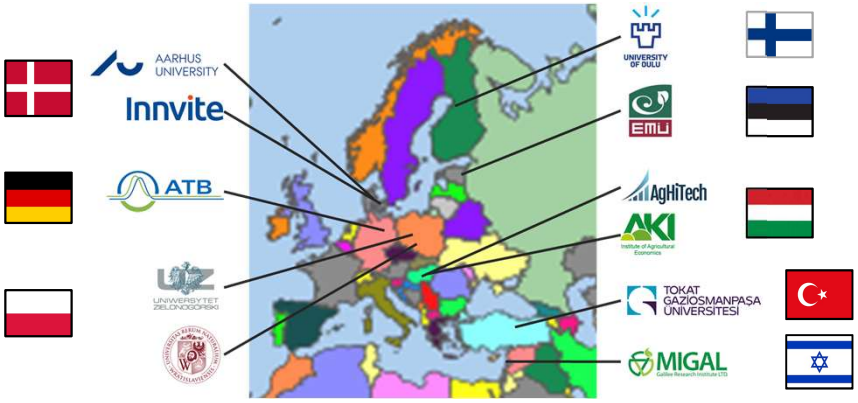
Development of a practical data management system with embedded sensors for improved environmental management and transparency of dairy farming

Introduction and goals: Europe's agri-food sector is in a state of change related to societal, economic and environmental demands, which progressively increase the system's complexity. Digital technologies are a key instrument to quantify and manage this complexity. In ET4D, we will validate and expand the reporting frame of a data management system (DMS) with embedded sensors for on-farm use to collect and process data from dairy barns. We will optimize the on-farm communication and demonstrate the system's applicability by deploying it in commercial farms in six different countries with different climatological and socio-economic conditions. We will study information needs of different stakeholders and demonstrate the potential added value of data and information sharing for the farmer and other interest groups.

Facts and Figures



- 6 EU and 2 associated countries
- 11 partner institutions
- 1.6 Mio. €
- 3 years

Leibniz Innovation Farm, Germany. Group photo of on-site participants

On-farm Communication Ecosystem

- Assess communication key performance indicator requirements and data traffic patterns of embedded sensors and DMS
- Characterize regional state-of-the-art connectivity performance (based on literature and questionnaires)
- Signal propagation modeling and suggestion of on-farm connectivity improvement options

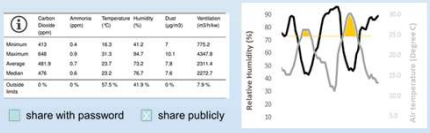
Sensor System and Empirical Models

- Central sensor unit EnviroDetect for barn climate and emission monitoring
- Additionally data from gas monitoring and PLF technology available at most test sites & trials with low cost sensors for very small farms intended
- Timeseries models to fill gaps and project likely future states of barn climate and management related variables

Stakeholder Attitudes and Information Needs

- In-depth studies for processors / retailers and regulating bodies in Poland, Hungary and Denmark with 10 persons per country intended
- Questionnaire surveys for farmers and end consumers of milk products in Poland, Hungary, Denmark, Germany, Türkiye, Estonia and Israel with around 40 persons per country intended

Data Space and Web Application



- Sustainability key scores for stakeholder specific reporting
- Data space with raw data, meta data and processed / modeled data; interactive graphs and different data sharing options

Expected results and impact:

- Recommendations for optimization of on-farm communication ecosystems
- Easy-to-use data space for environmental (and related) data from farms
- Target group specific multicriterial assessment and associated visualization
- Demonstrate added value of data sharing for farmers to create incentives

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