



# Data-driven control and prioritisation of non-EU-regulated contagious animal diseases

ICAHS May 5, 2022 - Translating surveillance outcomes into policy - How to deal with the uncertainty

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COORDINATOR



Universiteit  
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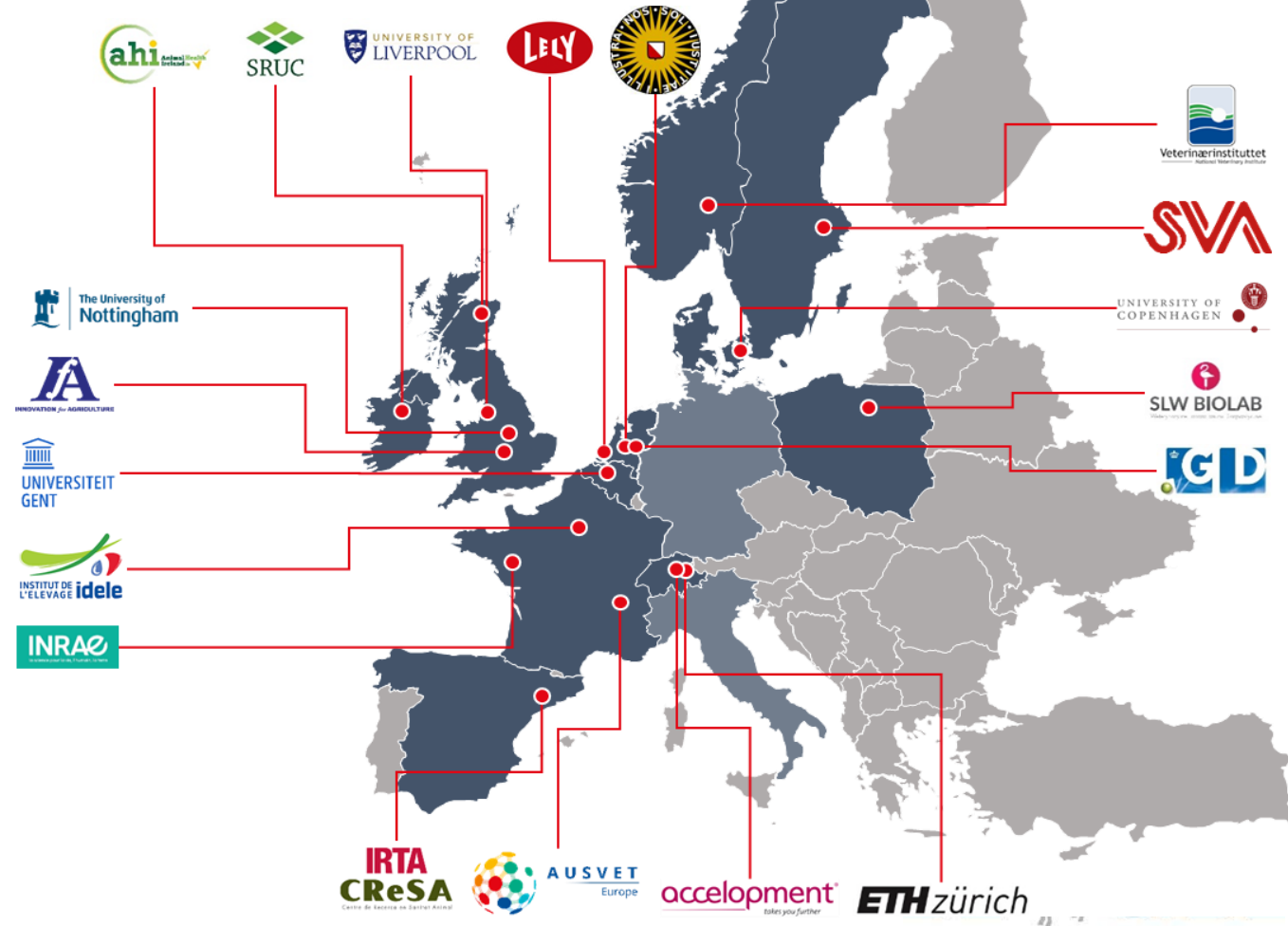


# The project

- July 1th 2021
- 5 years
- ~80 people of which 7 PhDs and 7 Postdocs



19 partners from 11 countries



# Goal

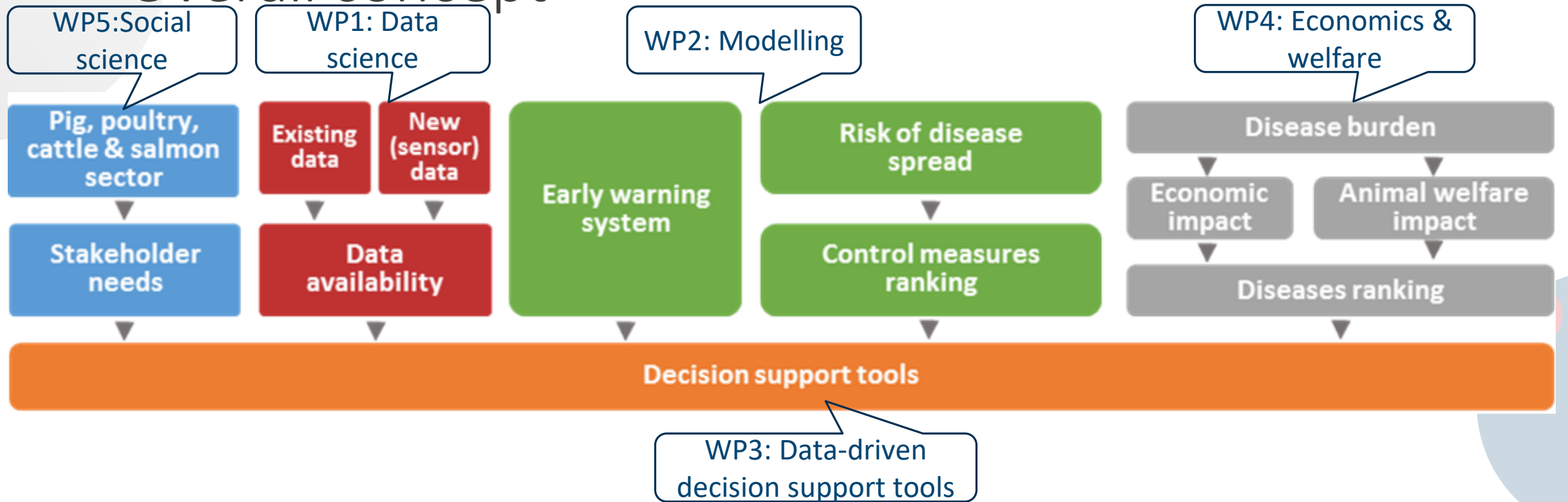
Develop data-driven decision support tools and workflows that enable farmers, veterinarians and other animal health and welfare managers to improve control of prevalent non-EU-regulated contagious animal diseases based on a multidimensional burden of disease metric.



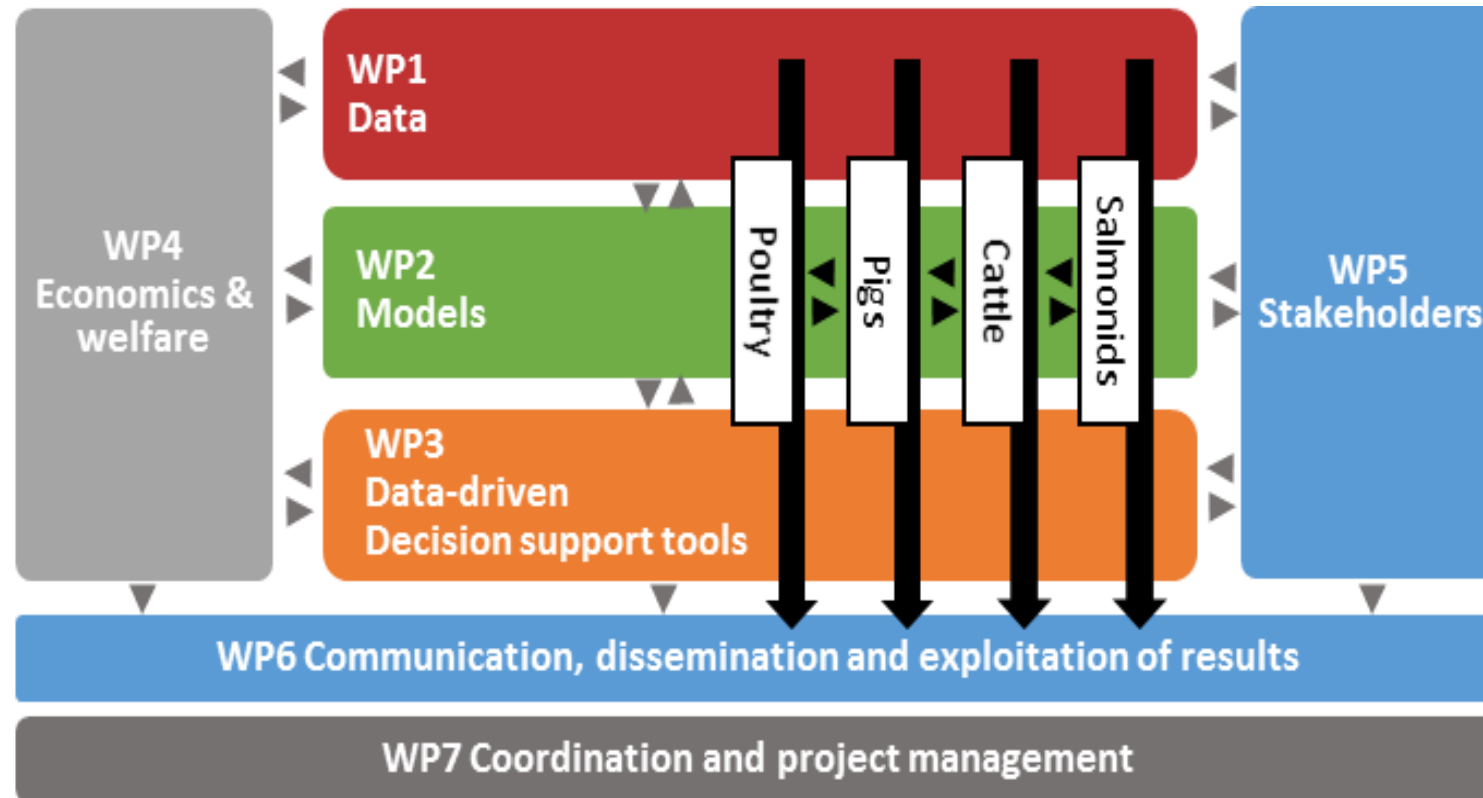
# Focus

- Gastro-intestinal and respiratory tract infections of calves, pigs and poultry.
- Specific pathogens related to growth reduction and mortality in salmonids.
- Endemic diseases that
  1. may spread;
  2. have the highest impact;
  3. lead directly or indirectly to antimicrobial usage; and
  4. negatively influence the value chain.

# Overall concept



# Overall structure of the work plan.



**Black arrows indicate the progress of the different species-specific decision-support tools through the WPs.**



## WP5 – Implementation and behavioural strategies for animal disease management

LEADER MICHAEL SIEGRIST & ANGELA BEARTH - ETHZ

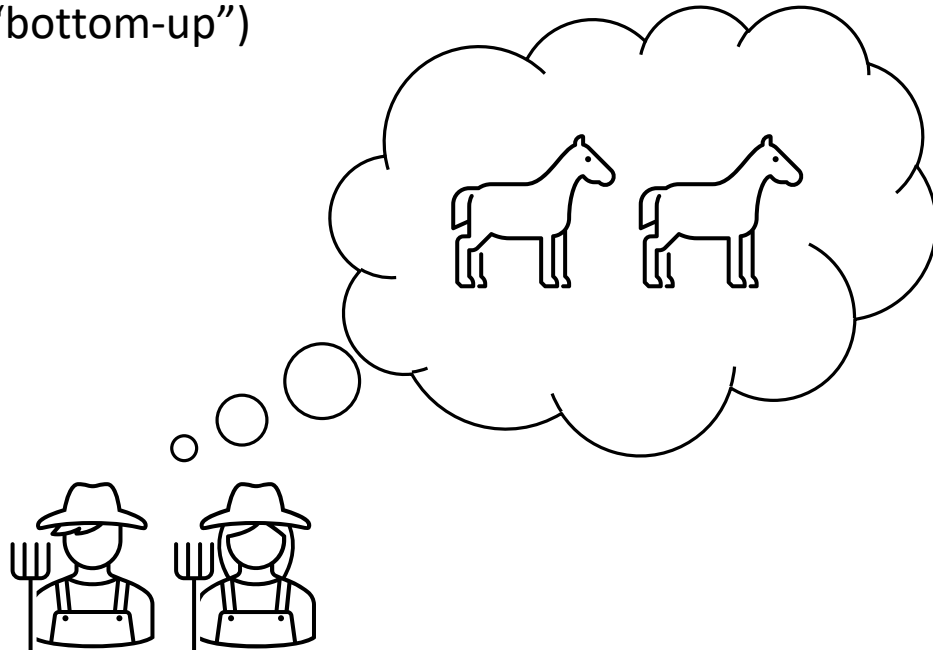
CO-LEADER JASMEET KALER – UON



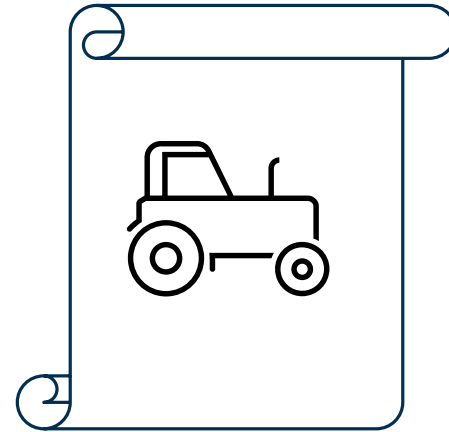
# Stakeholder engagement:

## A frequently discussed analogy

Asking farmers what they **want**  
("bottom-up")



Providing farmers with innovation  
("top-down")

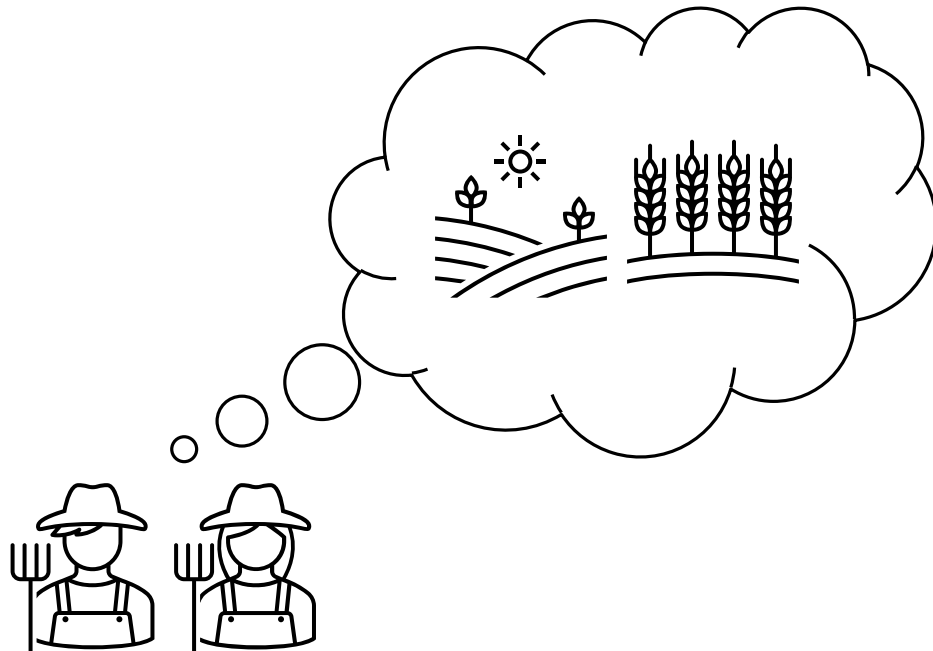




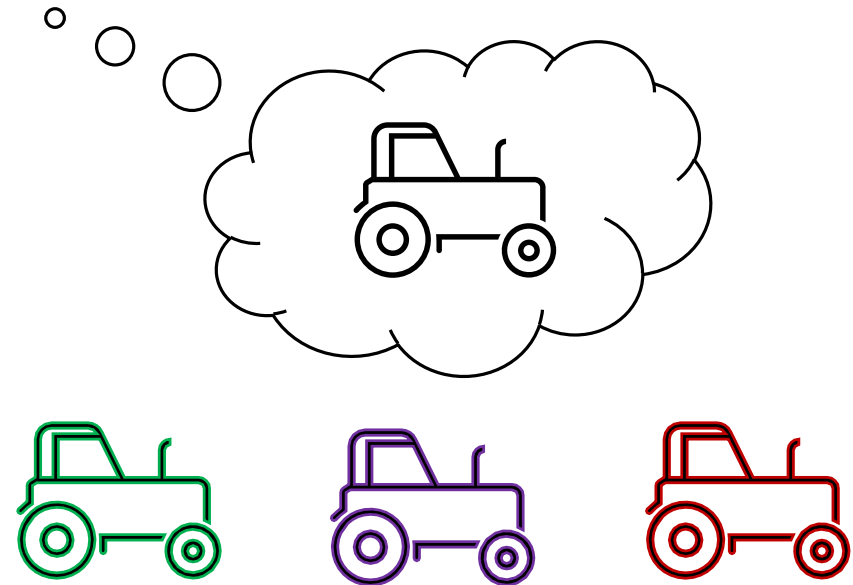
# Stakeholder engagement:

## A frequently discussed analogy

Asking farmers what they **need**

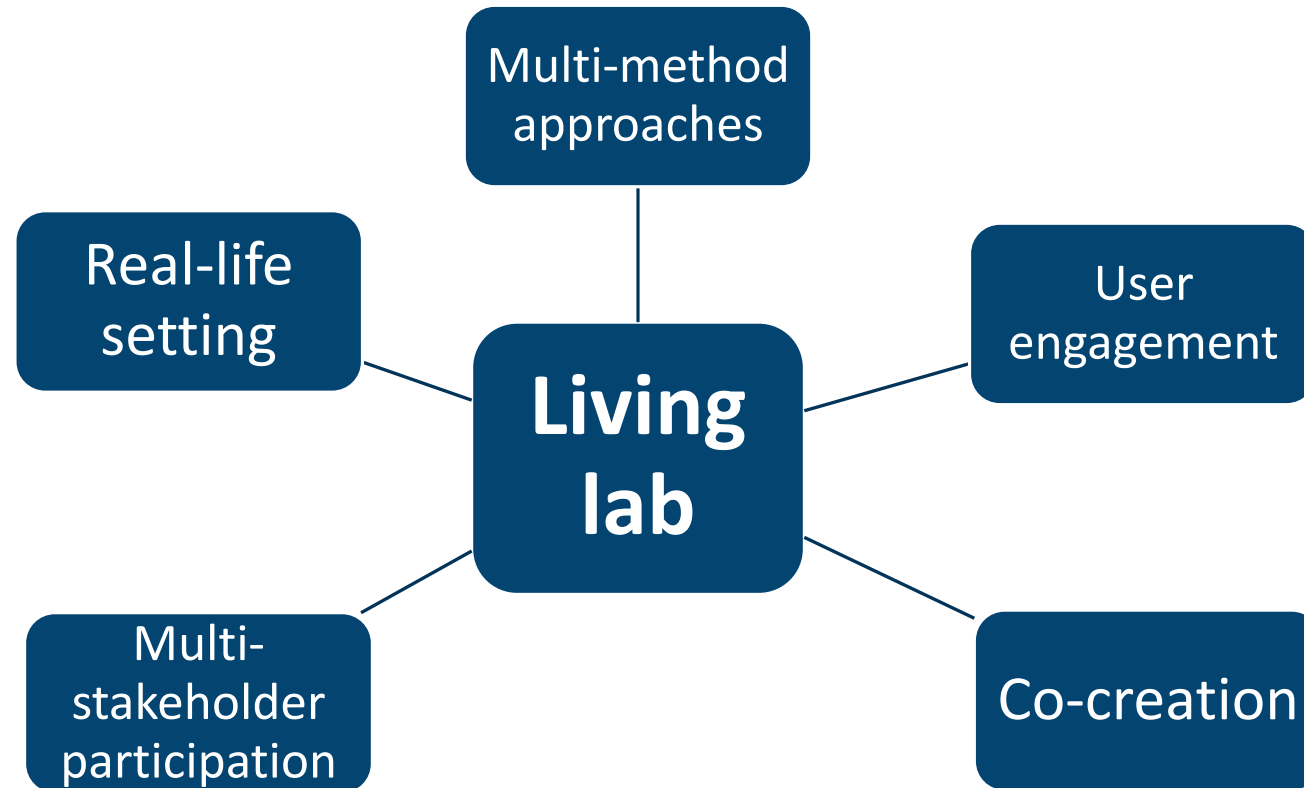


Asking farmers what they think of  
concepts and prototypes

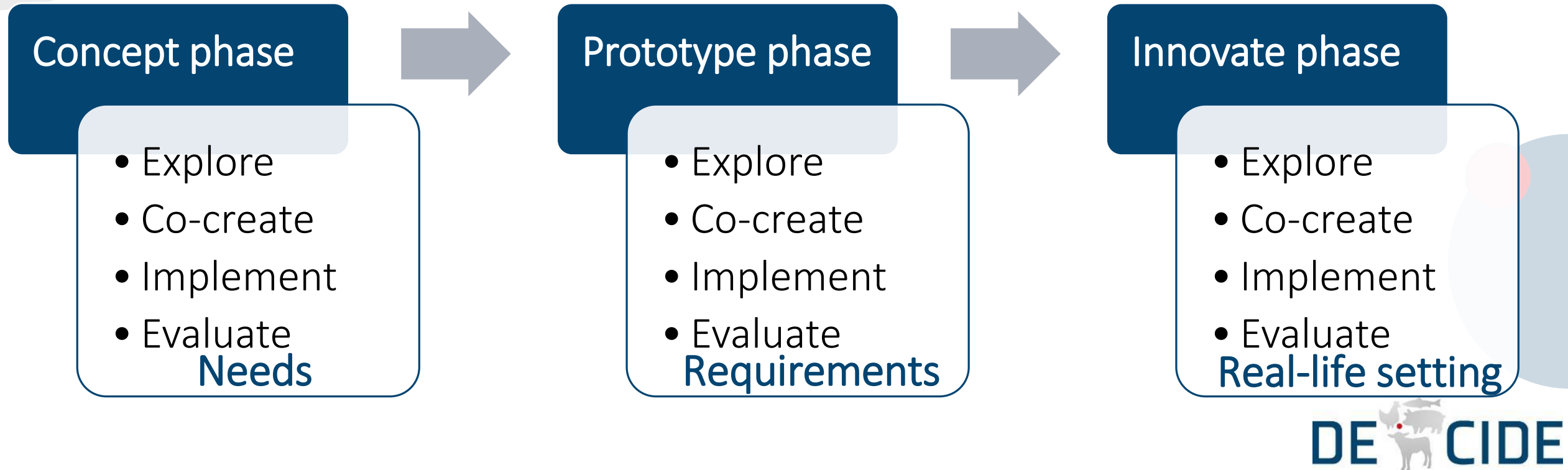


# Living Labs Approach as a frame for WP5

An approach that guides the planning, execution and evaluation of a project in a user centred and co-creative manner



# Living Labs : Our Approach Cattle



# Living Labs For Cattle

## Concept phase

### Explore

- Focus groups with farmers
- Qualitative surveys with vets
- Interviews with other stakeholders

### Co-create & Implement

- Discussions with cattle group members to develop concepts, personas & scenarios

### Evaluate

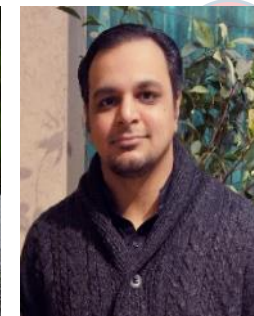
- Workshop with stakeholders
- Cognitive task analysis interviews with farmers
- Farmer quant survey



## Work Package 1 - Data identification, characterisation and acquisition

Miel Hostens, Ghent University  
Céline Faverjon, AUSVET  
Syed Gilani, Ghent University

WP1 leader  
WP1 co-leader  
PhD Student



# Objectives of WP1

Explore the different approaches for data access and data usage to support animal health via:

- Assess availability and suitability of data
- Develop a common ontology
- Develop and test alternate approaches for data access and define best practices

# Development of alternate approaches for data access

Each of the alternative approaches will be documented, evaluated and discussed to develop guidelines and recommendations using the knowledge acquired during the project

## Direct Data Sharing

- Default approach within DECIDE
- To be included in the evaluation and comparison of the alternative approaches

## Centralized Data Exchange (Federated Querying)

- To be implemented from scratch for at least one pilot implementation

## Privacy Preserving Data Analytics

- Federated Learning approach for privacy preservation
- Code-to-data instead of Data-to-code approach

*The DECIDE project will create proof-of-principles starting from the traditional way ... gradually building federated examples.*

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## WP2 - Methods for data analysis and modelling (to provide early warning signals)

WP LEADERS ANDERS R. KRISTENSEN & DAN B. JENSEN –UCPH

WP CO-LEADER PAULINE EZANNO - INRAE



# What is WP2 about?

- Multivariate and/or multi-level **dynamic monitoring models** that are generalizable to multiple cases (UCPH)
- Disease-specific **mechanistic models** to simulate pathogen spread and syndrome occurrence (INRAE)
- An **inference algorithm** to connect data and mechanistic models (INRAE)
- **Warning systems** based on both the monitoring and mechanistic models (UCPH)



## WP4 - Multidimensional burden of disease metric and prioritization of interventions

LEADER WILMA STEENEVELD(UU)

CO-LEADER JONATHAN RUSHTON, WILL GILBERT (UOL)

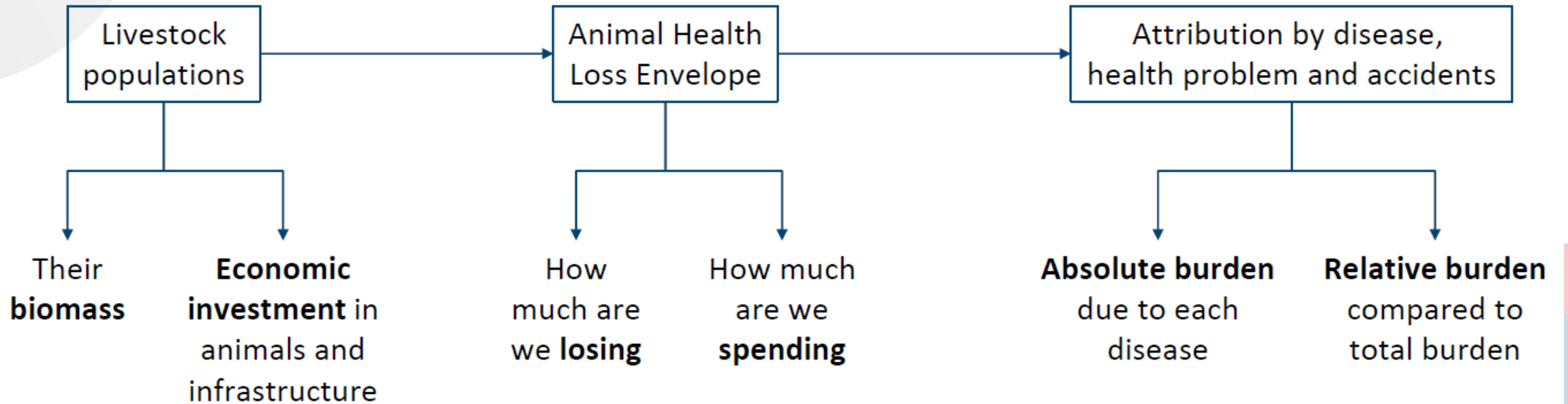


# Main objective and tasks

Objective: To determine the economic and welfare burden of prevalent contagious endemic diseases and ensure prioritisation of control measures for reduction of further spread, cost effectiveness and increased welfare

- Multidimensional burden of disease
- Loss and expenditure frontiers of the causes and risk factors of diseases
  - current levels of allocation
  - additional costs and benefits of interventions.
- Relationship between health, diseases and welfare

## Economic burden of disease



Adapted from Rushton et al 2021

<https://animalhealthmetrics.org/>

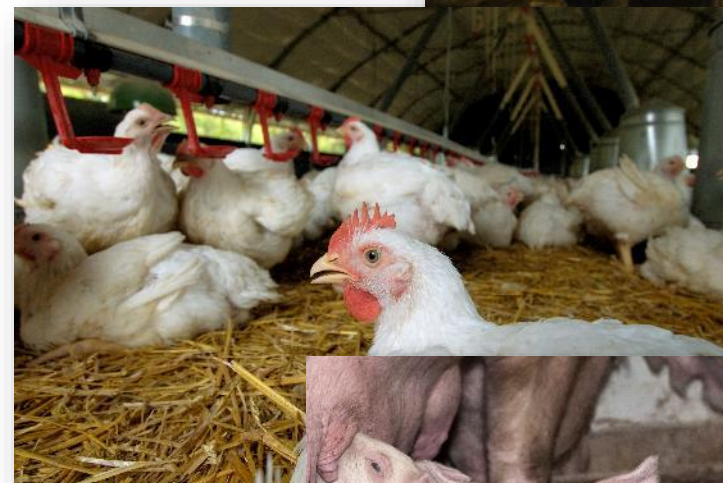




## WP 3 - Integration of data tools in disease control programs

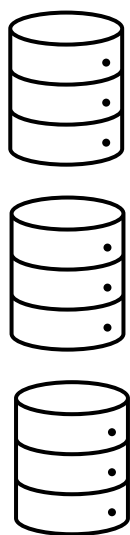
WP-LEAD: JENNY FRÖSSLING (SVA)

CO-LEAD: BRITT BANG JENSEN (NVI)



# Integration of data tools

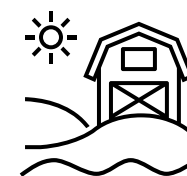
DATA



USERS

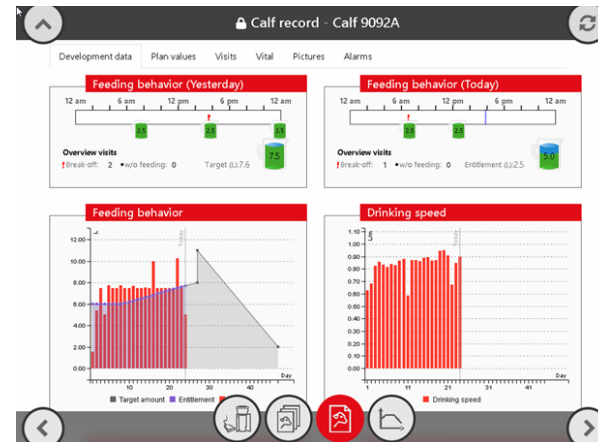


DECISIONS



# Example of pilot implementations - cattle

An add-in to the dashboard of the Lely automated milk feeder for calves, which indicates a reduction of milk intake in the group, the most likely infectious causes, and the most effective and efficient measures which the farmer and veterinarian can take for control.





# Translating surveillance outcomes into policy - How to deal with the uncertainty

- The DECIDE project integrates science with practise
  - Sound science
  - Innovative tools that support decisions by making uncertainties explicit
  - Tools that are useful for farmers, veterinarians or other health managers
- Prioritizing diseases and control measures for policy and research agenda's
- Better control of endemic infectious diseases is an important pillar of sustainable animal production

# DE CIDE

brings together 19 partners from 11 countries



Universiteit  
Utrecht



**ETH** zürich

