LIVESTOCK AND CLIMATE CHANGE: ASSESSMENT OF EMISSIONS, MITIGATION OPTIONS AND ADAPTATION STRATEGIES
Zaragoza (Spain), 11-15 February 2019

PROGRAMME

1. **Context (3 hours)**
   - 1.1. Livestock and climate change with a focus in the Mediterranean area: sector trends, contribution to Greenhouse Gases (GHG) emissions and mitigation strategies (1.1 to 1.4: 2 h) (A. Mottet, A. del Prado)
   - 1.2. Climate change scenarios, impacts on Mediterranean livestock and adaptation strategies (A. Mottet, A. del Prado)
   - 1.3. Importance of IPCC National GHG Inventories and methodologies (A. Mottet, A. del Prado)
   - 1.4. Potential role of livestock to meet Paris Agreement expectations under Nationally Determined Contributions (NDCs). Koronivia Joint Work on Agriculture (COP23 2017) (A. Mottet, A. del Prado)
   - 1.5. Discussion based on the situation, perspectives and challenges in participants' countries (1 h) (A. Mottet, A. del Prado, F. Estellés)
2. **Greenhouse gases from livestock systems (3 hours)** (A. del Prado, D. Styles)
   - 2.1. Livestock systems, components and interactions
   - 2.2. Emitting processes and reduction
     - 2.2.1. Animal level
     - 2.2.2. Manure level
     - 2.2.3. Feeding and feed production level
     - 2.2.4. Carbon sequestration
     - 2.2.5. Energy use
3. **Measuring and monitoring livestock GHG emissions and sinks (4 hours)** (F. Estellés, K. Klumpp)
   - 3.1. What should we measure and why?
   - 3.2. Methodological challenges: spatial/temporal variability, sampling issues, uncertainty, etc.
   - 3.3. Review of field and laboratory methods: limitations and opportunities. Low cost procedures and new developments
   - 3.4. Data collection, management, standardization and reporting
4. **Main strategies for mitigation (4 hours)**
   - 4.1. Productivity gains and efficiency (1 h) (A. del Prado)
   - 4.2. Better integration of livestock in circular bioeconomy (0.5 h) (D. Styles)
   - 4.3. Enhancing carbon sinks/offsets (1 h) (K. Klumpp)
   - 4.4. Practical work on the estimation of soil carbon sequestration (1 h) (K. Klumpp, A. del Prado)
   - 4.5. Demand-side approaches (0.5 h) (F. Estellés)
5. **Climate change adaptation strategies for livestock (3 hours)**
   - 5.1. Review of impact and existing adaptation strategies/options by regions and production systems (5.1 to 5.4: 2 h) (V. Blanfort)
   - 5.2. How to include livestock in National Adaptation Plans? (V. Blanfort)
   - 5.3. Case study on responses to drought (early warning systems, index based approach and feed emergency) (V. Blanfort)
   - 5.4. The issue of establishing feed balances (V. Blanfort)
   - 5.5. Discussion on climate change adaptation opportunities (1 h) (V. Blanfort, A. del Prado, F. Estellés, D. Styles, K. Klumpp, A. Mottet)
6. **Modelling approaches for assessing GHG emissions and mitigation measures at different scales (11 hours: 3 h lectures + 9 h practical hours)**

6.1. What should we model and why? (6.1 and 6.2: 1 h) (A. del Prado, K. Klumpp)
6.2. Types of models: overview, data requirement, limitations and opportunities, applications and outputs (A. del Prado, K. Klumpp)
6.3. Life cycle assessment (LCA): products footprints (1 h) (D. Styles)
6.4. Synergies and trade-offs between mitigation and adaptation measures. Examples of successful practices (1 h) (A. del Prado)
6.5. Practical work on modelling
6.5.1. A simple field scale model for grassland systems: NCYCLE (2 h) (A. del Prado, F. Estellés)
6.5.2. Livestock GHG National Inventories: basic calculation of Tier I emissions based on a country case (3 h) (D. Styles, A. del Prado, F. Estellés, D. Styles, K. Klumpp)
6.5.3. Global to subnational scale and LCA approach: FAO Global Livestock Environmental Assessment Model interactive (GLEAM-i) (4 h) (A. Mottet, V. Blanfort, A. del Prado, F. Estellés, D. Styles, K. Klumpp)

7. Socio-economic assessments and policies (4 hours) (S. Pellerin, D. Moran)
7.1. The marginal abatement cost curve methodology (MACC)
7.1.1. Key steps of the process
7.1.2. Examples from different countries
7.2. Adaptation cost curves
7.3. Accounting for multi-functionality
7.4. Policy mechanisms available to address livestock and climate change issues

8. Round table discussion (2 hours) (S. Pellerin, D. Moran, A. del Prado, F. Estellés, A. Mottet)
8.1. Priorities on knowledge for mitigation and adaptation
8.2. Barriers for mitigation and adaptation implementation in Mediterranean countries
8.3. How to incentivize the implementation of mitigation and adaptation measures