

# Farm-level modelling and digital monitoring of non-CO2 greenhouse gas emissions in Austria

Hermine Mitter<sup>1</sup>, Katharina Falkner<sup>1</sup>, Verena Kröner<sup>1</sup>, Bernadette Lienhart<sup>1</sup>, Franz Sinabell<sup>2</sup>, Franz Fensl<sup>3</sup>, Jakob Koch<sup>3</sup>, Florian Schuster<sup>3</sup>, Erwin Schmid<sup>1</sup>

<sup>1</sup> University of Natural Resources and Life Sciences, Vienna (BOKU), Department of Economics and Social Sciences, Institute of Sustainable Economic Development; <sup>2</sup> Austrian Institute of Economic Research (WIFO); <sup>3</sup> LBG Consulting GmbH

[hermine.mitter@boku.ac.at](mailto:hermine.mitter@boku.ac.at)

nonCO2farm

## MOTIVATION

Globally, agriculture is the largest emitter of anthropogenic non-carbon dioxide (non-CO<sub>2</sub>) greenhouse gas (GHG) emissions. A significant reduction of GHG emissions is required to achieve the ambitious climate-neutrality targets at EU and national levels in the next two decades.

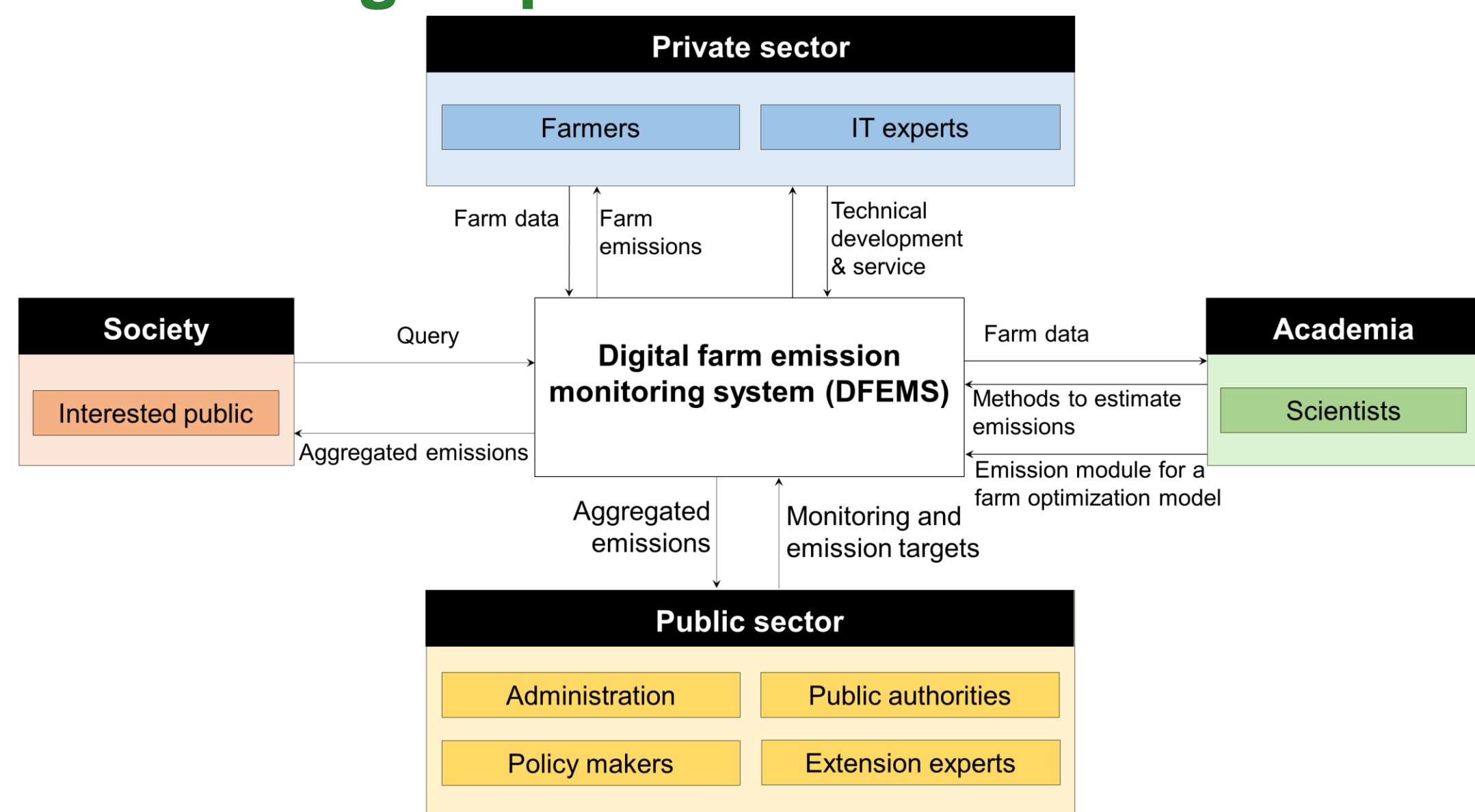
A portfolio of technical and structural measures is available to reduce methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) emissions in livestock and crop production. Their efficient implementation is challenging, because of information asymmetries and stochastic effects. A digital non-CO<sub>2</sub> farm emission monitoring system (DFEMS) can reduce such information gaps and enhance climate friendly agricultural production.

## PROJECT OBJECTIVES

- ▶ develop a **protocol** to derive robust estimates of farm-level non-CO<sub>2</sub> emissions;
- ▶ develop a **prototype** DFEMS and perform a **test run** with a sample of Austrian farmers;
- ▶ develop and model mitigation scenarios to identify **cost-effective mitigation measures** and emission reduction potentials at farm level;
- ▶ develop a **communication concept** for a web-based **dashboard** to provide non-CO<sub>2</sub> farm emission benchmarks.

## RESEARCH DESIGN AND PROGRESS

### Potential user groups of a DFEMS



Project start: 31.12.2021

### WP2

#### Protocol for developing a DFEMS

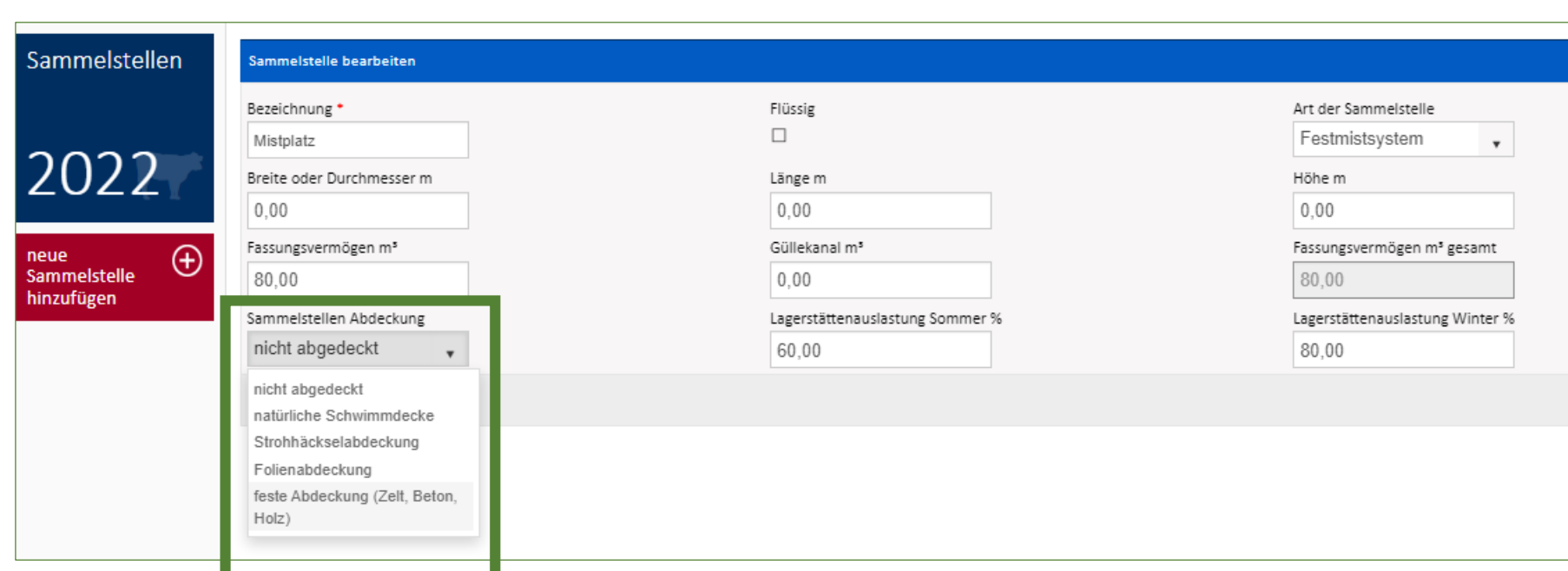
- ▶ calculation procedures for non-CO<sub>2</sub> farm emissions identified and tested
- ▶ emission factors by farm management practices and farm-level data gaps identified

Category	Identified farm level data gap
Methane (CH <sub>4</sub> )	Enteric fermentation
	Manure Management
Nitrous Oxide (N <sub>2</sub> O)	Managed Agricultural Soils

### WP3

#### Development of a prototype DFEMS

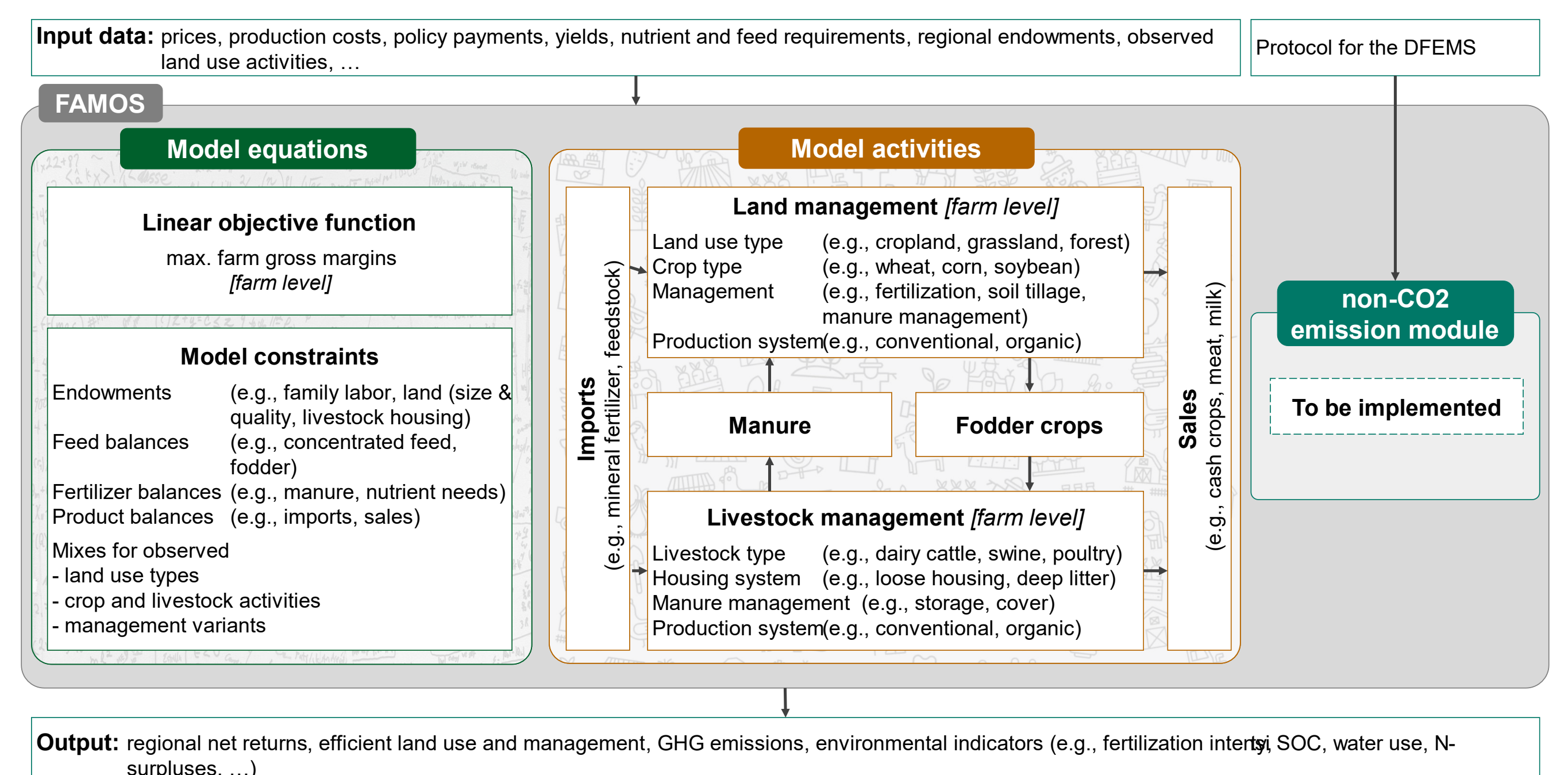
- ▶ existing web-based farm management system extended to close identified farm level data gaps
- ▶ determine the type of question (open, closed), categories for closed questions, unit for data query and emission calculation
- ▶ selection of test farms for prototype development



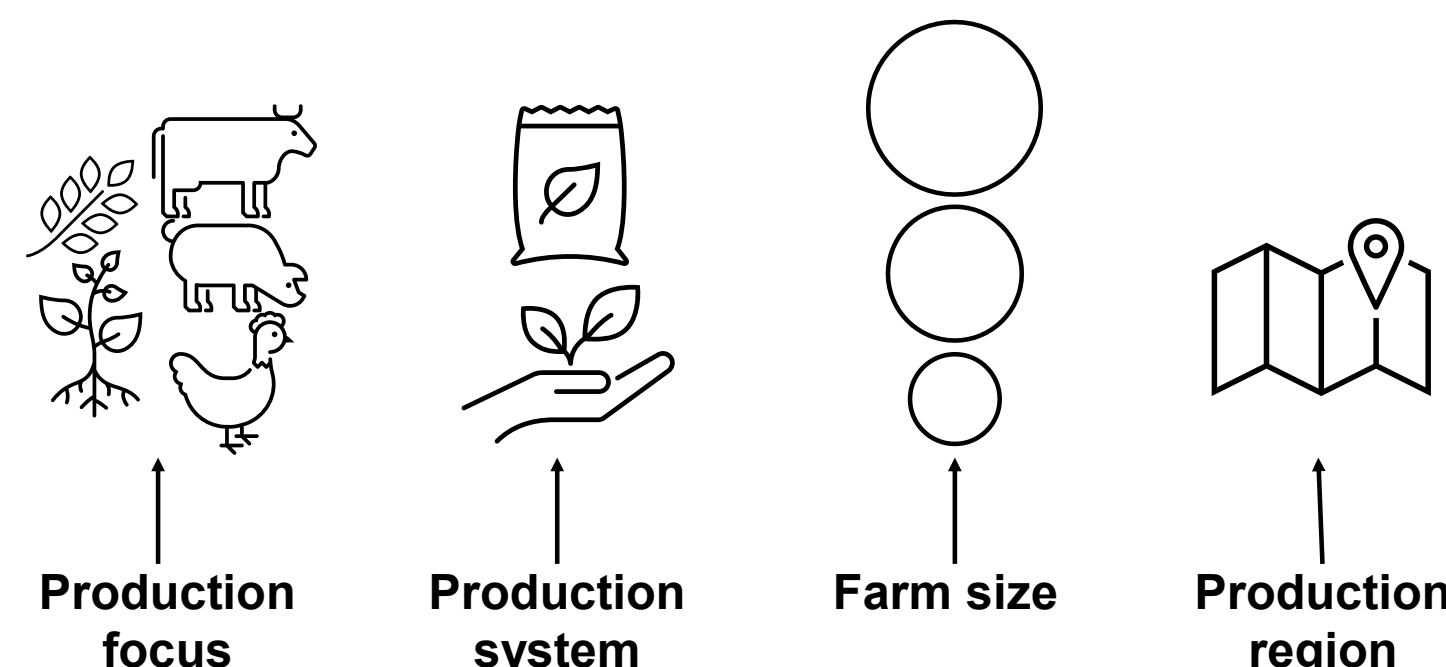
### WP4

#### Farm emission accounting and mitigation policy impact modeling

Schematic overview of the farm optimization model FAMOS



### Selection criteria for test farms



### WP5

#### Concept for a communication platform

Project end: 30.11.2024