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# GRA Flagships

Presentation to GRA Council

Berlin, 10 September, 2018

# Principles of a GRA flagship

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- Unique GRA added value
- Inclusive
- Relevant projects that benefit multiple countries
- 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

# GRA Flagships

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# GRA Flagship

# Soil Carbon Sequestration Flagship

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# Soil Carbon Sequestration flagship 2017-2019

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## *Developing* solutions

*Decision support toolbox*

- **Argentina, Australia, Brazil, France, Ireland, Lithuania, New-Zealand, USA (+ other countries?)**

**REGIONAL PROJECTS**
**(e.g. 2 post-docs or researchers by region, supported by SCS teams)**

- **Regional maps of crop and pasture practices suited to reach SCS targets**
- **Regional implications of SCS practices for**
  - **yields,**
  - **drought tolerance and climate change adaptation**
  - **$N_2O$ and $CH_4$ emissions, energy use**

## *Monitoring solutions*

*Methods to certify SCS*

- **Argentina, Australia, Brazil, France, Ireland, Spain, USA, EU-ERAGAS (+ other countries?)**

**REGIONAL PROJECTS**
**(e.g. 2 post-docs/researchers + multi-author SCS team)**

- **Handbooks and guidelines for project scale MRV adapted to regional contexts and agricultural systems**
- **Modelling & remote sensing methods for SOC stock change in crop and pasture systems**

## *Adopting* solutions

*Enabling environment*

- **France, Spain (+ other countries?)**

**PROJECT 3**
**(resources from CIRCASA)**

- **Regional stakeholder workshops on SCS**
- **Criteria for sustainable SCS projects supporting livelihoods**

CIRCASA: a funded Coordination and Support Action

# GRA Flagships – Projects

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## CIRCASA "Coordination of International Research Cooperation on Soil Carbon Sequestration in Agriculture"

The overarching goal of CIRCASA is to develop international synergies concerning research and knowledge transfer on agricultural soil carbon sequestration at European Union (EU) and global levels.

2018 first achievements:

- Development of an **online collaborative research platform**, which allows partners to share knowledge and experiences as well as research results and coordinate research collaborations.
- Assessment of national and international research projects and networks on agricultural SOC sequestration
- Organization of 11 regional workshops around the world (South Africa, China, Australia, Denmark, …) on "Stakeholders' perspectives and knowledge needs on SOC sequestration" during the second semester of 2018
- Stakeholder survey on the role of soil organic carbon management for climate change mitigation and sustainable development and knowledge needs: https://polls.ecologic.eu/index.php/791211?lang=en

# GRA Flagships - Projects

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## The "4 PER 1000: SOILS FOR FOOD SECURITY AND CLIMATE" initiative

**Action plan**

- Carbon-sequestring operational projects

**Research program**

- Estimating the potential of soil carbon sequestration and associated benefits
- Developing practices adapted to specific conditions
- Define and strengthen the enabling environment
- Monitoring, reporting and verification of soil carbon

**Evidence-based options for countries, stakeholders and the private sector**

4 PER 1000 SOILS FOR FOOD SECURITY AND CLIMATE

International

Multi-stakeholder

280 partners

Example of research action-oriented in the « 4 per 1000 » initiative developped by the Scientific and Technical Council:

- A formative assessment for the improvement of development projects on soil carbon sequestration

# GRA Flagships – next steps

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## Soil Carbon Sequestration Flagship

- **Developing** regional projects, such as the Latin America project on legumes in grasslands and similar soil carbon offset projects in Europe. Potential to do more in other regions
- **Monitoring**: involvement in the Global Soil Partnership to develop methodologies and guidelines on soil carbon.
- **Adopting**: workshop on carbon offset to bring together several initiatives

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GRA Council meeting, Berlin

•10 September 2018

# Flagship on Reducing GHG Intensity of Rice Systems

Álvaro Roel, Yasukazu Hosen and Ngonidzashe Chirinda

# Objectives

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Finding practical measures that reduce emission intensity of the rice systems, while sustaining or improving its overall production efficiency

# Components

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## Developing *solutions*

**Water management** – conducting multi-country experiments on commercial size farms to assess the effects of AWD as a mitigation solution.

**Organic matter management** – identification, testing & quantification of improved management of crop residue and manure as a mitigation solution.

**Cultivar selection** – identification, testing & quantification of high yielding rice cultivars with low $CH_4$ emission.

## Improving *quantification*

**Database compilation** – sharing experimental information and emission data among members.

**Improved 'emission factors'** – improving emission and scaling factors for $CH_4$/$N_2O$ emissions and soil C stock changes in country/region by analysing emission monitoring data.

**Modelling** – development and inter-comparison of process-based models to simulate $CH_4$/$N_2O$ emissions soil C stock changes.

## *Adopting* solutions

**Identification** – of areas where AWD can be applied and optimized to reduce yield loss risks, water and carbon footprints of rice systems.

**MRV guidelines** –measurement, reporting, and verification (MRV) guidelines for implementing the solutions to GHG mitigation actions.

**Promotion** of solutions – by communication of tested mitigation solutions with stakeholders to support NAMAs and NDC.

## Building *capabilities*

**Workshops** – to enhance the technical and institutional capacity to conduct relevant GHG research in the Group.

**Coordinated networks** – of scientists and extensionists, private-sector, and farmers for accelerating the wide-scale adoption of best-fit management options.

# Project 1

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## "On farm assessment of multi-beneficial improved water management techniques, reducing costs, water use and gas emissions in America´s rice systems"

- Who: Colombia, Perú, Chile with CIAT, FLAR and PRRG-GRA + others from Americas + Europe, regional partners
- What: Improve adoption of AWD by farmers
- Why: research shows great reductions without yield losses, but it is difficult to implement in scale
- How: Validating appropriate AWD in farmers' fields
- Funding: FONTAGRO "More rice with less emissions and less water consumption"

# Project 2

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## "Multi-country on-farm assessment of multi-beneficial integrated management techniques in the rice sector of Asia"

- Who: MIRSA3 Project, a collaborative research project with Japan (NARO & JIRCAS), the Philippines (PhilRice), Viet Nam (HUAF), Indonesia (IAERI), and IRRI, is just being launched.
- What: evaluate management techniques on multi-benefits of rice cultivation by combining fertilizer and organic matter management with water management
- Why: improve crop management for low emissions
- How: Field experiments on effects of water management, chemical and organic fertilizer application on GHG emissions, soil carbon stock, and rice production. Simulation models will be applied to evaluate long-term effects of the management.
- Funding: MAFF of Japan
- Next steps: Start the on-farm assessment in the Philippines, Viet Nam, and Indonesia by January, 2019

# Project 3

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"Identification of high yielding rice cultivars as related to low methane emissions"

- Who: all PRRG members – IRRI, CIAT, FLAR, CCAFS (Dr. Chirinda, CIAT)
- What: explore the potential of different rice cultivars to contribute towards the mitigation of CH4 emissions from irrigated rice systems in LAC and Africa
- Why: genetic diversity exists and exploiting cultivar diversity may be a very efficient tool for methane mitigation
- How: A desk-top study using peer-reviewed, to identify key mechanisms and rice attributes contributing to differences in CH4 emissions among rice cultivars. An initial screening of FLAR landmark varieties and elite lines, in CH4 emissions. A laboratory-based study to determine differences in aerenchyma.
- Funding: CLIFF – GRADS Scholarships x 2 (identification before end of 2018)

# Project 4

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## "Enhancing sustainable rice production in Latin America"

- Who: UIUC , CIAT, FLAR, AfricaRice (Lead: Dr. Pittelkow, UIUC; Dr. Chirinda, CIAT; and Dr. Graterol, FLAR)
- What: benchmark the economic and environmental sustainability of rice production in Latin America using the recently developed SRP platform
- Why: urgent need to evaluate the economic and environmental sustainability of current rice production practices for major rice producing countries in Latin America using an internationally accepted framework
- How: running SRP protocol for major rice producing countries
- Funding: University of Illinois International Joint Research Program

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# Enteric Fermentation Flagship

Presentation to GRA Council

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# Why is this flagship important?

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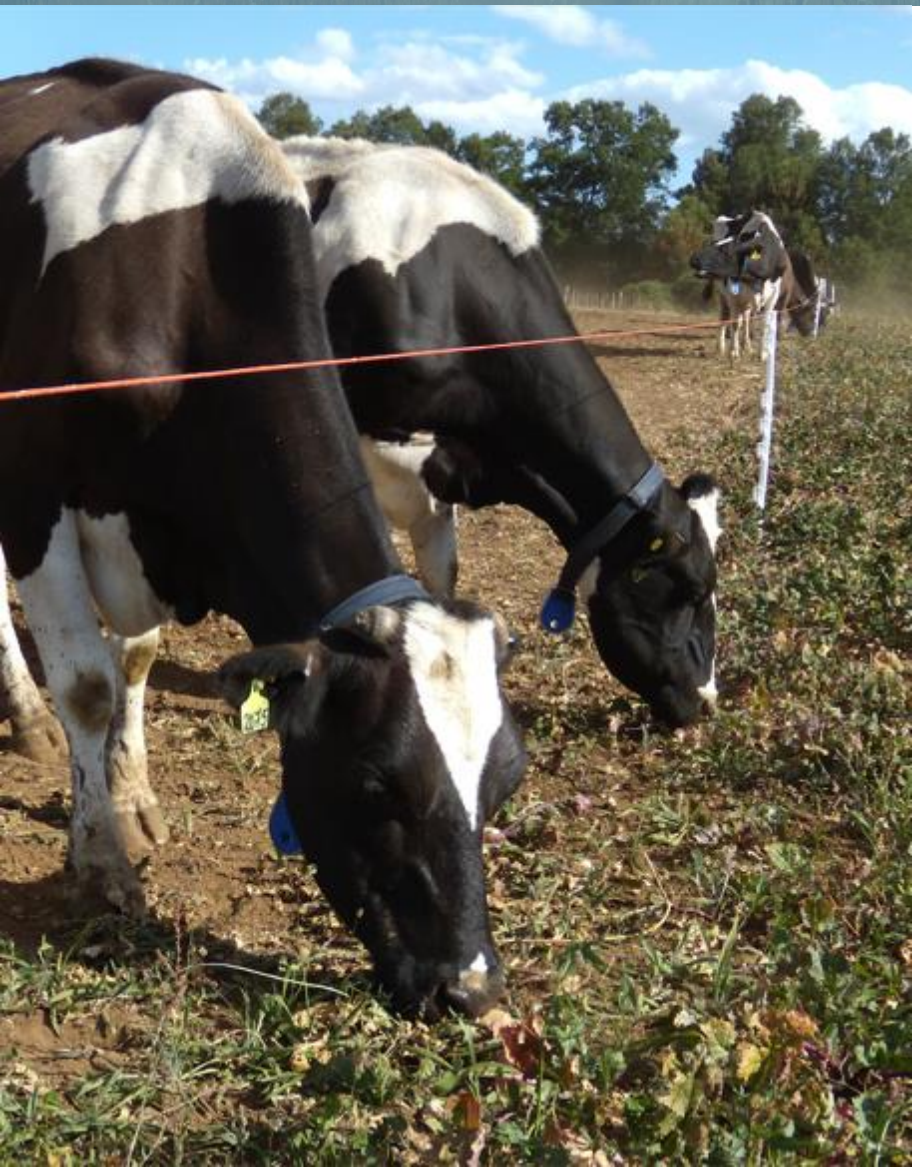

Enteric methane is the biggest source of direct global GHG emissions from livestock

**+**

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

**=**

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

# The Enteric Fermentation Flagship

**Three areas of focus:**

1. **Development of solutions for reducing enteric $CH_4$ emissions**
2. **Improved quantification of livestock emissions**
3. **Identification, testing and implementation of mitigation solutions**

# Process for identifying projects

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1. Workshops at the 2017 LRG meeting in Washington D.C.
2. Open call to LRG members and partners
3. Over 50 high level ideas received; projects prioritized if they met the following criteria:
   - ✓ Be realistic – deliver clear benefits in the short-medium term
   - ✓ Build on existing projects and databases and/or make better use of existing data
   - ✓ Demonstrate concrete products/outcomes
   - ✓ Committed project leaders already in place
   - ✓ Have a plan for resourcing

→ **Four priority projects emerged, all linked to existing activities of LRG research networks**

# Flagship projects

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Two projects are now underway (or being contracted):

1. **Rumen Microbiomes to Predict Methane:** led by AgResearch, NZ
2. **Feed/Methane Relationships:** led by Penn State University, USA and Wageningen UR, Netherlands

A third project concept, on forage-based mitigation options (submitted by Canada), will be incorporated into Project 2.

The fourth project concept, looking at interactions between the animal genome and rumen microbiome, is still being developed by the LRG's Rumen Microbial Genomics Network.

# Rumen Microbiomes to Predict CH4

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- A project of the LRG's Animal Selection, Genetics & Genomics Network
- Aims to develop a rapid, low-cost method for profiling rumen microbiomes that can be used to predict methane emissions and production traits in sheep and cattle
- Rumen fluid from a wide range of livestock will be sequenced to understand the heritability of microbial communities and structures
- Involves an open call to GRA countries, particularly developing countries, to submit samples for sequencing
- Delivers June 2020
- Funded by New Zealand
- Contributions from other countries

*Photo: V. Atakos, CCAFS*

# Feed/Methane Relationships

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- A project of the LRG's Feed & Nutrition Network
- Aims to improve the quantification of the effects of feed and nutrition on dairy cattle CH4 managed under a range of different production conditions and environments
- Builds on two existing multinational projects that were funded by FACCE-JPI, ERA-GAS and participating countries
- Incorporates the third flagship proposal (submitted by Canada) on forage mitigation options
- Delivers June 2020
- Funded by New Zealand

# Enteric Fermentation Flagship – next steps

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Additional projects are possible but first GRA members and partners need to:

a) Prioritise the flagship programmes

b) Identify existing multi-country projects that could be expanded and/or reproduced in other parts of the world

c) Commit resources and project participants

d) Actively engage in proposal development

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# GRA Flagship Greenhouse Gas Inventories

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# GRA Flagships – Overview

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## Enhancing inventory **structure**

For example:

- Regional and source-specific **guidance** for the development of advanced inventories

## Building **capability**

For example:

- **Analyses** of experiences of countries in adopting advanced methods
- **Delivery** of targeted technical training to improve emission factors and design inventories that work with existing national and regional data sources

## Acquisition and administration of **data**

For example:

- Incorporation of improved emission estimates into emissions (e.g. IPCC-EFDB, GRAMP, SAMPLES, MAGGnet) and activity databases
- National and regional research projects that validate measurement and modelling methodologies, ensuring that those gains can be captured in inventories

## Demonstrating **mitigation** in NDCs

For example:

- Provide targeted **support** for countries designing agricultural monitoring, reporting and verification (MRV) within NAMAs or Low Emissions Development pathways based on improved inventories

# GRA Flagships – Project Status

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- Have struggled to find project leaders or resourcing to advance project ideas
- Development of one project proposal on 'shared farm systems/production typologies' is in progress with leadership from CCAFS and the IRG's GHG Inventory Network.
- Work on quantification of GHGs is occurring:
  - Livestock Research Group and Integrated Research Group projects supporting Tier 2 livestock inventory work in developing countries
  - Enteric Fermentation. Soil Carbon Sequestration and Paddy Rice Flagships all have quantification of emissions as an area of focus

# GRA Flagships – next steps

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- GHG Inventory Flagship work should include efforts from the inventory/quantification projects under other research groups
- Activities under this flagship need support and leadership from Member countries
- Role of Partners will be key in capability building

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