Masterclass: Measuring GHG Emissions in Grasslands

12 April 2026, Évora University, Campus Mitra.

Duration: 1 day (8 hours)

Objective: Equip participants with the skills and understanding needed to measure GHG emissions in grassland ecosystems, focusing on methodologies, innovative tools, and the role of grasslands in carbon cycling and climate change mitigation.

Agenda

08:30 Depart from Évora to Mitra campus

09:00 - 09:30 | Welcome and Context Setting

- Introduction of participants and facilitators.
- Overview of the day's objectives.
- Grasslands and climate change: their role in the carbon cycle and emission dynamics.

09:30 – 10:45 | Fundamentals of GHG Emissions in Grasslands (Laura Cardenas)

- GHG sources and sinks in grasslands:
    - Nitrous oxide (N_2O) from soil management and fertilisers: Impact of fertiliser application on soil N_2O emissions.
    - Methane (CH_4) and carbon dioxide (CO_2) flux in grassland vegetation and soil: Restoration of degraded grasslands for carbon sequestration.

10:45 – 11:15 | Break

11:15 - 12:30 | Reporting, Standards, and Policy (Augustin Del Prado)

- Introduction to global frameworks: GHG Protocol, IPCC Guidelines.
- Reporting frameworks specific to grasslands:
    - CDP (Carbon Disclosure Project), IPCC.
    - Relevance of ISO 14064 standards.
- Policy context: Grasslands in NDCs (Nationally Determined Contributions).
- Aligning grassland management with climate goals and biodiversity targets.

12:30 - 13:30 | Lunch

13:30 - 15:00 | Direct GHG measurement Methods for Grasslands (Narasinha Shurpali + Rui Bessa)

- Unique challenges of measuring emissions in grasslands.
- Chamber-based measurements for N_2O and CO_2.
- Eddy covariance systems for landscape-level fluxes.
- Greenfeed and other methodologies for animals' measurement of CO_2 and CH_4

15:00 - 15:15 | Break

15:15 - 16:45 | Indirect GHG measurement Methods for Grasslands (Augustin del Prado + Rafael Silva)

- Emission factor calculations and modelling.
- Remote sensing for vegetation and soil monitoring.
- **Advances in Grassland GHG Measurement**
  - Technological innovations:
    - Use of drones for soil and vegetation analysis.
    - Integration of satellite data for large-scale monitoring.
    - AI and machine learning for predictive modelling.

16:40 - 17:00 | Discussion and Wrap-Up

- Reflection on learnings and challenges.
- Next steps: further resources, advanced workshops, and networking.
- **17:00 |** Closing and return to Évora *Colégio Espírito Santo* – UE for welcome drink

Support Materials

- Detailed guidebook on GHG emissions in grasslands.
- Links to tools for emission calculations and monitoring.
- Case study documents and practical worksheets.

Coordinator: David Fangueiro dfangueiro@isa.ulisboa.pt