Report of the 5th transnational workshop (TNWS 5)

Sm@RT

Sm@ll Ruminant Technologies

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 101000471.

30th January 2024
Teams online conference
10.00 – 15h00 CET

TNWS5

OBJECTIVES

Four main objectives were identified for the fifth transnational workshop (TNWS 5):

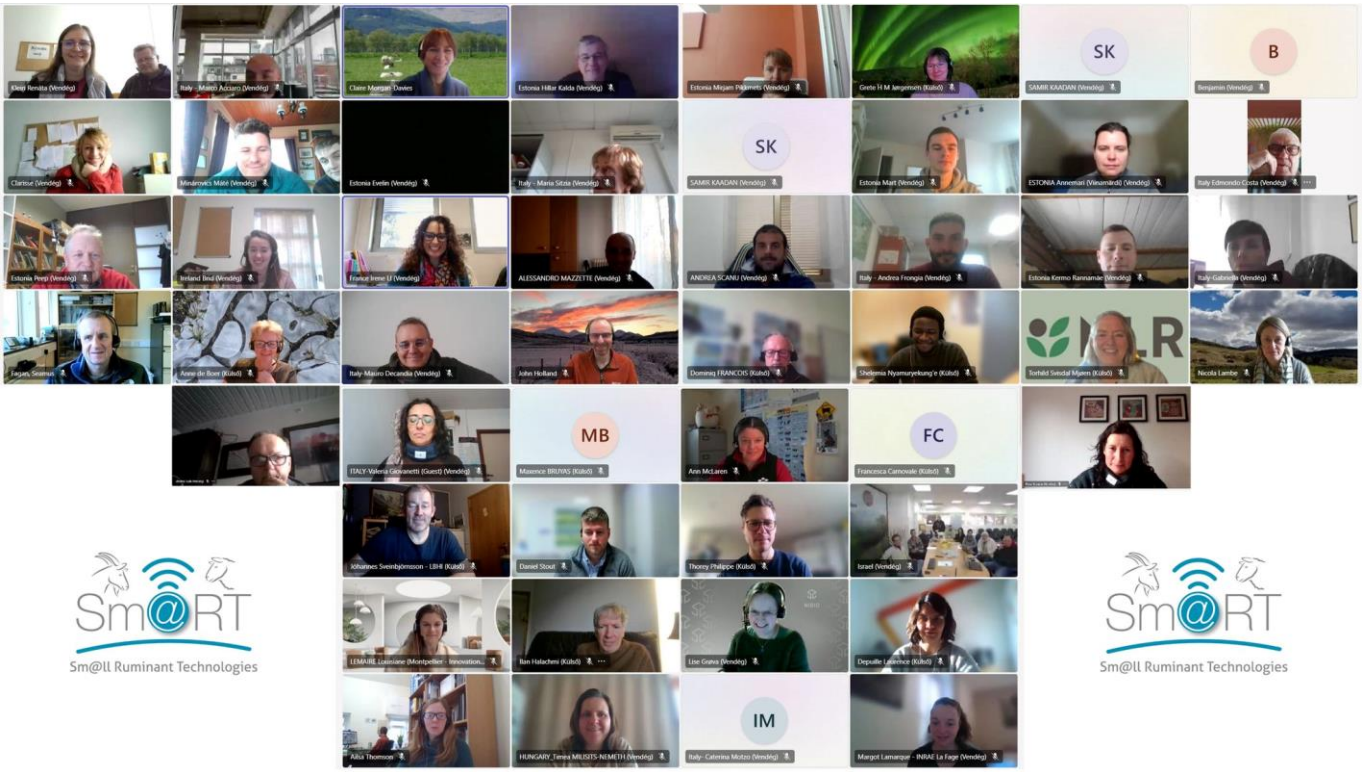
1. Present the Sm@RT project and its progress, in particular with regards to the farm demonstration days and training sessions, as well as the ongoing cost-benefit analysis of the selected innovative technologies.
2. Discussion around innovative technologies/digital tools adoption
3. Present and get some common feedback on the gaps between farmers' needs and identified innovative solutions.
4. Discover the Israeli sheep and goats sectors, and their use of innovative technologies.

ORGANISATION AND ATTENDEES

Due to the tragic events in the Middle East, the original organisation, which was a face-to-face meeting in Israel, was replaced by a Teams conference. Additionally, partners endeavoured to invite farmers and stakeholders/colleagues who could speak English, so most of the discussions were held in that language. The main meeting was hosted by the UK partner.

The TNWS 5 took place on the 30th of January 2024, at 10:00 am CET for 5 hours with 1 hour lunchbreak. The meeting was a plenary session in English and a series of breakout sessions by country (with discussions in their own language). In total, there were 8 breakout rooms for one of the sessions. The agenda of the meeting is detailed in annex 1. The slides used during the meeting are presented in annex 2.

A total of 72 people participated in this fifth TNWS, 9 from France, 7 from the UK, 4 from Ireland, 6 from Hungary, 8 from Norway, 12 from Estonia, 12 from Israel and 13 from Italy. We also had one participant from Iceland, who joined in with the Norwegian group. One of the Hungarian participants was a member of our advisory group.



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ADOPTION RATING OF THE REMAINING SOLUTIONS

During the plenary session, the project was presented to the participants, as well as a reminder of the results regarding farmers' needs in terms of technology and digital innovations, the solutions proposed by each country around the 5 main topics considered ((feeding/grazing, health/welfare/reproduction, milking/fattening, and flock management), the guidelines on those solutions being prepared, a report on the farm demonstration days and training sessions organised in each country in the past 2 years, and the cost-benefit analysis being prepared on the solutions.

Next, a participatory exercise to understand adoption of technologies by farmers was carried out in breakout rooms.

Each breakout room considered one technology solution proposed by another country, and, using the ADOPT software, defined the adoption rate and the time to peak adoption. The technologies chosen were the last ones which had not yet been considered during the past activities of the project.

The results from each breakout room was:

Room/Country	Technology	Adoption rate	Years till adoption
Estonia	Water meter (French solution)	77%	22 years
France	Automatic feeder (Italy/Hungary)	17%	5 years
Hungary	Pregnancy scanning (Irish solution)	97%	3 years
Ireland	Connected fence (French solution)	16%	12 years
Israel	Milk feeder for goats (Estonian solution)	7%	15 years
Italy	Milk tank weigher (French solution)	76%	8 years
Norway	Conveyor (Irish solution)	3%	11 years
UK	FEC pack (Irish solution)	58%	8 years

GAPS BETWEEN NEEDS & SOLUTIONS

In a plenary session, an exercise around the gaps between the identified needs and solutions was undertaken. Out of 116 needs identified during the first part of the project, only 18 did not have any solution.

Using a whiteboard function in Teams, participants were asked to brainstorm and write their suggestions regarding potential tools that could answer some of the needs. There were 3 needs regarding reproduction, 4 needs around health/welfare, 3 around herd monitoring, 2 around feeding/grazing, 4 regarding milking and 2 on fattening. The symbols show the species/system affected (yellow sheep = meat; blue sheep=dairy, green goat = dairy).

The results suggested by the participants are shown below:

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Topic	Need	Digital/PLF solutions?
Reproduction	Automatized following of the reproduction (warnings at every step)	• Oestrus detector (Alpha detector) • A bolus to record temperature
Reproduction	Identifying/controlling abortion issues	• Trough AI • Cameras • Isolation & recording ewes with abortion • Walk over Weigh to record unexpected liveweight change
Reproduction	Protection from predators of different mating groups at mating	• Activity monitors • High tensile fences with hot wires and dog • FindMy (distress warning under research)
Health/Welfare	Udder health/mastitis	• Portable somatic cell counters (only experimental) • Camera to detect mastitis (IR)? • UHF readers to identify animals at the back when moving
Health/Welfare	Early detection / tools to prevent diarrhoea in lambs	• FEC pack to check worm counts • Daily weight gain recordings
Health/Welfare	Early diagnosis of some infectious diseases (rams)	• Trough AI • Record eye temperature daily (only experimental)
Health/Welfare	Prevention and diagnosis of lameness	• Activity/distance walked may alert lameness

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Topic	Need	Digital/PLF solutions?
Herd monitoring	Automatic data recording	• GPS collars with automatic recording/integration of data
Herd monitoring	Sensors (ear, foot) for milk performance recording	• Milk meter with EID readers in parlour (Delaval already does it) • SCR
Herd monitoring	Monitoring of grazing (parasitism)	• FEC pack • Use FECpack to monitor egg counts in the animals. Use the egg count to predict which pastures will have more or less egg contamination, then graze or avoid • Virtual fencing to manage grazing with the aim of low parasitism
Feeding/Grazing	Increase of herbage availability and quality	• Grasshopper • Drone • (Overseeding – with different types of herbage)
Feeding/Grazing	Recording of feed intake times on pasture	• Bite-meter – technology from the Netherlands? (but not very accurate). • AGRIS Sardegna also has a bite-meter prototype (Beharum)

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Topic	Need	Digital/PLF solutions?
Milking	Individual milking supplementation based on animal's needs	• Individual concentrate distributor
Milking	Link between farmers and suppliers	• Supplier in milking parlour? • Whatsapp
Fattening	Additional feeding lambs during weaning time	• EID enabled weighing crate • Automated feed intake recording equipment
Fattening	Identification and management of lame lambs	• Activity monitors
Milking	Automatization of the cleaning of milking parlour (with alerts if problems)	• No suggestion
Milking	Pre and post dipping/udder cleaning management	• No suggestion

Most of the solutions proposed are still prototypes and not necessarily readily available or affordable to farmers.

VIDEOS ON ISRAELI SHEEP & GOATS SECTORS

A series of videos prepared by the Israeli partners were shown to the participants, who were then able to ask questions to the Israeli partners present in the Teams call.

1st video: Presentation of ARO & sheep & goats sectors in Israel

https://www.youtube.com/watch?v=B7pEA-cteO0

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2nd video: Presentation of a semi-extensive goats farm

https://www.youtube.com/watch?v=Na0NyilGmJ8

3rd video: Presentation of a sheep & goats intensive farm

https://www.youtube.com/watch?v=4qdQRjyjKy4

4th video: Presentation of a sheep dairy farm

https://www.youtube.com/watch?v=da6GxKOHIpI

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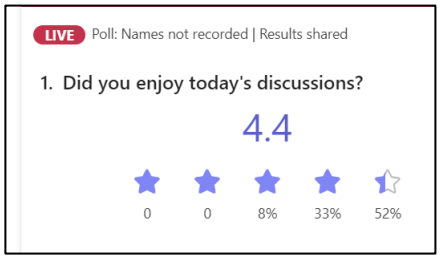
5th video: Presentation of technology used on an intensive lamb meat farm

https://www.youtube.com/watch?v=h0L62dwszJo

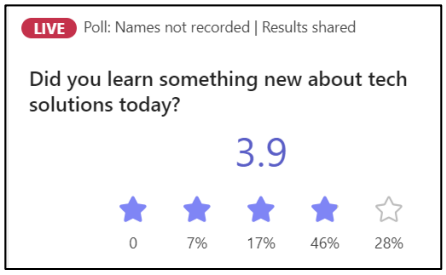
SATISFACTION POLL

A poll was used to gauge participants' satisfaction.

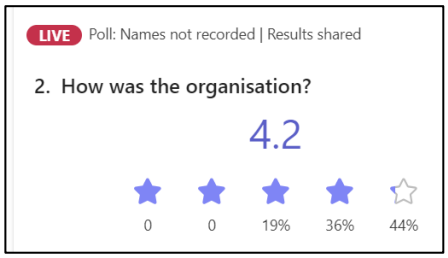
Did you enjoy today's discussions?



Did you learn something new about technology solutions today?



How was the organisation



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ANNEXES

Annex 1 - agenda

What	UK/Ireland time	France/Italy Norway/Hungary	Estonia/Israel
Welcome & Project update	**9.00 – 9.15**	**10.00 – 10.15**	**11.00 – 11.15**
Breakout sessions on technologies adoption	9.15 – 10.15	10.15 – 11.15	11.15 – 12.15
Presentation of Israeli sheep & goats' sectors (videos)	10.15-10.30	11.15-11.30	12.15-12.30
Feedback on technology farm demonstration days	10.30-11.00	11.30-12.00	12.30-13.00
Presentation of 2 Israeli farms and technology used (semi-extensive goats farm & sheep/goats intensive farm)	11.00 – 11.20	12.00 – 12.20	13.00 – 13.20
LUNCH (~1 HOUR)	**11.20-12.20**	**12.20-13.20**	**13.20-14.20**
Presentation of 2 Israeli farms and technology used (sheep dairy farm & intensive meat lambs farm)	12.20 – 12.30	13.20 – 13.30	14.20 – 14.30
Discussion on gaps between farmers' needs and available technologies	12.30 – 13.30	13.30 – 14.30	14.30 – 15.30
Feedback on technologies cost-benefits analyses	13.30 – 13.40	14.30 – 14.40	15.30 – 15.40
Project communication update	13.40-13.50	14.40-14.50	15.40-15.50
Conclusions & feedback	**13.50 – 14.00**	**14.50 – 15.00**	**15.50 – 16.00**

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Annex 2 – Participants list (from Teams)

Name	Room Name
ESTONIA Annemari (Viinamärdi)	Room 1- Estonia
Estonia Evelin	Room 1- Estonia
Estonia Hillar Kalda	Room 1- Estonia
Estonia Kermo Rannamäe	Room 1- Estonia
Estonia Maria	Room 1- Estonia
Estonia Mart	Room 1- Estonia
Estonia Mirjam	Room 1- Estonia
Estonia Mirjam Pikkmets	Room 1- Estonia
Estonia Peep	Room 1- Estonia
Estonia Priit	Room 1- Estonia
Estonia Saltanat	Room 1- Estonia
Estonia_Marwin Joseph	Room 1- Estonia
Clarisse	Room 2 - France
Depuille Laurence	Room 2 - France
Dominiq FRANCOIS	Room 2 - France
France Irene LI	Room 2 - France
LEMAIRE Louisiane	Room 2 - France
Margot Lamarque - INRAE La Fage	Room 2 - France
Maxence BRUYAS	Room 2 - France
Tesniere Germain	Room 2 - France
Thorey Philippe	Room 2 - France
Hungary Dr. Nora Vass	Room 3 - Hungary
Hungary István Egerszegi	Room 3 - Hungary
Hungary Nagy Zsuzsanna	Room 3 - Hungary
HUNGARY_Timea MILISITS-NEMETH	Room 3 - Hungary
Klein Renáta	Room 3 - Hungary
Minárovics Máté	Room 3 - Hungary
Fagan, Seamus	Room 4 - Ireland
Ireland Brid	Room 4 - Ireland
tim (Guest)	Room 4 - Ireland
Tomas Ireland	Room 4 - Ireland
Assaf Godo	Room 5 - Israel
Benjamin	Room 5 - Israel
dorit.kababya.il	Room 5 - Israel
Edna/il	Room 5 - Israel
elanit dadosh kalfon il	Room 5 - Israel
Ilan Halachmi	Room 5 - Israel
Israel	Room 5 - Israel
Jonathan IL	Room 5 - Israel
ofir maimon	Room 5 - Israel
SAMIR KAADAN	Room 5 - Israel
Tzach Glasser	Room 5 - Israel
איילות דהלוי	Room 5 - Israel
ALESSANDRO MAZZETTE	Room 6 - Italy
ANDREA SCANU	Room 6 - Italy
ANTONELLO LEDDA	Room 6 - Italy
Francesca Carnovale	Room 6 - Italy
GIAN SIMONE SECHI	Room 6 - Italy
Italy - Andrea Frongia	Room 6 - Italy
Italy - Marco Acciaro	Room 6 - Italy
Italy - Maria Sitzia	Room 6 - Italy
Italy- Caterina Motzo	Room 6 - Italy
Italy Edmondo Costa	Room 6 - Italy
Italy-Gabriella	Room 6 - Italy
Italy-Mauro Decandia	Room 6 - Italy
ITALY-Valeria Giovanetti (Guest)	Room 6 - Italy
Anne de Boer	Room 7 - Norway
eivind	Room 7 - Norway
Grete H M Jørgensen	Room 7 - Norway
Jóhannes Sveinbjörnsson - LBHI	Room 7 - Norway (Iceland)
Nyhus, Lars Terje	Room 7 - Norway
Øystein Solli	Room 7 - Norway
Sauebonden	Room 7 - Norway
Shelemia Nyamuryekung'e	Room 7 - Norway
Torhild Svisdal Mjøen	Room 7 - Norway
Ailsa Thomson	Room 8 - UK
Ann McLaren	Room 8 - UK
Claire Morgan-Davies	Room 8 - UK
Daniel Stout	Room 8 - UK
John Holland	Room 8 - UK
Nicola Lambe	Room 8 - UK
Fiona Kenyon	Room 8 - UK

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Annex 3 – Slides

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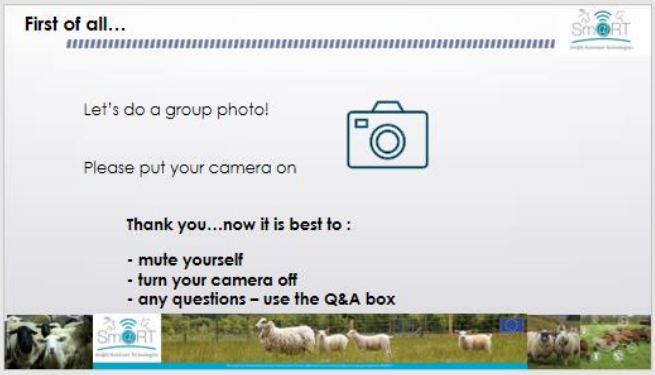

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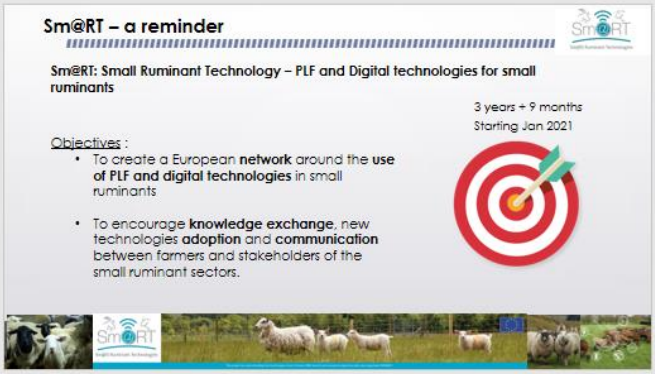

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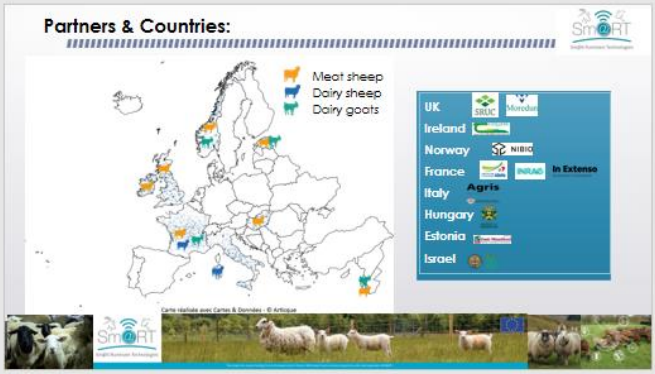

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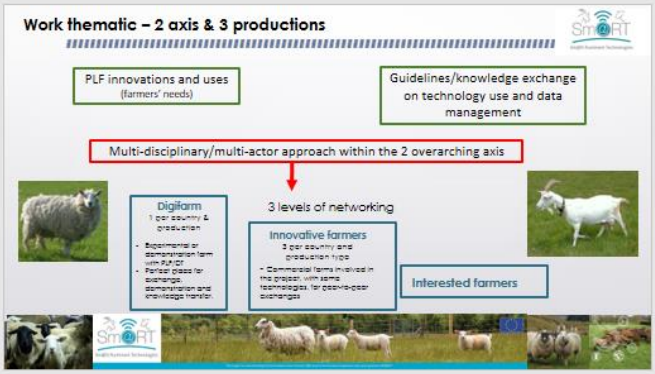

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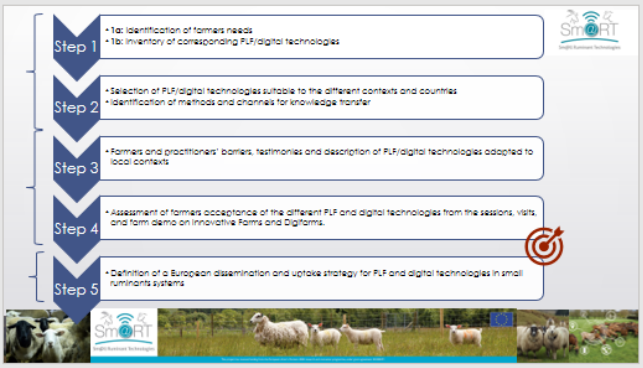

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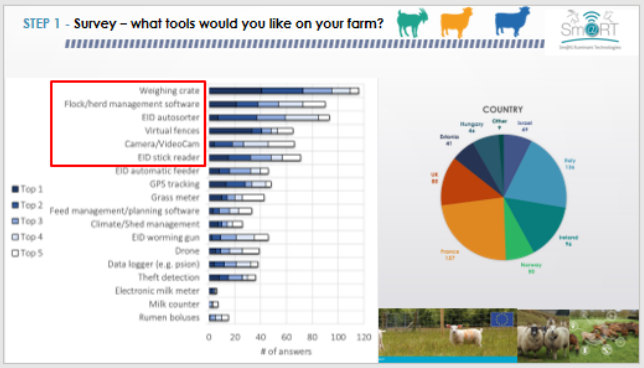

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STEP 1 - What technology needs do you have?

Topics			
Feeding/Grazing	*Forage quality*	*Fencing*	*Pasture monitoring*
Health/Welfare	*Early detection of health issues*	*Early detection of diseases*	*Early diagnosis of mastitis*
Reproduction	*Optimisation of AI*	*Animal selection*	*Early pregnancy diagnosis*
Flock/Herd management	*Batch management*	*Lack of support for using the tools*	*Group/batch formation*
Fattening/Milking	*Lack of references on milking tools*	*Lamb weighing*	*Milking machine maintenance*

11

STEP 2 - Solutions that can answer your needs?

- All needs were collated from the 8 countries, by production type
- Needs were ranked by order of importance by farmers, for each of the 5 main themes
  - Grazing/feeding
  - Health & Welfare
  - Reproduction
  - Flock management
  - Fattening/Milking

Proposed by all → >70 solutions

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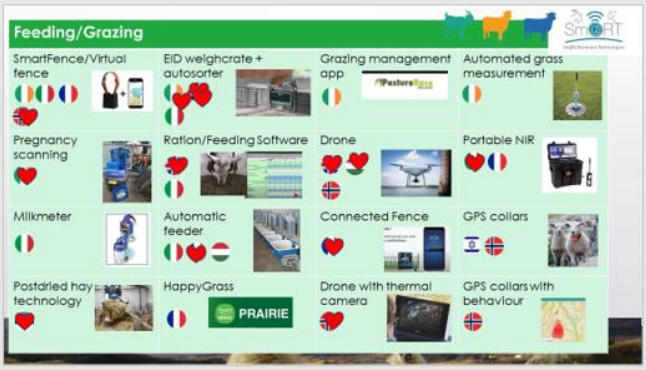

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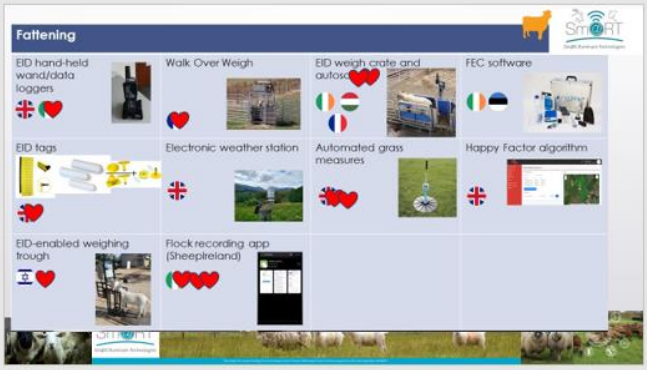

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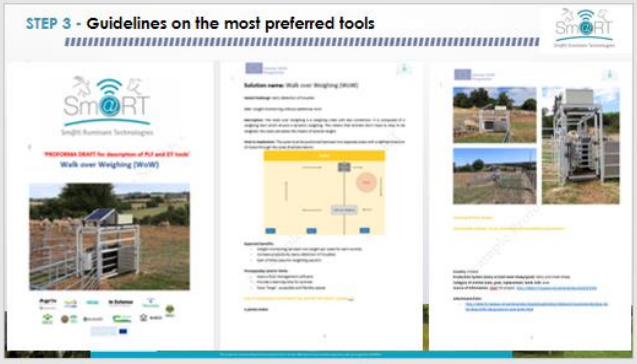

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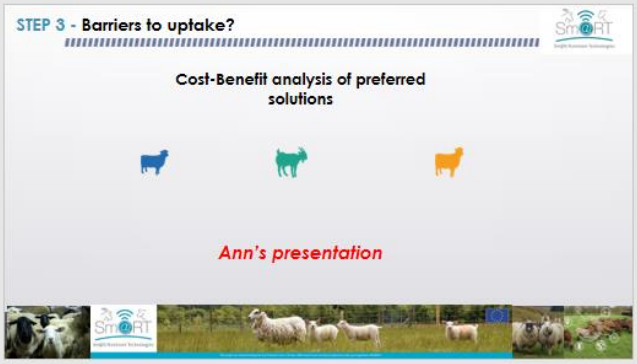

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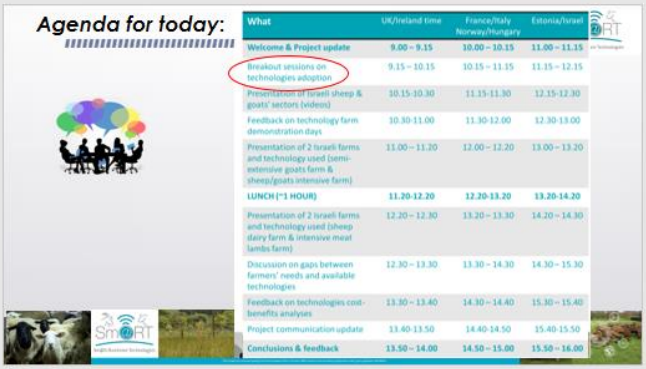

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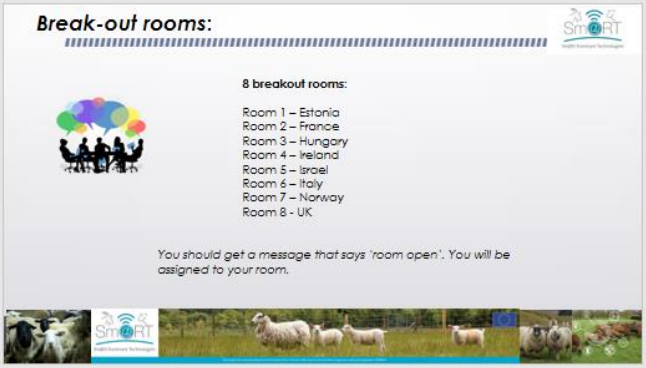

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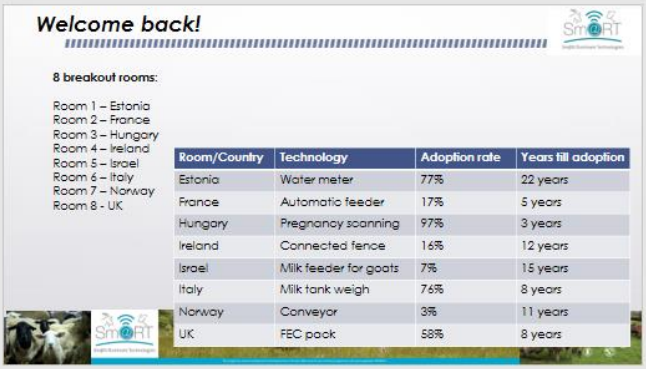

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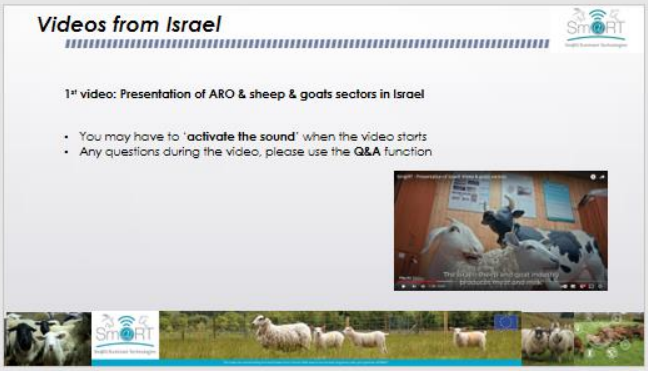

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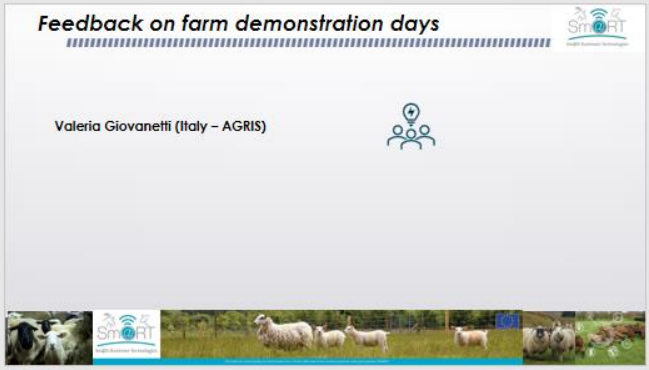

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5° Trans National Workshop

WP2 - Task 2.3 AGRIS (ITA)

Evaluation of innovative PLF and DT solutions in each country

Valeria Giovanetti, Marco Acciaro, Andrea Frongia

1

Sm@RT established focus groups in each country to assess the technology/innovative tool needs of sheep and goats producers regarding 6 topics and proposed about **50 solutions** that were subsequently voted by stakeholders during a transnational workshop.

Around 50 relevant digital tools selected

- 3D imaging
- Air ventilation system in milking room
- Auto weighing drafting/ Eid tag and recording database
- Automatic concentrate feeder according with EID ear tag readers
- Automatic feeder
- Automatic lamb milk feeder
- Automatic weighing scale
- Automatic weighing scale and sorting
- BioControl feed intake modules
- Bluetooth printer
- Breeding harness (tested)
- connected drenching gun
- Connected feed distributor
- Conveyor
- Dairy recording
- Digital weight + flow meter + EID
- Drone
- EID (RFID)
- EID 5 way auto-drafter
- EID ear tags and readers in milking parlour
- EID handheld
- EID Stick Reader
- EID weighorate and autodrafter
- Electronic milk flowmeters
- Embryo transplantation, frozen sperm laparoscopy
- FECPAK G2
- Feedcar (automatic concentrate distributor in sheepshed)
- Feeding post dried hay by electric crane
- Flock management
- Gallagher stick reader
- GPS collars
- Grasshopper
- Grassmeter
- Herd management software
- Kingswood/ANIDATA
- Lactocorder
- LoraWan Network
- Milk machines for goat kids feeding
- Milk quality control by milk
- Milk quantity and milk quality control for health status of animal
- Milking parlour 24 x 2
- Ovitel (herd management software)
- PAC chambers (methane)
- Panel reader
- Pasture grazing app
- Position data-logger
- RFID UHF tags (tested)
- Sheep recording system
- Sheep recording system (sheep Ireland)
- Smartfence
- TGM K- sheep recording system
- Virtual fences (collars Nofence)
- Webcams
- Weighhead Allflex (XR3000 and XR500)
- Weighting + autosorter
- WOW (Walk-Over-Weighing

L. Depuille (EAAP, Lione 2023)

The most important for farmers were evaluated in each country

2

The **selected 'solutions to needs'** were evaluated by farmers at 2 different levels (**Digifarms** and **Innovative Farms**, IF) in order to provide tangible knowhow on practice and to allow the farmers to see, experience and understand in practice how the different technologies work on farms.

Digifarms: from researchers to farmers | **Innovative farms: from farmer to farmers**

Training sessions	Demo Days
2/ production type and country	3/ production type and country
~ 8-10 farmers each time	~ 2-6 farmers each time
Researchers: • present the functioning of technologies of the digifarm	**Innovative farmer:** • presents the functioning of technologies of his private farm
Participants were able to: • use the technologies in a real life situation • learn how to use them with animals • how to upload or download the collected information	**Participants were able to:** • ask practical questions • use the technology if possible • and discuss any issues

A series of **Training sessions** on each country's digifarm(s) were held to evaluate the innovative PLF and DT solutions in each country in parallel with **Demo days** on innovative farms to collate information on farmers' views.

	Estonia	France	Hungary	Ireland	Israel	Italy	Norway	UK
Training session	1	3	1	1	1	2	1	2
Demo Day	2	6	2	1	1	3	1	2

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Digifarms (DF)

Please tick your answer	1 (Not at all)	2 (No)	3 (Yes)	4 (Yes a lot)
1. Did you have the tool on your farm?				
2. Did you like it?				
3. Was it easy to use?				
4. Would you have the infrastructure needed to implement it?				
5. Could you implement it on your farm easily?				
6. Is it affordable to you?				
7. Could you justify investing in it?				
8. Do you think it would take long to pay it back?				
9. Do you understand better after training?				
10. Would you recommend to somebody else?				
11. Do you think you need more training/guides/YouTube video to use it more often?				

Before- After

Name of the tool			
Number of answers	Smiley – Yes	Neutral - Maybe	Grumpy - No
BEFORE - What do you think of this technology?			
BEFORE - Would you put it on your farm?			

Innovative farms (IF)

Before- After

	Yes	No				
Do you have the tool?						
Do you think it is worth investing in it?						
Would you like to implement on your farm?						
			1	2	3	4	5
Level of practicality (1=low, 5=high)						

5

Digifarms (DF)

Estonia

- Milk feeder for kids
- Milking parlor 2x24 GEA/Westfalia (Automatic concentrate feeder by EID ear tag)
- Milking parlour 2x24 GEA/Westfalia (EID eartags and readers)
- Postdried hay technology and feeding it by electric crane

France

- Automatic Feeder
- Cameras
- Drone
- Milk tank weighing
- Virtual fences
- Water meter + EID
- Weighing and sorting crate
- Wow

Ireland

- Conveyor
- Data recording apps
- EID handheld
- EID wand
- Smartfence
- Weighing and sorting crate

UK

- Psion
- Stick Reader
- Tru-Test & Weigh Head

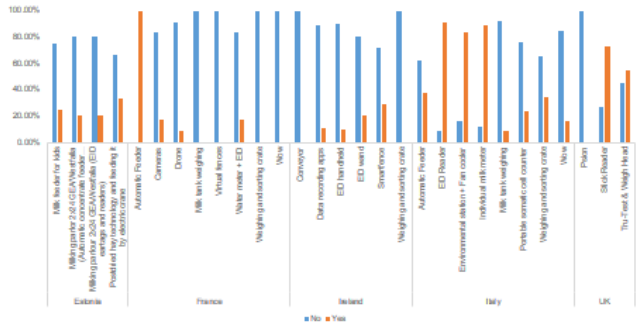
Italy

- Automatic Feeder
- EID Reader
- Environmental station + Fan cooler
- Individual milk meter
- Milk tank weighing
- Portable somatic cell counter
- Weighing and sorting crate
- Wow

6

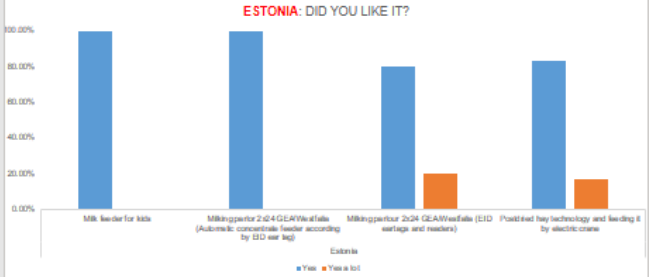
Digifarms (DF)

1. Did you have the tool on your farm?



Digifarms (DF)

2. Did you like it?



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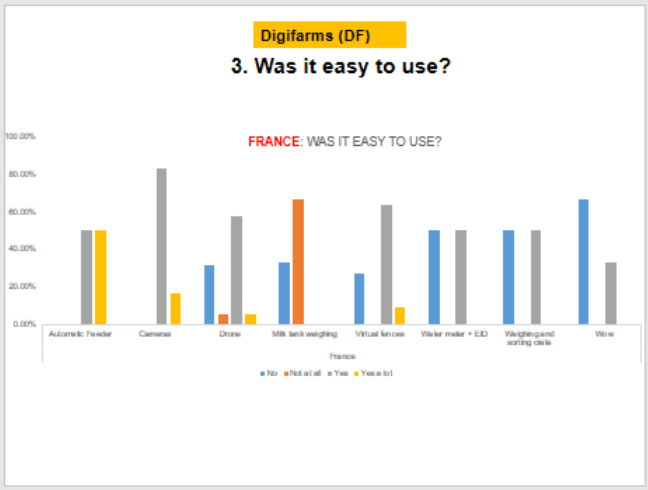

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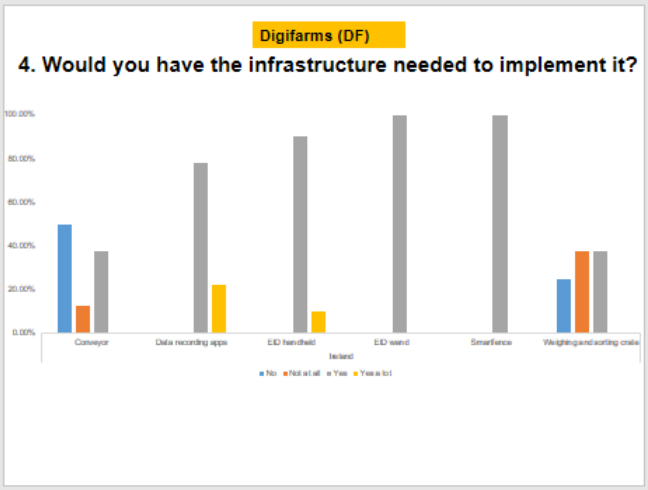

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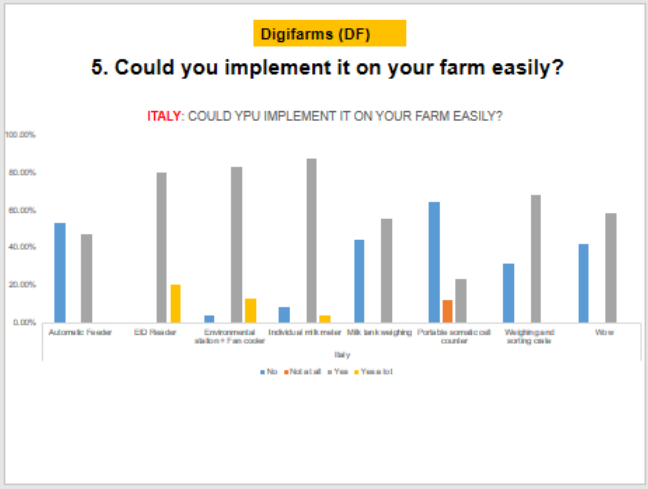

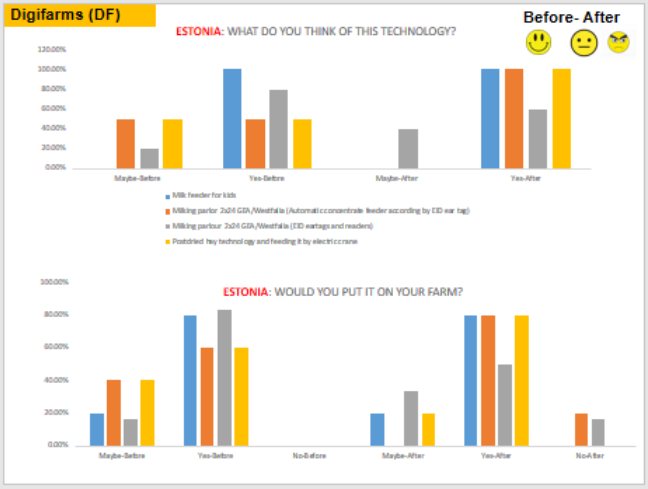

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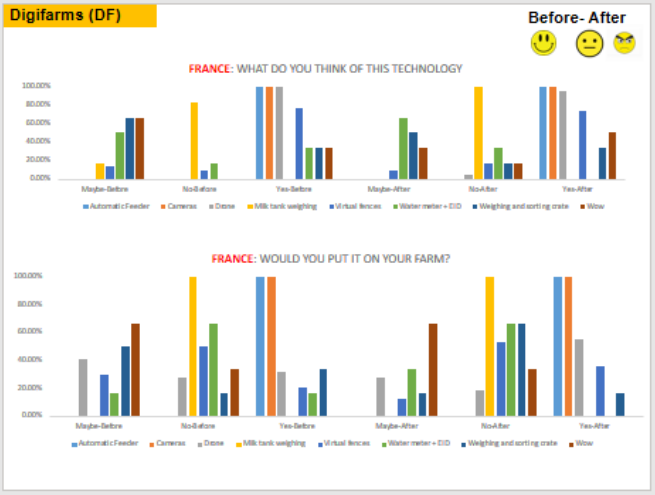

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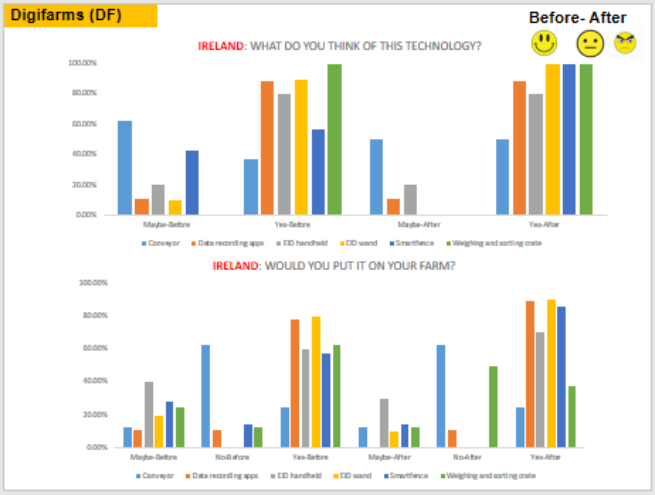

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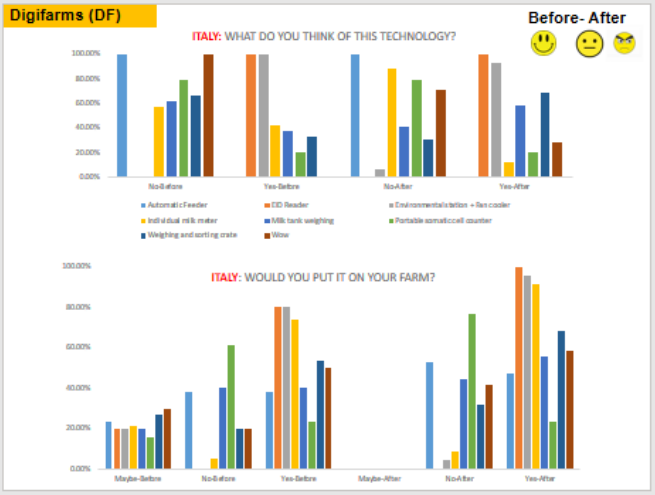

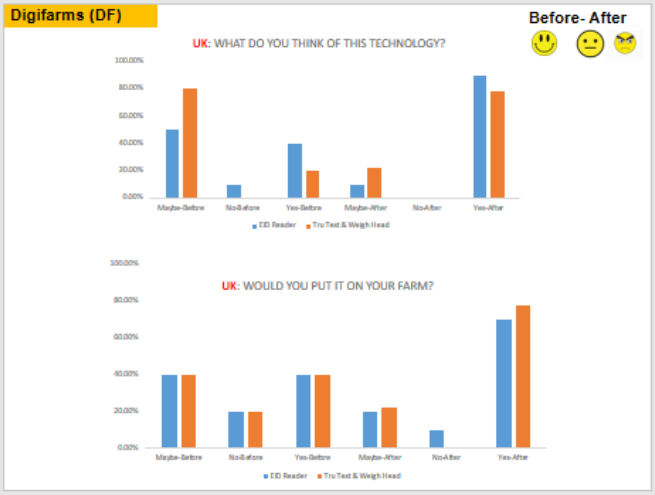

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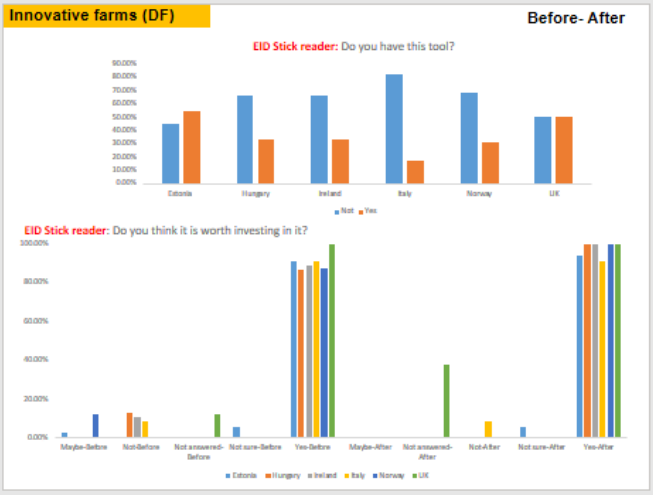

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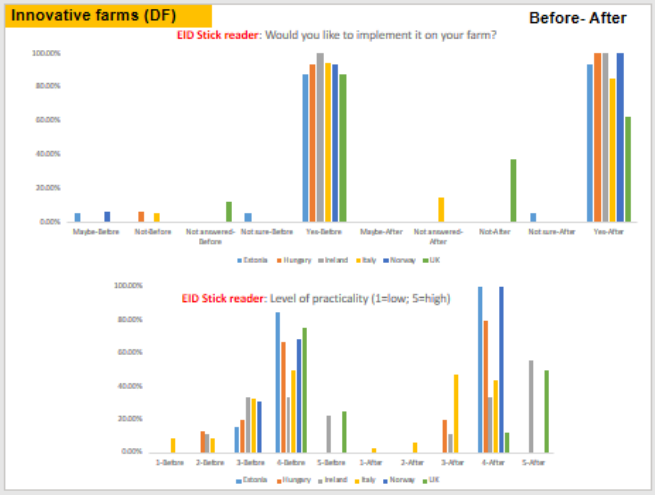

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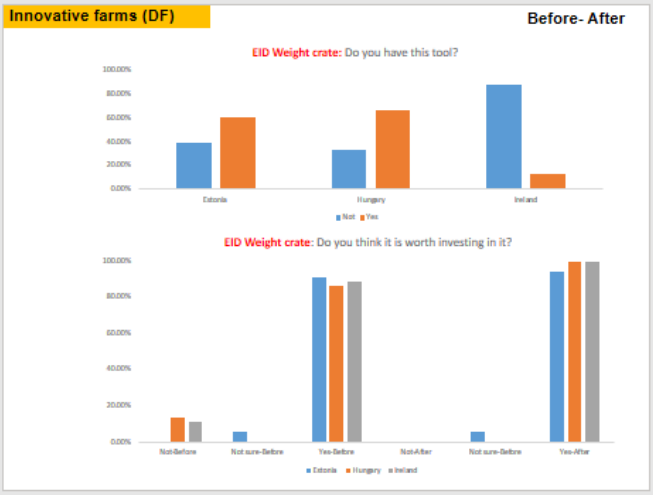

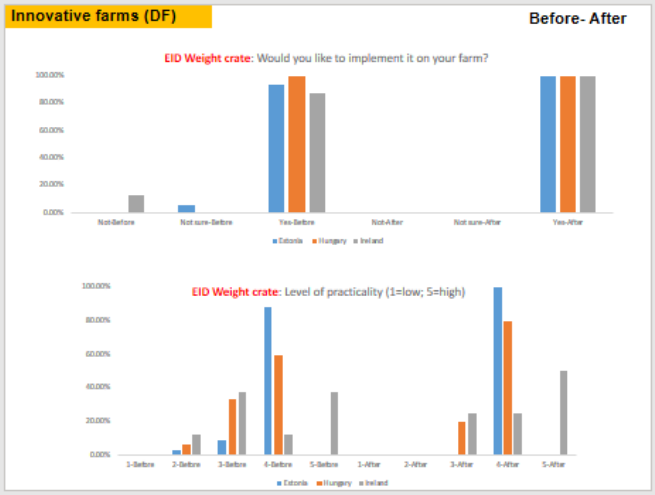

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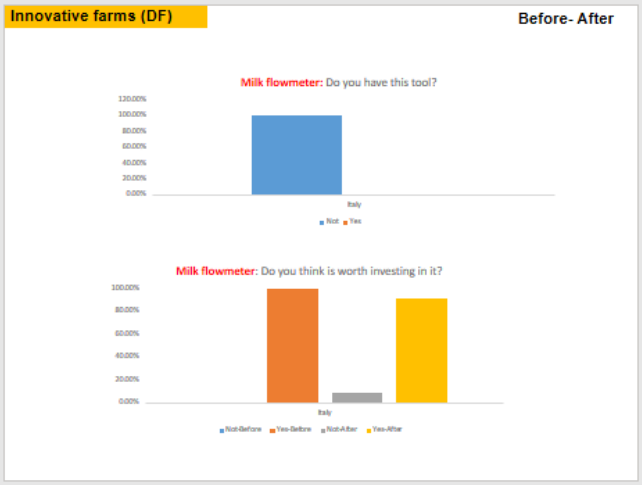

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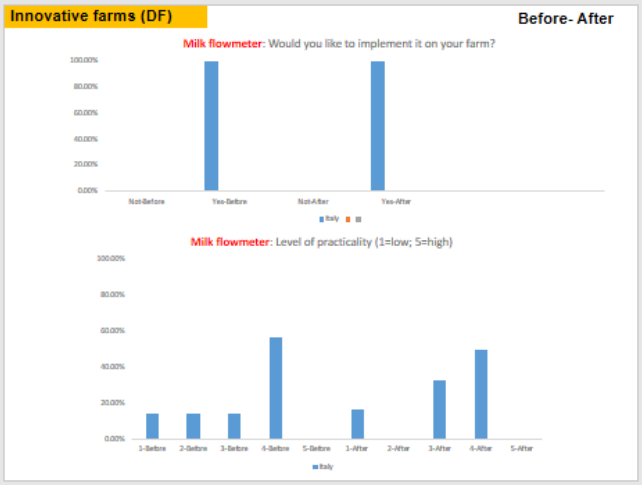

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Conclusions

- **Training sessions** and **Demo days** were a good occasion to build a bridge between researchers and farmers
- **Innovative farmers**: knowledge sharing from farmer to farmers has revealed to be successful
- **Digifarms**: remain a reference for those farmers who need to improve their knowledge on a specific technology

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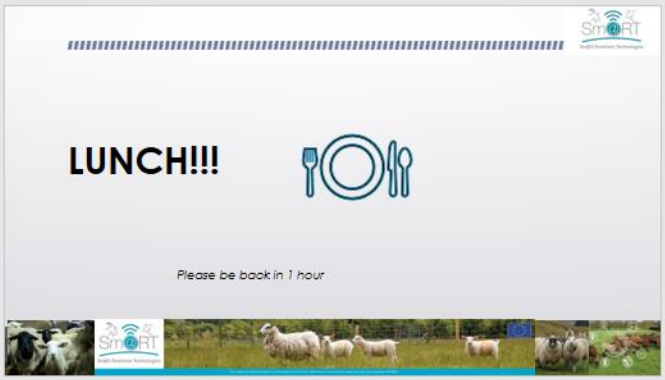

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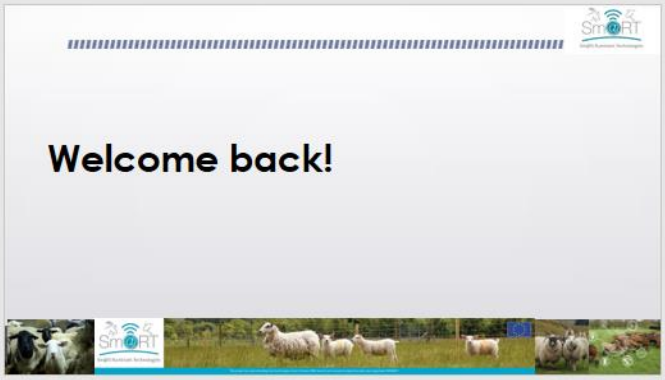

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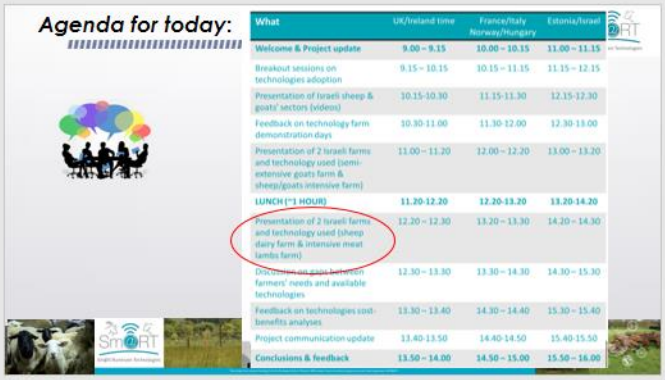

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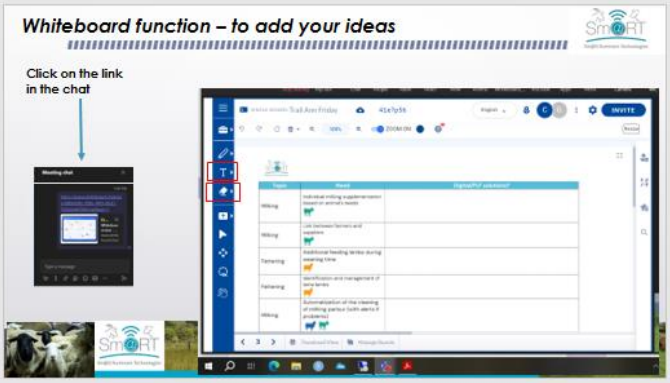

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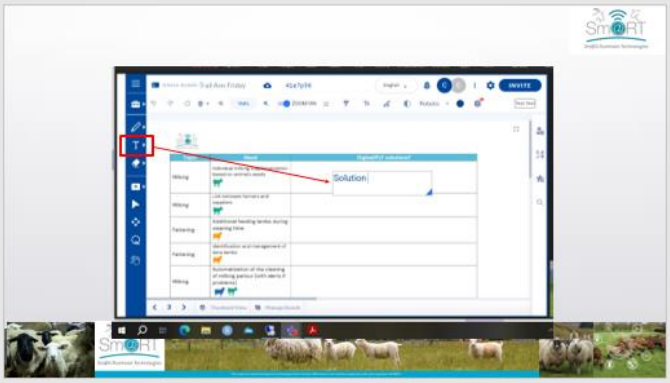

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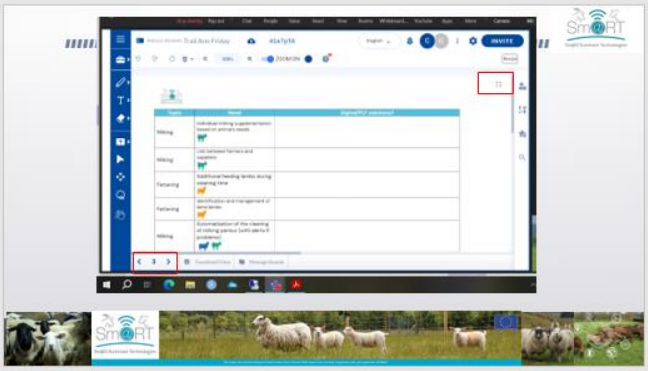

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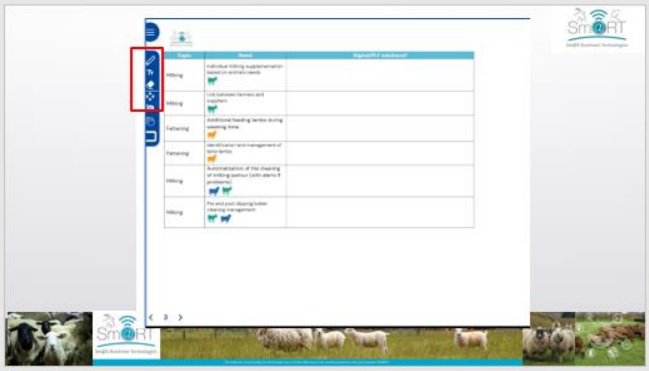

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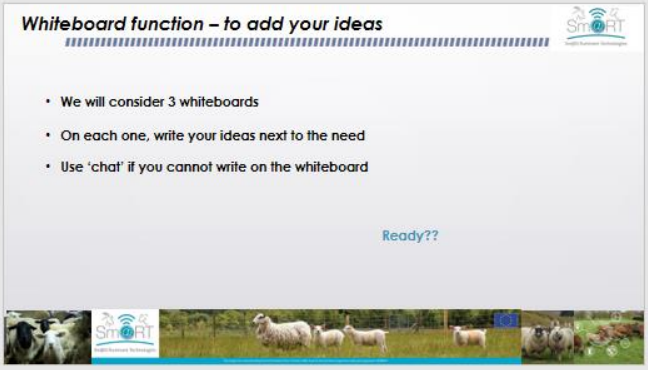

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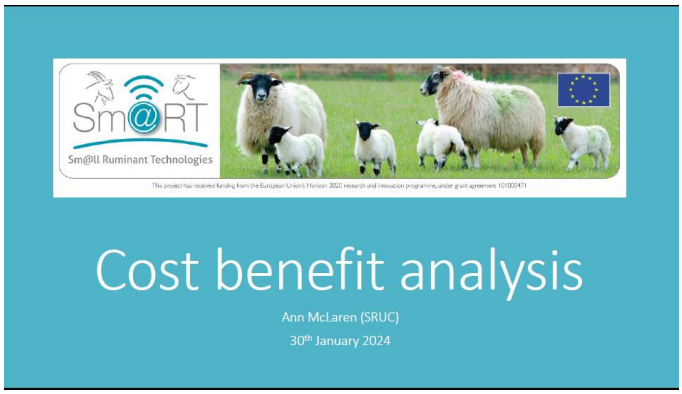

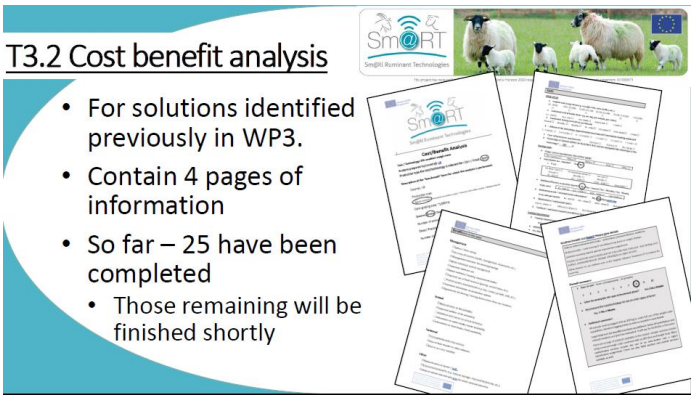

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T3.2 Cost benefit analysis

- Costs: running costs
  - Additional subscription fees

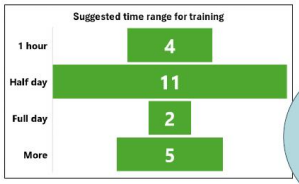
Technical support provided on farm after purchase?
Yes = 14, No = 10, N/A = 1

T3.2 Cost benefit analysis

- Costs
  - A range of costs involved – from nothing to over €15,000.

T3.2 Cost benefit analysis

- Costs: Training requirements
  - All solutions (apart from 3) required some level of training

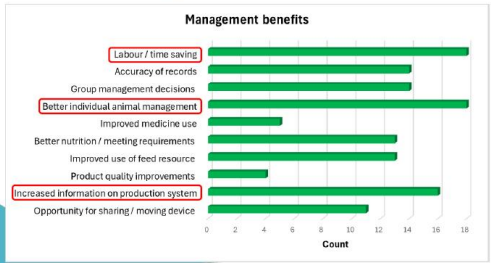


Additional technical advice required?

No = 13
Yes = 12

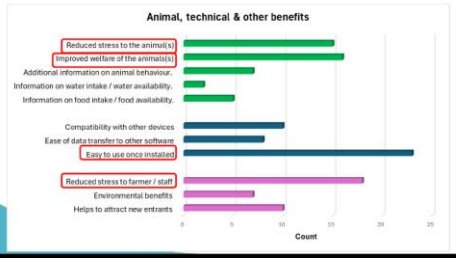
T3.2 Cost benefit analysis

- Benefits: Management



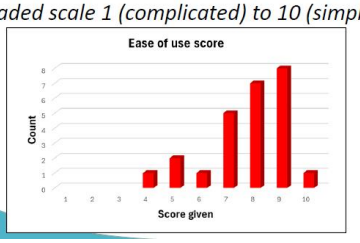
T3.2 Cost benefit analysis

- Benefits: Animal, technical & other



T3.2 Cost benefit analysis

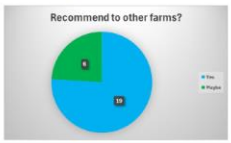
- Overall summaries
  - Ease of use
    - *Graded scale 1 (complicated) to 10 (simple)*



T3.2 Cost benefit analysis

- Overall summaries
  - *Based on the **benchmark farm** used for each analysis*
  - *May differ slightly depending on system or flock/herd size etc.*
  - *Value for money*

Recommend for other types of farm



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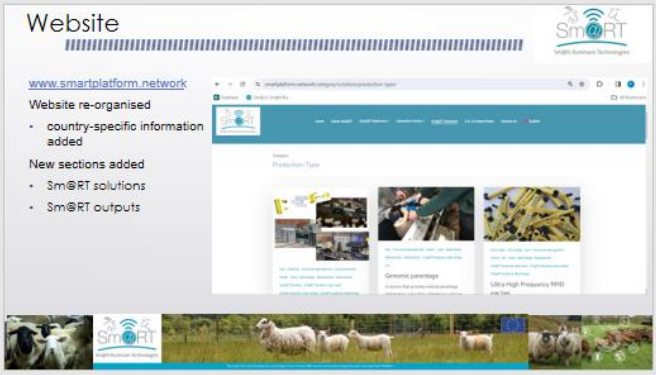

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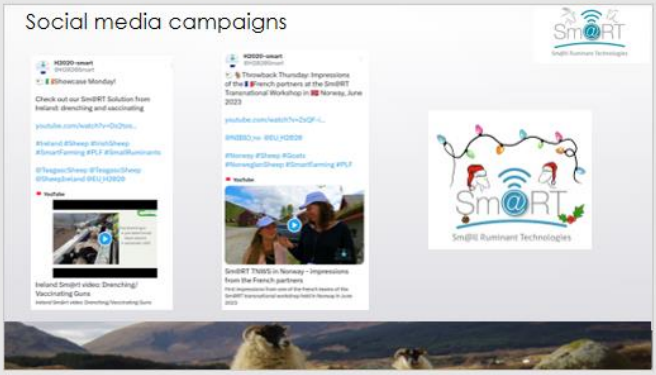

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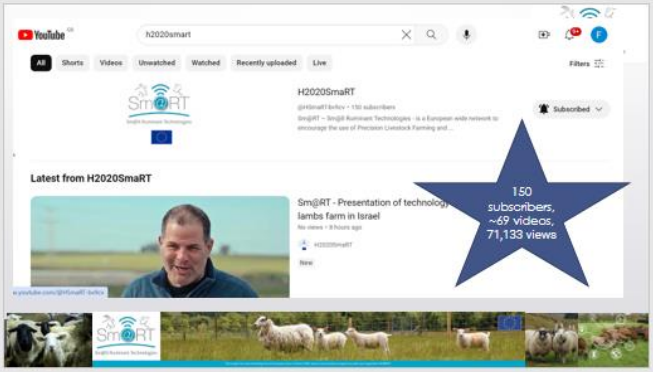

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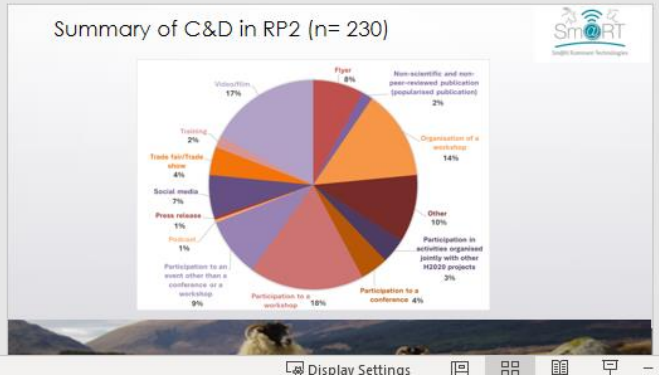

Slide 11 of 50 English (United Kingdom) Accessibility: Investigate Display Settings

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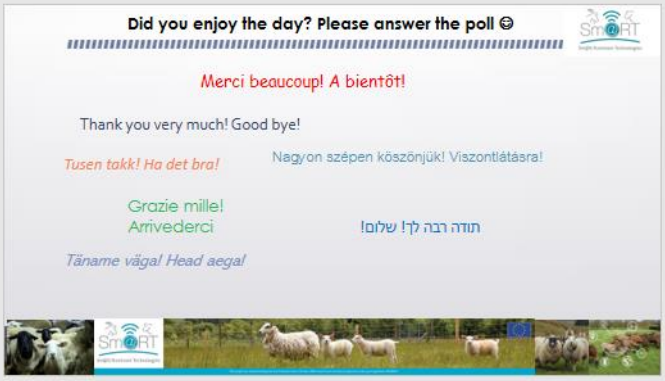

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