GLOBAL RESEARCH ALLIANCE
ON AGRICULTURAL GREENHOUSE GASES

GRA FLAGSHIP PROJECT PROPOSAL

Title: Satellite monitoring of quantity and quality of available biomass in pastoral livestock systems

Leader: Hayden Montgomery, GRA Special Representative

GRA Council Champions: *list the names of at least 5 GRA Members and Partners (including at least 3 Member countries)*

1. *Canada*
2. *Uruguay*
3. *Costa Rica*
4. *Fontagro*
5. *New Zealand*
6. *Argentina*

7. **Countries involved**: *Canada, Uruguay, Costa Rica, Fontagro, New Zealand, Argentina*

Start date and project length: March 2022, 48 months

Brief description of project: The objective of the project is to use space-borne remote sensing information coupled with modelling approaches and field sampling to identify and classify types of grasslands/rangelands, their characteristics, including estimates of the quantity and quality of biomass available, in real-time and with adequate precision to improve monitoring of greenhouse gas emissions and removals in pastoral livestock systems and to provide tools for improved decision making for grazing management for climate mitigation and adaptation.

Key partners and existing resources: FONTAGRO, MPI – NZ, INTA Argentina, FAUBA - Argentina, INIA - Uruguay, Agrosavia – Colombia, INTA – Costa Rica, MAGYP - Argentina, MGAP – Uruguay, AACREA – Argentina, GRSB, Proleche - Costa Rica, Manaaki Whenua Landcare Research - New Zealand, Teagasc – Ireland, University of Glasgow - UK, CSIRO - Australia, AAFC-Canada, HBLFA - Austria, University of Life Sciences Vienna – Austria, INRAE – France, James Hutton – UK, SRUC – UK, UNIMI – Italy, KIT – Germany, UNIFI – Italy, CESBIO – France, CIRAD – France, CSE – Senegal, University of Free State – South Africa, Makarere University – Uganda. USD1.3M has already been already secured. In-kind contributions will supplement this and further resources will be sought to support expanded participation.

Benefits and outcome from Flagship project:

i. Define rangeland/grassland mapping classes and a methodology for global harmonization and use the results to describe guidelines for mapping global rangeland/pasture systems.
ii. Real-time prediction models of biomass quantity and quality available from locally calibrated remote sensors for forage resources from temperate, subtropical and tropical, semi-arid and humid climates.
    a. Assess RS products and related algorithms in order to provide timely estimates of grassland biomass dynamics and related information on management and soil properties to be used by crop and process-models

b. Improve farm to landscape scale model and RS products assemblies for differently managed grasslands, allowing to optimize grassland and soil management for improved soil functions at site, farm and landscape scales under current and climate change conditions.
c. Models validated and implemented in demonstration units and commercial farms.

iii. Develop decision support tools that can be tested in many regions, to help improve nutrient and resource management supporting local initiatives to mitigate and adapt to climate change and deliver regionally appropriate sustainable management practices.
iv. Build international capacity outside the consortium by communicating project data, methodology, tools in refereed publications, conferences, workshops, and training.

Further Resourcing needs:

i. Contributing historical and future field data/samples from diverse grassland/rangeland ecosystems, with associated site information
ii. Contributing other remote/proximal sensing information/capability to complement space-borne information.
iii. Contributing with new image processing techniques and development of predictive models.

Resourcing mechanisms: FONTAGRO, EJP Soil, ERANET Joint Call, national funding.

Linkages: GEOGLAM RAP, CIRCASA/ORCASA, EJP Soil