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TechCare: technologies to manage the welfare of sheep and goats: from pilots to large scale studies

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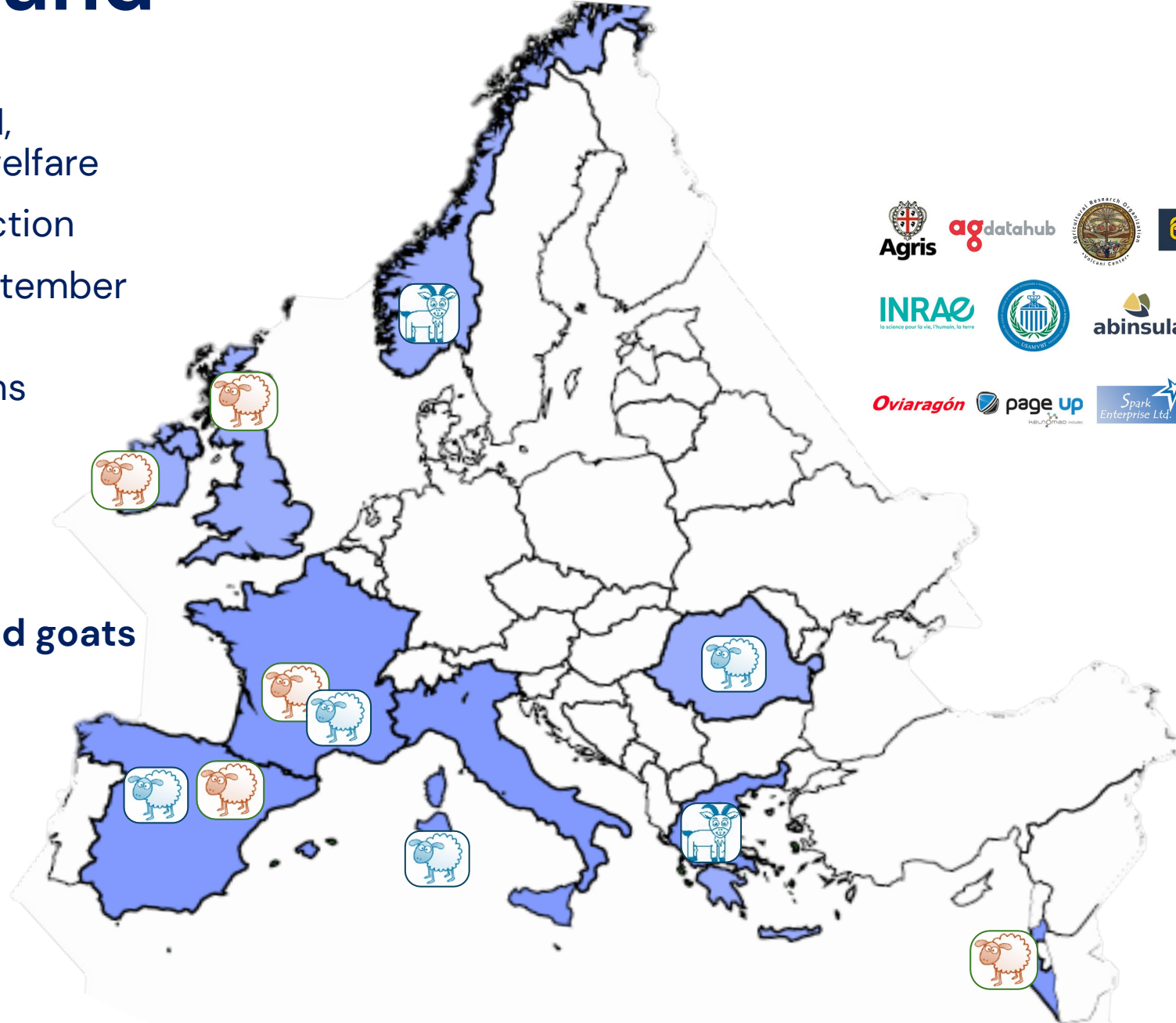
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1. Background

- 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

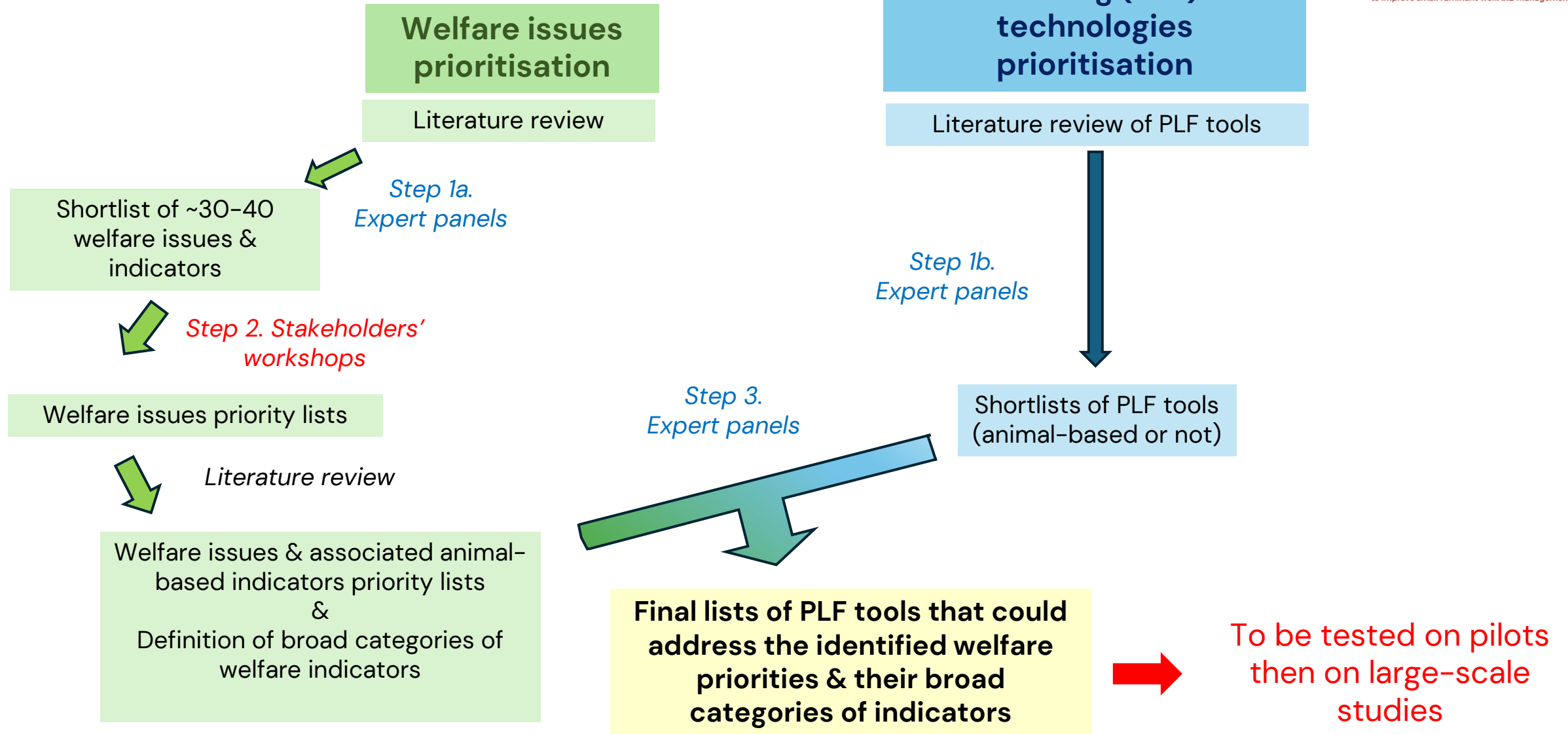


2 main outputs:

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



3. Results

welfare priorities & indicators



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



Weight loss or change in body state (animal based)

Behavioural change (animal based)

Milk yield and quality (animal based)

Environmental indicators (resource based)

3. Results

Pilots studies – research farms



Technological devices tested	Nutritional issues	Mastitis	Gastro-intestinal parasites	Lameness/ claw health	Inappropriate water supply	Agonistic behaviour	Poor envt 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

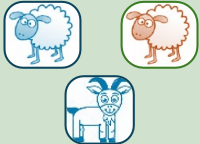
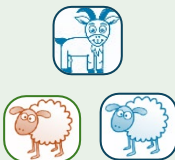
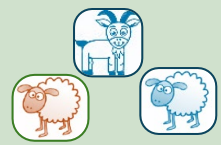
Large scale studies

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	Welfare Issues	Welfare indicators
	EID tags (LF or UHF)		Individual	• Lameness • Mastitis • Other illnesses	Behavioural change (BC)
	Milk meter		Individual	• Mastitis • Heat stress	Milk yield (MY)
	Milk tank scale system		Flock/batch	• Mastitis • Heat stress	Milk yield (MY)
	Inside sensors (housing conditions)		Flock	• Heat stress • Environmental air quality, bedding quality • Respiratory diseases	Environment: (Evt)
	Weather station (outside)		Flock	• Outdoor environmental stress (temperature, rainfall, wind, etc.)	Environment (Evt)
	Weigh crate With an EID reader/antenna or stick		Individual	• Nutrition (Bad/under) • Lameness • Mastitis • Internal and external parasites	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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