

Innovative technology in livestock farming



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Hill & Mountain Research Centre

Leading the way in Agriculture and Rural Research, Education and Consulting

Outline



1. Challenges facing livestock farming
2. Innovative technologies – can they help?
3. Recent applications
 - a. Electronic identification (EID)
 - b. Feeding
 - c. Production & health management
 - d. Grazing behaviour & management
4. Conclusions



Livestock production in Scotland - challenges

SRUC

- Environmental
 - Rangeland/remotely based
 - Harsher environment/survival issues
- Welfare
 - Less supervision
- Economic
 - Diversity of systems
 - Sector less organised
 - Less efficiency/low productivity
 - Low level of income
 - Reliance on public support
- Labour
 - More traditional/ageing sector
 - Lack of labour
- Slow uptake of technological advances



Innovative technology?



- Greater **sustainability** and **productivity**
- Increased **efficiency** and **profitability**
- Optimised use of **labour** and improved quality of life for the producer
- Improved **health** and reduced treatments through the use of early disease detection systems and optimised treatment
- Improved **welfare** through continuous individual animal monitoring
- Reduced **environmental impact** through more efficient production
- Increase in **product quality** and consistency



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a. Electronic Identification

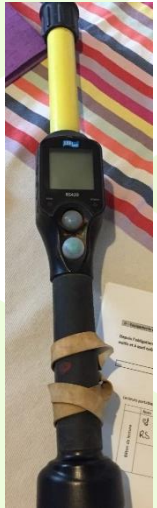
- Traceability
- Consumer confidence
- Better on-farm management
 - Pedigrees
 - Rapid sorting
 - Movement recording
- Health control
 - Treatment records
- Genetic Selection
- Abattoir/supermarket feedback



➤ Automated ID essential for many innovations

a. EID readers

STICK READERS



PSIONS



DATA LOGGERS



PANEL READERS

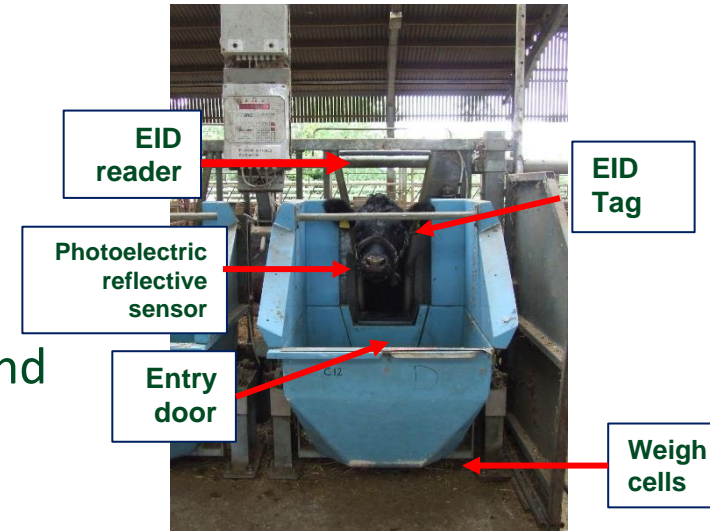


b. Feed intake -> cattle

Carol-anne.Duthie@sruc.ac.uk



- Advances in technology – since 1990's
- Individual feed intake measurement at large scale
 - Fully automated and electronic feed intake bins
 - Large quantity of data – feeding behaviour and intake
 - Many different commercially available examples



www.biocontrol.no

www.bigbeef.co.uk

www.hokofarmgroup.com

b. Feed intake -> sheep

Nicola.lambe@sruc.ac.uk

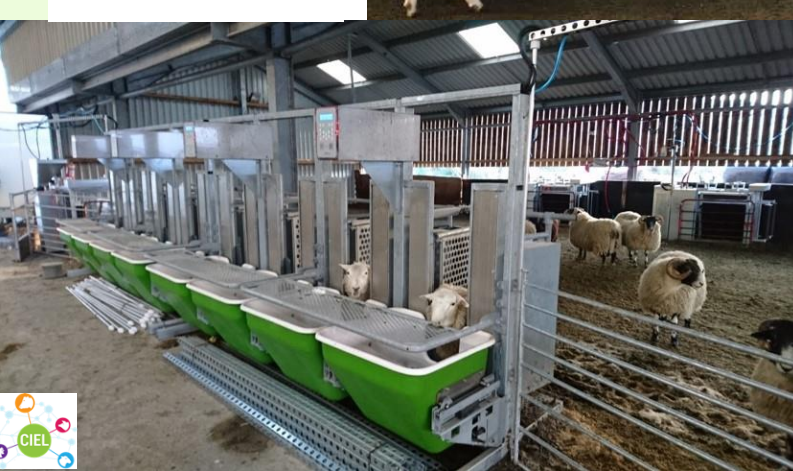


Feed intake recording equipment:

- 3 modules, each containing:
 - 16 forage bins
 - 4 concentrate feeder crates
 - 4 water crates with weigh platforms
 - 1 control room trailer
 - space for ~140 sheep



GrassToGas



c. Production & health management

Auto-weighing/shedding/weight platform

- Ease and accuracy of data collection
- Speed of animal handling
- Labour cost savings
- Health and safety for staff
- Multiple weights per day
- New opportunities for animal management
 - Targeted selective treatment for disease
 - Targeted approach to feeding
 - Data collected used to support EBVs

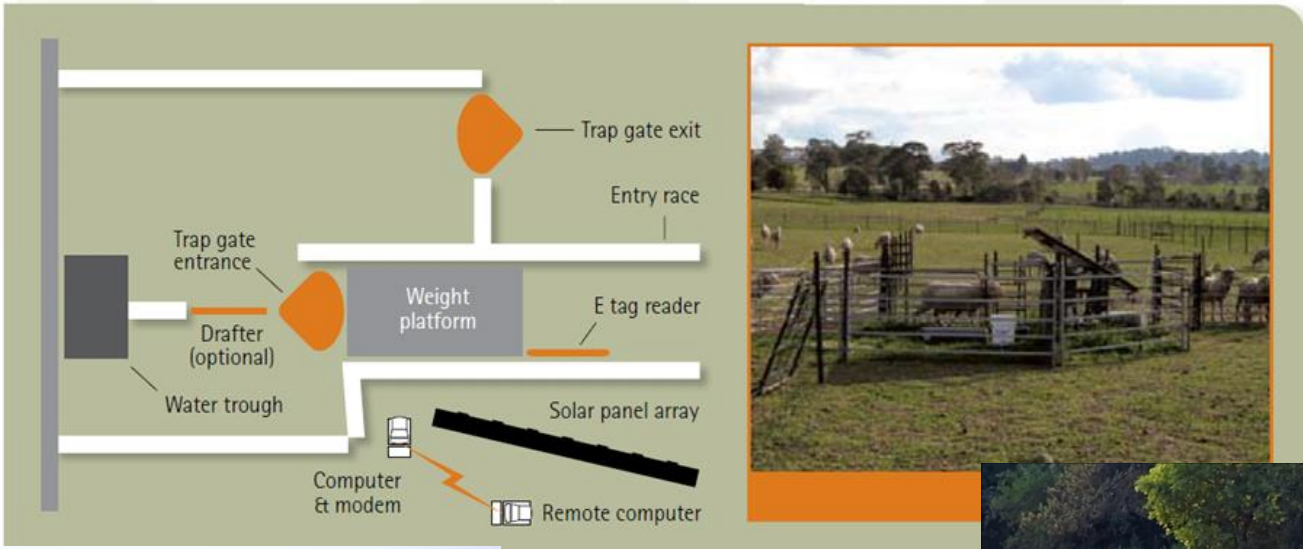


c. Production & health management



Outdoor weight monitoring

WOW design and operation



Brown et al., 2012; 2014
(Sheep CRC, Australia)



González-García et al,
2018 (INRAe, France)

c. Production & health management



Mating



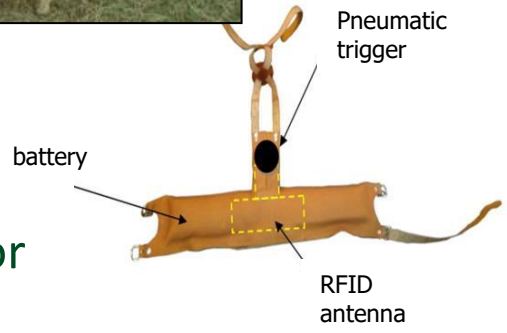
Pedigree matchmaker (Australia)



DNA parentage (NZ Shepherd+ DNA test)



Alpha Detector (France)

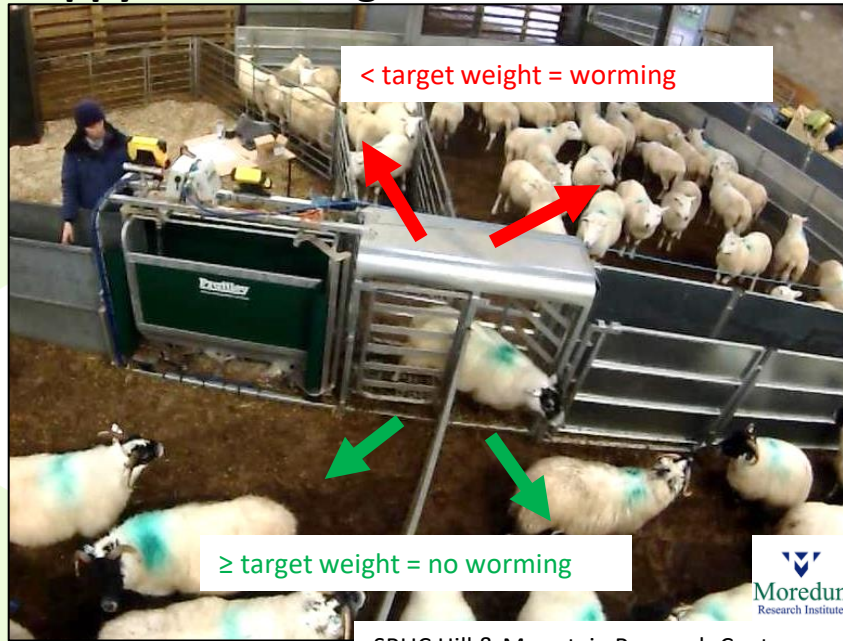


c. Production & health management

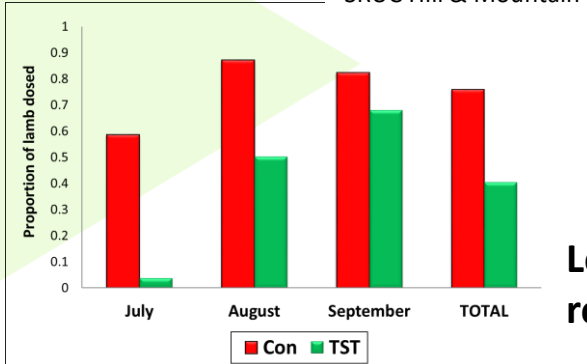


Targeted Worming

Happy Factor™ algorithm



SRUC Hill & Mountain Research Centre



Less wormer, less anthelmintic resistance, less labour, same lamb weight

...led to InnovateUK project:

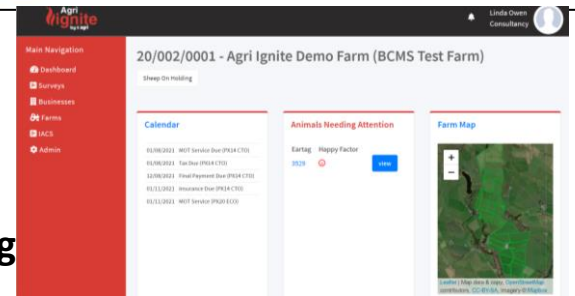
Smart Sheep – precision livestock farming and sustainable sheep production

Smart sheep project

Innovate UK

To encourage uptake of precision livestock farming by developing new, co-designed tools by:

1. Improving the application of on-farm digital technology through co-design.
2. Validation of improved PLF digital technology on commercial farms.
3. Knowledge exchange and demonstration of new tools



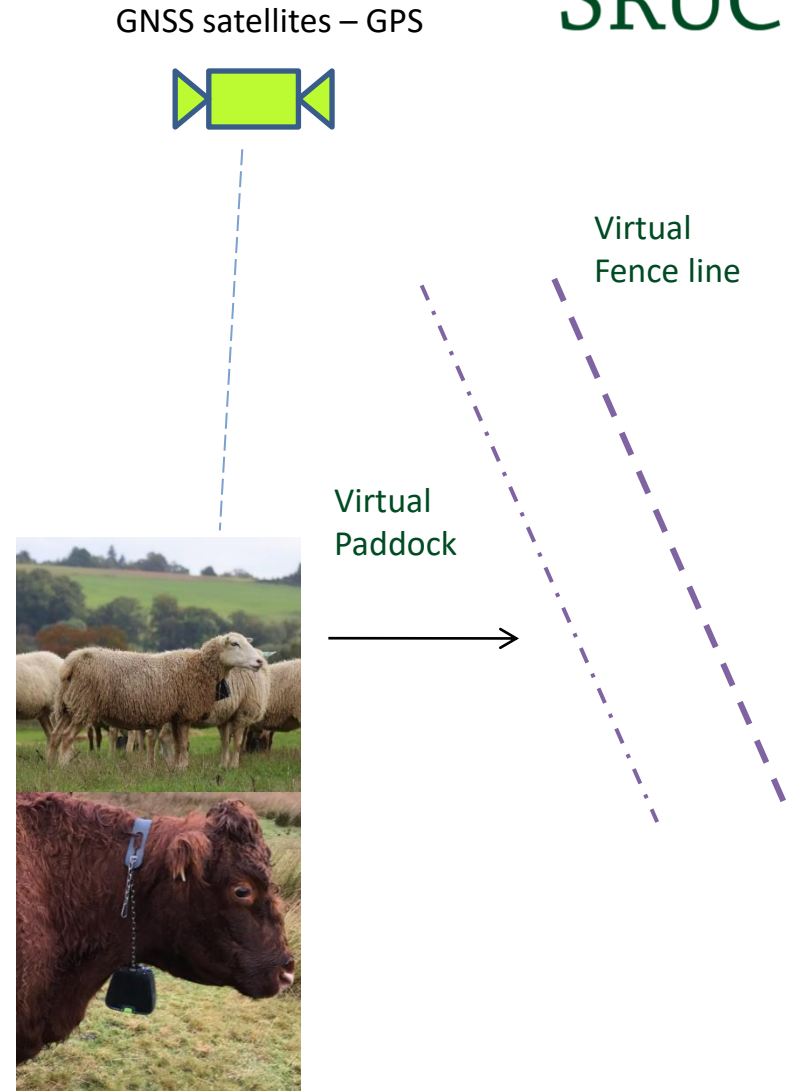
d. Grazing management

Virtual Fencing

- Current fencing is high costs (typical SRUC farm has a capital cost of >£0.5 million on fences and walls)
- Temporary electric fencing is labour intensive

Virtual fencing combining;

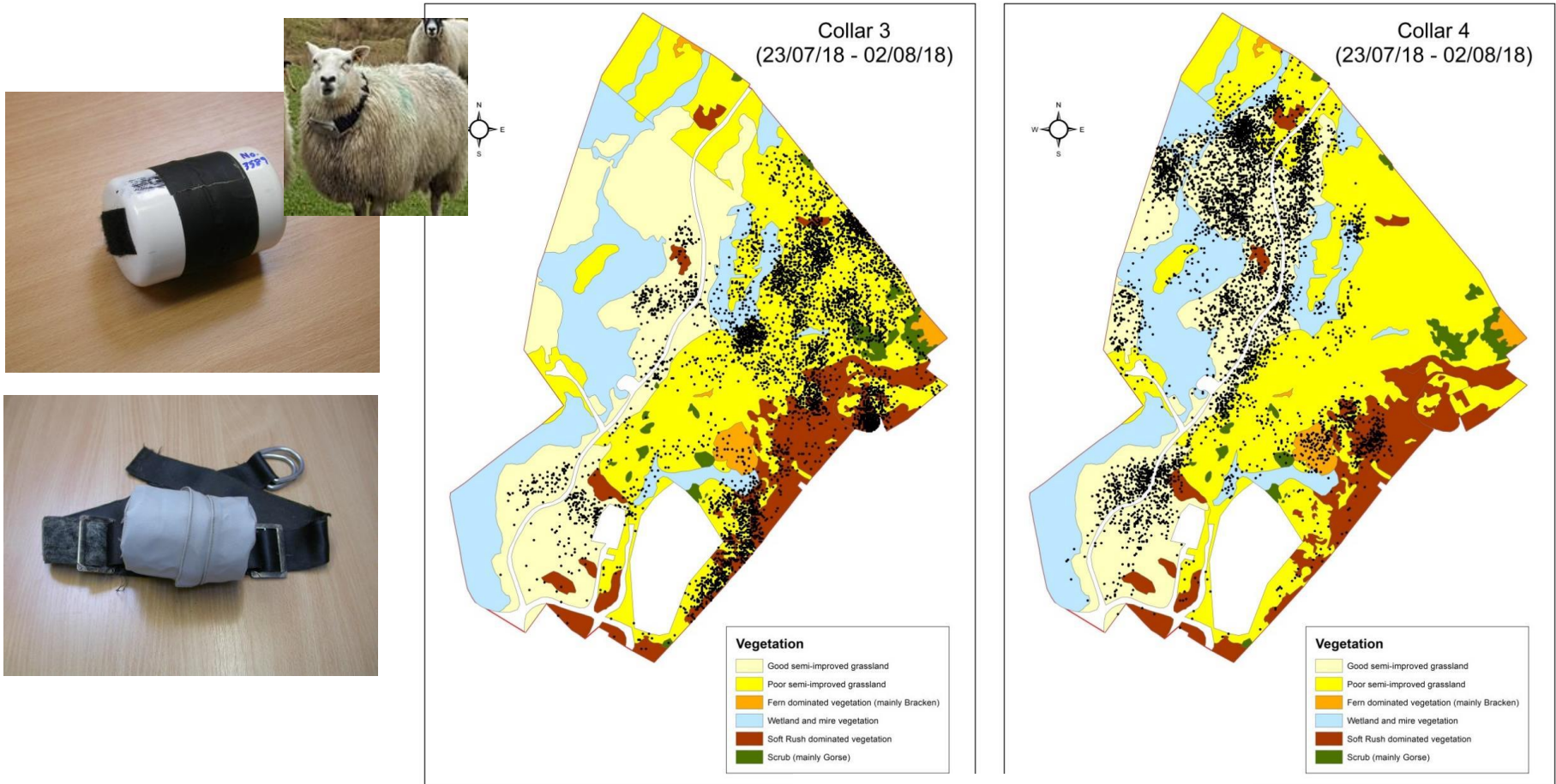
- GPS (satnav) with virtual fenceline (also “geofence”)
- Electric pulse collar
- Pre-pulse warning signal
- No wires, so potential to move fenceline remotely



d. Grazing management

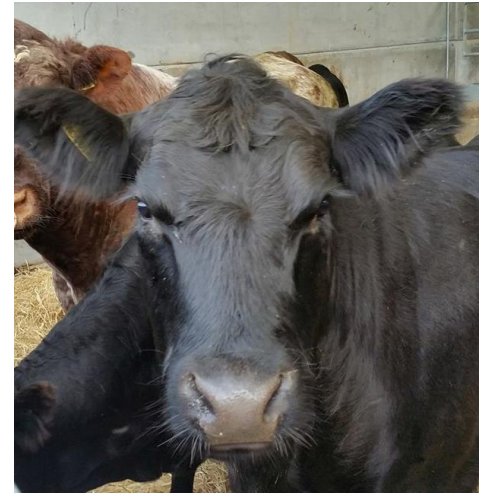
Tracking sheep & behaviour

“Hoofprints” LoRa enabled GNSS unit with three sets of tri-axial motion sensors



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Latest innovation projects at SRUC (Sheep)



Horizon 2020 research and innovation programme, grant agreement No. 862050



Integrating innovative TECHNOLOGIES along the value Chain to improve small ruminant welfare management

www.techcare-project.eu



Horizon 2020 research and innovation programme, grant agreement No. 101000471



Sm@ll Ruminant Technologies

www.h2020-smart.eu

• Key steps

1. Prioritise welfare challenges and issues
2. Identify potential innovative technologies solutions
3. Validate the solutions in different and real conditions (pilots and commercial farms)
4. Define appropriate business models

Objectives

- To create a European network around the use of PLF and digital technologies in small ruminants
- KTE & new technologies adoption
 - Regular national & international workshops
 - 'farm demo' days, on-farm trainings

**Thank you for
your attention!
Any Questions?**



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