quantiAGREMI

On farm quantification of ammonia and greenhouse gas emissions from livestock production

Needs

The agriculture sector, in particular livestock housing, contributes substantially to the emission of various greenhouse gases (GHG) within the EU including 93% of EU ammonia (NH_3), 48 % of Methane (CH_4) and 72% of nitrous oxide (N_2O) emissions. Further, emissions of NH_3 cause formation of fine aerosol particles, acidification and eutrophication of the environment and can be transformed to N_2O.

The EU Green Deal seeks to reduce GHG emissions for the agriculture by 55% of the 1990 level by 2030 and to reduce N losses by at least 50 %.

As a result, the uncertainties in emission inventories (up to 300%), in deposition of NH_3 release from livestock housing and in N_2O production processes in biogeochemical models all need to be reduced. Low-cost emission monitoring solutions such as sensors that are traceable and validated are required.

It is thus essential to develop a coordinated European metrology infrastructure to improve the NH_3 and GHG measurements and to reduce the uncertainties of emission data for a better understanding the emissions of GHG and reactive N in agriculture.

Objectives

- Develop traceable techniques for quantifying NH_3 and CH_4 emissions from selected livestock housings
- Develop and characterise CO_2, NH_3 and CH_4 monitoring techniques for enhanced spatial/temporal coverage
- Identify key-indicators and improve emission models for increasing the representativeness of emission estimations.
  To develop simple-to-use farm-monitoring systems and provide management tools to farmers
- Reduce uncertainty associated with up-scaling GHG emissions and nitrogen loss from soils.
  To improve methods for quantifying NH_3 deposition from livestock housing and tracing N in managed soils.
- To facilitate the dissemination and uptake of the technology and measurement infrastructure

Project Organisation

WP1 *Towards SI-traceable reference methods for livestock emissions factors*

- Improved **wet ammonia reference gas**,
- **New comparisons directly in stables** (reduction of the uncertainties),
- **SI characterization, validation and comparison** of the sophisticated emission calculation methods and other simplified models,
- **Uncertainty assessment** of the methods and the emissions factors.

WP leader: METAS Federal Office of Metrology

WP2 *New sensors and measurement techniques: development, laboratory testing and demonstration in the field*

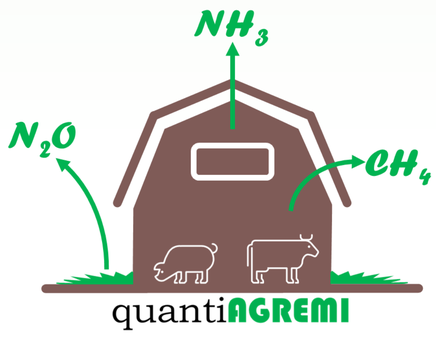
- Development and characterization of **new complementary sensors**,
- Two **field comparison** campaigns
- Precise **instruction for farmers** to use the new sensors

WP leader: VTT

WP3 *Beyond livestock buildings: Reducing the uncertainties of N_2O inventories and improving the quantification of NH_3 deposition*

- Determination of **NH_3 deposition** close to livestock housings,
- **Intercomparison of measurement techniques for determination of field NH_3 fluxes,**
- Determination of **N_2O source** processes in the field based on **isotope ratios in N_2O**,
- **Improvement of biogeochemical models** based on isotope measurements.

WP leader: KIT Karlsruher Institut für Technologie



WP4 *Dissemination and communication*

- **Contribution to missions inventory reports** under the UNFCCC,
- Provision of **guidelines** to facilitate the establishment of decision matrices and the promotion of mitigation measures by policy makers,
- Providing farmers access to **reliable methods** for identifying efficient mitigation strategies and provide **quantitative GHG emissions** at farm level.

WP leader: LGC

WP5 *Management and Coordination*

WP leader: LNE Laboratoire National de Métrologie et d'Essais

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METROLOGY PARTNERSHIP

EURAMET

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