will also be useful if there is a changeover of staff between day and night

Optimising labour use at lambing time project

As part of an AHDB Farm Innovation Grant, shepherds of three outdoor-lambing flocks had cameras strapped to them to record video during lambing. Researchers watched the videos and calculated the amount of time spent doing certain tasks; the proportion of time spent doing these tasks is shown in Figure 2. The three tasks to which the most time was allocated were driving (32 per cent), caring for lambs (16 per cent) and walking (12 per cent).



As lambing progressed, the proportions changed as more time was spent checking ewes with lambs. It was clear that moving between sheep, either by driving or walking, took up a significant amount of time. These figures may provide targets for improvement, for example, one of the farmers involved in the trial has now invested in drive-over gates at key points around the farm to reduce the amount of time spent opening gates.

Opening and closing gates can take 18 hours each year.

Wool

There are various labour costs associated with wool, including those for shearing, dagging and shepherding to check for flystrike. Pre-shearing, wool can also lead to less active grazing and increased heat stress if sheep are housed. In total, these costs can add up to £2 per ewe.

Shearing pregnant sheep in winter before housing can increase building capacity by up to 30 per cent, reduce respiration rates and extend gestation by 1.5 days leading to larger, more vigorous lambs. A snow comb can be used on ewes that are due to lamb outdoors. If you don't use a snow comb they need eight weeks regrowth before turning out.

An extreme solution to avoid these costs is to select breeds that shed their wool so they don't need shearing at all, but this may not suit every system. Prevention for flystrike may still be needed.

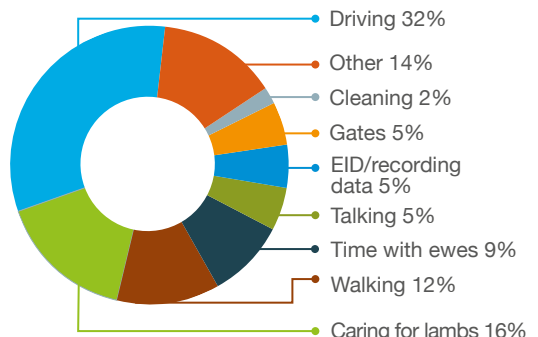


Figure 2. The proportion of time spent on jobs at lambing time (ewes lambed outdoors, averaged for three farms)

The right sheep

The breeding ewe is key to any sheep system. However, selecting ewes, whether for your own replacements or to sell on, is not a simple task. Potential breeding stock must be selected to suit the specific system and the intended markets for its progeny.

Buying in or breeding own replacements?

Most farms use a variety of approaches for selecting replacements. There are advantages to breeding your own replacements because their health status is known, they are familiar with your system and you may have recorded data on their breeding line. However, there are also advantages to buying in replacements, such as the ability to select from a wider genetic pool, less on-farm management required and a reduced feed demand if they are bought in as shearlings.

The policy will depend on the system and may change if there is a health challenge or a focus on particular traits.

See the BRP manual **Improving ewe breeding for Better Returns** for more information on establishing breeding strategies for rearing your own replacements and selecting rams on maternal Estimated Breeding Values (EBVs).

Easier management traits

Stock can be selected for traits that will ease management. Ease of lambing is a key genetic trait carried by both rams and ewes. Figure 3 shows the variation within two breeds of rams, Suffolk and Scottish Blackface, on the percentage of lambs assisted at lambing.

Lambing ease EBVs are currently available for Texel rams. Data is being collected for more breeds to produce EBVs in the future.

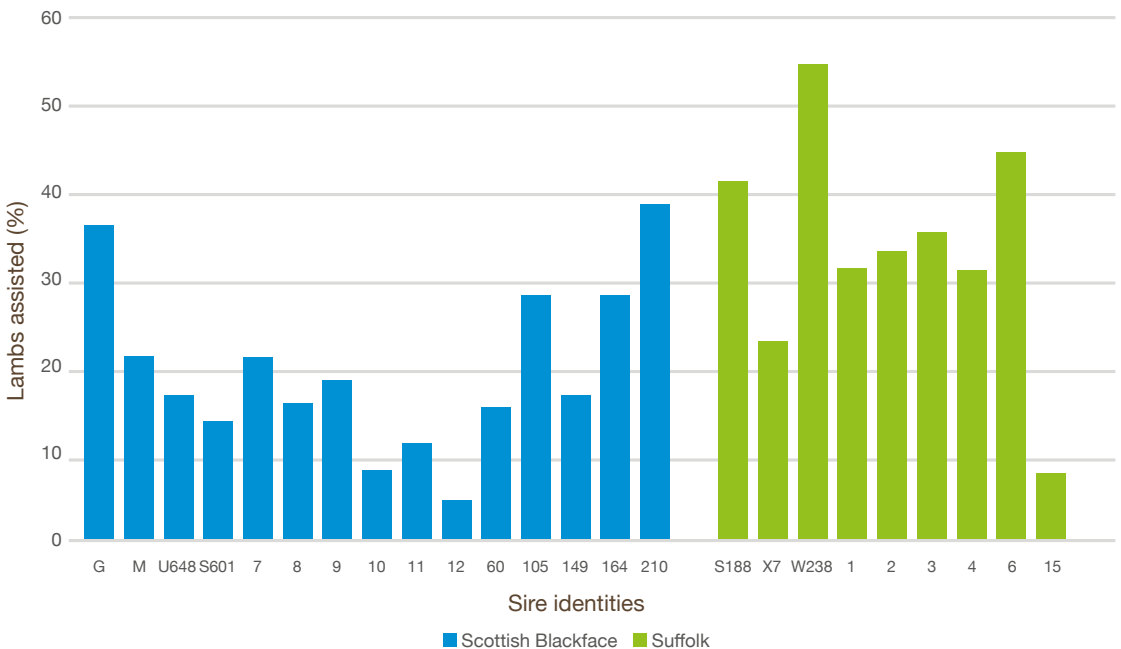


Figure 3. Variation between lambing assistance for rams from two breeds

Source: SAC 2005

Culling to improve flock performance

If a flock objective is to reduce labour requirements at lambing, then record keeping is crucial. EID tags make this easier, or an additional management 'cull' tag can be used.

Table 3 provides information on how to calculate a ewe's lambing score based on lambing ease, mothering ability and lamb vigour. Decide on your threshold and cull as appropriate. Alternatively, move them into a 'B flock', which is only mated with terminal sires so replacements are not retained. After five years of selecting by lambing scores your requirement for lambing assistance will be significantly reduced.

Table 3. Guide on how to calculate a lambing score

Lambing score	-1	0	1
Lambing ease	Assisted	Minor help	No assistance
Mothering ability	Leaves lambs	Stands well back	Follows whatever
Lamb vigour	Has to be sucked	Slow to suck	Up and sucks

Other traits for a culling checklist could include:

- Repeated treatment for lameness
- Excessive dagging
- Prolapse
- Mastitis, poor udder and teat conformation

Lamb survival EBVs are currently available for Lleyn rams. Data is being collected for more breeds to produce EBVs in the future.

Managing the right genetics

Both breeding potential and flock management affect performance.

Regularly assessing ewes' body condition score (BCS) and grouping them accordingly will improve flock performance.

Ensuring ewes are at target BCS at key stages of the production cycle will improve fertility, reduce ewe and lamb mortality, improve lamb growth rates from birth to weaning (90 days) and improve ewe longevity.

Target body condition will vary depending on the farm type, breed and stage of the production cycle.

The impact of ewe BCS at scanning on lamb performance at eight weeks and 90 days can be seen in Table 4, with higher BCS leading to heavier lambs. The data comes from the AHDB-funded sheep key performance indicators (KPI) project. Ewes rearing twins are included in this dataset.

Table 4. The impact of ewe BCS on lamb performance at different weighing points

BCS at scanning	Average 8-week weight (kg)	Average 90 day weight (kg)
2.25	14.9	18.6
2.50	15.6	21.7
2.75	17.5	24.3
3.00	17.8	25.1
3.25	20.8	

See the BRP manual **Managing ewes for Better Returns** for more information on the impact of body condition scoring.

Options to reduce feed costs

Grazed grass

Well-managed grassland provides the most economic feed throughout the year. Correctly fertilised pasture containing productive grasses and clovers can produce 10–11 tonnes of dry matter per hectare for grazing. Realising this potential will depend on soil type, pH and structure, nutrient levels (fertiliser, manures and soil reserves), sward composition, weed levels and stocking rates.

See the BRP manual **Managing grazing strategies for Better Returns** and the BRP+ document **All grass wintering** for more information.

Brassicac

Forage crops such as forage rape or stubble turnips can provide nutritious, cost-effective feeds for sheep. These crops do not fit into every system and site selection is crucial, especially when used for outwintering. Attention to crop nutrition and agronomy is important for a successful yield.

To fully utilise the crop, it should be block-grazed or strip-grazed using an electric fence. Grazing larger areas will increase trampling and wastage.

See the BRP manual **Using brassicas for Better Returns** for more information.



High-quality silage

Ewes in late pregnancy and early lactation can cope with well-balanced rations with high-quality silages from a variety of crops, including grass, red clover, wholecrop and lucerne. The amount of feed that is needed to supplement silage can be significantly reduced in systems that can push intakes of conserved forages to up to 3 per cent of body weight.

Farmers with very high-quality grass silage (11MJ of metabolisable energy or higher) have been testing a new approach to supplementing ewes with protein. They have been using 50g of protected soya (eg Sopralin, Ultrasoy or Soypass) per lamb carried, plus 20g per head per day of mineral/vitamin mix for the last three weeks of pregnancy. Some are now feeding this mixture three times per week to save labour and trough space. However, there is no formal research that confirms this approach.

Maximising intake of forages

In the UK, around 60 per cent of ewes will be housed at some point during the year, even if just around the lambing period, with more being fed conserved forages and other feeds outside. The aim of feeding animals with high demand (ie, those during late pregnancy and early lactation) is to maximise forage intake and supplement where needed.



There are three important factors that will help optimise a ewe's forage intake:

- Frequency and timing of feeding should be constant
- Presentation of feed to encourage higher intakes, eg chopped silage rather than long, big-baled material
- Access to feed, eg, feeding space allowance, competition, freshness and quality of feed

Stable rumen function is important for the wellbeing of the ewe. Any change in feed type or quantity should be gradual and feeding should take place at the same time each day.

Other factors affecting dry matter intake

- **Forage digestibility** – the higher the digestibility of the feed, the higher the intake because food is broken down more quickly and has a faster rate of passage through the rumen. For example, good grass silage is more digestible and promotes higher intake compared to straw or poor hay
- **Shy feeders** – unless they are feeding ad lib, some ewes, especially young animals, may need to be penned separately to ensure they are not prevented from feeding by older or larger ewes
- **Rumen turnover rate** – in the late stages of pregnancy, the effective volume of the rumen is reduced as the foetuses increase in size. This can lead to a reduction in intake if the diet is based on poorer quality forage. However, with high-quality forages, the rate of passage of feed through the rumen increases, so intake does not fall significantly
- **Lactation** – intake during lactation is around 30 per cent higher to meet the increased energy demands of milk production

- **Ill health** – for example, endoparasite and ectoparasite infestations and cobalt deficiency, can reduce feed intake. Mastitis and lameness that causes pain to the ewe will reduce the likelihood of her getting up to feed
- **Mineral/trace element deficiency** – for example, deficiencies of phosphorus and cobalt can reduce the activity of the rumen microbes and feed intake

See **Feeding the Ewe** for more information.



Flock health

A flock health plan should be developed between the farmer, any staff and the vet. This should be farm-specific and provide a planned approach to ensuring flock health, managing routine treatments and monitoring flock performance. Taking a preventative approach to disease is more cost-effective because it will far outweigh the cost of the farm being hit by a major disease. A flock health plan should also help to reduce the amount of antibiotics used on farms. Antibiotics should be used as little as possible, but as much as necessary.

As part of the health plan, any bought-in stock, including rams, should be quarantined for a minimum of 21 days. This allows time to administer treatments and monitor animals' health before introducing them to the rest of the flock. Flock records are essential for a successful health plan. They do not have to be recorded in an extensive EID spreadsheet, a simple notebook is sufficient.

Key areas

Pre-tupping

- Ensure ewe lambs are on a clostridial vaccination programme. They need to have both doses (4–6 weeks apart) before tupping
- Check the ewes (teeth and udders) – if there is any doubt, cull. Check BCS and give thinner ewes access to good grazing to enable them to put on condition before tupping



- Vaccinate against abortion four weeks before tupping
- Only worm thin and young ewes and rams
- Check the ram's fertility and BCS 10 weeks before tupping
- Rams may benefit from a high-protein (18–20 per cent) feed 6–8 weeks before tupping to improve semen quality and quantity



Post-tupping

- Make sure rams have access to good-quality grazing to regain condition
- Maintain the ewes on similar grazing for the first few months of pregnancy so they do not gain or lose condition. Between 60 and 90 days of pregnancy, scan the ewes and group for easier nutrition management
- Analyse winter forage and plan the purchase of supplementary feed
- Discuss liver fluke risks and controls with your vet



Pre-lambing

- Work out the feed requirements depending on forage analysis, scanning results and group sizes
- Vaccinate against footrot if it is a problem on your farm
- Ensure all ewes and rams receive a yearly clostridial vaccination booster, 4–6 weeks pre-lambing
- Consider blood sampling a sample of ewes to check the energy and protein levels in their diet meet requirements



Lambing time and few weeks after

- Isolate any ewes that have aborted post-lambing
- Record lamb losses and ewe issues
- Carry out routine procedures (navels, castration, tailing, tagging)
- Check ewes and lambs for any signs of problems such as mastitis or hungry lambs
- Vaccinate for orf if it is a problem on your farm
- Monitor for coccidiosis if it is an issue on your farm and check nematodirus forecast maps

Six to eight weeks post-lambing

- Lambs require their first clostridial vaccination, with or without Pasteurella, depending on the risk on your farm
- Carry out regular, routine faecal egg counts (FECs) to monitor the worm burden in lambs
- Weigh ewes and lambs to monitor performance up to eight weeks and use this information to decide when to wean

Early summer

- Continue to assess worm burden in the lambs by monitoring FECs
- Depending on performance, consider weaning 90 days after lambing to allow ewes sufficient time to regain body condition for mating and avoid ewes and lambs competing for grazing
- Treat any cases of lameness as soon as possible to reduce spread of disease
- Administer treatments to prevent ectoparasites as they can significantly affect productivity, reduce reproductive potential and lead to a poor lamb crop

Handling systems

Good pens and handling races make management far easier and reduce labour demands. Farms with spread-out land will suit mobile handling systems.

Work in Northern Ireland found that 55 per cent of handling systems on sheep farms are inadequate. It was suggested that, each year, 4–8 hours are spent handling each ewe. Poor or inadequate handling facilities could add 1–1.5 hours of work per ewe each year, which equates to an extra eight, 60-hour weeks for a flock of 500 ewes.

Up to 40 per cent of the time taken to perform a procedure can be spent moving sheep through yards and races. Well-designed systems and methods can speed flock movement and reduce 'wasted' time. The most successful handling systems exploit the normal behaviour of sheep. It is better to make use of the sheep's willingness to learn to negotiate a system, rather than using fear as the motivator.

There are various crates on the market that can weigh and capture data via the EID tag and then automatically draft. Others can restrain the sheep for treatment or inspection, which can reduce the physical burden of handling sheep.

See the BRP manual **Improving sheep handling for Better Returns** for more information.

Fencing systems

Rotational grazing systems for grass or forage crops are becoming more common, but can be labour intensive because electric fencing is needed. Forward planning is essential to save time and energy when it comes to erecting the electric fence in the field.

Consider the following to select the right components for your system:

- What type of fence is needed? Permanent, semi-permanent, temporary or to protect an existing fence or hedge
- What livestock is to be contained? This will influence wire height and post spacing
- What length or area is to be fenced? An accurate assessment of the area to be fenced off will indicate how many posts, what length of wire and the energiser power output required
- How many corners and changes in direction are there? Stronger posts are required at corners and any significant bends in the fence
- Are there any gateways? Think about stock movement in and out of the fields before constructing
- Can mains power be accessed or will a battery or dual-power unit be needed? The power output of the energiser required will depend on the length of the fence or type of stock. Consider the proximity of the fencing to roads and the risk of battery theft because this could create problems later

Installation time

It typically takes 30 minutes to one hour to erect and pick up a 600m three-line system. With labour at £15 per hour, the cost to move and re-erect a fence is estimated to be about 1.25–2.5 pence per metre.

Very efficient systems of winders and fence post carriers are available that fit on to quad bikes, utility vehicles or trailers and make putting up and taking down fences quicker and easier. There are various apps available that can help calculate field areas, which makes subdividing them into paddocks more accurate.

See the BRP+ document **Electric fencing for livestock** for more information.

The tale of two systems

The profitability of a system is determined by the output, minus the variable and overhead costs. Low input, low output systems can be as profitable as high input, high output ones. However, it is crucial to analyse your costs and to budget on an annual basis.

Examples of two different systems have been pulled out from AHDB's Farmbench programme. These show that scanning

percentage is similar, but the differences start to emerge for percentage of lambs sold finished and average carcase weight. Feed and forage costs are higher for the indoor systems, while the vet, medicine and labour costs are similar. Overall, it demonstrates the value of looking at data and not basing decisions on assumptions, and that different systems can be very similar in terms of profitability.

Table 5. Example costings of two systems taken from Farmbench

	Indoor system	Outdoor system
Scanning percentage (including ewe lambs, if lambled) (%)	157	153
Rearing percentage (%)	140	136
Percentage of lambs sold finished (%)	47	37
Average carcase weight (kg)	20.4	19.5
Total feed and forage costs (£)	12.15	7.08
Total vet and medicine costs (£)	6.82	6.13
Gross margin per ewe (£)	69.27	73.66
Imputed labour costs (paid and unpaid) (£)	21.26	20.92
Total overhead costs (£)	46.29	49.40
Net margin per ewe (£)	22.98	24.26

Available to all sheep farmers, AHDB's Farmbench is a free tool that can calculate cost of production and allows farms to be benchmarked against industry data and previous years. See farmbench.ahdb.org.uk for more information.



Recording data

Good data handling makes record keeping simple and allows information gathered in the field and yard to be converted into powerful management information. In turn, this enables good decisions to be made. EID helps to make it easier and quicker.

What are the benefits of EID?

- Fast and accurate collection of information
- Reduced paperwork and transcription errors
- Speeds up routine weighing and medicine administration, therefore having the potential to reduce labour requirements
- Immediate access to animal data can help with management decisions, eg daily liveweight gains (DLWG) from last weighing could influence the decision to sell, continue to feed or to identify potential animal health issues
- Prevent any potential losses through selling stock still in assurance residency periods
- Potentially less stressful for the stock than having to manually read ear tags
- Data is easy to upload to spreadsheets or farm software packages to interrogate or monitor performance

What do you need?

It is important to understand what you want EID to achieve. Table 5 provides guidance on what equipment is needed for different recording objectives. For example, if you want to record weight in a crate in a permanent system, you could have a static reader linked to a weigh head that is connected to main electricity, which in turn connects to software that links animals' records together.

Table 6. Hardware and software guidance

	I only want to comply with movement regulations
Hardware requirements	Stick reader with thermal printer to attach to form
Software requirements	None for paper movements. Stick readers often include simple software that allows tags to be downloaded to a computer, where you can print a list of tags and attach to licence or upload directly to the ARAMS database
Notes	You can keep your flock register manually or access it on the central database. If you want to keep an electronic flock register on the farm, it may be beneficial to buy a software package that links to the ARAMS database

Area of interest

I want to link progeny to their mothers and record details at lambing	I want to record weights in a crate in a mobile system	I want to record weights in a crate in a permanent system	I want to record animals as they move through race
Stick reader with extra functions, data logger	<p>Manual entry – data logger</p> <p>Automatic entry – static reader linked to weigh head, laptop, logger or tablet</p> <p>Need to be compatible with 12V power source</p>	<p>Manual entry – data logger</p> <p>Automatic entry – static reader linked to weigh head, laptop, logger or tablet</p> <p>May use mains electricity</p>	Static reader linked to weigh head, laptop, logger or tablet
Buy a unit with a software package or, alternatively, create your own software package	Specialist software is required to link between different pieces of hardware. This may be included with the reader. Also links animal records quickly. May want to consider compatibility with, and use of, a separate farm management package, although some work can be done in spreadsheets		Buy a unit with a software package
Need to be clear about what data you want to record as models vary in the variety of functions they can offer. Ensure software package links to ARAMS	Make sure the suppliers know that it is going into a mobile race because may change antenna type. Consider the environment in which you will use the equipment	Metal and electric cabling can cause interference and affect read rates	

Options for hardware

Readers

It is important to ensure the reader you select is ISO compliant (ie, will read HDX and FDX tags). Most readers are also Bluetooth-enabled (or can be) so tag numbers can be sent wirelessly to other devices in real time.



Read ranges can vary between products, which can also be handheld or static. If purchasing a handheld reader, ensure it meets all your requirements, eg the ability to store tag details or view animal history. If purchasing a static reader (also known as a panel reader), it is important to consider the type and positioning of the antenna.



Weigh scales

Generally, there are two approaches:

- EID reader is linked to the weigh head and data is stored on the weigh head. Growth rates can be displayed. The data can be downloaded onto a computer, either into the scale software or a farm software package



- EID reader is linked to a data logger, tablet or laptop to which the weight is directly sent from the scale (either by cable or Bluetooth). A greater variety of animal information can be immediately stored and viewed

Options for software

Most readers and weigh scales come with their own software, which may be sufficient to meet your requirements. However, if you are looking to invest in a farm software package, ensure it will link with your reader and any external websites you may wish to use.

Many EID-enabled weigh scales include quite sophisticated software packages. These will allow detailed analysis of the records collected, either on their own or when used with spreadsheet software (eg Excel).

For full management analysis for flock improvement, you may benefit from buying a ready-made software package that enables this.

See the BRP+ document **Electronic identification of beef and sheep** for more information.

EID terminology explained

Term	Definition
EID	Electronic Identification
Holding register	A record of all the sheep on the holding, containing details such as year of birth, date of identification, breed, date of death, replacement tag records and individual or batch movements
Reader identifier	A handheld or static device that reads the electronic identifier
Electronic identifier	Method by which the animal is electronically identified, such as an electronic ear tag, electronic pastern tag or electronic bolus
Transponder	The electronic microchip contained within a tag or bolus
FDX/HDX	Full Duplex/Half Duplex – different types of technology used in the transponders
Dual technology	Means it is compatible with both FDX and HDX. Readers should be approved to read dual technology
CPRC	Central Point Recording Centre – an approved site at which the animal's electronic identifier can be read and the movement records populated, eg a market, abattoir or third party
Match-up tag	An ear tag that is required in sheep that are individually identified. It has the same number as the electronic identifier
Slaughter tag	A single electronic tag that can be used in lambs destined for slaughter under 12 months of age
Batch-within-batch	The number of different flock numbers present within an overall batch of lambs
WYSIWYG	'What you see is what you get'. This refers to the tag numbering system and means that the visual number on the tag is the same as the number on the transponder
ISO	International Standards Organisation
ISO 11784	Standard relating to data content of the EID transponder
ISO 11785	Standard relating to EID reader protocols
LF	Low frequency
UHF	Ultra high frequency
RFID	Radio frequency identification
Panel antenna	An antenna attached to side of race/crush
Portal antenna	Single antenna that loops over the race/crush
Twin antenna	Two antennae attached either side of the race/crush, linked to one reader
Relational	The programmed transponder number is 'random' and doesn't match what is printed on the tag

Analysis of data

Key performance indicator	Target	Why	What data is needed
All systems			
Cost of production	Varies year on year and by farm	It is essential to know your costs to know the areas you need to target	Farm income Variable costs Fixed costs
Ewe systems			
Losses scanning to weaning	<13%	Work out losses from scanning to weaning to identify potential issues causing loss	Record lamb losses and reasons for loss
Rearing percentage	Depends on system and scanning percentage	Work out rearing percentage to identify ewes' productivity Compare with scanning percentage	Scanning number Lamb losses Rearing number per ewe
Weaning weight (90 days)	30kg	Lambs weaned at 30kg that continue to have access to good feed and are in good health are likely to finish well	Weigh lambs at 90 days
Ewe mortality	<5%	Identify reasons and timing of ewe losses	Ewe losses
Replacement rate	20–25%	Retaining poorly performing ewes is a false economy	Record instances of mastitis, lameness, poor mothering ability, poor BCS etc
Finishing lambs			
Daily liveweight gain (DLWG)	>250g	Assess liveweight gain to help with management decisions such as when to wean	Weigh lambs at regular intervals
Percentage hitting specification	>80%	Finishing lambs to specification maximises payments and efficiencies	Carcase classification and weights

How to capture	How to calculate
EID Flock notebook Wallchart	(Farm income – variable costs – fixed costs) Software programmes such as Farmbench are freely available to farmers
EID Flock notebook Wallchart	$\frac{(\text{Number of lambs scanned} - \text{Number of lambs weaned})}{(\text{Number lambs scanned})} \times 100$ $\frac{(\text{Number of lambs reared})}{(\text{Number of ewes put to ram})} \times 100$ <p>Average weight of lambs at weaning. As age will vary, weights can be taken between 75 and 105 days of age, then adjusted to 90 days</p> $\frac{(\text{Number of ewe deaths})}{(\text{Total ewes put to ram})} \times 100$ $\frac{(\text{Number of ewe deaths} + \text{Number culled ewes})}{(\text{Number ewes put to ram})} \times 100$
	$\frac{(\text{Average lamb weaning weight} - 4\text{kg birth weight})}{(\text{Average age of lambs in days})} \times 1,000$
	$\frac{(\text{Number animals hitting target spec})}{(\text{Total number animals finished})} \times 100$

Beef and sheep BRP Manuals

Manual 1	Marketing prime lamb for Better Returns
Manual 2	Buying a recorded ram for terminal sire traits
Manual 3	Buying a recorded ram for maternal traits
Manual 4	Managing ewes for Better Returns
Manual 5	Growing and finishing lambs for Better Returns
Manual 6	Optimising sheep systems for Better Returns
Manual 7	Reducing lameness for Better Returns
Manual 8	Worm control in sheep for Better Returns
Manual 9	Improving ewe breeding for Better Returns
Manual 10	Controlling external parasites for Better Returns
Manual 11	Target ewe fertility for Better Returns
Manual 12	Improving ewe nutrition for Better Returns
Manual 13	Improving sheep handling for Better Returns
Manual 14	Reducing lamb losses for Better Returns

See the AHDB Beef & Lamb website beefandlamb.ahdb.org.uk for the full list of Better Returns Programme publications for beef and sheep producers.

Produced for you by:

Better Returns Programme

AHDB Beef & Lamb
Stoneleigh Park
Kenilworth
Warwickshire
CV8 2TL

T 024 7647 8834

E brp@ahdb.org.uk

W beefandlamb.ahdb.org.uk

TW [@AHDB_BeefLamb](https://twitter.com/AHDB_BeefLamb)

If you no longer wish to receive this information, please email us on comms@ahdb.org.uk

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