KTIF Final Report Template

Contents:

1. PROJECT TITLE/APPLICANT

1.1 Title

Live Lambs; improving lamb survival and farm profitability

1.2 Overview of your company

SAC Consulting has been the lead organisation for this project. SAC Consulting is a division of SRUC.

2. EXECUTIVE SUMMARY

2.1 Overview – Maximum 1 page

The aim of our three year project was to identify the main barriers to achieve an increase in the average number of lambs reared per ewe and identify solutions which improve farm profitability and viability, enhance animal welfare and reduce the carbon footprint in sheep enterprises.

To achieve this we monitored seven focus farmers over the three year period (2016-2019), who were chosen over the main sheep areas of Scotland including lowland, upland and hill operations, indoor and outdoor lambing and various geographical challenges. In the original tender, we set out to involve five farms, but added an additional two, one being the SRUC hill and mountain research centre at Crianlarich, the other being a Northern English farm; these were funded through Horizon2020 (SheepNet) and AHDB Beef and Lamb respectively.

The project facilitators worked with the focus farmers and collected sheep production figures to analyse any trends, issues or progress from the project. These were shared with a wider group of forward thinking sheep farmers (42 members) who offered their expertise to the focus farmers. As well as farmers this included invited project partners from industry (MSD Animal Health, East Coast Viners, Rumenco and Norvite). An operational group was set up to oversee the project including, the two facilitators and programme manager from SAC Consulting, SRUC researcher Cathy Dwyer, Veterinary Investigation Officer, Marion MacMillan and a leading sheep farmer, Graham Lofthouse to steer the project management.

The focus farmers, along with the wider group met twice per year, for a total of eight times over the project lifetime, to discuss the findings from the focus farms and exchange knowledge in ways to enhance performance, while ensuring the welfare of the animal was paramount in any decisions made.

Five key areas were highlighted as the basis of our farm management approach:

1. Condition scoring
2. Late pregnancy nutrition for ewes
3. Reducing numbers of lambs lost to abortion
4. Management at lambing
5. Recording and identifying causes of lamb deaths

Innovative techniques used throughout the project included novel Australian sheep condition scoring pads to ensure farmers are more consistent in the assessment of ewe condition scoring, use of a colostrometer to understand the effects of ewe condition and nutrition on colostrum quality and quantity. Videos were produced along with numerous recording templates for flock managers, which are all available on our knowledge repository at https://www.sruc.ac.uk/info/120732/live_lambs.

Information is available to view on the Live Lambs website (above) including all meeting minutes, details of the farms/farmers, fact sheets, videos, etc. Much information has been disseminated through articles in the farming press and social media posts. Messages regarding condition scoring, nutrition, lambing management, abortion control and recording have been highlighted through the Scottish Farm Advisory Service at many sheep resilience meetings across the country.

Having a group of focus farmers at the core of the project was highly influential in providing data, stimulating discussion and influencing others on practical measures to increase lamb survival. Practical management measures reported have included nutritional management (Body Condition Score, ultrasound scanning), the right genetics for the system (birth difficulty, lamb vigour, thermoregulation, maternal care) and a suitable birth environment (shelter, hygiene, low stress) as well as colostrum awareness, feeding Digestible Undegradable Protein, recording losses accurately, enhanced lambing hygiene, respecting the lambing site, and weaning lambs at 90 days.

The large attendance at the closing conference at the Roslin Institute Building, Edinburgh was an excellent example of what the project had done over its three year run, bringing farmers, advisers, researchers, vets and the supply trade together to work on practical solutions for farmers to adopt. Although the project is now finished, the lessons learned and key messages will live on with the farmers involved and industry influencers, and materials from Live Lambs will continue to be delivered to sheep farmers in the years to come. Industry networks have been formed and channels of communication such as the WhatsApp group kept open for future use.

3. PROJECT DESCRIPTION

4. FINANCE

4.1 Sum awarded

The total sum awarded for the three year project was £81,314

4.2 Detail of spend

We intended to claim the full project budget of £81,314, but note that we ended with an underspend of £2.26. This has been presented in claim forms submitted to the Scottish Government.

4.3 Noting any underspend and explain why

We claimed £81,311.74 against a budget of £81,314. This represents an underspend of £2.26, a small amount, which is perhaps a rounding error on time. We delivered more time on the project than we were able to claim.

5. PROJECT AIMS/OBJECTIVES

4.1 Linking what was set out in the application

Aim in application
Identify and remove some of the constraints to sheep farmers maximising net margin per hectare. Success will be measured in terms of the value of extra lambs produced from the same number of ewes and the impact this has on both farm and supply chain profitability.

The projected average rearing percentage in 2019 was 7% greater than the baseline data collected for 2015. We calculated this projection by deducting the average losses occurred after one week post lambing (based on the previous four years) from the number of lambs reared to one week in 2019. However, this improvement did not occur for each interim year and did not occur across all focus farms (Fig 1).
Several farms increased numbers of breeding females (Fig 2). Therefore labour per ewe reduced across the years of the study. In addition, the number of ewe lambs put to the tup increased on some of the farms (Fig 2), ewe lambs are less prolific than ewes, thereby resulting in lower scanning and rearing rates.

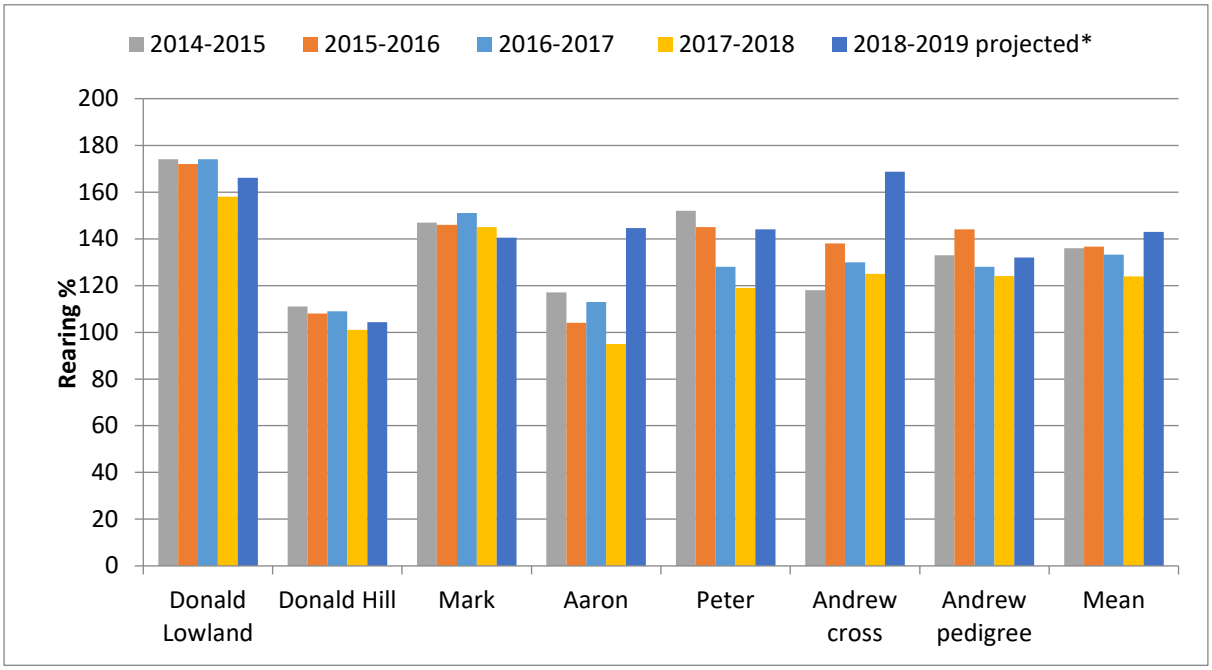

Figure 1 Rearing percentage trends across five focus farms from 2014-2019

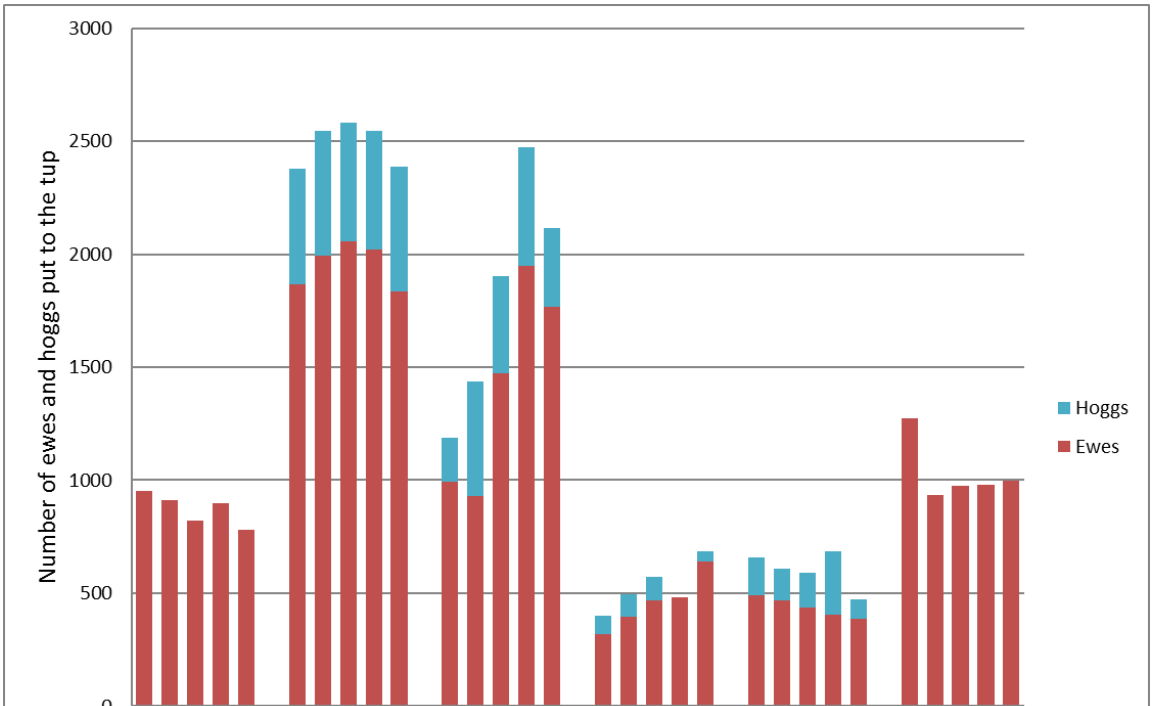

Figure 2 Ewes and ewe lambs put to the tup over the five years

The winter of 2017, leading in to lambing 2018, saw the beast from the East affect all of our focus farms at lambing and turnout. This had a big impact on ewe condition and a knock on effect on lambing and rearing figures for 2018, as well as impacting the 2019 breeding season. These three factors – inconsistent ewe numbers, ewe lamb inclusion and extreme weather – meant the rearing rate increase was not actualised for every year in the project.

However, we have streamlined farmers' production systems and understood and overcome numerous causes of lamb mortality within the influence of farm management by emphasising the five key focus areas:

1. Body Condition Scoring: We provided the evidence that Body Condition Scoring, and associated management to achieve target condition scores, influences ewe rearing rate (Hanrahan, 1990). This motivated the farmers to focus on this practise. We trained the farmers to Body Condition Score using the Australian sheep condition scoring pads and live sheep. Then they collected condition scoring data throughout the project to check they were on track to achieve targets. As a result, the farmers practised body condition scoring more regularly and adjusted management to achieve targets at critical times (mating, mid-pregnancy, lambing, and weaning). Although the data is unclear, this will have contributed to greater ewe and lamb survival as indicated by peer-reviewed scientific papers.
2. Late Pregnancy Nutrition: We funded silage analysis and developed rations for the focus farmers to ensure late pregnancy protein and energy needs were met. In addition to this, we conducted Trace Element audits for each of the farms which led to identification of mineral over-supply causing greater lamb mortality. Both late pregnancy nutrition and trace element supply are influential to lamb survival (C. M. Dwyer, 2015).
3. Lambing set up: Professor Cathy Dwyer visited the focus farms to discuss ewe behaviour at lambing and how they might promote natural behaviour for greater lambing success. This led to farmers changing their management at lambing to avoid negatively impacting the ewe-lamb bond at this critical time.
4. Abortion control: Farmers with evidence of Toxoplasmosis and Enzootic Abortion were encouraged to vaccinate for these dominant causes of abortion. Veterinary Clinician, Kim Hamer, Glasgow University, discussed the other causes of abortion and prevention with the group too with a recently developed app.
5. Data collection: The following data were collected: scanning percentage, barren percentage, lambs born alive, lambs lost in the first week, lambs weaned and lambs sold/retained (see annex 1). With this we were able to identify the main times for

improvements in lamb survival. In addition, some of the focus farmers collected the causes of lamb loss and this was discussed with veterinary investigation officer Marion MacMillan, SRUC, for improvements, see here.

Objectives in application

- *Reduce incidence of ewe deaths*
    - This was focused on at many of the meetings through condition scoring, nutrition and health. A common problem amongst farms, and in the wider industry, is Ovine pulmonary adenocarcinoma (OPA) in ewes. Prevention and management was discussed and implemented. Condition scoring and good nutrition would contribute to greater ewe survival too.

- *Encourage farmers to benchmark ewe and lamb losses*
    - Focus farms data was collected, analysed and benchmarked as a group including ewe and lamb losses on an annual basis (fig. 1 and annex 1). Group discussions were held around these and any trends addressed, with a number of practical actions put in place

- *Increase farmers confidence in condition scoring*
    - As mentioned, condition scoring training was provided. Condition scoring was highlighted at every meeting, along with the protocols the host farmer used. A number of farmers reported that they were condition scoring more regularly as a result of the project.

- *Reduce losses through abortion*
    - MSD animal health have been a project partner and have nurtured the focus farmers through abortion control. Where justified, the focus farmers now vaccinate for the two dominant causes of aborting _ Toxoplasmosis Gondi and Enzootic abortion. Glasgow University have recently developed an abortion planning app, which was demonstrated and used by the focus farmers.

- *Assess the benefits of Digestible Undegradable Protein (DUP) in pre lambing rations*
    - Every year, silage on the focus farms has been analysed, and rations have been tailored to these using sources of DUP e.g. soya. The inclusion of targeted protein in this way creates a more rumen-friendly ration. The farmers including soya in the ration report better colostrum supply as a result and less stress in the lambing shed. This approach has also emphasised the value of good quality silage and reduced the cost of feeding.

- *Increase awareness of improving neonatal survival in small ruminants*
    - This was the overarching objective of the project and the five point management plan which was taken on by the focus farmers and promoted wider through the meetings and media.
    - SRUC researcher Cathy Dwyer has been active in the project to increase awareness to improving survival through welfare and animal behaviour. Cathy visited all of the Focus Farms and provided them with practical behavioural advice for each farms unique circumstances.

- *Provide farmers with tools to conduct own post mortem diagnosis in lambs*
    - A post mortem of a ewe was carried out at an on farm meeting, as well as a video created for a post mortem of a lamb (MacMillan, 2018)showing how to identify diagnose common causes of death on farm. These would help the farmer complete the worksheet to track causes of lamb loss (Annex 2). We

also signposted the focus farmers to existing resources (AHDB Beef and Lamb, 2012).

- *Improve lamb performance*
    - Lamb performance has been a real focus point, from weaning earlier, to the forage they are offered and common loses in weaned lambs. The emphasis on early life management of lambs will not only have improved their survival but will have given them the best start for subsequently greater growth rates. The summer meeting discussed weaning management and forage management for better lamb finishing.

- *Use of operational group as a forum for discussion*
    - The three groups involved within the Live Lambs project – Operational (management) Group, Farmer Focus Group and the Wider Group – have played important roles in this project. The Operational Group reviewed progress and oversaw project activity. The Focus Farmer Group the source of many of the best ideas and these farmers were highly influential on how the project progressed. The 40+ farmers who are members of the SAC sheep group for forward thinking farmers have been an excellent sounding board for the focus farmers, sharing experiences and co-operating with each other. In addition, the Live Lambs focus farmers were connected to international operational groups through the SheepNet Horizon2020 programme.

- *Disseminate benefits to sheep industry*
    - This project has had a strong Knowledge Exchange profile. Benefits have been disseminated through press articles, newsletter articles, social media, videos, website, recording tools and key messages through FAS meetings.

6. PROJECT OUTCOMES

5.1 How aims/objectives were achieved

See above for how the aims / objectives were achieved.

5.2 Milestones

Key milestones:

1. Recruit and train focus farmers: we identified these farmers through our farmer networks as those which represent different systems in Scotland with opportunity for improvement
2. Gather farm data to understand opportunity for improvement: see annex 1
3. Group meetings: held twice a year, all reports available here https://www.sruc.ac.uk/info/120732/live_lambs
4. Publicity: press articles, videos fact sheets and a webpage have been produced to publicise the project.

7. LESSONS LEARNED

6.1 Issues/Challenges

Geographical differences between the farms have been a challenge for the project. With the highest being 1,000 metres above sea and the lowest being 20 metres above sea, with some having extensive hill and rock and others having sandy soils. This has been a challenge when benchmarking, but has also been a strength of the project – covering all aspects of Scottish sheep farming.

The weather has been another issue and challenge for the three year project. Where we have seen the 'beast from the east' in 2017/18 to the drought in 2018, which have both affected productivity of the focus farms flocks.

We had one focus farmer, who requested to stop his involvement in the project. This was due to personal diversification developments on his farm and a lack of time to engage in the project fully. This has had an impact on the dataset not being complete for the full seven farms for the duration of the project.

6.2 Impacts

The project was very successful in bringing the sheep industry together to tackle lamb survival topics. The audience at the closing conference at the Roslin Institute Building was an excellent example of what the project had done over its three year run, bringing farmers, advisers, researchers, vets and the supply trade together to work on practical solutions for farmers to adopt.

Our selected focus farmers were extremely bought in to the project, one actually reported that he felt that the focus farmers owned the group, where they felt part of a collective group of forward thinking farmers who aided in driving their businesses forward. They have been a real driving force, which has aided in keeping the motivation of the group driving forward and all tasks being completed in a timely fashion.

This engagement, the meetings and release of extensive Knowledge Exchange materials available through reports, videos, social media posts and technical publications have greatly raised awareness and discussion of factors improving lamb rearing percentage within the sheep industry.

We have strong evidence that the project made a meaningful impact on the Focus Farmer Group who were most involved in the project, with each farmer making positive changes to their sheep management and lambing operations, which were influenced by what they discussed at meetings and on WhatsApp.

Live lambs has provided a framework for other sheep farmers to follow, and enhanced the knowledge of industry professionals – advisers, vets, researchers and supply chain – who have significant influence over other farmers and can spread the lessons learned.

Live Lambs has focussed the sheep industries attention on the importance of colostrum and the 3 Q's – quality, quantity and quickly.

The project has had an international impact through its association with Horizon 2020 SheepNet.

Although the project is now finished, the lessons learned and key messages will live on with the farmers involved and industry influencers, and materials from Live Lambs will continue to

be delivered to sheep farmers in the years to come. Industry networks have been formed and channels of communication such as the WhatsApp group kept open for future use.

8. COMMUNICATION & ENGAGEMENT

7.1 Detail throughout the project's lifetime

Focus Farms Meetings

Meeting	Date	Target
Focus Farmer Training	11th July 2016	Focus Farmers only
Saughland	7th November 2016	Open Meeting
Carfraemill	9th February 2017	Open Meeting (hotel based)
Glensaugh	14th July 2017	Open Meeting
Pre-lambing webinar	7th March 2018	Webinar (online, focus farmers only)
Carstairs	6th June 2018	Open Meeting
Bankhouse	12th October 2018	Open Meeting
Broomhouse	21st February 2019	Open Meeting

Over the three years, we held one introduction meeting, which allowed the focus farmers to meet the project team, meet each other and introduce their businesses and undertake condition scoring training. In addition, there were two meetings per year held, with the majority being interactive meetings on focus farmers or operational group member's farms. These were publicised widely and were open to the public. They all had a theme, usually around specific issues on the host farm and benchmarking figures were highlighted at all meetings. After each meeting, minutes were created and circulated to the focus farmers, operational group and are now available on the web (SRUC, 2019).

Focus Farm Visits

The facilitation team (Kirsten and Poppy) had close contact with the focus farms throughout the project, between farm visits, phone calls and the Live Lambs WhatsApp group. The farms were visited pre lambing on an annual basis where rations for the ewes were discussed, unique rations were tailored to their forage analysis. Further visits were carried out if there were any specific issues.

MSD animal health have been a project partner, where their vet Bridget Girvan was involved with initial data capturing using their flock indicator tool and offered her specialist advice for abortion control with the focus farms. In year one she either visited the focus farms or their vets and had discussions about their abortion control strategies.

Marion McMillan, SAC veterinary investigation officer was in the operational group and visited any farms who had specific cases e.g. Mark Grey had an issue with calcium in his flock.

Cathy Dwyer, SRUC researcher specialises in animal behaviour, along with the facilitators, she visited all focus farms pre lambing in year three to discuss management practices and positive behavioural interactions.

Data Collection

Data collection from the focus farms was ongoing over the three-year project lifetime, this was collected and analysed by the project team on an ongoing basis. Data was presented

at meetings to stimulate discussion and comment and presented at the final conference. See website for further information.

Press and Articles

Year	Publication
Year 1	• Farming Monthly National • Farm Business article on launch of project • The Scotsman article on launch of project • The Courier article on launch of project • Press and Journal article on launch of project • SAC sheep & beef news • EIP-Agri newsletter • A presentation and poster was also delivered at the EIP-Agri Innovation Summit in Lisbon by Poppy
Year 2	• Scottish Rural Network Video (filmed at 14/07/17) meeting (https://www.ruralnetwork.scot/case-studies/live-lambs) • The courier (minimising losses during lambing) • P & J (minimising losses during lambing) • A feature was printed in the Scottish Farmer of one of the focus farmers (Donald Barrie) • Farming today radio interview (https://t.co/9p6ijIuZPR?amp=1) • Post mortem video posted on YouTube (https://bit.ly/2tjL0Wf) • Project highlighted at Scot Sheep
Year 3	• Scottish Farmer (when to wean) • Scottish Farmer (press release for seminar) • Press and Journal (press release for seminar) • Scottish Farmer feature post seminar • Four fact sheets

Fact Sheets and Website

A website specific to Live Lambs was created, allowing for a main point for people to source the information from the project (https://www.sruc.ac.uk/info/120732/live_lambs).

Farmer friendly fact sheets have been created on key aspects of the farm management approach to increasing live lambs including

- Lambing management
- Abortion
- Body condition scoring
- Nutrition

Final Seminar

A final seminar was organised for the end of the three-year project, to highlight the outcomes from the project as well as main messages to help improve flock performance (annex 3). This event was attended by over 100 people; made up of farmers, vets, consultants and researchers. This was a very well received event, with an extremely positive response and excellent follow up from the press from the event.

An interactive question and answer session was held at the end of the event, which generated a lot of discussion from the audience. This used voting buttons to gain instant feedback from all members of the audience. The final question posed to the audience was "is increasing live lambs reared achievable in Scottish Farms?", 35% of the audience responded, absolutely, 62% responded, yes with management changes and 3%, said there are too many impacts from the weather (Fig. 3.). This gives insight into the perspective of the audience following the conference regarding opportunity to improve.

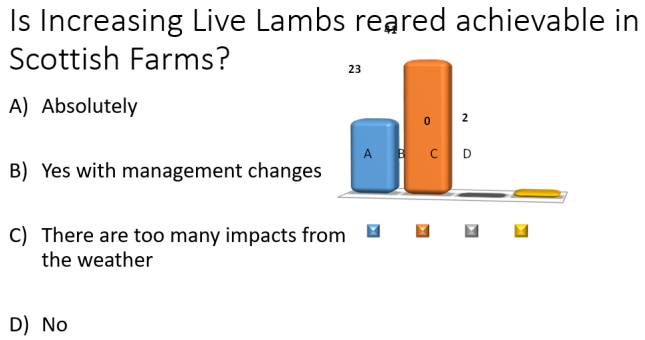

Figure 3 The audience response to a question posed at the final seminar

7.2 FAS Engagement (if applicable)

Many of the key farm management approach principles have been used in delivering messages through FAS. In 2018/19 there were numerous sheep resilience meeting held across the country through FAS, where either Poppy or Kirsten where asked to speak about the principles of Live Lambs and the positive effects on the focus farms.

The FAS women in agriculture meetings included condition score training, for this we used the Australian condition scoring toolkit.

FAS social media was used as a stream for both publicising the industry seminar and then for pushing out messages after the event in a series of tweets using #LiveLambs (https://twitter.com/i/events/1212722091738501121?s=13).

7.3 EIP-AGRI Engagement (if applicable)

Live Lambs was one of the first Scottish Operational Groups to be registered on the EIP-Agri website (https://ec.europa.eu/eip/agriculture/en/find-connect/projects/live-lambs-ktif-improving-lamb-survival-and-farm). We had requests for a Live Lambs feature at EIP-Agri conferences and Poppy Frater presented a poster at the Innovation conference in Lisbon in October 2017. A summary version of the final report will be posted on the website.

Live Lambs was linked to the EU funded Horizon 2020 SheepNet project and both Poppy and Live Lambs farmers have attended a number of these events to report on our project and pick up useful tips from others in Europe.

9. KEY FINDINGS & RECOMMENDATIONS

- Having a focus farmer group at the centre of this project was highly influential in shaping the project and getting messages out top other farmers.

- The project was approached from a farm management perspective with practical recommendations as key outputs, making the research/new thinking easier to implement on farms.

- It was beneficial to have a broad representation of Scottish sheep systems used in the project e.g. hill, upland, lowland, indoor lambing, outdoor lambing, making the results applicable to many sheep production systems and farm types.

- Various methods of knowledge transfer where used including, practical farm based meetings, industry seminar and materials available through the web to reach as many sheep farmers and supply chain partners as possible. People absorb information in different ways and this multimedia approach helped us reach a large audience and get key messages across.

- There were obvious environmental differences of the various farms, meaning that increasing scanning percentage, wasn't always the way to higher rearing %.

- Lamb mortality can be caused by a number of different factors but ensuring that lambs get adequate colostrum soon after birth if key to survival

- Most important management factors to lamb survival include, nutritional management (BCS, ultrasound scanning), the right genetics for the system (birth difficulty, lamb vigour, thermoregulation, maternal care) and a suitable birth environment (shelter, hygiene, low stress).

- Colostrum is gold; rapid intake of sufficient colostrum will increase lamb survival.

- DUP feeding has reduced concentrate levels and stabilised rumen pH, giving a lamb with high vigour being born, but ensuring the intake of the good quality silage is being achieved is paramount.

- Recording losses as they happen, so that themes or patterns can be analysed and caused of death are identified.

- Weaning lambs at 90 days, to allow the best nutrition to be allocated to highest priority stock, as well as ewes regaining condition before the next breeding cycle.

- Enhanced hygiene reduces potential for infection in lambing sheds, especially around site for any wounds e.g. tailing bands, tags

- Respect the lambing site:, minimise movement of ewes once they start to nest. Some used swing gates to isolate the ewe and lamb for better bonding.

10. CONCLUSION

Increasing the rearing rate of Scottish sheep flocks will improve farm profitability, reduce greenhouse gas emissions per kilogram of lamb sold and improve animal welfare. A farm management approach to improving lamb survival was developed and implemented on five focus farms. This approach, based on peer-reviewed science will have contributed to greater lamb survival, however, the challenges of extreme weather and flock management changes make it difficult to identify the impact of these improvements in a three year project. The average rearing rate across the focus farmers in 2019 was projected to be 7% greater than

the 2015 baseline data, with the focused approach, this improvement should be sustained and/or increased further in future years.

The following webpage (https://www.sruc.ac.uk/info/120732/live_lambs) contains a wealth of information for other farmers to access. The press, factsheets and videos disseminated this information further. Through the FAS Sheep Resilience events 2018-19, the key messages have been communicated and key areas such as colostrum management and lamb survival have been forward for videos for the FAS 2020-21 programme.

11. ANNEXES

1. Farm data

Ann McLaren (SRUC Hill and Mountain Research Centre, involvement funded through SheepNet)

The flock is split between Kirkton and Auchtertyre (hill) Farms. Kirkton stocks 400 Blackface ewes and 200 Lleyn ewes, while Auchtertyre stocks 500 hill Blackface. Lambing is based on an outdoor system with the exception of twin bearing ewes, which are housed through the night.

Sheep performance: SRUC Lleyns							
Year		**Number tupped**	**Empty %**	**Scan %**	**Mortality % to end of Lambing**	**% Loss Scan to Sale**	**Rearing %**
2015	Ewes	333	7	141	NA	31	98
2016	Ewes	176	13	130	NA	19	106
2017	Ewes	182	6	144	9	10	129
2018	Ewes	198	18	105	9	30	73
2019	Ewes	202	9	132			

Sheep performance: SRUC Kirkton Blackface							
Year		**Number tupped**	**Empty %**	**Scan %**	**Mortality % to end of Lambing**	**% Loss Scan to Sale**	**Rearing %**
2015	Ewes	553	9	133	NA	35	87
2016	Ewes	386	11	126	NA	21	100
2017	Ewes	395	8	137	14%	15	116
2018	Ewes	367	8	132	10%	24	100
2019	Ewes	427	7	132			

Sheep performance: SRUC Auchtertyre							
Year		**Number tupped**	**Empty %**	**Scan %**	**Mortality % to end of Lambing**	**% Loss Scan to Sale**	**Rearing %**
2015	Ewes	386	9	104	NA	50	52
2016	Ewes	370	14	103	NA	19	65
2017	Ewes	397	15	108	NA	20	78
2018	Ewes	416	8	90	NA	29	65
2019	Ewes	367	9	111			

Aaron Byrnes, (Nether Oldwhat)

Aaron's flock was made up of 700 Shetland ewes crossed to the Romney tup, comprising of 550 ewes and 150 hoggs at the start of the project. Due to losing seasonal grazing, his ewe numbers have decreased. More recently, he has started out of season lambing with 65 Dorset ewes.

Year		**Number tupped**	**Empty %**	**Scan %**	**Mortality % to end of Lambing**	**% Loss Scan to Sale**	**Rearing %**
2015	Ewes	491	7	169	NA	25	117
	Hoggs	168	22	120			
2016	Ewes	468	5	172	NA	35	104

	Hoggs	141	13	112			
2017	Ewes	434	4	172	21	19	113
	Hoggs	156	16	112			
2018	Ewes	403	31	164	9	9	95
	Hoggs	284	24	47			
2019	Ewes	388	5	154	8		
	Hoggs	84	9	114			

Donald Barrie, Glensaugh, Fettercairn (James Hutton Institute)
There are 900 ewes including 400 Blackfaced on the hill and 500 Texel X lowground ewes. Annually 80 hill Blackfaced are drafted into the lowland flock. The farm is building the blackface ewes numbers and reducing the cross ewes. They have also had significant staffing changes.

Sheep performance: Glensaugh hill

Year		Number tupped	Empty %	Scan %	Mortality % to end of Lambing	% Loss Scan to Sale	Rearing %
2015	Ewes	383	5	125	NA	11	111
2016	Ewes	372	5	124	NA	13	108
2017	Ewes	340	4	124	9	11	109
2018	Ewes	359	6	115	12	12	101
2019	Ewes	384	10	119	11	15	

Sheep performance: Glensaugh lowland

Year		Number tupped	Empty %	Scan %	Mortality % to end of Lambing	% Loss Scan to Sale	Rearing %
2015	Cross	570	2	195	NA	7	174

	Blackface		11	139			
2016	Cross	539	3	194	NA	8	172
	Blackface		9	148			
2017	Cross	483	3	202	9	10	174
	Blackface		4	155			
2018	Cross	538	11	178	6	10	158
	Blackface		18	155			
2019	Cross	397	6	188	7		
	Blackface						

Mark Gray (Broom House Farm, involvement funded through AHDB Beef and Lamb)

Broom House Farm is organic and includes 2,000 Lleyn ewes and 500 ewe hoggs lambed indoors.

Year		Number tupped	Empty %	Scan %	Mortality % to end of Lambing	% Loss Scan to Sale	Rearing %
2015	Ewes	1865	2	182	NA	12	147
	Hoggs	515	18	110			
2016	Ewes	1994	3	188	8	15	146
	Hoggs	553	15	118			
2017	Ewes	2058	3	187	9	12	156
	Hoggs	524	17	114			
2018	Ewes	2022	3	184	13	14	145
	Hoggs	522	16	112			
2019	Ewes	1837	3	176			
	Hoggs	550	28	91			

Peter Eccles, Saughland Farm, Dalkeith

Peter has built the flock up from 1,000 ewes up to 1,800 ewes. Previously the flock was predominantly mule ewes lambing indoors, now he lambs Aberfield cross ewes outdoors in late April.

Year		Number tupped	Empty %	Scan %	Mortality % to end of Lambing	% Loss Scan to Sale	Rearing %
2015	Ewes	995	7	183	NA	17	152
	Hoggs	191					
2016	Ewes	928	2	174	NA	17	145
	Hoggs	507					
2017	Ewes	1471	3	169	15	17	128
	Hoggs	433	25	99			
2018	Ewes	1949	9	161	14	17	119
	Hoggs	523	34	79			
2019	Ewes	1768	5	160	13		
	Hoggs	348	37	80			

Andrew Baillie, Carstairs Mains, Lanark

There are two flocks run at Carstairs Mains including a 300 head of Commercial ewes and 200 pedigree Beltex and Beltex X ewes, which are signet recorded.

Sheep performance: Carstairs Mains Pedigree Beltex							
Year		**Number tupped**	**Empty %**	**Scan %**	**Mortality % to end of Lambing**	**% Loss Scan to Sale**	**Rearing %**
2015	Ewes	193	5	162	NA	20	133
2016	Ewes	196	4	171	NA	16	144
2017	Ewes	212	5	160	10	20	128
2018	Ewes	313	4	148	15	15	124
2019	Ewes	211	4	165	15		

Sheep performance: Carstairs Mains Commercial Aberfield cross cheviots							
Year		**Number tupped**	**Empty %**	**Scan %**	**Mortality % to end of Lambing**	**% Loss Scan to Sale**	**Rearing %**
2015	Ewes	125	8	195	NA	18	118
	Hoggs	80	38	74			
2016	Ewes	199	6	192	NA	18	138
	Hoggs	100	19	123			
2017	Ewes	258	3	186	7	20	130
	Hoggs	100	28	101			
2018	Ewes	168	21	135	7	7	125
	Hoggs	0	0	0			
2019	Ewes	430	3	197	7		
	Hoggs	45	11	104			

2. Lamb loss record sheet **Live lambs. Improving lamb survival and farm profitability**

Reason for loss	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Ewe death																				
Abortion																				
Stillborn - fresh																				
Stillborn – not fresh																				

Premature/small/weak lamb																			
Hunglamb/malpresentation																			
Big lamb, crushed																			
Not licked/suffocated																			
Rejected/stolen																			
Lack of colostrum																			
Laid on																			
Watery mouth																			
Navel ill/joint ill																			
Hypothermia																			
Predator																			
Unknown																			

3. Final seminar Programme

Maximising Live Lambs

Tuesday 4th June 2019
10.30am
Roslin Institute Building, Easter Bush Campus, Midlothian

Increasing live lambs has been the challenge set to seven focus farmers over the last three years with support from SAC Consulting advisors, vets and SRUC researchers.
Join us to hear how they have got on alongside the research and new methods to improve flock performance.

10.30	**Welcome**
10.40	**Overview of project & key findings** Kirsten Williams and Poppy Frater, SAC Consulting
11.10	**A review of the science on new born lamb losses** Dr Cathy Dwyer, SRUC Research
11.35	**Managing 6% lamb loss in 2018** Graham Lofthouse, Bankhouse Farm
12.00	**Colostrum Matters** Poppy Frater, SAC Consulting
12.25	**Sustainable antibiotic use**

	Dr Alexander Corbishley, University of Edinburgh
12.50	**Lunch**
13.50	**A focus farmers experience** Donald Barrie, Glensaugh
14.15	**Question session with audio response system**
14.45	**Chair summary and close**

Other information

All other project information can be found on the website
https://www.sruc.ac.uk/info/120732/live_lambs

1. References

AHDB Beef and Lamb. (2012). *www.beefandlamb.ahdb.org.uk.* Retrieved from http://beefandlamb.ahdb.org.uk/wp/wp-content/uploads/2013/06/Form-Lamb-post-mortem.pdf

C. M. Dwyer, J. C. (2015). Invited review: Improving neonatal survival in small ruminants: science into practice. *Animal*, 449-459.

Hanrahan, J. (1990). *The relationship between ewe body weight, condition score and reproductive performance. Research note number 6/90 for Teagasc advisors.* Carlow: Teagasc.

MacMillan, M. (2018). *Live Lambs; Lamb Post-mortem.* Retrieved from YouTube: https://www.youtube.com/watch?v=XkGv7rVSHWU&list=PLVdYIkNPNi-zlJ-qIM2KLu5nSvkpUzGSo&index=2&t=8s

SRUC. (2019, June). *Live Lambs*. Retrieved from www.SRUC.ac.uk: https://www.sruc.ac.uk/info/120732/live_lambs

KTIF Final Report Guidance

Guidance:

- Introductory section explaining the basis for the project utilising rural development regulation you appropriate EU Grant Measure (ie. 16.1), making mention of the operational group (if appropriate), the roles and responsibilities of members and what the group set out to achieve;
- Report back on project aims and objectives and if they've been achieved – much of this can be pulled from the KTIF application;
- Detailed information on actual spend and how much was underspent (if any and a reason). How much funding was provided, from where (ie. 75% or 100% co-funded by SG/EU) and details of the project duration and milestones;
- Section on 'Lessons Learned'. Things which were highlighted as issues, resolved or to do better if done again. We understand some project won't work out as well as hope but be honest about this. By identifying limitations we can target the problem;
- Pull information in from the other reports your project has produced (ie. Progress Reports and Evaluation Reports) or as appropriate annex these;
- Remember your audience. Avoid too technical language and don't assume the reader has in-depth knowledge.
- A table detailing communications which have gone out (where, when and the size of the audience) and commentary would be beneficial;
- Detailed information on actual spend and how much was underspent (if any and a reason). How much funding was provided, from where (ie. 75% or 100% co-funded by SG/EU).