



ntegrating innovative TECHnologies along the value Chair to improve small ruminant welfARE management

#### LANDWARDS CONFERENCE 2024

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# **Livestock Sector View**

What does the livestock sector want from agricultural engineering?



Dr Claire Morgan-Davies SRUC, Livestock Systems Scientist

#### **Outline**

- Context which livestock systems?
- Issues for those systems/challenges
- Technologies for those systems?
- What do we need from Engineers?



#### Which systems?

Sheep & Goats









### Which systems?

#### Context

- In the British Isles: Rough grazing, harsh environment
- Grassland or semi-arid Mediterranean environment





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### Which systems?

- Production type
  - Meat production
  - Milk production & cheese production
  - Wool











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## Issues/Challenges

- Harsher environment/Remote
- Lack of resources, labour
- Surveillance needs
- Welfare issues, health, disease
- Sector less organised
- Efficiency/Productivity
- Traceability
- Connectivity



# Issues/Challenges

- Low technology uptake
  - Survey (2019) 1150 respondents
  - Survey (2021) 670 respondents





Sm@ll Ruminant Technologies

70%

62%

McLaren et al., 2022. , Attitudes of small ruminant European farmers towards new digital technologies







#### Farmers' needs for technology



166 needs identified

Themes	Dairy goats	Dairy sheep	Meat sheep
Feeding/Grazing	13	5	17
Health & Welfare	13	10	17
Flock/herd monitoring	10	8	11
Reproduction	9	5	15
Milking/Fattening	8	9	16





#### Farmers' priorities

#### Overall welfare priorities (all sheep)

- 1 Nutritional issues
- 2 Mastitis
- 3 Gastrointestinal parasites
- 3 Lameness
- 5 Ectoparasites
- 6 Inadequate water supply
- 6 Reproductive disorders





# Overall welfare priorities (all goats)

1 Mastitis

- 2 Insufficient food & water
- 3 Agonistic behaviour/feed competition
- 4 Poor environmental management
- 5 Gastrointestinal parasites
- 5 Ectoparasites
- 7 Lameness/claw health





#### Farmers' priorities

		Overall welfare pi (all sheep)	riorities	Overall	welfare priorities (all goats)
	1	Nutritional issues	Weight loss or chang	to in body state	]
	2	Mastitis	(animal based)		ood & water
	3	Gastrointestinal p			haviour/feed competition
	3	Lameness	Behavioural (animal bi	change	imental management
	5	Ectoparasites	(animai ba	used)	inal parasites
	6	Inadequate water	Milk yield and	l quality sed)	S
	6	Reproductive disc	(animal ba		aw health
19.00			Environmental (resource b	indicators based)	
Ag			Environ		



#### Solutions already exist





#### Solutions already exist



- Solutions already exist....but issues remain!
  - Data standard between systems
  - Compatibilities of the tools
  - After-sales help







- Solutions already exist....but issues remain!
  - Understanding the system (training)
    - Farm demonstration





- Solutions already exist....but issues remain!
  - Understanding the system (training)
    - Farm demonstration
  - Adoption & acceptance?
    - the peak adoption level
      - the scale of the sheep/goat enterprise
      - the potential profit benefit during the years that the technology were used

#### - the length of time to peak adoption were:

- the need to develop substantial new skills and knowledge to use the technology
- the learnability characteristics of the technology



ADOPTION & UPTAKE OF TECHNOLOGIES

Sm@RT POLICY BRIEFS



- Solutions already exist....but issues remain!
  - Understanding the system (training)

- Adoption & acceptance
- Data produced
  - Interpretation
  - Ownership

Simpler readers and ability for manual registration





AgrE

Ease of data handling across different devices and

from different sources

### Why is technology important?

Harsher environment/Remote Monitoring Alerts/warning systems Lack of resources, labour Time saving Surveillance needs Monitoring Alerts/warning systems Welfare issues, health, disease **Alerts/warning systems** Sector less organised **Benchmarking Time saving** Efficiency/Productivity Monitoring **Benchmarking** Traceability Monitoring Benchmarking Connectivity



Solutions readily available, affordable & accessible to farmers

#### Perfect solution?

- Cost-effective/cheap
- Can be implemented on the whole flock/herd
- Easy to understand
- Real-time or download?
- API (link) when creating the tools
- Applicable for outdoor conditions (e.g. weatherproof)



#### Checklist:

- Think of connectivity:
  - UHF tags & readers
  - RealtimeID proximity loggers
    - » Is LoraWan a solution?
- Think of power supply:
  - Battery?
  - Solar?
  - Wind?
- Practicality:
  - Battery life (e.g. GPS)
  - Battery change
  - On-off button?









#### Checklist:

• Size



• Durability

• Clarity on data value + ownership?

• Think outside the box?

(Walker et al., 2024)





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#### Blue Sky Thinking...

• Automatic weighing of sheep – Walk over Weigh?



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

• Image recognition & AI/machine learning



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SheepNet









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