This project has received funding from the European Union's Horizon 20202 research and innovation programme under grant agreement No. 862050

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

Halosheep 3rd Annual Consortium meeting + 2nd Info day
2 – 4 October 2024
Universidad de León (ULE), Conde Luna Palace
León/ SPAIN

SRUC

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Εργαστήριο Υγεία & Ευζωία Παραγωγικών Ζώων
ΙΝΣΤΙΤΟΥΤΟ ΚΤΗΝΙΑΤΡΙΚΩΝ ΕΡΕΥΝΩΝ

PRIMA PARTNERSHIP FOR RESEARCH AND INNOVATION IN THE MEDITERRANEAN AREA
European Commission
HaloSheep

The Aim :

The project in a nutshell

TechCare is a multi-actor approach project to demonstrate innovative approaches and appropriate business models to monitor animal-based welfare indicators and improve welfare management in small ruminants (SR) systems using precision livestock farming (PLF) technologies along the whole production chain, enabling all stakeholders, from farmers to consumers and regulators to choose animal welfare friendly products. TechCare will tackle the challenge of using innovative and low-cost technologies, adapted to small ruminant systems across the EU.

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The Consortium

9 countries, 19 partners

1. **UK:** 3 partners: SRUC, MRI, *Breedr Ltd*
2. **France:** 5 partners: Idele, INRAE, *CNBL, API-AGRO, Page Up*
3. **Italy:** 3 partners: Agris, EAAP, *Abinsula*
4. **Spain:** 2 partners: UAB, *Oviaragon*
5. **Israel:** 2 partners: ARO, *Spark*
6. **Romania:** 1 partner: BUAS
7. **Ireland:** 1 partner: Teagasc
8. **Norway:** 1 partner: NIBIO
9. **Greece:** 1 partner: ELGO-VRI

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1. Background

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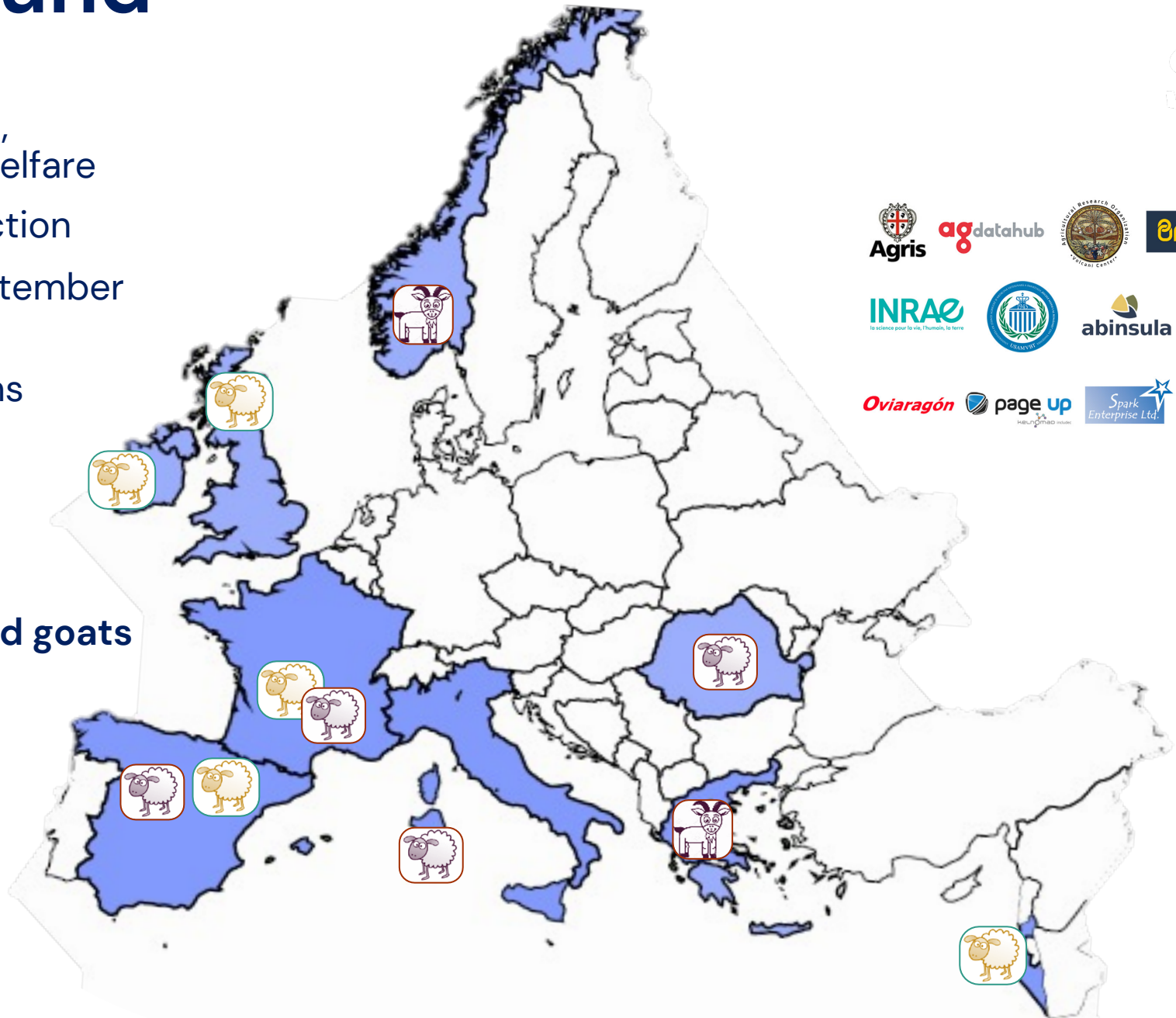
- H2020-SFS-2019-1, Improving animal welfare
- Type: Innovative Action
- Starting date: 1 September 2020
- Duration: 60 months



- Focus on **sheep and goats farming systems**

- **9 countries**
- **19 partners**

5 key steps:

1. Prioritise welfare challenges and issues

2. Identify potential innovative technologies solutions

3. Validate the solutions in different and real conditions

4. Define appropriate business models

5. Communicate widely the results

2 main outputs:

1. Ready to use **PLF solutions** for small ruminant welfare management (**tested & validated**)
2. Guidelines/blueprints for adapted solutions not ready yet to be deployed

2. Methods

Welfare issues prioritisation

Literature review

Step 1a. Expert panels

Shortlist of ~30-40 welfare issues & indicators

Step 2. Stakeholders' workshops

Welfare issues priority lists

Literature review

Welfare issues & associated animal-based indicators priority lists
&
Definition of broad categories of welfare indicators

Precision Livestock Farming (PLF) technologies prioritisation

Literature review of PLF tools

Step 1b. Expert panels

Shortlists of PLF tools (animal-based or not)

Step 3. Expert panels

Final lists of PLF tools that could address the identified welfare priorities & their broad categories of indicators

To be tested on pilots then on large-scale studies

Morgan-Davies et al. 2024. Exploring the use of PLF for small ruminant welfare management. Animal, 101233.

3. Results

welfare priorities & indicators

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

Overall welfare priorities (all sheep)	
1	Nutritional issues
2	Mastitis
3	Gastrointestinal parasites
3	Lameness
5	Ectoparasites
6	Inadequate water supply
6	Reproductive disorders

Weight loss or change in body state (animal based)

Behavioural change (animal based)

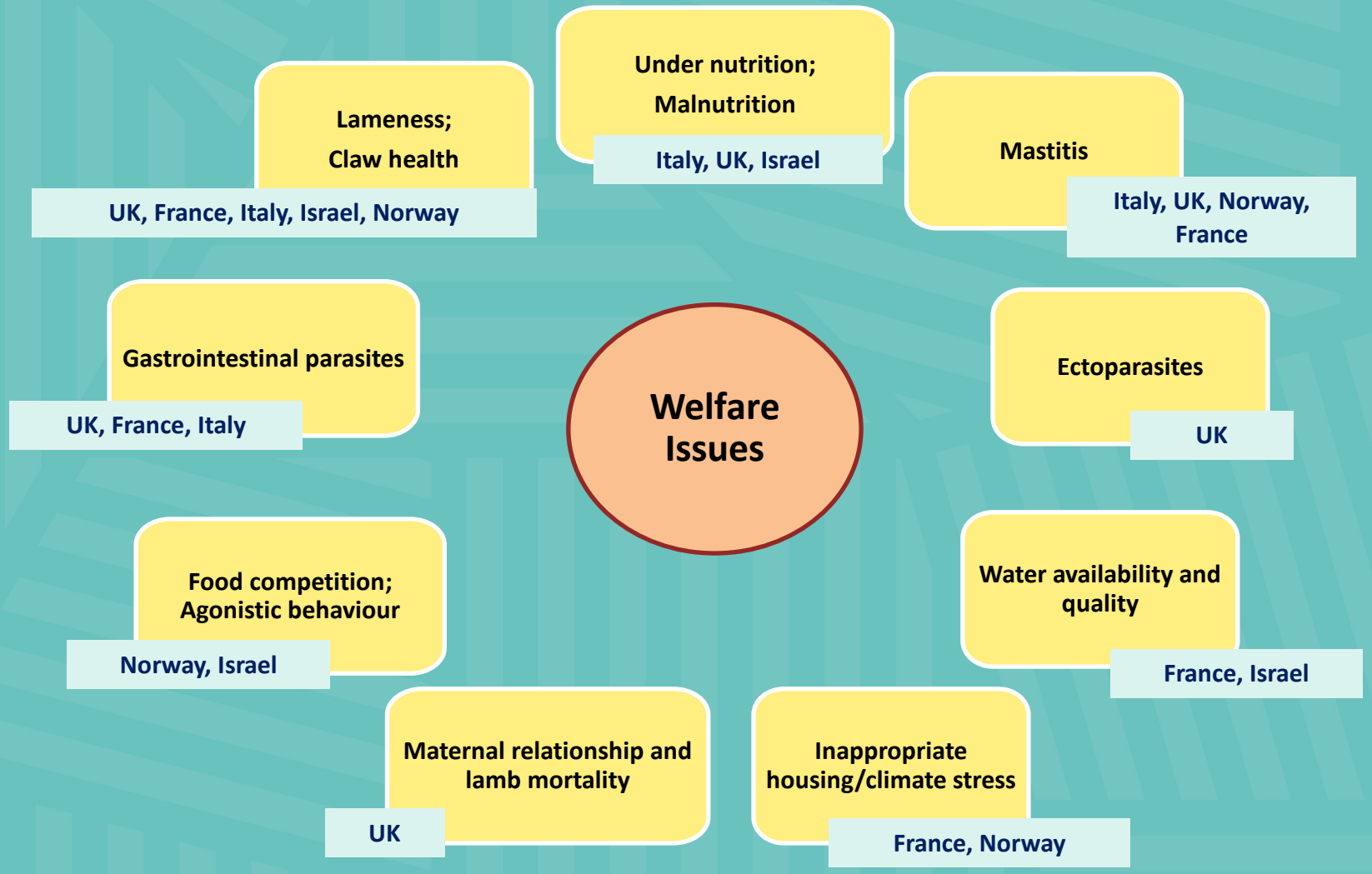
Milk yield and quality (animal based)

Environmental indicators (resource based)

Overall welfare priorities (all goats)	
1	Mastitis
	Insufficient food & water
	Agonistic behaviour/feed competition
	Poor environmental management
	Gastrointestinal parasites
	Ectoparasites
	Lameness/claw health

3. Results

Pilots studies



3. Results

Pilots studies

Technological devices tested	Nutritional issues	Mastitis	Gastro-intestinal parasites	Lameness/ claw health	Inappro-priate water supply	Agonistic behaviour	Poor envtal management
Water meters	BC		BC	BC	BC		
Walk-over-Weigh	BWC		BWC	BWC	BWC		
Proximity loggers	BWC		BWC	BWC	BWC		
Portable SCC readers	MY	MY					
Thermal camera	MY	MY			MY		
EID UHF ear-tags + readers	BC	BC	BC	BC	BC	BC	
EID LF ear-tags + readers	BC	BC	BC	BC	BC	BC	
Electronic milk meter	MY	MY					
Milk tank weighing scales	MY	MY			MY		
Temp. & Hum. sensors					Evt		Evt
Weather stations					Evt		Evt
Weigh crate	BWC		BWC	BWC	BWC		

BC = behaviour change *BWC = change in body state* *MY= milk yield & quality* *Evt - Environmental indicators*

3. Results

Pilots studies

Technological devices tested	Nutritional issues	Mastitis	Gastro-intestinal parasites	Lameness/ claw health	Inappro-priate water supply	Agonistic behaviour	Poor envtal management
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Thermal camera	MY	MY			MY		
EID UHF ear-tags + readers	BC	BC	BC	BC	BC	BC	
EID LF ear-tags + readers	BC	BC	BC	BC	BC	BC	
Electronic milk meter	MY	MY					
Milk tank weighing scales	MY	MY			MY		
Temp. & Hum. sensors					Evt		Evt
Weather stations					Evt		Evt
Weigh crate	BWC		BWC	BWC	BWC		

3. Results

Large scale studies

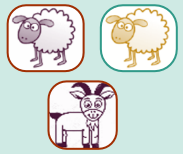
Technological devices	France	Greece	Ireland	Spain	Romania
EID LF ear-tags + readers	✓	✓	✓	✓	✓
Electronic milk meter	✓	✓		✓	
Milk tank weighing scales	✓	✓			✓
Temp. & Hum. sensors	✓	✓	✓	✓	
Weather stations	✓	✓	✓	✓	
Weigh crate			✓	✓	

- Potential to measure broad welfare indicators
- Available commercially
- Meet other criteria for likely uptake by farmers (e.g., cost, robustness, ease of use).

- 6-10 commercial farms in each large scale
- Welfare assessments





	Technologies selected	Production	Level of data information	Relevant measure	Welfare Issues	Welfare indicators
	**EID tags (LF or UHF)**		Individual	Movement patterns, use of key resources Behavioural change, ewe-lamb relationships	• Lameness • Mastitis • Other illnesses	Behavioural change (BC)
	**Milk meter**		Individual	Individual changes in milk production	• Mastitis • Heat stress	Milk yield (MY)
	**Milk tank scale system**		Flock/batch	Flock-level changes in milk production		
	**Inside sensors (housing conditions)**		Flock	Environmental risks	• Heat stress • Environmental air quality, bedding quality • Respiratory diseases	Environment: (Evt)
	**Weather station (outside)**		Flock	Environmental risks	Outdoor environmental stress (temperature, rainfall, wind, etc.)	Environment (Evt)
	**Weigh crate** With an EID reader/antenna or stick		Individual	Changes in weight or condition	• Nutrition (Bad/under) • Lameness • Mastitis • Internal and external parasites • Other issues: conflicts with wildlife	Body state change (BWC)

4. What's next?

Alerts for farmers

Algorithms (sensors + welfare assessments data)

- Change in milking order (LF ear tags & readers)
- Change in milk yield (milk meters/milk tank weigh)
- Change in liveweight (LF ear tags & readers with weigh crate)
- Change in environmental conditions (THI -> with indoor/outdoor weather station)

Completed with pilots, to be refined with large scale

Ongoing with pilots, to be refined with large scale





5. Conclusions

- Useful approach for uptake
- Potential for sensors to monitor sheep/goat welfare
- Limited level of optimal technology
- Alerts? ongoing
- Promising other technologies -> still prototypes or too expensive





Acknowledgments

All the farmers and stakeholders in the 9 countries for their feedback and to the commercial farmers in the 5 countries for their participation

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