BSAS CONFERENCE 2023

Animal science: delivering for all our needs

Sustainable control of roundworms in livestock

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Principal Investigator | Moredun Research Institute

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Top health and welfare issues in UK sheep industry

Rank	Meat sheep
	Mostly outdoor
1	GI parasites
2=	Lameness
2=	Nutritional issues
4	Mastitis
5	Ectoparasites
6	Poor maternal relationship
7	Morbidity and mortality rate

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TECH CARE
Integrating innovative TECHnologies along the value Chain to improve small ruminant welfARE management

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Roundworms are everywhere!

Infection affects productivity, carcass quality and ~10% lower value at sale
Infections with multiple worm species common

Subclinical disease common, so difficult to spot

Recent (2020) estimates suggest annual costs to UK meat sheep industry of:
£15 million (€ 16.9 million) in lost production
£27.3 million (€ 30.7 million) in treatment
Total (£42.4 million/year)

Charlier et al, 2020. Preventative Veterinary Medicine, 182; 105103.

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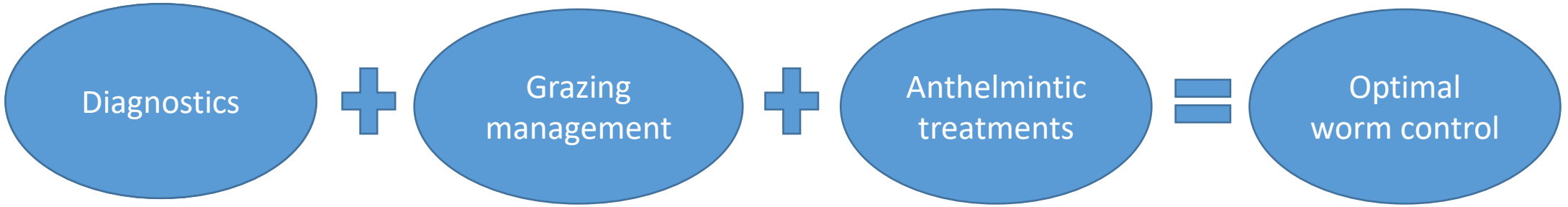
Control of roundworms

- What parasites are present
- Extend of challenge/risk of disease
- Efficacy of anthelmintics



Grazing history
Management history
Clinical signs
Forecasting
Faecal egg counts
Weight gain (EID)

Rotational grazing
Co-grazing
Clean grazing
Late turn out
Early housing

Product choice
Timing
Correct dose rate
Appropriate storage
Appropriate administration
Effective treatment

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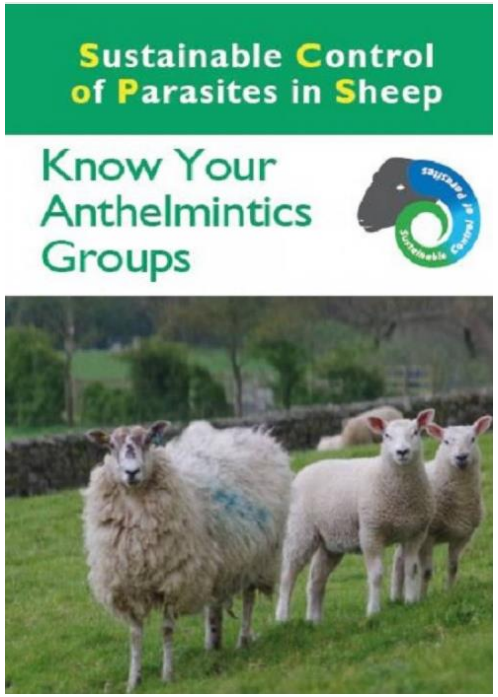
Current control

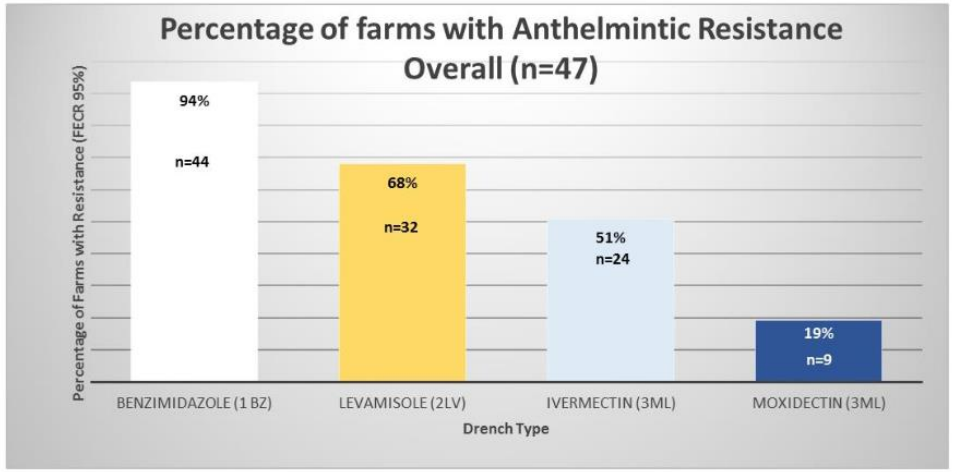
Wormers (anthelmintics) are only curative treatments available

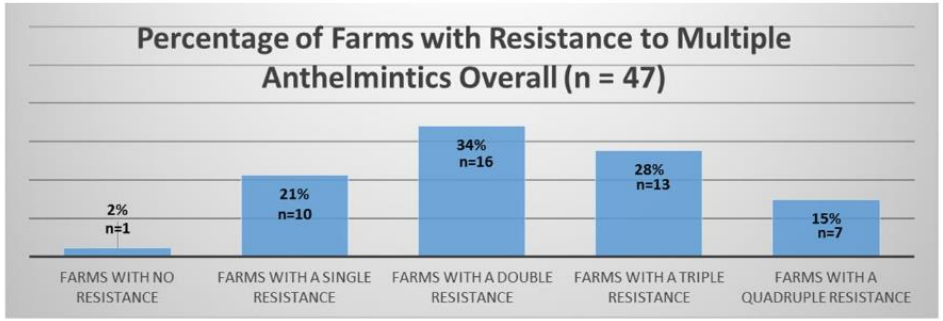
Five classes available:

BUT worms can develop resistance

- can lead to treatment failures
- clinical disease
- sub-clinical production loss more common



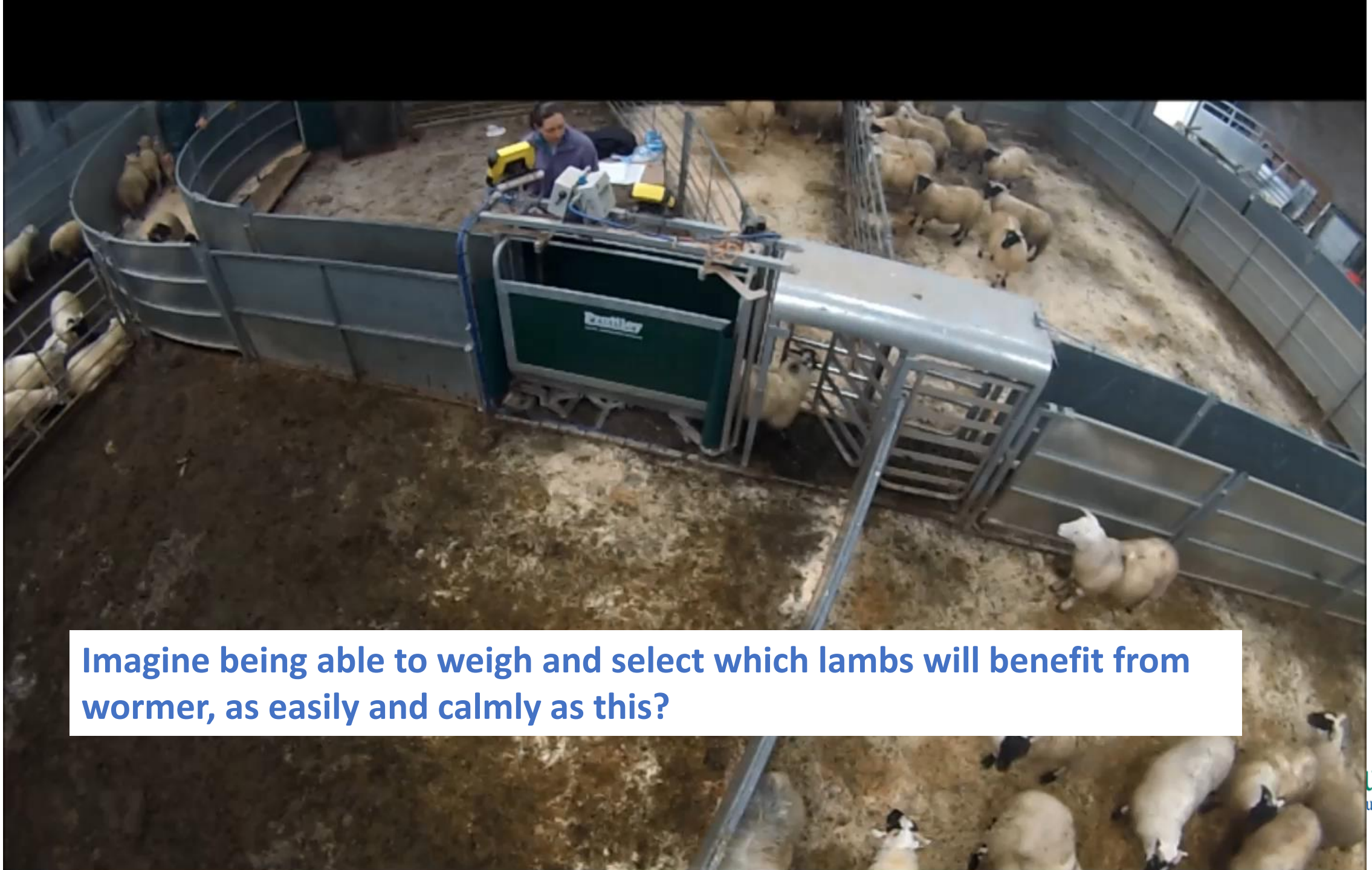




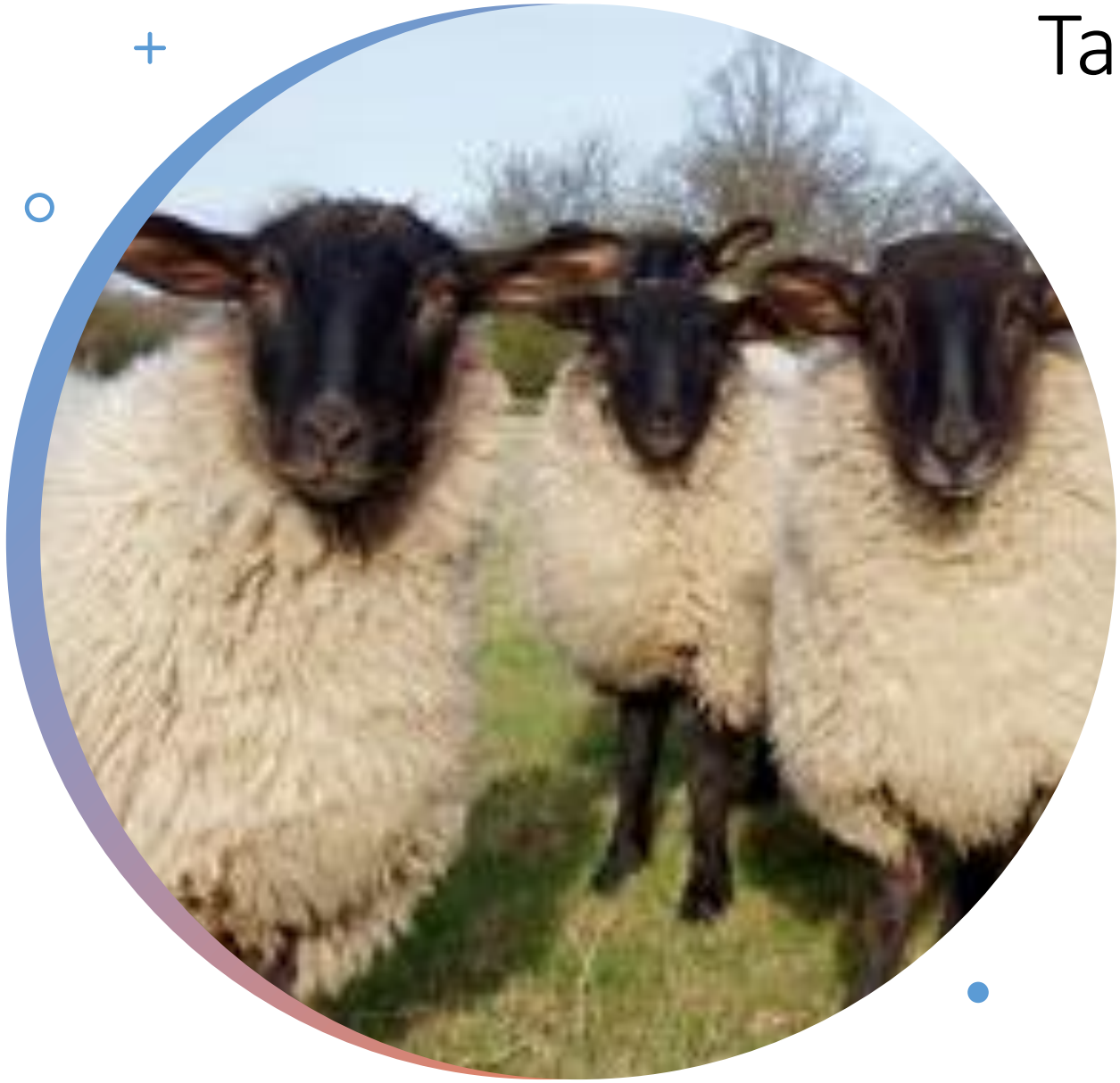
Need to use anthelmintics carefully

- Only 5 actives on market (for sheep)
- ‘Little as possible, as much as needed’!

- Target treatments – use FEC, monitor group performance
- Only administer wormers to certain animals



Imagine being able to weigh and select which lambs will benefit from wormer, as easily and calmly as this?



Targeted Selective Treatment (TST)

Roundworm control method where wormer is given to only underperforming lambs

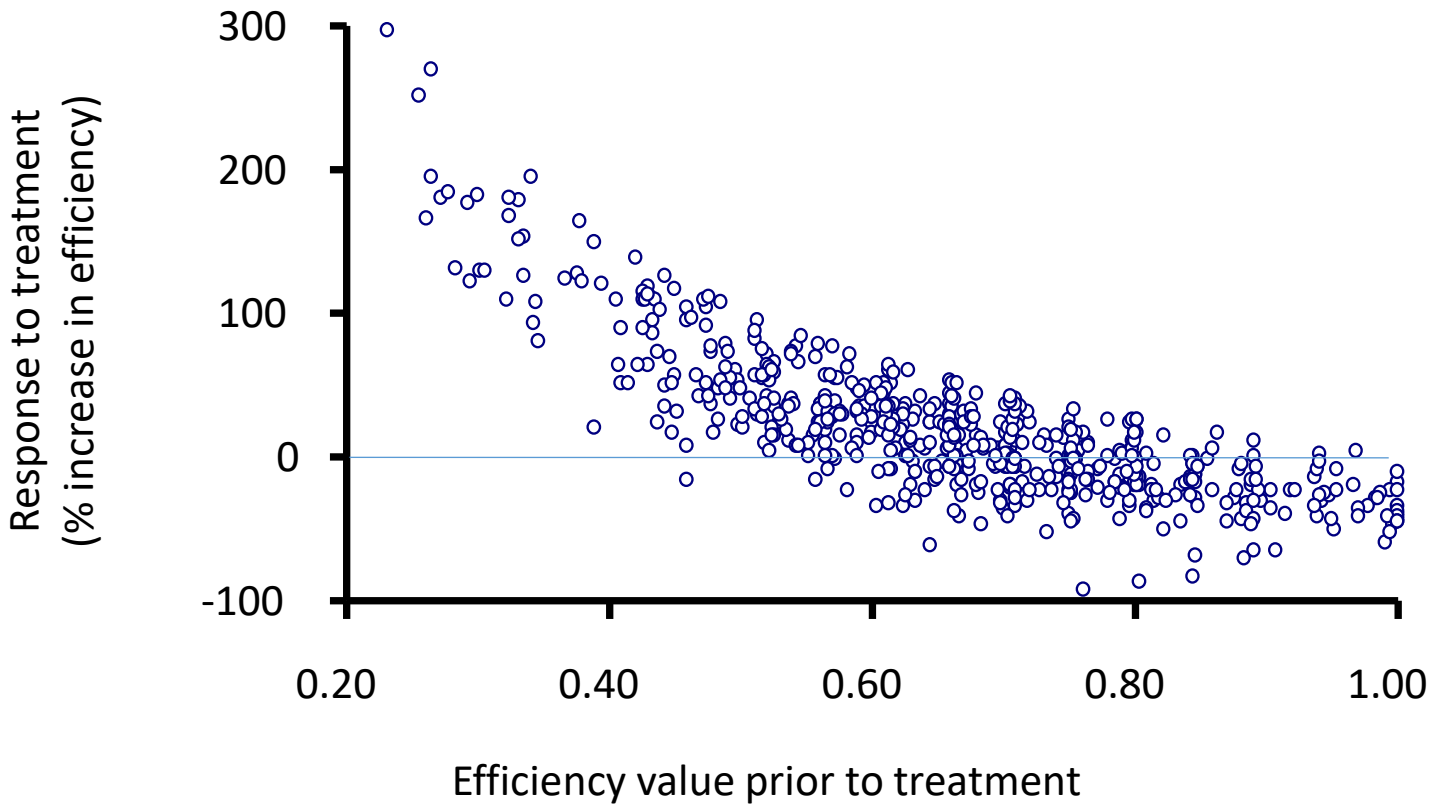
- optimise the amount of wormer used
- reduce the selection pressure on the worms
- rate of wormer resistance is slowed.

In prime/fat lamb production system,

short-term weight gain

offers simple, quick and effective identification.

Production efficiency in sheep varies within a group; anthelmintic treatment can improve efficiency



Greer et al, 2009, Vet Parasitol. 164, 12-20

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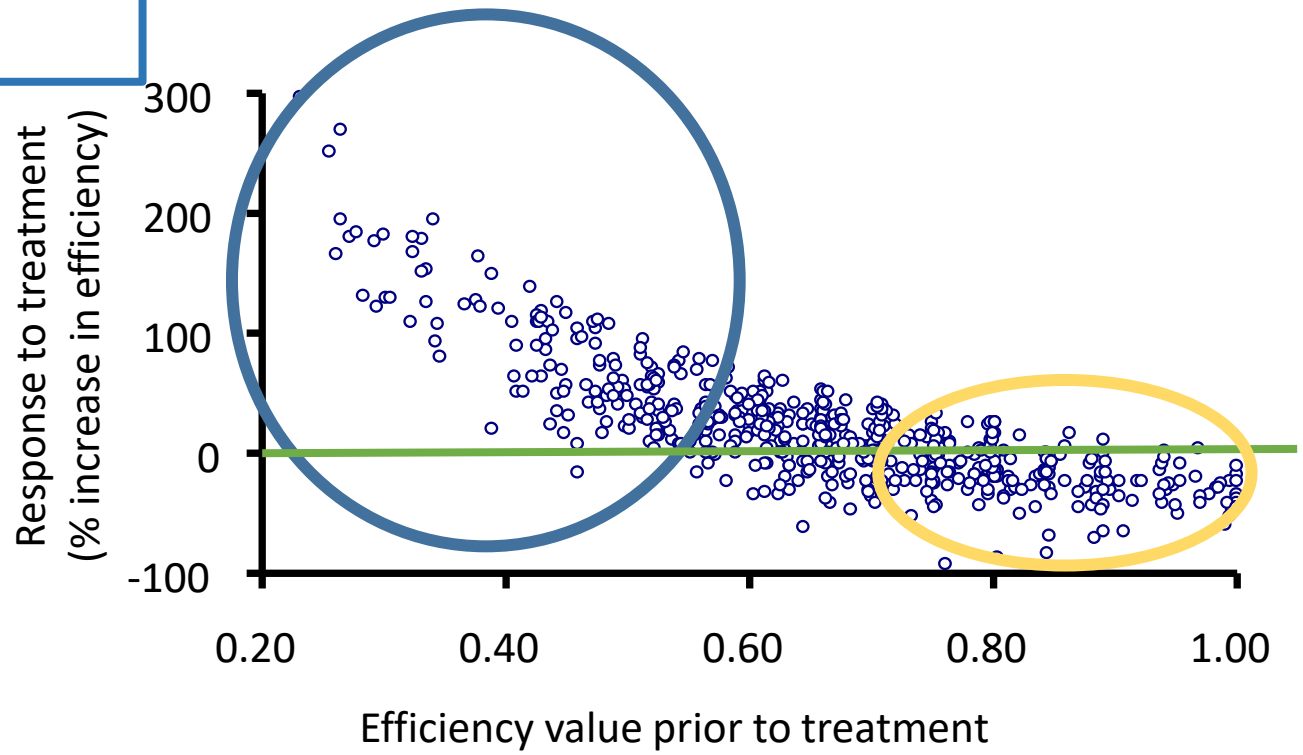
We can make wormers work harder for us by focusing treatment on those lambs that will respond to worming with increased efficiency of production

Underperforming lambs that show increase in performance post-worming



Well-performing lambs that show no increase in performance post-worming

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Greer et al, 2009, Vet Parasitol. 164, 12-20

Happy Factor TST short-term weight gain

- Target underperforming animals
- Reduce wormer use by 40-50% compared to other strategies
- Maintain lamb performance
- Slows development of resistance
- Reduce costs and labour
- Successful in a range of farming systems and breeds

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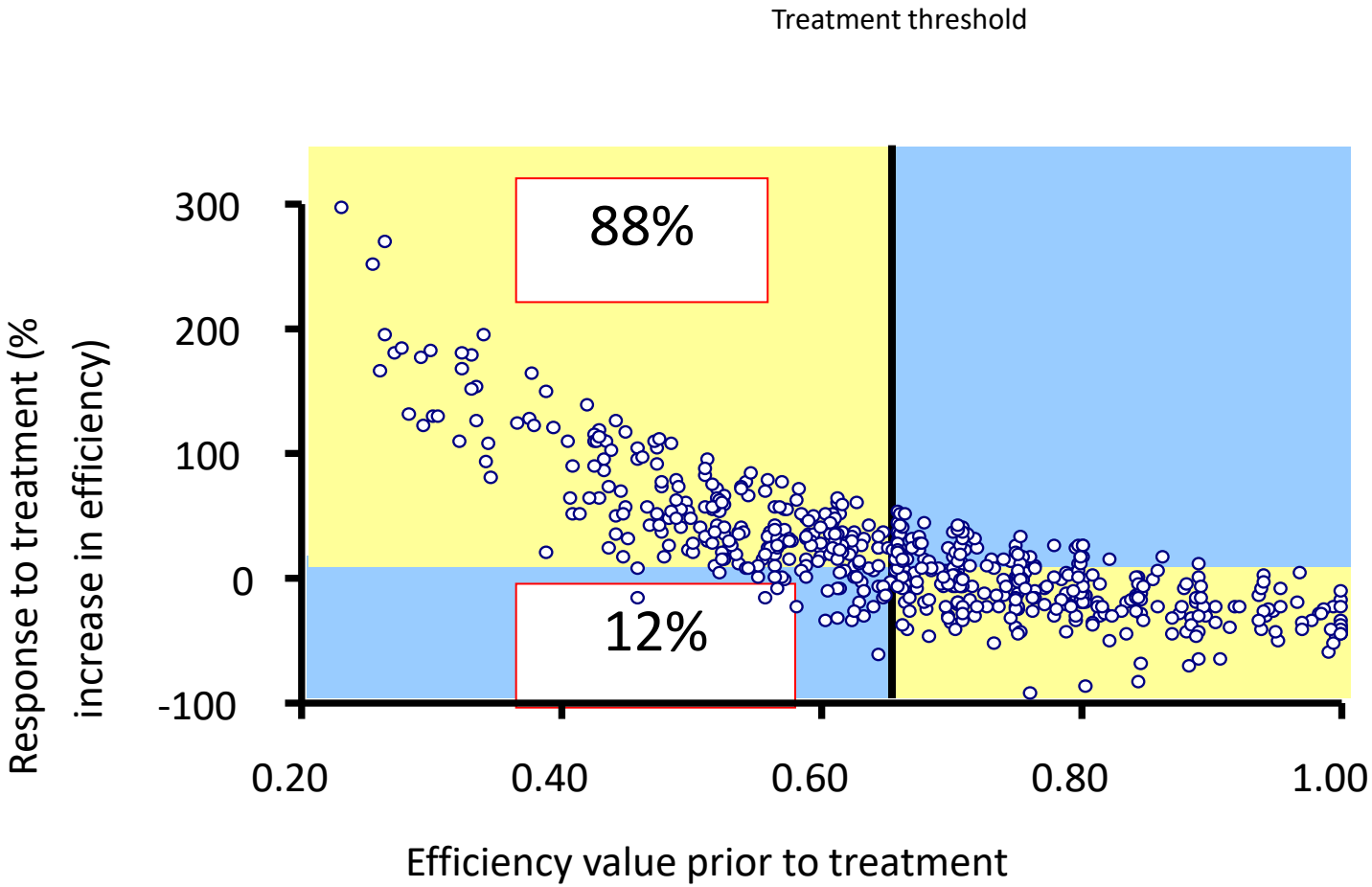
The happy factor identifies lambs requiring treatment with 74% sensitivity, 88% specificity



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TST reduces wormer use, maintains weight gain, slows wormer resistance and lower GHG

Group	Mean No. Treatments	Mean final bodyweight (kg)	Mean IVM efficacy 2010 (95% confidence limits)	Mean GHG emission ($kgCO_2e$/kg LW)
Monthly	4.0	36.84	62% (55, 68)	2.17
TST	1.8	36.02	86% (81, 92)	2.22
Strategic	2.0	35.86	86% (83, 90)	2.27
Clinical	1.4	33.65*	83% (78, 88)	2.48*

Clinical – production cost and extra 10% emission of CO_2e per kg of weight gain

Kenyon et al, 2013, IJP:DDR, 3:77-84; Kenyon et al, 2013, Agriculture, 3:271-284

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Software development

- Farmers, farm advisors and vets included in design process
- Wanted way to determine minimum weight target automatically

- Dashboard to visualise information created

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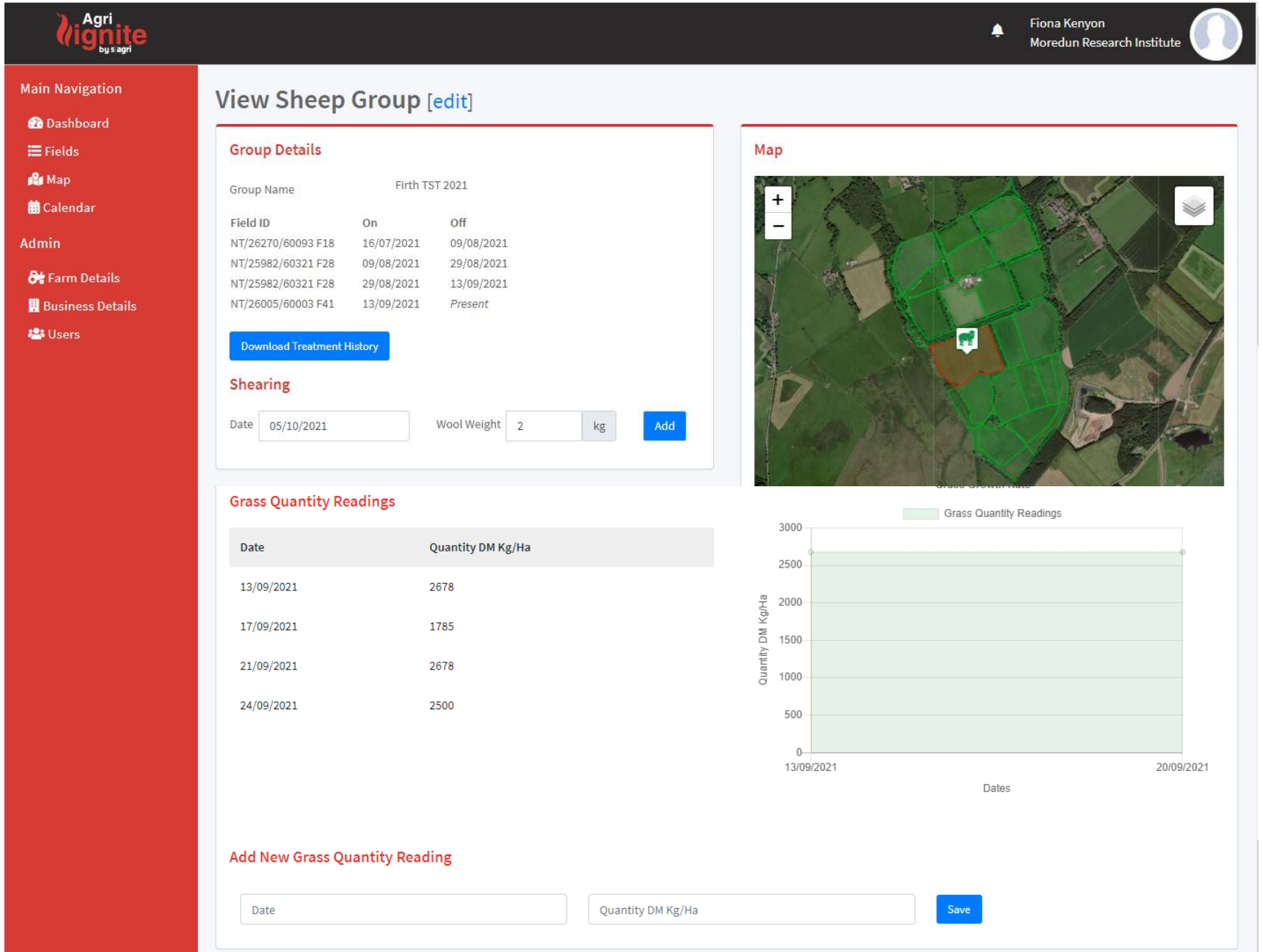
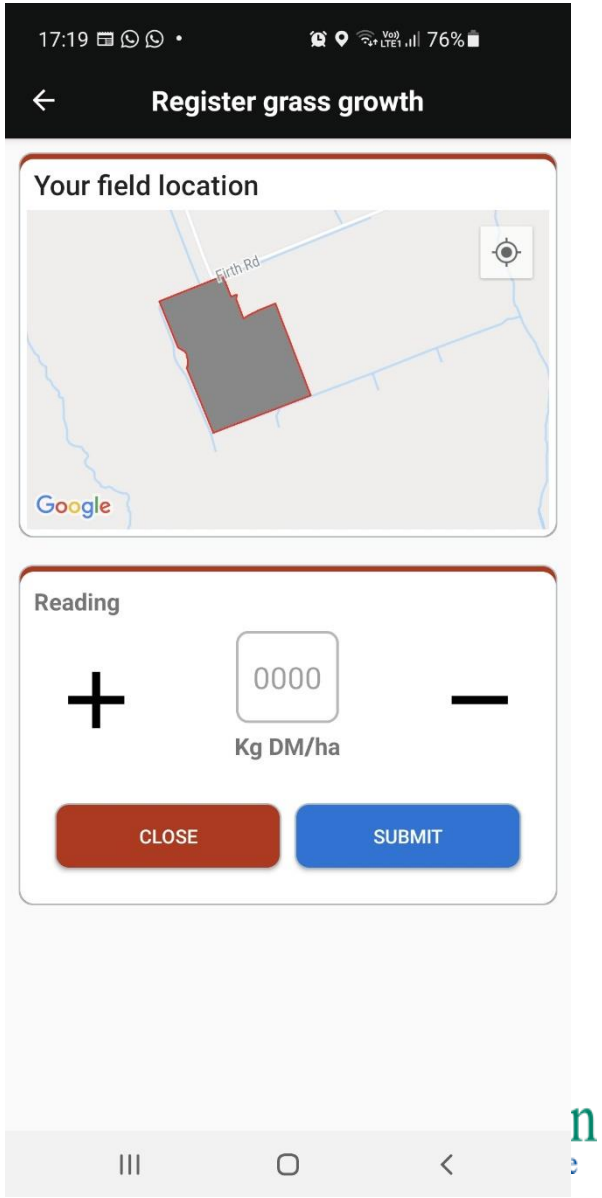
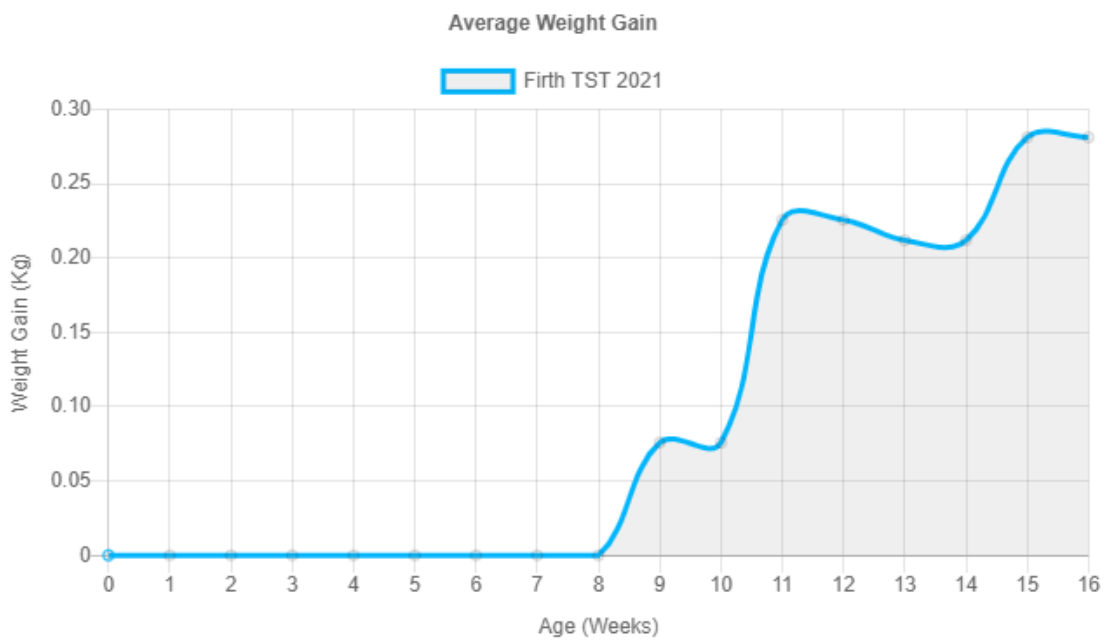
The TST APP Dashboard

Desktop and phone





Lamb Performance



Weather Details

Current:
Weather: heavy intensity rain
Wind: WNW, 3 mph
Temperature: 8°C
Sunrise: 7:23 Sunset: 18:38

Tomorrow:
Weather: moderate rain
Wind: NW, 13 mph
Temperature: 11°C
Sunrise: 7:25 Sunset: 18:35

Thursday:
Weather: light rain
Wind: SSW, 11 mph
Temperature: 16°C
Sunrise: 7:27 Sunset: 18:33

Groups

Group	Head Count	Weight	Growth Rate		
Firth TST 2021	96	48.17 Kg	0.28 Kg/day	view	Edit

Create

Upload To Ignite

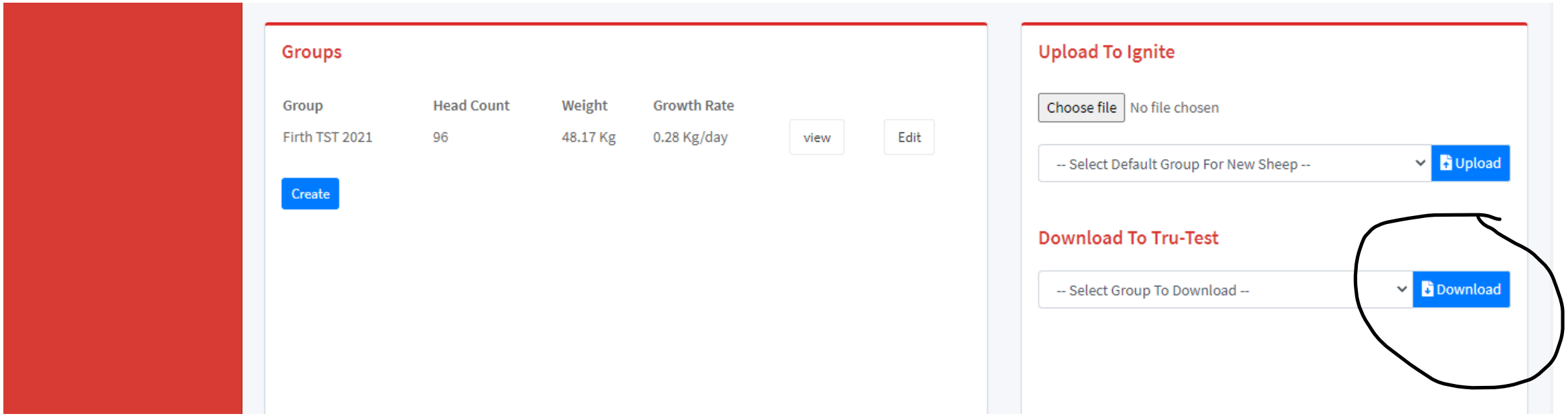
Choose file No file chosen

-- Select Default Group For New Sheep -- Upload

Download To Tru-Test

-- Select Group To Download -- Download

To get minimum target weights…



Email: info@5agri.co.uk

Weigh lambs and draft against target weight

Have reached weight target,
No treatment

Did not reach weight target,
TREAT

Visual check for any other issues recommended for ‘sad’ lambs

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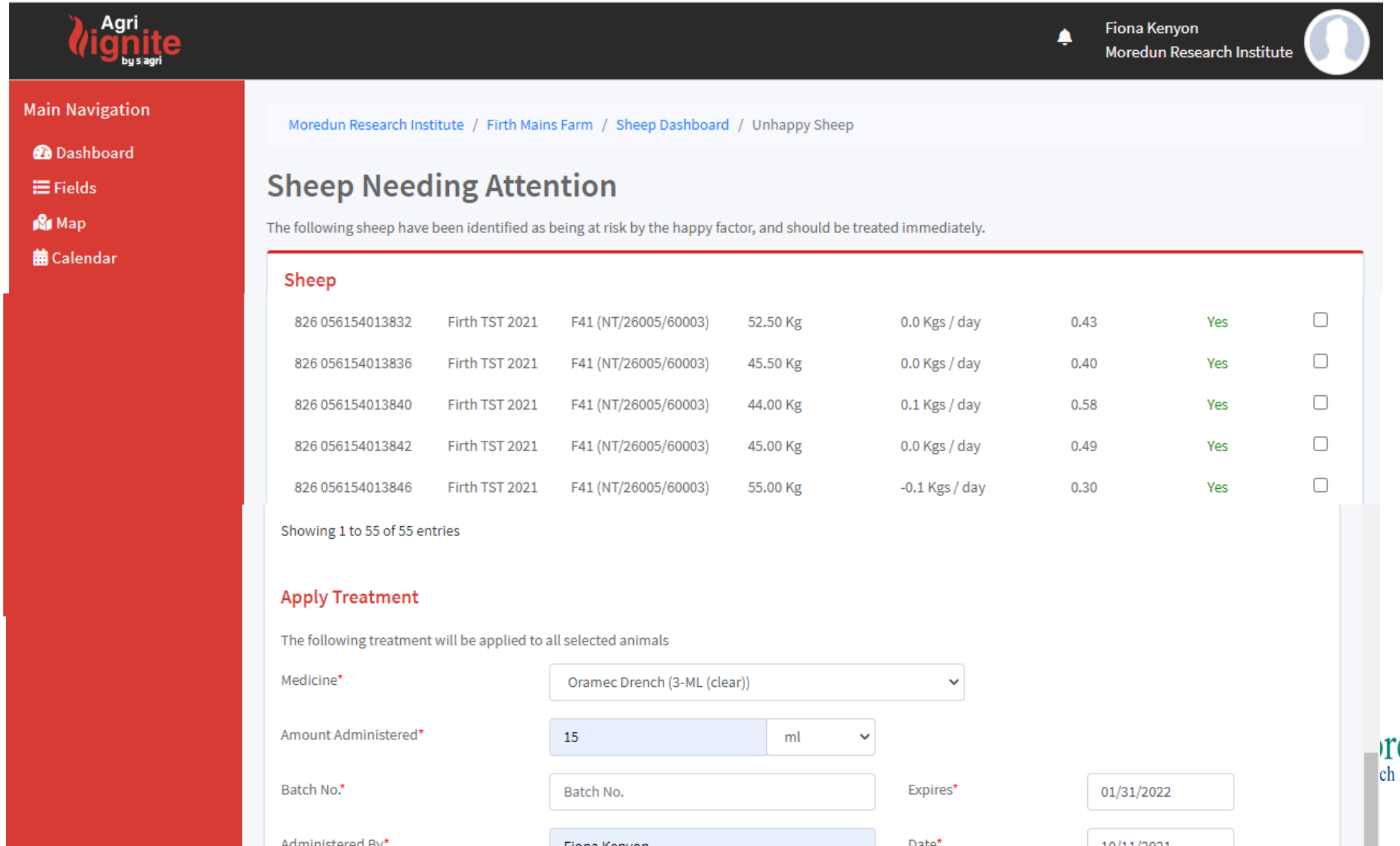
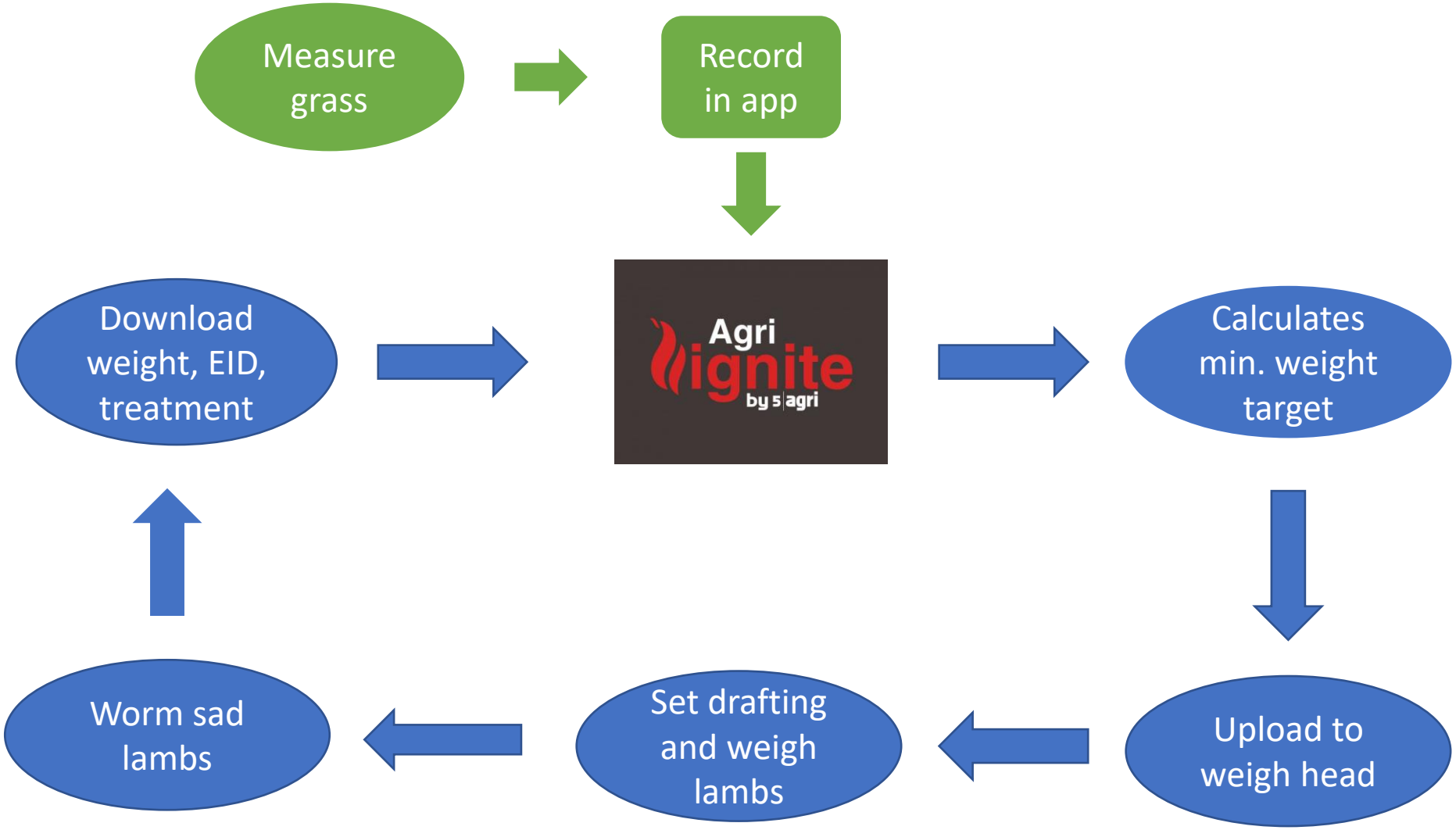
Includes a medicine record





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Commercial Farms:

- AGR
- EG
- LS
- MC1

Institute Farms:

- MRI
- SRUC

On farm validations

System simple to use and gives farmers better understanding of growth rates on farm

- No impact of leaving some lamb untreated,
- Gained confidence in using technology

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On farm validations complete

- Plenty of teething problems
- Main issues
  - Connectivity between equipment
  - Data format
  - Lack of familiarity with equipment, both farmers and advisors
- All but one farmers had success in using AgriIgnite

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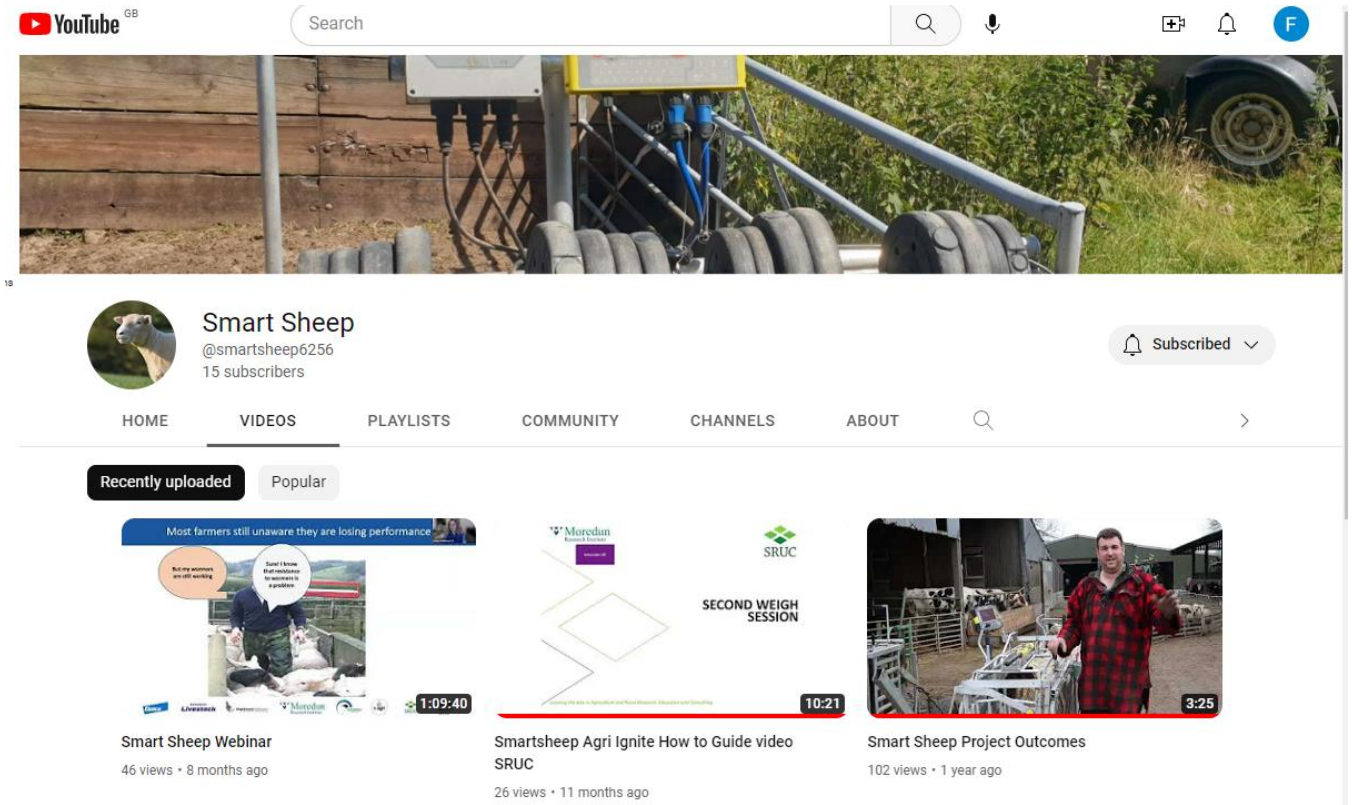
SmartSheep: Precision Parasite Control & Integrating Technology

Youtube Channel Development

- Series of videos developed
- Storyboard but also to stand alone
- Multiple advisors and farms involved
- Freely available to the public



https://www.youtube.com/channel/UCyis8euy-AQw159rWAZgrYQ

Elanco
DATAMARS Livestock
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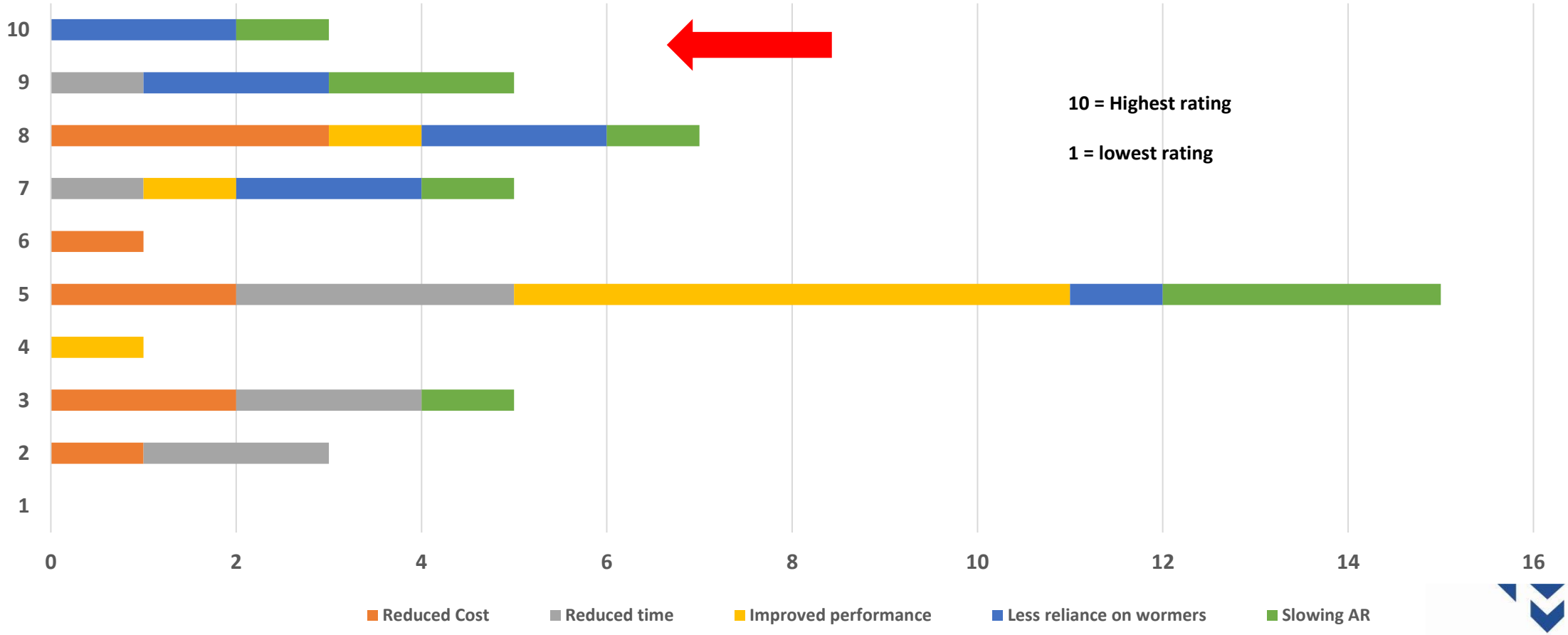
Scoring the benefits of Smart Sheep



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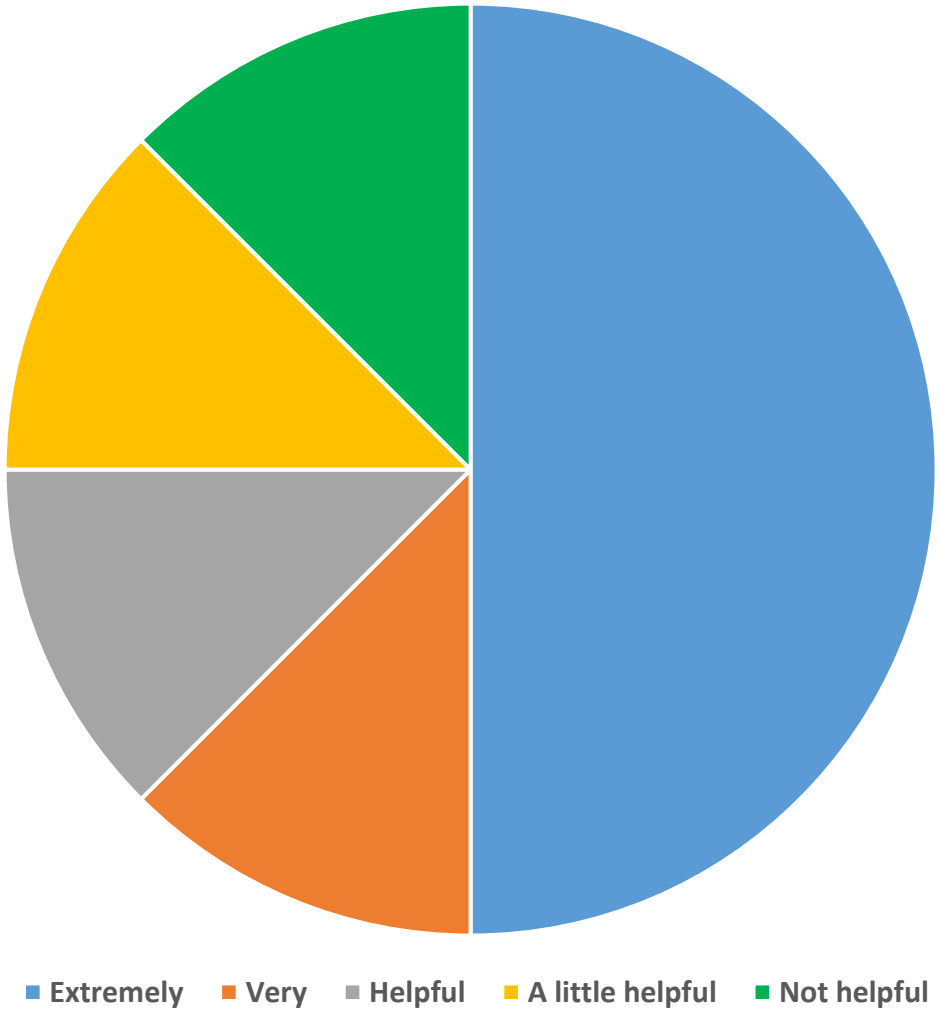
How helpful was the project in your general use of PLF?



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Measure the weight gain of some animals

MEASURE to MANAGE
Use EID to **record** individual weights

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LOOK at the data

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Ask Questions- Are the animals growing as you would expect? If not, why not?

Check your pasture

Agri ignite by 5|agri

Use a **software package** to collate all this data to allow you to make **informed decisions** on any **interventions**

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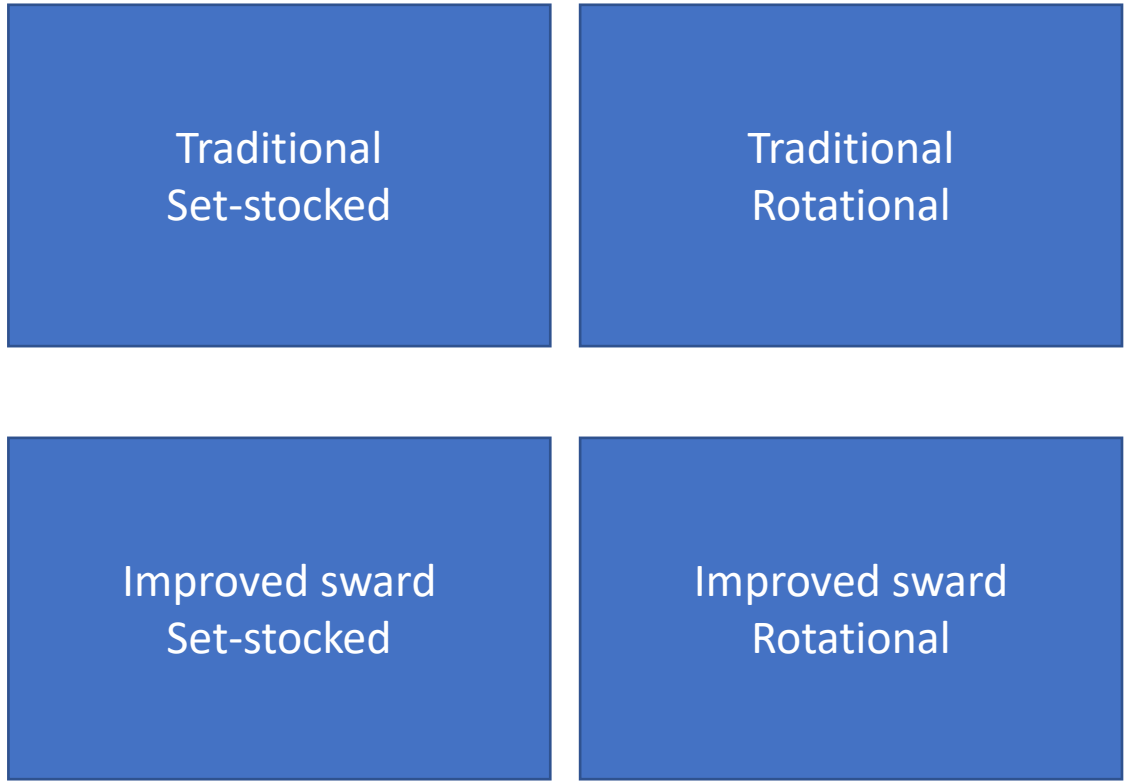
How can we further improve reduction in anthelmintic use?

- Breeding for resistance/tolerance of worm infections
- Improved sward mix
  - including various pasture species with properties such as increased nutrition, anthelmintic effects
- Grazing management

Integrated worm control trial



In a sheep only system

What are the production benefits of the various systems?
> Expect that Improved sward, rotational will be best

What is the impact of each system on roundworm prevalence and species composition?

How much wormer is required to maintain acceptable lamb growth? (Use TST to determine wormer need)

What is the longevity of the improved pasture species?

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Thanks to……

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