SmartCow

an integrated infrastructure for increased research capability and innovation in the European cattle sector

SmartCow: Integrating research infrastructures to support innovation in European cattle breeding

R. Baumont[1], M. O'Donovan[2], R. Dewhurst[3], P. Lund[4], B. Kuhla[5], R. Carelli[6], C. Reynolds[7], C. Martin[1] and I. Veissier[1]

[1]INRAE - FR, [2]Teagasc - EI, [3]SRUC – UK, [4]AU – DK, [5]FBN-Leibniz – DE, [6]EAAP – IT, [7]UREAD - UK

Concept and overall objective of SmartCow

Better coordination of research infrastructures (RIs) in the cattle sector is necessary to develop more efficient approaches to address the various challenges in cattle breeding and research
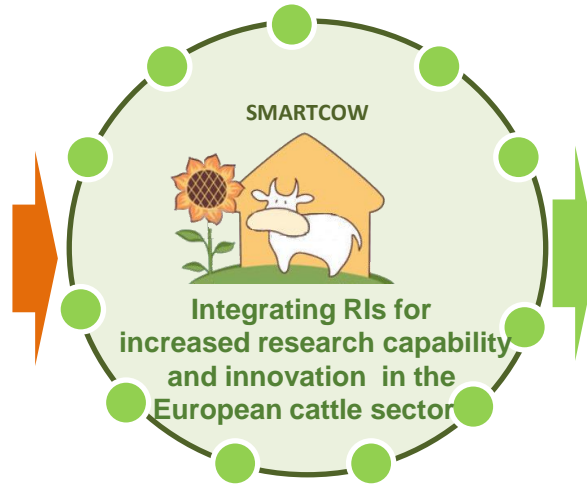
Challenges and cross-cutting issues

Efficient use of biomass – Food security

Sustainable competitiveness of livestock farming systems

Healthy livestock for healthy diets and healthy people

Improving infrastructure for research and innovation

SMARTCOW

Integrating RIs for increased research capability and innovation in the European cattle sector

Solutions

Networking RIs and stakeholders of the cattle sector to upgrade research practices and foster innovation

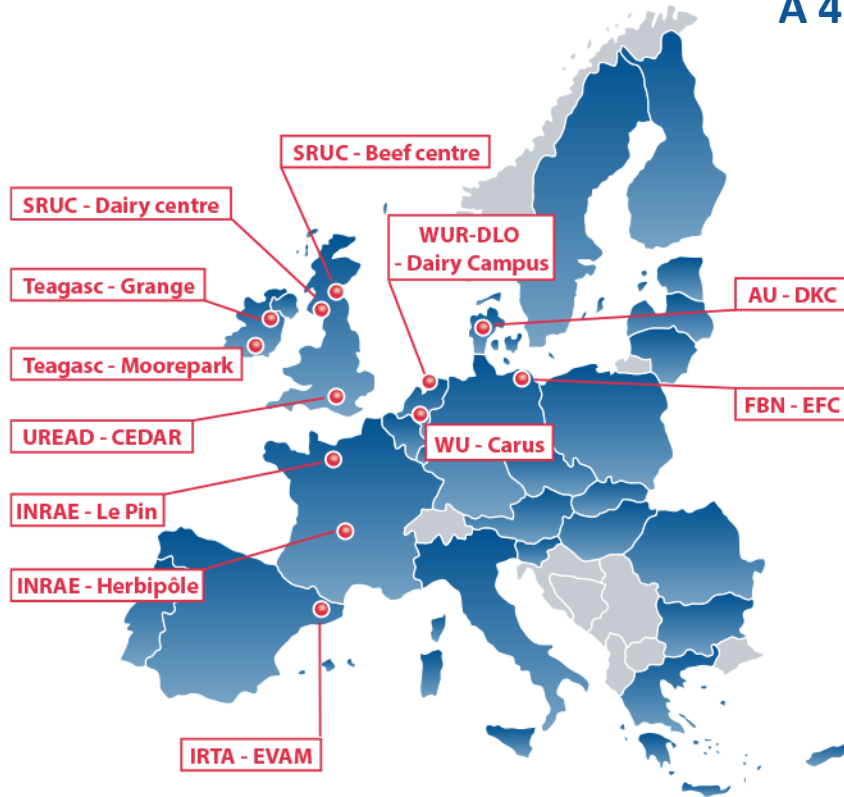Offering access to the most advanced research tools in the cattle sector

Improve quality and ethics of cattle research with best practices, new measurement capabilities and smart technologies

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14 partners across Europe

A 4 years project (2018 – 2022) with a 5 M€ Budget
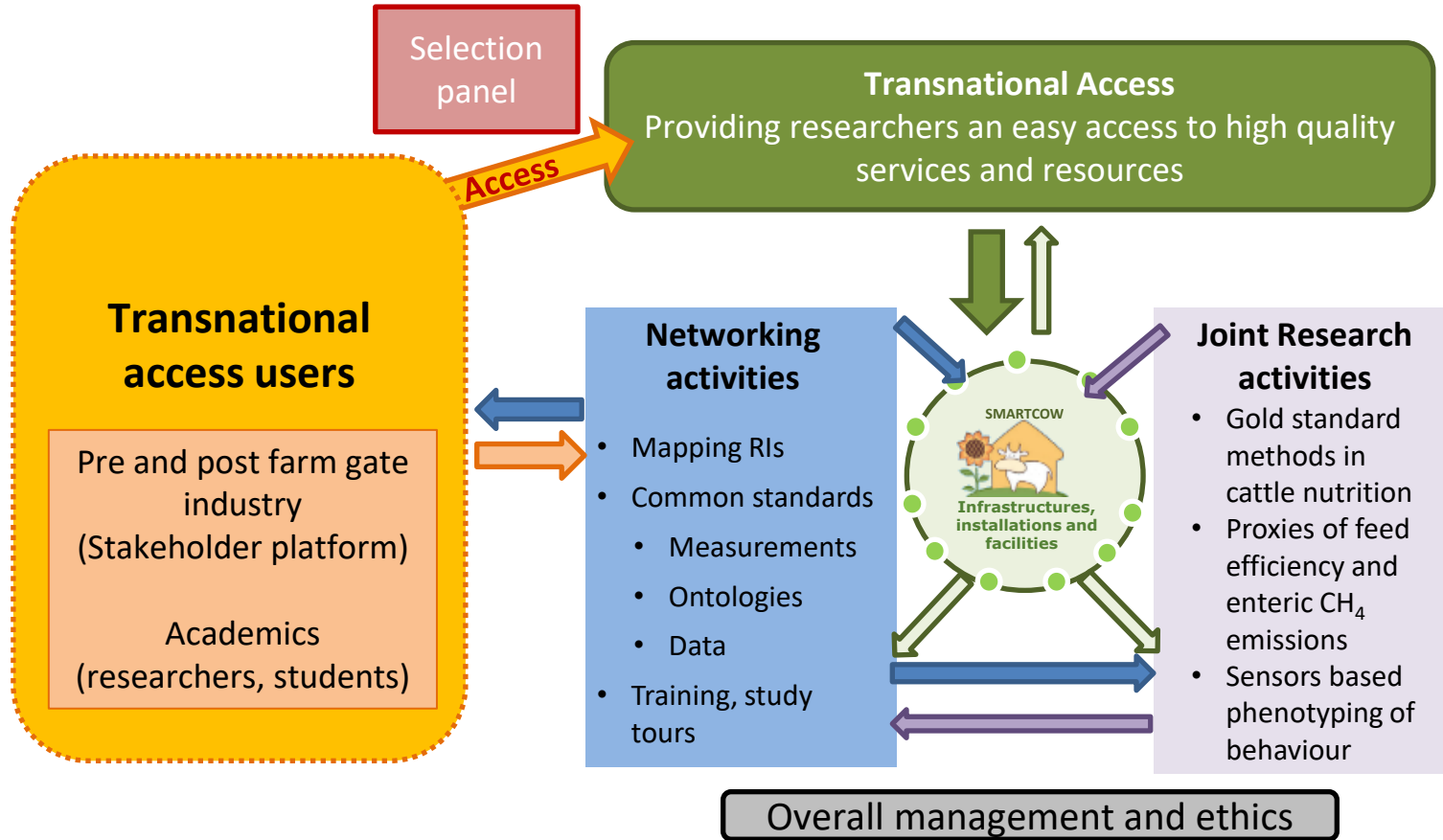www.smartcow.eu

9 partners that bring RIs

- 11 major RIs distributed in 7 EU countries
- 12 locations, which include 18 installations
- 2500 dairy and 750 beef cows

5 other partners for specific skills

- Agrimetrics : Cloud based data-platform
- CRA-W : NIR and MIR techniques for phenotyping
- Idele and EAAP: Dissemination and stakeholders
- INRAE Transfert: Project management
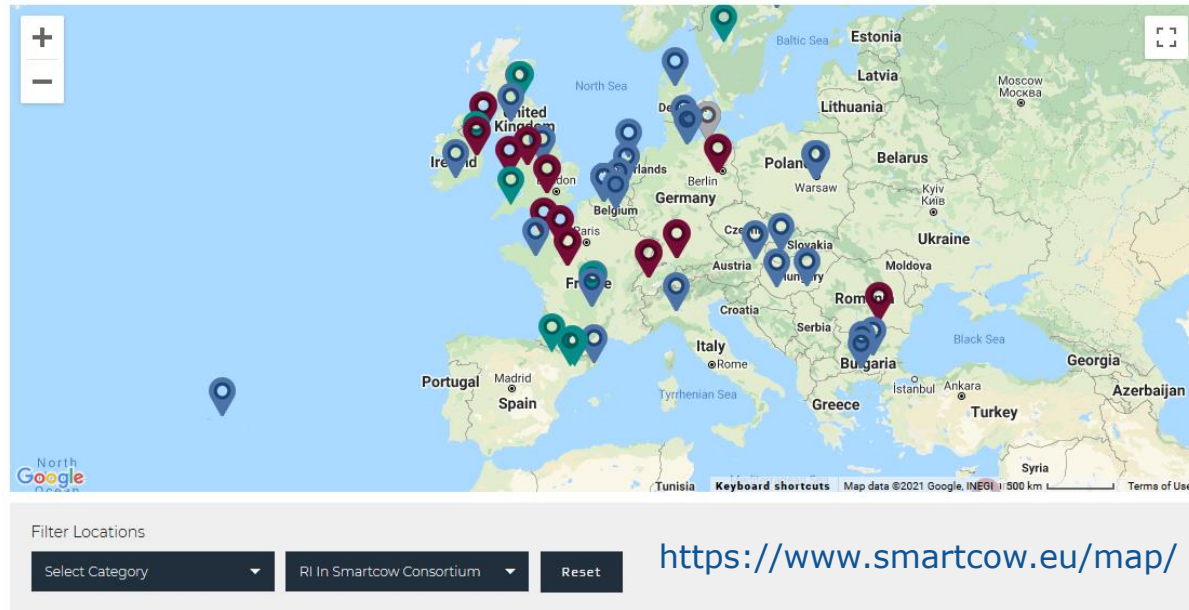
SRUC - Beef centre
SRUC - Dairy centre
Teagasc - Grange
Teagasc - Moorepark
UREAD - CEDAR
INRAE - Le Pin
INRAE - Herbipôle
IRTA - EVAM
WUR-DLO - Dairy Campus
WU - Carus
AU - DKC
FBN - EFC

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SmartCow activities and aims

Mapping of cattle RIs in Europe

- A database of equipment, data and sample bank within the consortium and a survey of cattle RIs in Europe ➜ Interactive map (see Posters 72.12 and 72.13)

Smartcow Consortium and non-Consortium Research Infrastructures throughout Europe

https://www.smartcow.eu/map/

Towards common standards…

…for measurement and data management ➜ see Poster 72.14

- An Online Living HandBook

Publishing > Books > Overview > Methods in cattle physiology and behaviour research – Recommendations from the SmartCow consortium

Methods in cattle physiology and behaviour research – Recommendations from the SmartCow consortium

Sadjad Danesh Mesgaran, René Baumont, Lene Munksgaard, David Humphries, Emer Kennedy, Jan Dijkstra, Richard Dewhurst, Holly Ferguson, Marta Terré and Björn Kuhla (editors)

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https://books.publisso.de/en/publisso_gold/publishing/books/overview/53/186/about

- Improved 'Animal trait and Environmental Ontologies'
- A Cloud-based Data Platform according FAIR principles

A Successful Transnational Access Programme

- **Support of 24 research projects that represent** (see Poster 72.15)
  - The use of 10,000 experimental 'cow-weeks' and €1.5 million
  - Projects led by academic and industry teams from 11 different countries in Europe
- **TNA projects developed new collaborations and strengthened joint research activities in SmartCow**
  - First TNA results presented by Niu et al, Perez-Marin et al, Manzocchi et al, and in Posters 72.21, 72.22, 72.25, 72.28, 72.31

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Joint Research Activities

to improve reference methods and increase phenotyping capacities

- Refinement of gold standard methods in cattle nutrition : CH_4 chambers, digestibility and N balance (Reynolds et al., Bellagi et al., Posters 72.16, 72.20)

- Biomarkers and infrared spectra as proxies to predict CH_4 emissions and feed efficiency and their components (Correa-Luna et al., Vanlierde et al., Posters 72.17, 72.18, 72.19)

- Use of sensor data to phenotype behaviour and complex animal traits (Veissier et al., Posters 72.23, 72.24)

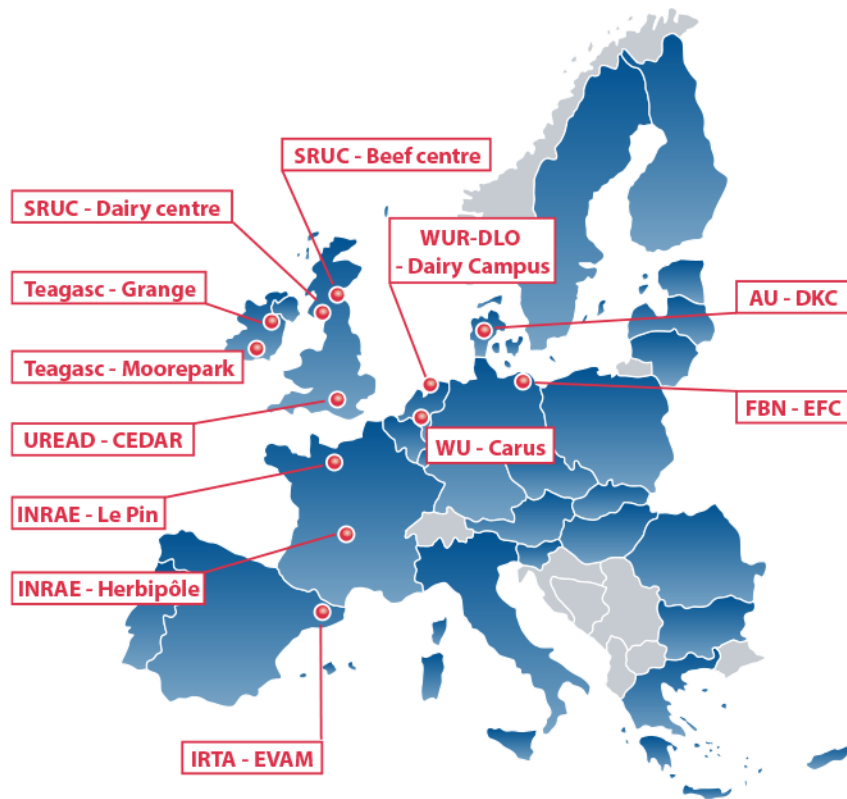➜ *Implementation of 3R principles (Replace, Reduce, Refine)*

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Conclusion

- SmartCow is **a first step towards the integration of RIs** for the European cattle sector

- Networking activities have created **a portal to key European cattle RIs**

- The SmartCow **book of methods provide guidelines** for improvement of ethics in cattle experiments and measurement of anatomic, digestive, metabolic, and behavioural traits

- The successful TNA programme provided **wider, simplified, and more efficient access** to the best research infrastructures to academic and industry organisations across Europe

- TNA projects developed **new collaborations and fostered innovation** through a reinforced academic–industry partnership

- Attractive training courses and involvement in TNA projects contributed to the **education of a new generation of researchers**

- Joint research activities are **refining GSM in cattle nutrition, and developing less-invasive methods and high-throughput phenotyping**

➔ *This session is the opportunity to share and discuss SmartCow results together with contributions coming outside the consortium*

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Thank you for your attention

First-class Cattle Research Infrastructures (RIs) across Europe:
- 11 major RIs distributed in 7 EU countries
- 12 locations, which include 18 installations
- 2500 dairy and 1000 beef cows

- **Networking of RIs** to inventorize resources, harmonize procedures, and share data
- **Joint research activities** to improve experimental methods and phenotyping capability
- **Interaction with stakeholders** to stay in line with industry needs and improve dissemination

http://www.smartcow.eu/stakeholders/

TRAINING PROGRAM
For Scientists, Technicians, Stakeholders, PhD students
- Face-to-face training courses
- Free web-conferences
- One-day study tours in 4 different countries

http://www.smartcow.eu/resources/training/

TRANSNATIONAL ACCESS CALLS
Offers external users (academic and industry) free access to SmartCow RIs
- 30 projects during the 4 years of SmartCow
- Access to around 10,000 cow-weeks

http://www.smartcow.eu/calls/