



Horizon 2020
Programme

Report of the second national workshop in the UK (UK NWS 2)



Agris

Agencia pro sekciji in agricultura
Agencia regionale per la ricerca in agricultura



INRAE

In Extenso

Innovation Croissance

Moredun



Eesti Maaülikool
Estonian University of Life Sciences



This project has received funding from
the European Union's Horizon 2020
research and innovation programme
under grant agreement N° 101000471.



10th February 2022
Virtual meeting

Sm@RT UK NWS2

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OBJECTIVES

3 main objectives were identified for the second national workshops (NWS 2):

- Present Sm@RT project progress to stakeholders
- Propose innovative solutions to answer the needs identified by the farmers in NWS1 and get feedback
- Have an idea of means communications used by stakeholders

ORGANISATION AND ATTENDEES

Date and place of the NWS 2: 10 February 2022, online (Zoom meeting)

Present: (see printout from Zoom in Annex 1)

Number of participants: 25

Claire Morgan-Davies (SRUC & coordinator), Ailsa Thomson (SRUC), Aimee Walker (SRUC), Daniel Stout (SAC Consulting), Laura Henderson (SAC Consulting), Fiona Kenyon (MRI), Hannah Park (farmer), Eilidh Geddes (academic), Lesley (farmer), Susan McDiarmid (other), Euan Ferguson (farmer), Andrew Turnbull (farmer), Paul Crawford (farmer), Nick Cotter (farmer), Robbie Newlands (farmer), Lachlan Jones (academic), Peter Baber (farmer), Anne (other), xx (no name – iPhone – other), xx (no name – Owner – farmer), Catherine Nakielny (consultant), Jenny Stanford (other), Paul Allison (farmer), Fiona Williams (academic), Krista McLennan (academic)

Apologies:

Ann McLaren (SRUC, NF UK)



Organisation:

In a plenary session, Claire MD presented the goals of the day, before asking participants, using a Zoom poll, where they come from, and what their background was (farmer, adviser/consultant, research/academic/other).

Then, participants were given a quick presentation of the project and its progress. The needs of farmers and innovative solutions identified by the UK team were then presented, before splitting the group into 3 breakout rooms.

The 3 breakout rooms focused on a) fattening, b) grazing/feeding/flock management, and c) health/welfare/reproduction, respectively.

In each breakout room, participants were shown innovative solutions corresponding to the breakout room topic. They were then asked to vote for the 3-4 solutions that they thought would be most realistic and interesting to present at the TNWS.

Each participant had the opportunity to hear about all solutions (they went to each breakout room in turn). All participants came back in the plenary session for a final recapitulation of the votes and choices.

Finally, they were shown different means of communication that the digifarms and innovative farms use and asked which ones they engage most with. This was done via a Zoom poll.

The meeting closed by thanking people for their participation and feedback.

The detailed agenda for the day is shown in Annex 2 and the PPT presentation during the meeting in Annex 3.

Solutions identified for needs and votes/prioritization:

Feeding / Grazing		
Need / challenge	Solutions	Prioritization
Moving electric fences is very time-consuming and complicated - and issue of no fences on the hill ground/fencing, wolf free fences	Virtual fencing	
Identification of sick animal, move animals in big lots		
Distribution/Management of concentrate allocation during lambing -		
Physical, repetitive work		
Grazing monitoring (pasture optimisation, virtual fences, connected fences, grass growth...)	Automated grass measures	
	Relevant softwares	
Control/Fear around predators (surveillance of the flock)		
Knowing how much sheep grazing days are left in a field/Grass allocation/measurement		
Deciding on feeding groups/Link between the state of the animals & feeding	EID tags & EID-enabled weigh crate	x
Auto drafting ewes for nutrition management	EID tags & EID-enabled weigh crate	x
Lamb surveillance on pasture	Drone	xx
Get information on behaviour on pasture (accelerometer information)		
In pasture, distribute the concentrate with all the ewes around you		
Measuring grass heights (time-consuming)/Automatic grass measuring	Automated grass measures	
	Relevant softwares	X
Technology is not that simple to use (make it simple!)		

Mowing grass under wireline		
Establishing paddocks on other farms/locations		
Water distribution is time consuming/Feeding/water to ewes in individual pens post lambing		
DAC/automated feeder/distribution (how to use?)		
Knowing which sheep are using hopper/feeders or not in the field		
Water supply to grazing groups		
How to avoid bullying ewes during concentrate feeding?		
Every day flock control in a very large area of pasture		
Making/maintaining fences		
Expensive technology (NoFence, GPS) - needs improvements		
Ewe/Lamb proximity sensors /bond		

Fattening		
Need / challenge	Solutions	Prioritization
Lamb weighing (in barn and also in pasture)	EID tags & EID-enabled weigh crate	xx
Animal sorting, manipulations, moving	EID tags & EID-enabled weigh crate	xx
Parasitism detection/Faecal egg sampling/when to treat	EID tags & EID-enabled weigh crate	xx
	Faecal egg count testing technology	xx
Outdoor condition / barn condition to monitor / adapt	Electronic weather station	x
	Automated grass measures	x
Help for the farmer to know when the lamb is ready for slaughter (with BCS, autosorter, weight in function of what do the lamb eat)	EID tags & EID-enabled weigh crate	xx
Drafting fat lambs /lamb to keep	EID tags & EID-enabled weigh crate	xx
Additional feeding lambs during weaning time	Ration software	
Added value of digital technologies (cost, use of technologies at some periods)	Farm management software	
Setting up the weighing scales		
Ration formulation	Ration software	
Timely weaning	EID tags & EID-enabled weigh crate	xx
	Automated grass measures	x
Body condition score evaluation		
Lamb self-weighing whilst feeding – and drafting	EID tags & EID-enabled weigh crate	xx
Ration allocation/trough management	Ration software Feed intake system	x
Performance recording (growth rates, slaughter data etc.)	EID tags & EID-enabled weigh crate	
	Hand-held data loggers	xx
	Farm management software	

Automatic foot bathing		
Lamb identification (with eyes)		
Shearing of the last lambs		
Make sure your auto-drafter/new handling system fit your current handling system		
Snacker is difficult to manage in bad weather/wet ground		
Identification and management of lame lambs		
Lambs always in one large group, bigger lambs push away smaller ones before weaning time and on pasture too		

Health / Welfare		
Need / challenge	Solutions	Prioritization
Early detection of health issues /identifying disease issues	EID tags & EID-enabled weigh crate	X
Detection common parasites/manage external parasites/and treatment	EID tags & EID-enabled weigh crate	Xx
	Faecal egg count testing technology	x
Identification of sick animal for a better follow (mastitis, worm, etc.)	EID tags & EID-enabled weigh crate	x
	Hand-held data loggers	x
	Farm management software	
Training on existing tools		
Tools adaptation needed for each farm		
Recording/collecting/analysing health data is time-consuming/recording tags health issues, including withdrawal period	EID tags & EID-enabled weigh crate	x
	Hand-held data loggers	x
	Farm management software	
Combining of individual health data and all other data	Farm management software	
Not overdrenching - so having an autodrench gun based on weight would be great/ dosing & FEC monitoring	Autodrench gun	xx
Large predators and birds of prey- ravens		
Parasite warning system (from climate data)		
Udder health/mastitis		
Need tools to observe animals and help the farmer for the decision	Drone	
Following of water consumption	Water intake recording crate/flow meter	
Physicality of treating lameness (turning the animal)/footbathing & treating lameness	Conveyor or other handling systems	
How to separate the animals who are lame?	EID tags & EID-enabled weigh crate	x
BCS general handling / lack of knowledge of ewe body scoring		
Shearing		
Welfare is not easy to define and apply to all systems, how to measure the welfare ?		
Coping with extra 'health' handling at key periods (time-consuming)		
Good layout of handling systems		

Availability of drugs can be limiting in some contexts		
undernutrition of ewes in many flocks, using low quality feed		
Cost of parasite analysis (e.g. FEC, etc.)		
Regular monitoring of weight		
Suitable stocking density inside/sufficient indoor area (to high animal density)		
Using data recorded in the Sheep recording system		

Reproduction		
Need / challenge	Solutions	Prioritization
Flock management software which integrate all data from devices + easy transfer from one device to another		
Monitoring the reproduction (tool to identify ewes for insemination/tupping dates)/Ram health monitoring/fertility testing		
Automatized following of the reproduction (warnings at every steps)		
Deseasoning monitoring (light treatment)		
Coordinate reproduction with sales		
Scanning and dividing ewe groups for appropriate nutrition	Pregnancy scanning	X
	Hand-held data loggers	x
	EID tags & EID-enabled weigh crate	xx
Measurement of BCS (time-consuming)		
Selecting/drafting ewes for rams/replacements	EID tags & EID-enabled weigh crate	xx
Difficult to manage flock with different mating groups	Genomic parentage	x
How to collect IDs automatically outside (through gates?)		
Lambing records/ewe performance	EID tags & EID-enabled weigh crate	Xx
	Hand-held data loggers	x
	Farm management software	
Availability issues of new breeding material from abroad and in a country		
Identification of the young ewes		
Raddling rams		
Sourcing stock with right history/rearing		
Have more time for the lambing		
Easier organisation of the grazing / barn with a lot of batch		
Tag reading distance is too short		
Identifying/controlling abortion issues		
Bolus use/drenching		
Protection from predators of different mating groups at mating		
Too large mating groups		

Flock management		
Need / challenge	Solutions	Prioritization
Recognising and/or weighing your sheep automatically	EID tags & EID-enabled weigh crate	x
Difficulties foot-trimming	Conveyor or other handling systems	

Means of communications:

Communication methods	Never				Always
Facebook	x				xxxxxxx
YouTube	x				xxx
Twitter	xxxxxxx				xx
Instagram	xxxxxxx				xx
Newsletters					xxxxxxxxx
Farm Open day/Visits					xxxxxx
Farming column in Press	x				xxxxx
Podcasts					xxxxxxxxx
Websites (farm websites)	x				xxxxx
Farming groups					xxxxxx
Trainings					

Workshop evaluation:

Of those who answered the Zoom poll, 84% enjoyed the meeting, and all thought the organization of the meeting was good.



ANNEXES

ANNEX 1 – PARTICIPANTS LIST (ZOOM PRINTOUT)

Poll Report					
Report Generated:	29/03/2022 14:38				
Topic	Meeting ID	Actual Start Time	Actual Duration (minutes)		
Sm@RT National Wo	890 9978 3993	10/02/2022 18:06	158		
Poll Details					
#	User Name	User Email	Submitted Date/Time	1.Where are you from?	2.What do you do?
1	Daniel		Feb 10, 2022 18:40:00	Scotland	Other
1	Hannah Park		Feb 10, 2022 18:39:45	Scotland	Farmer
1	Eilidh Geddes		Feb 10, 2022 18:39:43	Scotland	Researcher/Academic
1	Lesley		Feb 10, 2022 18:39:39	England	Farmer
1	Susan MacDiarmid		Feb 10, 2022 18:40:04	Scotland	Other
1	Euan Ferguson		Feb 10, 2022 18:39:56	Scotland	Farmer
1	Andrew Turnbull		Feb 10, 2022 18:39:49	Scotland	Farmer
1	Paul Crawford		Feb 10, 2022 18:39:47	Northern Ireland	Farmer
1	Nick Cotter		Feb 10, 2022 18:39:47	Other	Farmer
1	robbie newlands		Feb 10, 2022 18:39:44	Scotland	Farmer
1	iPhone		Feb 10, 2022 18:39:44	Scotland	Other
1	Lachlan Jones		Feb 10, 2022 18:39:42	Scotland	Researcher/Academic
1	Anne		Feb 10, 2022 18:39:46	Scotland	Other
1	Peter Baber		Feb 10, 2022 18:39:44	England	Farmer
1	Owner		Feb 10, 2022 18:39:48	Scotland	Farmer
1	Catherine Nakielny		Feb 10, 2022 18:39:43	Wales	Adviser/Consultant
1	Jenny Stanford		Feb 10, 2022 18:39:37	Wales	Other
1	Paul Allison		Feb 10, 2022 18:39:36	England	Farmer
1	Fiona Williams		Feb 10, 2022 18:40:04	England	Researcher/Academic
1	Krista McLennan		Feb 10, 2022 18:39:35	Wales	Researcher/Academic

+ the organizers' team: Claire Morgan-Davies (SRUC & coordinator), Ailsa Thomson (SRUC), Aimee Walker (SRUC), Daniel Stout (SAC Consulting), Laura Henderson (SAC Consulting), Fiona Kenyon (MRI).





ANNEX 2 – DETAILED AGENDA

1. Workshop objective :

- a. **Objective:** to propose innovative solutions to answer the needs identified by the farmers in NWS1.
- b. **Target:** Farmers, advisers, consultants, technicians, innovative farms and digifarms.

2. Farm demonstration (only if possible):

- Have a farm visit before or after the workshop
- If this is an option, the farm should ideally be one of the digifarms, or one of the innovative farms. They must be easy to reach and able to welcome a group of 15-20 people.

3. Workshop:

- Between 2 to 3 hours
- Inside (or in a shed) with PPT projector, and enough space to have small discussion groups (with social distancing if necessary).
- Food and coffee/tea (depending on the format)
- We need ~15-20 people per production type. If you consider more than one production, then it may be easier to organise workshops in parallel or several workshops.



Workshop contents proposition:

Welcome	20' (20')	Reminder of the previous meeting (NWS + TNWS) Objectives for the day	Introduction, rules of engagement, health & safety rules, objectives, quick agenda. What do you remember from the last sessions?	NF NF or other colleague	PPT or oral
Identification of the solutions/technologies that answer the needs “Solutions market”	50' (70')	Reminder of the needs & proposition of corresponding solutions	Solution market approach – we present all the solutions we have identified (as a quick excel table) then we ask the farmers to go and listen to the ones that interest them. Then we rotate, and people go and listen to another solution, etc. Proposition: 4 or 5 tables (along the themes : Reproduction, Feeding/Grazing, Health & Welfare, Milking & transformation or Fattening, Flock/herd management) On each table : - Presentation of needs	NF + colleagues (1 person per table/breakout room)	PPT / Printed A3 on the needs Photos/videos/youtube/props/short PPT slides of the solutions Tokens or stickers for voting (ONLINE: USE A POLL TO RANK THE 3-4 PREFERRED SOLUTIONS)

			- Presentation of solutions - Ask if any solutions are missing - Participants vote/rank the 3-4 most interesting and/ realistic solutions to present to TNWS 2 10 - 12 min par table Then we rotate, and people go and listen to another table, etc. IF ONLINE – HAVE A QUICK PLENARY SESSION TO PRESENT THE FULL LIST OF SOLUTIONS AND THEN GO IN BREAKOUT ROOMS (INSTEAD OF TABLES).		
Further exploring of the choices (DEPENDS IN TIME – YOU CAN POTENTIALLY IGNORE THIS STEP)	20' (90')	Refine the choices of solutions	For the retained solutions – in groups (depending on number of participants -> 3-4 people per group): - Are the solutions for a specific context of farming system? - What are the potential barriers and advantages of the	NF + colleagues	Paper boards Post-it, pens IF ONLINE – IN BREAKOUT ROOMS AND USE WHITEBOARD/NOTES TO KEEP TRACK OF DISCUSSIONS

			solutions (according to them) 2 sets of solutions to consider – 10 min on each (and then we rotate).		
Means of communication	20' (110')	Discussion around the means of communications about new technologies/innovative technologies	Brief presentation des modes de communication (from your excel file) Use a board/line ('I use'... I don't use') for each means of communication. Use post-its along the 'line' IF ONLINE – USE A POLL FOR EACH MEANS, WITH 2 CHOICES – USE/DON'T USE)	NF + colleagues	Paper board Post it
Conclusion	10' (120') ~2 hours total	Next steps and how we value their input. Dates	Use of paperboard for feedback: 2 questions with 3 smileys each : - Did you enjoy the meeting and discussions? - How was the meeting organisation? IF ONLINE, USE A POLL OR CHAT FUNCTION FOR FEEDBACK	NF	PPT Paper board pens



ANNEX 3 – SLIDES PRESENTED DURING THE MEETING



Sm@RT - Small Ruminant Technology

Second National Workshop – 10th February 2022




Welcome!

Goals for today:

- Propose and choose which innovative technologies/digital tools can help answer your needs
- Feedback on means of communication



Agenda:

- Project presentation (~15 min)
- Quick presentation of the needs and solutions (~5 min)
- Breakout sessions to discuss the solutions (~1 hour)
 - 3 breakout rooms
- Feedback on means of communications (~10')
- Last words and conclusions (5')




Suggested terms of engagement...

- All **opinion** is welcome...
 - ...without interrupting!
- You are **not obliged** to do anything...
 - ... but we share **responsibility** for success
- Kindness** towards one another...
 - ... no **value judgment**
- Confidentiality** in group
- Respect** timetable and group decisions




Where are you from?

What do you do?

-> A little poll ...




What do we mean by 'new technology' or 'new technology' in this project Sm@RT?

Any tool, automation, robot, innovation or digital solution that is used or applicable to livestock farming




Sm@RT presentation

Sm@RT: Sm@RT: Small Ruminant Technology – PLF and Digital technologies for small ruminants

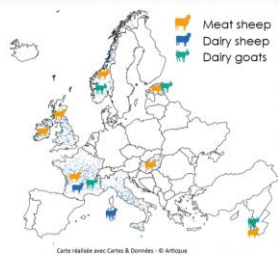
3 years
Starting Jan 2021

Objectives :

- To create a European **network** around the **use of PLF and digital technologies** in small ruminants
- To encourage **knowledge exchange**, new technologies **adoption** and **communication** between farmers and stakeholders of the small ruminant sectors.




Partners & Countries:



Meat sheep
Dairy sheep
Dairy goats

UK	SRUC	Moredun
Ireland	Agriis	
Norway	NIBIO	
France	INRAE	In Extenso
Italy	Agriis	
Hungary		
Estonia		
Israel		

Carte réalisée avec Cartes & Données - © Antiqua





Horizon 2020 Programme

Work thematic – 2 axis & 3 productions



PLF innovations and uses
(farmers' needs)

Guidelines/knowledge exchange
on technology use and data
management

Multi-disciplinary/multi-actor approach within the 2 overarching axis



Digifarm
1 per country & production
- Experimental or demonstration farm with PLF/DI
- Perfect place for exchange, demonstration and knowledge transfer.

3 levels of networking
Innovative farmers
3 per country and production type
- Commercial farms involved in the project, with some technologies, for peer-to-peer exchanges

Interested farmers



Important dates to remember



National workshops
Every 6 months

International workshops
Every 6 months after the national workshops

PLF/Digital technologies demonstration/training
On the Digifarms and 'Innovative Farms' in 2022 / 2023

Step 1

- 1a: Identification of farmers needs
- 1b: Inventory of corresponding PLF/digital technologies

Step 2

- Selection of PLF/digital technologies suitable to the different contexts and countries
- Identification of methods and channels for knowledge transfer

Step 3

- Farmers and practitioners' barriers, testimonies and description of PLF/digital technologies adapted to local contexts

Step 4

- Assessment of farmers acceptance of the different PLF and digital technologies from the sessions, visits, and farm demo on innovative Farms and Digifarms.

Step 5

- Definition of a European dissemination and uptake strategy for PLF and digital technologies in small ruminants systems

Solutions that can answer your needs?



- All needs were collated from the 8 countries, by production type
- Needs were ranked by order of importance by farmers, for each of the 5 main themes

- Fattening
- Health & Welfare
- Grazing/feeding
- Reproduction
- Flock management

Proposed by UK team

13 solutions

Topic	Needs / What is complicated ?	Votes	Solution
Fattening	Lamb weighing (in barn and also in pasture)	19	EID tags & EID-enabled weigh crate
Fattening	Animal sorting, manipulations, moving	13	EID tags & EID-enabled weigh crate
Fattening	Parasitism detection/faecal egg sampling/when to treat	10	Faecal egg count testing technology (eg FePaK2)
Fattening	Outdoor condition / barn condition to monitor / adapt	6	Electronic weather stations. Quad bike mounted grass measure.
Fattening	Help for the farmer to know when the lamb is ready for slaughter	5	EID tags & EID-enabled weigh crate
Fattening	Drafting fat lambs / lamb to keep	5	EID tags & EID-enabled weigh crate
Fattening	Additional feeding lambs during weaning time	5	Ration software
Fattening	Added value of digital technologies (cost, use of technologies at some periods)	4	Farm management software
Fattening	Ration formulation	4	Ration software
Fattening	Timely weaning	4	EID tags & EID-enabled weigh crate. Quad bike mounted grass measure.
Fattening	Lamb self weighing whilst feeding – and drafting	3	EID tags & EID-enabled weigh crate
Fattening	Ration allocation/trough management	2	Ration software. Feed intake system.
Fattening	Performance recording (growth rates, slaughter data etc.)	1	EID tags & EID-enabled weigh crate. Hand-held data loggers. Farm management software

Topic	What is needed/complicated	Votes	Solutions
Feeding / Grazing	Moving electric fences is very time-consuming and complicated - and issue of no fences on the hill ground/fencing, wolf free fences	15	Virtual fencing.
Feeding / Grazing	Grazing monitoring (pasture optimisation, virtual fences, connected fences, grass growth...)	7	Quad bike mounted grass measure. Relevant softwares.
Feeding / Grazing	Knowing how much sheep grazing days are left in a field/Grass allocation/measurement	5	Quad bike mounted grass measure. Relevant softwares.
Feeding / Grazing	Deciding on feeding groups/Link between the state of the animals & feeding	5	EID tags & EID-enabled weigh crate
Feeding / Grazing	Auto drafting ewes for nutrition management	5	EID tags & EID-enabled weigh crate
Feeding / Grazing	Lamb surveillance on pasture	5	Drone
Feeding / Grazing	Measuring grass heights (time-consuming)/Automatic grass measuring	4	Quad bike mounted grass measure. Relevant softwares.

Topic	What is needed/complicated	Votes	Solutions
Health / Welfare	Early detection of health issues /identifying disease issues	19	EID tags & EID-enabled weigh crate
Health / Welfare	Detection common parasites/manage external parasites/and treatment	17	EID tags & EID-enabled weigh crate; Faecal egg count testing technology.
Health / Welfare	Identification of sick animal for a better follow (mastitis, worm, etc.)	10	Hand-held data loggers. Farm management software
Health / Welfare	Recording/collecting/analysing health data is time-consuming/recording tags health issues, including withdrawal period	9	EID tags & EID-enabled weigh crate. Hand-held data loggers. Farm management software
Health / Welfare	Combining of individual health data and all other data	8	Farm software
Health / Welfare	Not overdrenching - so having an autodrench gun based on weight would be great/ dosing & FEC monitoring	5	Autodrench gun
Health / Welfare	Need tools to observe animals and help the farmer for the decision	4	Drone
Health / Welfare	Following of water consumption	4	Water intake recording crate / flow meter
Health / Welfare	Physicality of treating lameness (turning the animal)/footbathing & treating lameness	4	Conveyor or other handling systems
Health / Welfare	How to separate the animals who are lame?	4	EID tags & EID-enabled weigh crate

Topic	What is needed/complicated	Votes	Solutions
Reproduction	Difficult to manage flock with different mating groups	5	Genomic parentage
Reproduction	Selecting/drafting ewes for rams/replacements	5	EID tags & EID-enabled weigh crate.
Reproduction	Lambing records/ewe performance	4	Hand-held data loggers.
Reproduction	How to collect IDs automatically outside (through gates?)	4	Farm management software
Flock monitoring	Recognising and/or weighing your sheep automatically	10	EID tags & EID-enabled weigh crate
Flock monitoring	Difficulties foot-trimming	4	Conveyor or other handling systems

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Group exercise : solutions

There are 3 breakout rooms:

1. Ann: Fattening
2. Daniel: Grazing/Feeding/Flock management
3. Fiona: Health/Welfare/Reproduction

Ailsa, Aimee & Laura are your shepherds!

You have ~ 20 min per breakout room.

Then back to plenary session (after ~1 hour)

In your table/breakout room:

- 1) presentation of the needs & solutions proposed &
- 2) vote for the 3-4 solutions that you think would be most realistic and interesting to present at the TNWS

Ask any questions to your breakout room person!



Fattening

Topic	Needs / What is complicated ?	Votes	Solution
Fattening	Lamb weighing (in barn and also in pasture)	19	EID tags & EID-enabled weigh crate
Fattening	Animal sorting, manipulations, moving	13	EID tags & EID-enabled weigh crate
Fattening	Parasitism detection/Faecal egg sampling/when to treat	10	EID tags & EID-enabled weigh crate Faecal egg count testing technology
Fattening	Outdoor condition / barn condition to monitor / adapt	6	Electronic weather stations. Automated grass measures.
Fattening	Help for the farmer to know when the lamb is ready for slaughter	5	EID tags & EID-enabled weigh crate
Fattening	Drafting fat lambs /lamb to keep	5	EID tags & EID-enabled weigh crate
Fattening	Additional feeding lambs during weaning time	5	Ration software
Fattening	Added value of digital technologies (cost, use of technologies at some periods)	4	Farm management software
Fattening	Ration formulation	4	Ration software
Fattening	Timely weaning	4	EID tags & EID-enabled weigh crate. Automated grass measures.
Fattening	Lamb self weighing whilst feeding – and drafting	3	EID tags & EID-enabled weigh crate
Fattening	Ration allocation/trough management	2	Ration software. Feed intake system.
Fattening	Performance recording (growth rates, slaughter data etc.)	1	EID tags & EID-enabled weigh crate. Hand-held data loggers. Farm management software



Potential Solutions

EID tags/bolus & EID-enabled weigh crate

• What is it?

- Sheep identified using their tag/bolus
- Weigh crate collects individual data (e.g. weights) linked to the animals tag/bolus



• Useful for?

- Collecting individual animal data
 - e.g. weights, condition scores...
- Drafting groups of animals (manually or automatically)
 - e.g. mating groups, animals ready for market, ewes to be culled, groups requiring treatments, management groups...

• Additional benefits

- Reduces stress and improves the safety of both the animal and shepherd.
- Can be permanently fixed in position or mobile.
- Data collection for management decisions.



Feed intake system

• What is it?

- Automatic feeders for feeding sheep. Collects data using the animal's EID tag.



• Useful for?

- Monitoring how much individual animals eat.
- Allocating specific animals to specific rations.

• Additional benefits

- Potential to identify unwell animals early (change in behaviour – they won't be eating as much).
- Identifying efficient animals/family lines

• Cost? £££ – mainly research at the moment



Data loggers

• What is it?

- EID-enabled data loggers and/or stick readers



• Useful for?

- Collecting individual animal data
 - e.g. health treatment records, lambing problems, lambing data, pregnancy scan results...
 - Recording animal movements (on and off farm)
 - Management group information

• Additional benefits

- Data collection for management decisions.
- Links with farm management software.
- Data collection for breeding schemes.



Farm Management Software

• What is it?

- Computer software to help collate/analyse data
- Several options – e.g. FarmIT, Sheep Manager, AgriWebb
 - Different software offer different capabilities



• Useful for?

- Vet and med recording
- Performance recording
- Connects to EID readers
- Can connect to government databases, e.g. ScotEID

• Additional benefits

- Ensures records are kept for compliance purposes or farm assurance schemes
- Can often use mobile apps

• Cost – varies depending on what the software offers





Ration Software

• What is it?

- Software used to formulate a ration that meets feed requirements at various times of the year



• Useful for?

- Forage analysis allows a more accurate ration
- Maximise output and reduce feed costs
- Feed ewes to achieve the correct BCS, e.g. pre tupping
- Feed appropriate diets mid pregnancy for the number of lambs

• Additional benefits

- Can use home grown forages to reduce the cost of bought in feeds
- Improving feed efficiency can reduce GHG emissions



Grass measuring

• What is it?

- Automatic methods for collecting grass height / biomass information
- Can link with mobile phone app / computer software (e.g. AgriNet).



• Useful for?

- Monitoring and assessing grass growth
 - Assessing number of days grazing available
- Rotational grazing systems
- Systems that have a large number of fields

• Additional benefits

- Improved decision making
 - Grazing management
 - Flock performance
- Data stored and accessed easily



Electronic Weather Stations

• What is it?

- Measures various weather parameters
- Links with mobile phone app / computer software



• Useful for?

- Indoor and outdoor systems
 - Can predict risk of heat stress or drought, where water availability is limited
 - Wind speed/direction and temperature data can be used to predict stress during cold/wet weather
- Soil temperature can be used to predict grass growth

• Additional benefits

- Particularly useful for farms that are spread out, and the farmer isn't always on the farm
- Temperature data can be used to predict worm risk in lambs, such as *nematodirus*



Faecal egg counting

• What is it?

- An on-farm faecal egg count testing system
- Collects images which can then be sent, via the internet, for analysis.



• Useful for?

- Assessing when animals require worming treatments
 - Reducing anthelmintic resistance
 - Labour saving
- Sampling a large number of different management groups

• Additional benefits

- Simple to do
- Samples do not need to be physically sent to a lab
- Results received quickly



Feeding / Grazing Flock Management



Topic	What is needed/complicated	Votes	Solutions
Feeding / Grazing	Moving electric fences is very time-consuming and complicated - and issue of no fences on the hill ground/fencing, wolf free fences.	15	Virtual fencing.
Feeding / Grazing	Grazing monitoring (pasture optimisation, virtual fences, connected fences, grass growth...)	7	Automated grass measures. Relevant software.
Feeding / Grazing	Knowing how much sheep grazing days are left in a field/Grass allocation/measurement	5	Automated grass measures. Relevant software.
Feeding / Grazing	Deciding on feeding groups/Link between the state of the animals & feeding	5	EID tags & EID-enabled weigh crate
Feeding / Grazing	Auto drafting ewes for nutrition management	5	EID tags & EID-enabled weigh crate
Feeding / Grazing	Lamb surveillance on pasture	5	Drone
Feeding / Grazing	Measuring grass heights (time-consuming)/Automatic grass measuring	4	Automated grass measures. Relevant software.
Flock monitoring	Recognising and/or weighing your sheep automatically	10	EID tags & EID-enabled weigh crate
Flock monitoring	Difficulties foot-trimming	4	Conveyor or other handling systems



Potential Solutions

EID tags/bolus & EID-enabled weigh crate

• What is it?

- Sheep identified using their tag/bolus
- Weigh crate collects individual data (e.g. weights) linked to the animals tag/bolus



• Useful for?

- Collecting individual animal data
 - e.g. weights, condition scores...
- Drafting groups of animals (manually or automatically)
 - e.g. mating groups, animals ready for market, ewes to be culled, groups requiring treatments, management groups...

• Additional benefits

- Reduces stress and improves the safety of both the animal and shepherd.
- Can be permanently fixed in position or mobile.
- Data collection for management decisions.





Horizon 2020 Programme

Conveyor system

• What is it?

- Handling system that suspends animals above the ground in an adjustable "V" created by two belts on rollers.
- Movement controlled by electric foot pedals.



• Useful for?

- Routine sheep handling events
 - Dosing, jugging, inspections and health treatments etc.
 - Accurate recording of treatments – when combined with an EID system (EID stick or data logger)
- Weighing
 - EID enabled weighing systems also available.

• Additional benefits

- Reduces stress and improves the safety of both the animal and shepherd.
- Can be permanently fixed in position or mobile.

• Cost? £££

Virtual Fencing

• What is it?

- Device worn by cattle/sheep, uses GPS to track animal
- Gives a warning sound and low electric pulse when animal nears virtual fence line
- e.g. Nofence



• Useful for?

- Mobile app can be used to adjust virtual field boundaries
 - Easy to use for rotational grazing
- Animals can be kept away from 'danger' areas, e.g. gorge
- If fields are flooded can switch off virtual fence so animal can move away
- Farms that have no/limited fences currently

• Additional benefits

- Reduces cost and time to maintain fences
- Conservative grazing
- Potentially used for virtual gathering

• Cost –potentially too expensive for commercial sheep farms at the moment...?

Drone

• What is it?

- Drone can be remotely controlled or flown on an automated flight
- Can take aerial images/videos or carry sensors



• Useful for?

- Monitoring sheep
 - Can check all sheep are present
 - Can monitor water / feed sources
- Can produce an image of your fields
 - This can be used to create vegetation maps
 - Assess grazing availability

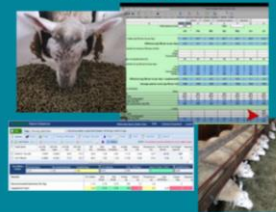
• Additional benefits

- Saves time for farmers
- Can be used to check fences are secure

Ration Software

• What is it?

- Software used to formulate a ration that meets feed requirements at various times of the year



• Useful for?

- Forage analysis allows a more accurate ration
- Maximise output and reduce feed costs
- Feed ewes to achieve the correct BCS, e.g. pre tupping
- Feed appropriate diets mid pregnancy for the number of lambs

• Additional benefits

- Can use home grown forages to reduce the cost of bought in feeds
- Improving feed efficiency can reduce GHG emissions

Grass measuring

• What is it?

- Automatic methods for collecting grass height / biomass information
- Can link with mobile phone app / computer software (e.g. AgriNet).



• Useful for?

- Monitoring and assessing grass growth
 - Assessing number of days grazing available
- Rotational grazing systems
- Systems that have a large number of fields

• Additional benefits

- Improved decision making
 - Grazing management
 - Flock performance
- Data stored and accessed easily

Health / Welfare Reproduction

Topic	What is needed/complicated	Votes	Solutions
Health / Welfare	Early detection of health issues /identifying disease issues	19	EID tags & EID-enabled weigh crate
Health / Welfare	Detection common parasites/manage external parasites/and treatment	17	EID tags & EID-enabled weigh crate; Faecal egg count testing technology; EID tags & EID-enabled weigh crate; Hand-held data loggers; Farm management software
Health / Welfare	Identification of sick animal for a better follow (health, worm, etc.)	10	EID tags & EID-enabled weigh crate; Hand-held data loggers; Farm management software
Health / Welfare	Recording/collecting/analysing health data is time-consuming/recording tags health issues, including withdrawal periods	9	EID tags & EID-enabled weigh crate; Hand-held data loggers; Farm management software
Health / Welfare	Combining of individual health data and all other data	8	Farm management software
Health / Welfare	Not overstocking – so having an auto-drench gun based on weight would be great/ dosing & FEC monitoring	5	Auto-drench gun
Health / Welfare	Need tools to observe animals and help the farmer for the decision	4	Drone
Health / Welfare	Following of water consumption	4	Water intake recording crate / flow meter
Health / Welfare	Physicality of treating lameness (turning the animal)/footbathing & treating lameness	4	Conveyor or other handling systems
Health / Welfare	How to separate the animals who are lame?	4	EID tags & EID-enabled weigh crate
Reproduction	Scanning and dividing ewe groups for appropriate nutrition	4	Pregnancy scanning; Hand-held data loggers; EID tags & EID-enabled weigh crate; Genetic pedigree
Reproduction	Difficult to manage flock with different mating groups	3	EID tags & EID-enabled weigh crate
Reproduction	Selecting/breeding ewes for rams/replacements	3	EID tags & EID-enabled weigh crate; Hand-held data loggers; Farm management software
Reproduction	Lambing records/ewe performance	4	EID tags & EID-enabled weigh crate; Hand-held data loggers; Farm management software



Potential Solutions

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 101000471.





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 - e.g. mating groups, animals ready for market, ewes to be culled, groups requiring treatments, management groups...

• Additional benefits

- Reduces stress and improves the safety of both the animal and shepherd.
- Can be permanently fixed in position or mobile.
- Data collection for management decisions.

Data loggers

• What is it?

- EID-enabled data loggers and/or stick readers



• Useful for?

- Collecting individual animal data
 - e.g. health treatment records, lambing problems, lambing data, pregnancy scan results...
- Recording animal movements (on and off farm)
- Management group information

• Additional benefits

- Data collection for management decisions.
- Links with farm management software.
- Data collection for breeding schemes.

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• Useful for?

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 - Can check all sheep are present
 - Can monitor water / feed sources
- Can produce an image of your fields
 - This can be used to create vegetation maps
 - Assess grazing availability

• Additional benefits

- Saves time for farmers
- Can be used to check fences are secure

Genomic Parentage

• What is it?

- Service that provides animal parentage information using DNA collected as a tissue sample.



• Useful for?

- Identifying the sire and dam of lambs
 - From flocks that lamb in extensive systems or that are not routinely lambed indoors.
- Flocks that use multi-sire mating groups.

• Additional benefits

- Assess sire success rate
- Assess ewe rearing performance
 - When monitoring lamb growth / survival of lambs allocated to each ewe.

• Cost? ££

Farm Management Software

• What is it?

- Computer software to help collate/analyse data
- Several options- e.g. FarmIT, Sheep Manager, AgriWebb
 - Different software offer different capabilities



• Useful for?

- Vet and med recording
- Performance recording
- Connects to EID readers
- Can connect to government databases, e.g. ScotEID

• Additional benefits

- Ensures records are kept for compliance purposes or farm assurance schemes
- Can often use mobile apps

• Cost- varies depending on what the software offers

Autodrench Gun

• What is it?

- Drench gun that allows the dose rate to be altered to the individual animal's weight
- Connects to EID reader/ weigh crate



• Useful for?

- Allows accurate dose rate for individuals
 - Prevents over/underdosing
- Reduces cost of products used
- Reduces risk of anthelmintic resistance

• Additional benefits

- Quick and easy to use
- Records medicine use
 - Can connect to computer to download records
- Environmental benefit of reduced product used

Water intake recording

• What is it?

- Automatic recording crate used to collect water intake information – using the animals EID tag.



• Useful for?

- Monitoring water intake in housed animals.
- Data automatically collected from individual animals.

• Additional benefits

- Some systems also collect live weight data while the animal is in the crate drinking.
- Early warning system if an animal is becoming ill – change in drinking behaviour





Pregnancy Scanning

• What is it?

- Ultrasound scanning of ewes to identify how many lambs they are carrying



• Useful for?

- Identifying ewes in-lamb or empty
 - Identifying the number of lambs the ewe is carrying
- Managing different groups of ewes
 - Appropriate feeding levels
 - Early –vs– late

• Additional benefits

- Individual ewe results can be recorded at the same time onto a data logger or farm management app using an EID stick.



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• Useful for?

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Group exercise : Votes?

1. Fattening
2. Grazing/feeding/Flock management
3. Health/Welfare/Reproduction



Group exercise : Votes?



	Group 1 (Aimee)	Group 2 (Allsa)	Group 3 (Heather)
<u>Fattening (Laura)</u>	Data logger FEC Grass measuring EID (if app on phone – game changer!)	EID tags Data logger Weather station	FEC (resilience) TST/Happy Factor
<u>Grazing/Feeding/Flock management (Daniel)</u>		EID tags + crate Drone	Ration software Feed intake/grass availability Drone (auto) Lamb handling/lamb chute
<u>Health/Welfare/Reproduction (Fiona)</u>	Data logger EID tags scanning	Autodrench	Parentage Autodrench EID tag + scanning machine TST/Agri-ignite

Means of communication

List of means of communication that our **digital** farm and innovative farms used

Regularly

- Twitter
- Facebook
- Instagram
- Regular podcasts
- Own website
- YouTube
- Regular columns in the press
- Attend/hold farmers' group meetings
- Open days
- Newsletters
- School visits
- Students' placement

Sometimes/Soon

- Member of farming group
- Farm shop
- Public engagement
- Other social media (LinkedIn, Tik Tok...)

Poll:

Do you use any of these?



Next steps:

Transnational workshop: 22 February 2022
3rd National Workshop: early June 2022
3rd Transnational workshop: early July 2022

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Feedback on today:

Did you enjoy the meeting and discussions?



How was the meeting organisation?

