### GLOBAL RESEARCH ALLIANCE

**ON AGRICULTURAL GREENHOUSE GASES** 

9<sup>th</sup> Livestock Research Group meeting

10-12 April 2017

## **Advancing the Enteric Fermentation Flagship**

#### Why is this flagship important?





Enteric methane is the biggest source of direct global GHG emissions from livestock

Emissions per animal vary widely depending on the species, feed and productivity

A significant challenge for estimating **AND** an opportunity for reducing livestock GHGs

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Opportunities to mitigate enteric CH<sub>4</sub> emissions through:

- Improving animal selection and breeding
- Improving animal feed/feeding
- Modifying the rumen microbiome
- Improving animal health care and resilience
- Increasing animal and farm-system productivity

...the flagship is a way of drawing these opportunities together in a coordinated, globally collaborative way

#### Principles of a flagship

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- Unique GRA added value
- Inclusive
- Relevant projects that benefit the majority
- Solution-focused, linking clearly to mitigation practices
- Multifaceted co-benefits with improved livelihoods, food security and adaptation
- Build capacity and capability
- Add value to existing efforts and increase the scope and depth of future efforts



### **The Enteric Fermentation Flagship**



- 1. Development of solutions for reducing enteric CH4 emissions
- 2. Improved quantification of livestock emissions
- 3. Identification, testing and implementation of mitigation solutions

# 1. Development of research solutions



Some examples:

- Animal selection: data sharing & analysis to help develop genetic/genomic markets for low emission traits
- Feed: identification, testing and improved quantification of low emitting feeds
- **Microbiome:** improved understanding of enteric CH<sub>4</sub> formation, characterisation and manipulation
- Animal health: exploring the links between improved health, GHG outcomes and food security
- Manure management: ?



Some examples:

- Improved emission factors: determining methane yield (Y<sub>m</sub>) in different systems and feeds
- Improved activity data: low-cost, innovative generation of data to support Tier 2 approaches
- Livestock Tier 2 inventory development: guidance and support to countries for developing practical and defensible systems within data and resource constraints

# 3. Identification, testing and implementation of solutions



Some examples:

- Identification of locally appropriate mitigation solutions: drawing on work area (1) and (2)
- **Pilot testing of solutions:** impact on mitigation, economics, food security, synergies with adaptation
- Implementation: communication and promotion of tested mitigations, mainstreaming mitigation actions into development projects, systems to demonstrate achievement of INDCs

Improved Y<sub>m</sub> estimates for cattle diets containing a high % of byproducts

Leader: Person X, Country Y

Countries involved: GRA countries in S/S-E Asia

**Brief description:** establish a searchable database that will allow the extraction of Ym values that better reflect local circumstances than current IPCC default values...database coordinator...country contact points...co-authored paper...

**Benefits:** supports policy needs...develops capability...builds on existing resources...tangible product

**Resourcing needs:** [roles/responsibilities/\$\$]

Resourcing mechanisms: LEARN post-doctoral award...in-kind contribution...

**Key partners and existing resources/projects:** FNN database...IPCC emission factors database...etc

#### Implementing GHG mitigation practices on smallholder dairy farms in S.E. Mars region

- Work with policy and science to improve national dairy cattle GHG inventory methodology.
- Collect local data to identify opportunities for better advancing livelihoods and enhancing food security while simultaneously reducing GHG emissions.
- Prioritise interventions & develop projects for small scale piloting & demonstration of priority actions with role out on a larger scale if successful. Identify and seek funding from existing international sources e.g. GEF, GCF for this.
- Experienced scientists from GRA countries to assist local scientists in the development of project proposals. Work in close coordination with GRA Partners (CCAFS, FAO etc.).
- Funding for GRA involvement in GHG inventory development & assistance with project development to be provided in-kind on a voluntary basis by individual countries.

## The development of improved generic CH4 prediction algorithms for use in national inventories.

- Builds on existing feeds database more countries, more data, improved information of feed effects on CH4 across a wider range of diets.
- Development of generic prediction algorithms that rely on simple feed characterisation for better quantification CH4 emissions where direct measurements are limited but feed characterisation is possible.
- In-kind contribution for supply of information, cash needed for maintenance and analysis of the database and employment of a project coordinator (Post doc capability building opportunity).



### The feeding & testing of bioactive compounds for use in and confined and grazing dairy cows with an emphasis on both mitigation and productivity impacts

- Joint GRA research call, each country to fund its own researchers.
- All projects to involve a minimum of three GRA countries.
- Formal evaluation process.

#### Identifying low emitting sheep and cattle using microbial profiles

- Build on existing GPLER4 project that is funded to work on identifying a rapid, noninvasive method of identifying low emitting animals.
- Central sequencing and analysis of rumen and mouth swab samples submitted from participating countries, data linked to individual animal methane measurements.
- Information on relationships between CH<sub>4</sub> and microbial populations available to all participants.
- Funding mainly in-kind from participating countries for sample collection and CH4 measurements, with the cash needed to fund the central sequencing and analysis contributed on a pro rata basis based on the number of samples submitted.

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#### What next?



Views welcome on the structure of the flagship:

- Are the main components right?
- Can you see how your country could engage?
- Have we missed anything?
- What are specific priority projects?

After lunch we will use breakout groups to develop each component, populating them with ideas for short and longer term priority projects



# Developing specific project proposals

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Guidelines to work to in the breakout groups

- 1. Be realistic tangible benefits in the short-medium term
- 2. Build on existing projects and data
- 3. Build on existing databases, or develop new ones
- 4. Demonstrate concrete outcomes beneficial to the majority
- 5. Is there a committed (and resourced) leader?
- 6. Is there a resourcing plan for the project?