

# GLOBAL RESEARCH ALLIANCE

ON AGRICULTURAL GREENHOUSE GASES

MACS-G20

15 November 2017

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## Building the global capacity to reduce agricultural greenhouse gas emissions



Hayden Montgomery  
Special Representative

# Food security, climate change, sustainable development

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## Paris Agreement:

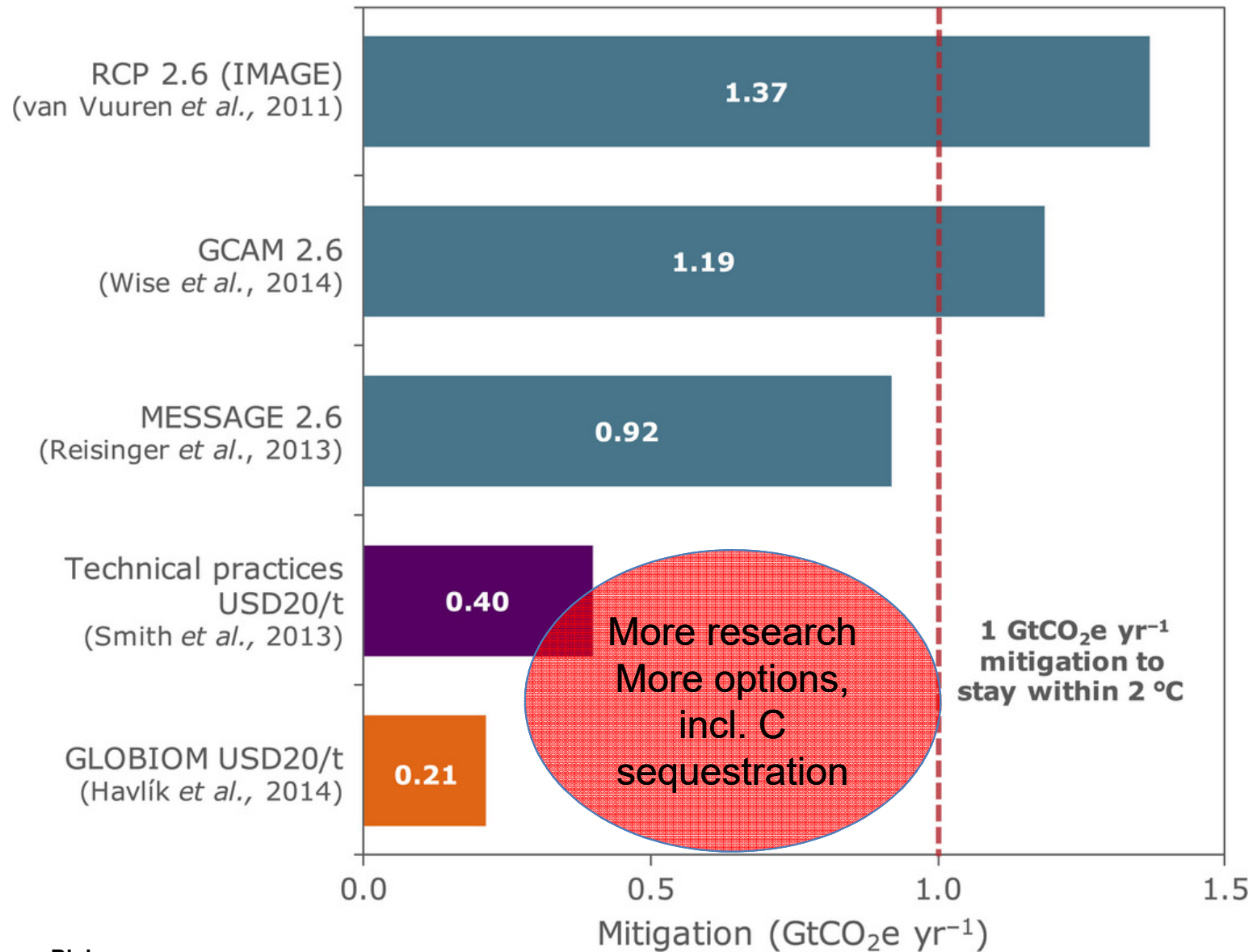
*Recognizing the fundamental priority of safeguarding food security and ending hunger, and the particular vulnerabilities of food production systems to the adverse impacts of climate change.*

*Holding the increase in the global average temperature to well below 2°C above pre-industrial levels.*

*Low greenhouse gas emissions development, in a manner that does not threaten food production.*

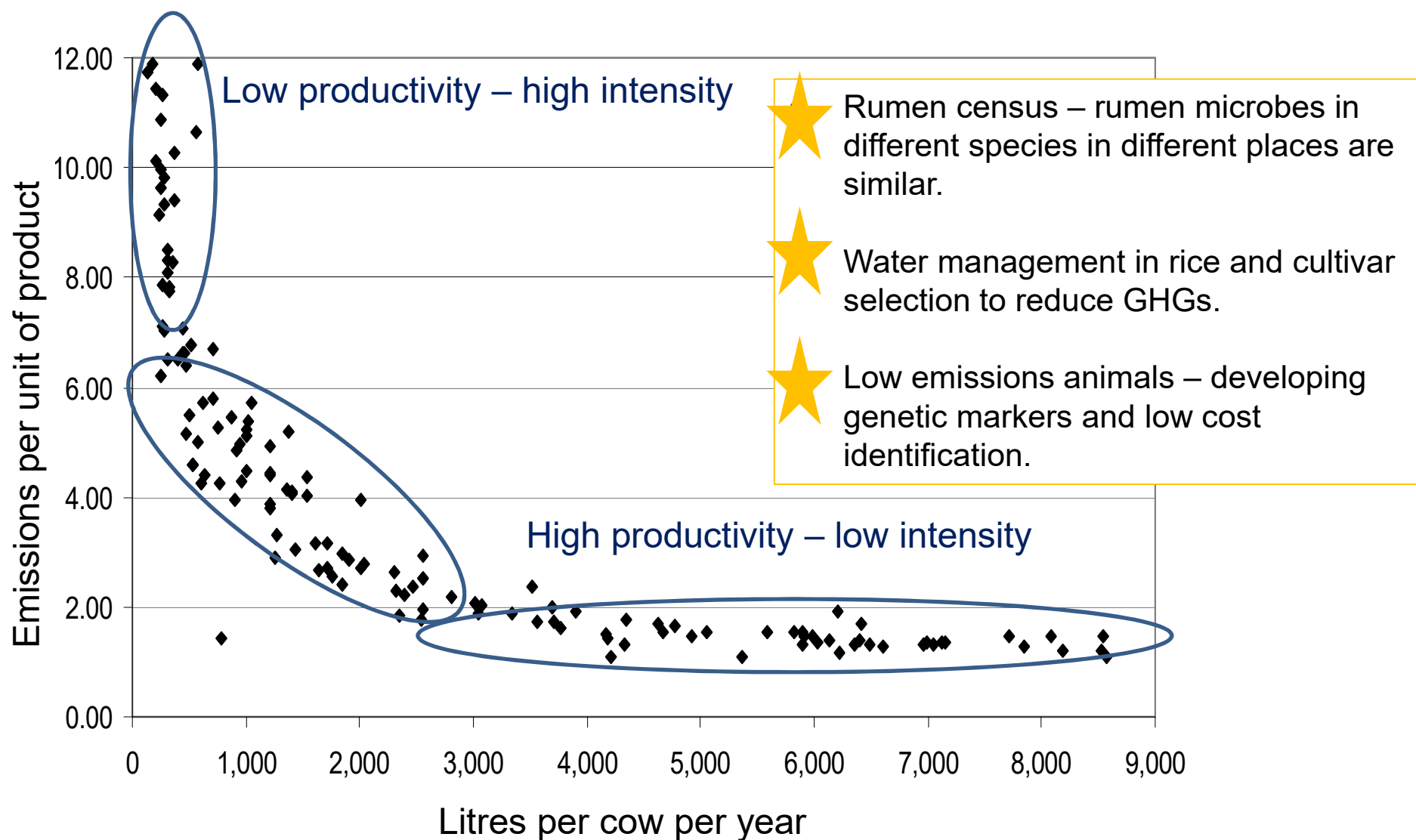
Sustainable Development Agenda (SDG2, SDG12, SDG13, SDG15, but relevance to most).

# Reducing emissions from agriculture to meet the 2 °C target



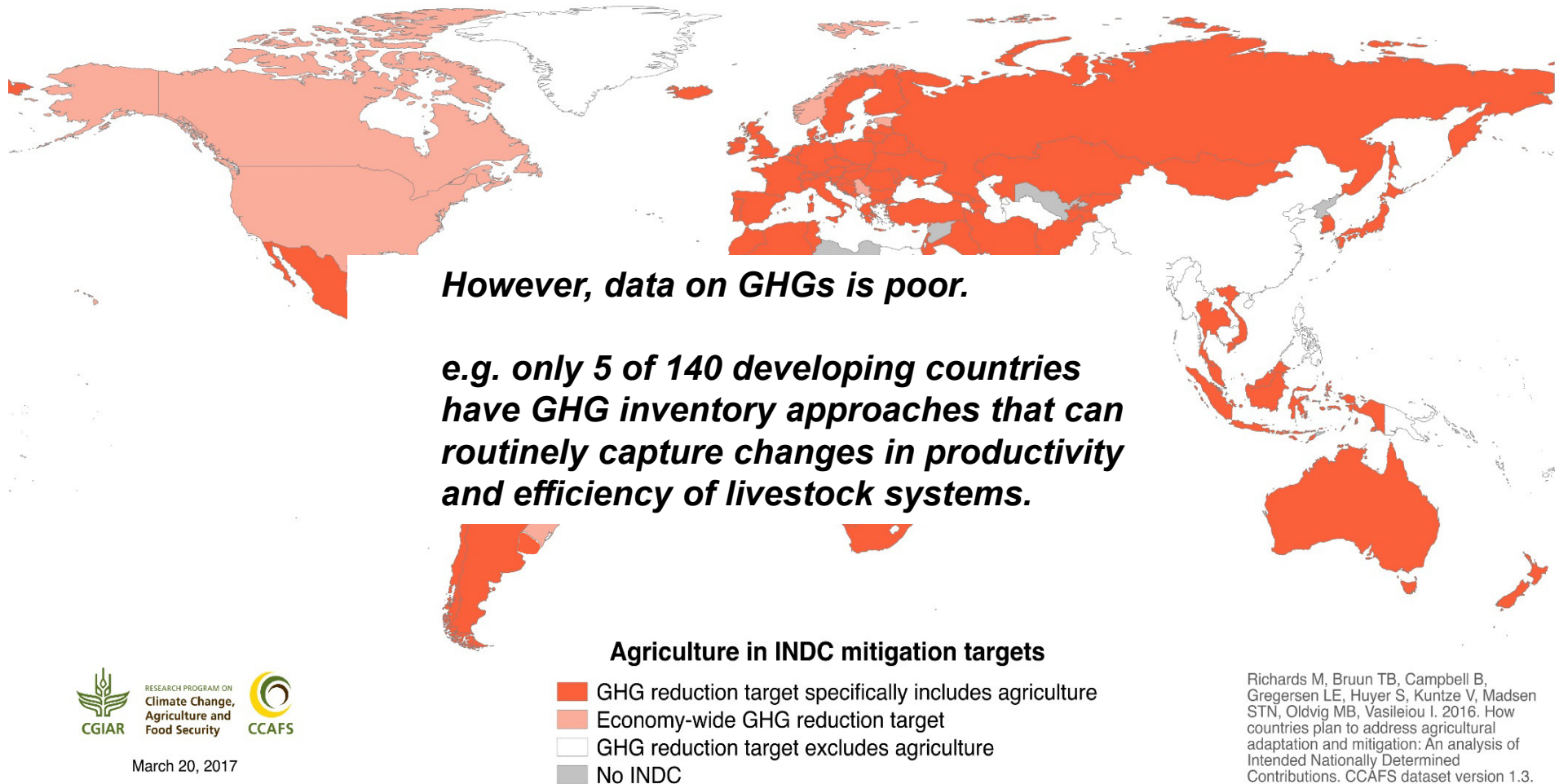
# Dual objectives – fully exploiting productivity curve and exploring new frontiers of knowledge

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## Good news

- agriculture is now central to many countries' response to climate change
- work on agriculture agreed by UNFCCC on 13 November (SBSTA/SBI)



## ON AGRICULTURAL GREENHOUSE GASES


[illegible]

**49**  
member  
countries

17 partner organisations

Over **3000** scientists involved in activities of the GRA 

**44** international collaborative projects supporting the GRA

 **50** fellowships awarded to recipients from **25** countries

## 4 Research Groups

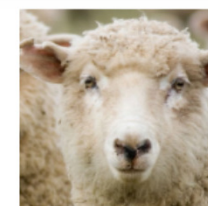
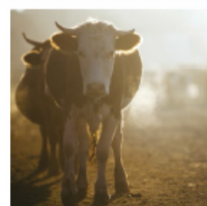
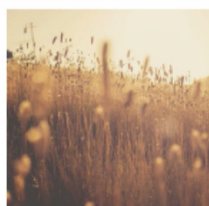


Integrative  
Research  
Group



 **19** technical training workshops held

**12** technical guidelines,  
resource materials and  
databases produced



**@GRA GHG**

October 2017

# Partners

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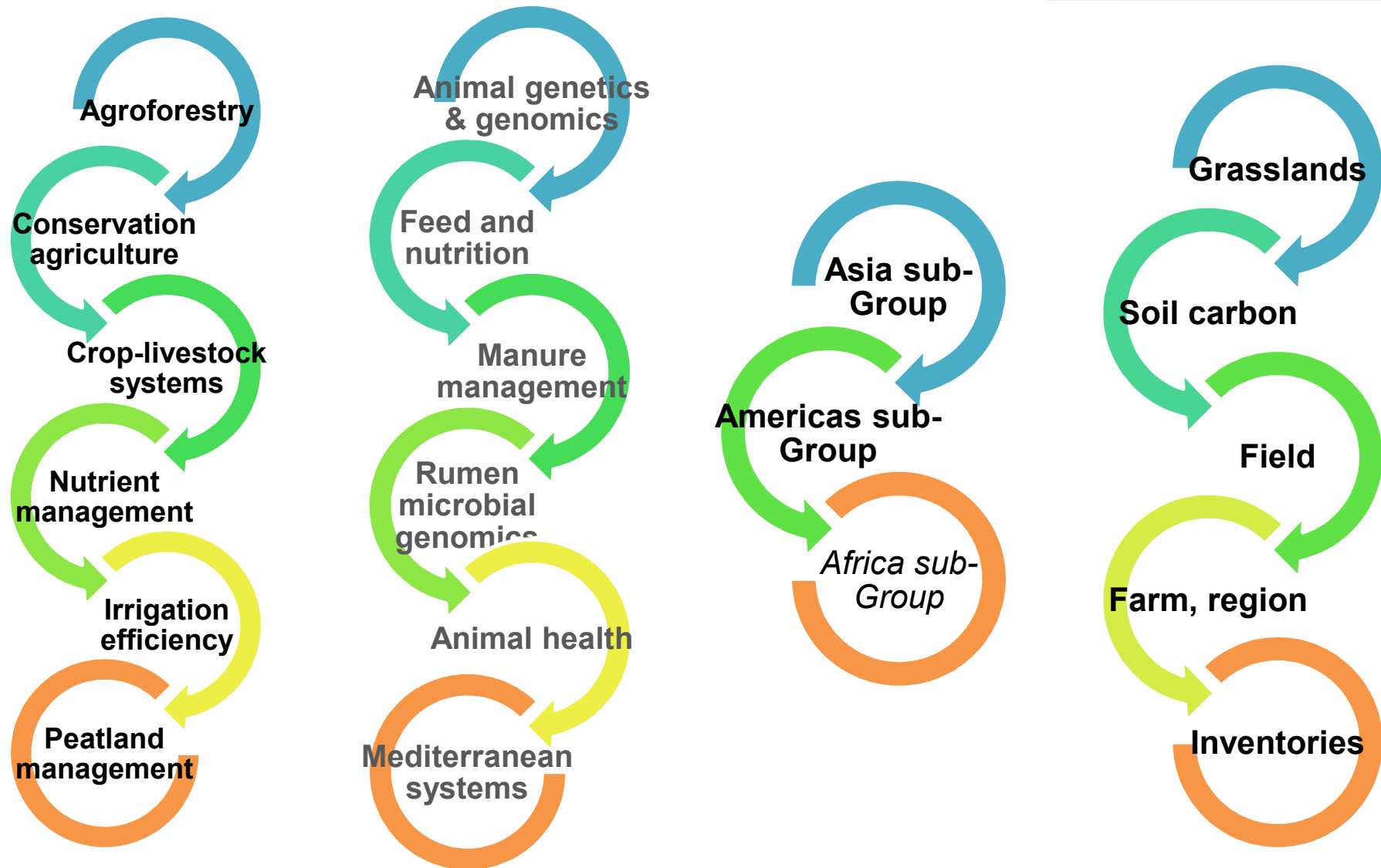
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# Networks

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# Example products of GRA Research Groups/Networks

- MAGGnet – a searchable, online meta-database of experimental sites. Continuous to expand metadata content.
- Practice brief for policy makers on improved ruminant genetics for productivity and climate change outcomes and advanced state of knowledge on breeding low-emitting animals
- Ground-breaking research in understanding rumen composition across animal species and development of global reference sets of data on the rumen microbiome.
- GHG-MIP (in revision, Global Change Biology), showing that the median of 3-4 simulation models predicts within experimental error N<sub>2</sub>O emissions and yields of crop rotations and grasslands at 10 sites across 4 continents.
- First global map showing organic carbon inputs to soils required to reach the 4 per 1000 target (presented at COP23, Marrakech)
- Guidelines for measuring CH<sub>4</sub> and N<sub>2</sub>O emissions from rice paddies published.

# STRATEGIC PLAN 2016-2020

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## Key Strategies

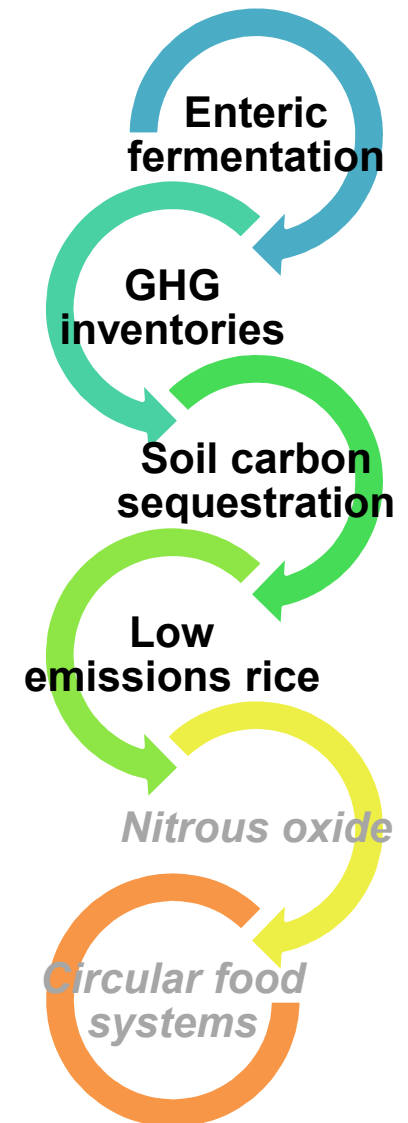
Further Research Collaboration	Foster Outreach, Knowledge Sharing and Information Exchange	Build Effective Partnerships	Leverage Financial and Other Resources
Strategic Objectives	Strategic Objectives	Strategic Objectives	Strategic Objectives
<p>The GRA has achieved broad global participation in research cooperation and investments to help develop relevant practices and technologies.</p> <p>The GRA has built global expertise in relevant knowledge and technologies.</p> <p>The work of the GRA is efficient, effective, and coherent.</p>	<p>There is broad awareness of the GRA's work, particularly its research results and impacts, through an integrated outreach strategy.</p> <p>There is increased availability and accessibility of research results to relevant stakeholders, including farmers.</p> <p>There is widespread adoption of relevant practices and technologies.</p>	<p>The GRA is well connected with other initiatives that carry out activities relevant to GRA work and objectives.</p>	<p>The GRA has strong and ongoing financial and other resources to support its activities and Research Groups, including through multilateral development banks and private and philanthropic organisations.</p> <p>GRA Members and Partners will invest in research and capability building relevant to the GRA mandate, and develop effective mechanisms for resourcing and coordinating collaborative research.</p>

Implementation through Priority Actions and the Council, Research Groups, Partners, Special Representative and Secretariat

# GRA Flagships – guiding principles

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- **GRA added value** – why GRA and not another entity?
- **Inclusive** – all members should be able to participate if they wish
- **Relevant** – all members get something out of series of flagships
- **Solution focused** – concrete products/results
- **Multifaceted** – more than just GHGs
- **Increasing capacity/capability**



# Joint programming

- Mobilizing resources to support priorities of GRA:
  - Mobility and Fellowships (priority topics, research fellows)
  - Bilateral funding arrangements (topics aligned with GRA priorities)
  - GRA Thematic Annual Programing (alignment of existing programmes, sharing data)
  - Multi-partner research call (common topics, coordinated timing, intra-national funding)
  - Fund for International consortia (common topic, coordinated timing, inter-national funding)
- **Most important** – avoid duplication, use GRA as forum to facilitate linking and alignment of national priorities

# Enteric fermentation

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## Development of **solutions**

- **Animal selection** – data sharing & analysis to facilitate development of genetic/genomic markers (microbial & animal) for low emission traits
- **Feeding** – identification, testing & improved quantification of low emitting feeds suitable for incorporation into the diverse range of animal husbandry systems found in GRA member countries
- **Microbiome** – Improved understanding of the processes involved in enteric CH<sub>4</sub> formation, characterisation and direct manipulation of the microbial populations
- **Animal health** – improved understanding how animal health has an impact on the enteric microbiome functioning in relation to methane production
- **Manure management** – exploring the options to improve the quality of manure from a fertilizer or energy source by fostering the enteric microbiome

## Improved **quantification** of livestock emissions

- **Improved ‘emissions factors’** – the determination of methane yield (Y<sub>m</sub>) in temperate, tropical, rangelands/semi arid feeding systems and in by-product dominated diets
- **Improved activity data** - low cost innovative generation of data on animal performance, populations, feeding systems
- **Livestock Tier 2** inventory development – utilise expertise and experience of GRA Members

## Identification, testing and **implementation** of mitigation solutions to support NDC/INDC

- **Identification** of locally appropriate mitigation actions –e.g. feeding, breeding, animal health, reproductive performance
- **Pilot testing** of solutions – impact on mitigation, economics, food security, adaptation-mitigation synergies
- **Implementation** at scale – communication & promotion of tested mitigations, mainstreaming mitigation actions into existing development projects, support for NAMA development

GRA facilitates linking:



# GHG inventories

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## Enhancing *inventory structure*

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

Tier 2 **inventory development** – utilise expertise and experience of GRA Members

Guidance for development and adoption of **modelling approaches** (i.e. Tier 3) for specific sources within inventories.

## Demonstrating *mitigation in NDCs*

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

## Building *capability*

**Analyses** of current methodologies for estimating GHG emissions adopted in national GHG inventories by source, **barriers to adoption** of advanced methods and **experiences of countries** in adopting advanced methods (networks and reports from international workshops, technical and summary papers)

Identification of **training needs**; country-specific guidance and training needs developed jointly with countries.

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*

Incorporation of **improved emission estimates** in emissions databases (e.g. IPCC-EFDB, GRAMP, SAMPLES, MAGGnet) and activity databases.

National and regional **research projects** that validate existing measurements and identify and validate approaches (measurements and modelling methodologies) to reduce the emissions intensity of food production and ensuring that those gains can be captured in inventories.

**Dissemination** of improved estimates of GHG emissions developed from regional and national projects to inform the **development and verification of methodologies** by the IPCC and other inventory support mechanisms

## GRA facilitates linking:



RESEARCH PROGRAM ON  
Climate Change,  
Agriculture and  
Food Security



CLIMATE &  
CLEAN AIR  
COALITION  
TO REDUCE SHORT-LIVED  
GREENHOUSE POLLUTANTS



The World Bank



USAID  
FROM THE AMERICAN PEOPLE

# Soil Carbon Sequestration

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## Online collaborative knowledge hub

### Developing solutions

#### *Decision support toolbox*

- Maps of SCS potential (e.g. to reach the 4 per 1000 aspirational target)
- Maps of crop and pasture practices suited to reach SCS targets
- Implications of SCS practices for
  - yields,
  - drought tolerance and climate change adaptation
  - N<sub>2</sub>O and CH<sub>4</sub> emissions, energy use
- Costs and benefits of transitioning to SCS practices

### Monitoring solutions

#### *Methods to certify SCS*

- Tiered methodologies for monitoring, reporting and verifying (MRV) soil organic carbon (SOC) stocks in crop and pasture systems
- Handbooks and guidelines for project scale MRV adapted to regional contexts and agricultural systems
- Technologies for rapid SOC stock verification
- Modelling of SOC stock change in crop and pasture systems

### Adopting solutions

#### *Enabling environment*

- Regional stakeholder workshops on SCS
- Criteria for sustainable SCS projects supporting livelihoods
- Assessment of barriers to the adoption of SCS practices
- Value chains, business models and policy options
- Research funding strategy and international research cooperation

## Capacity building, knowledge transfer and training



**CIRCASA**

Coordination of International Research  
Cooperation on soil Carbon Sequestration in  
Agriculture



GRA facilitates linking:



Instituto Nacional de  
Tecnología Agropecuaria

# Low emissions rice

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Developing <i>solutions</i>	Improving <i>quantification</i>	<i>Adopting</i> solutions	Building <i>capabilities</i>
<ul style="list-style-type: none"> <li>• <b>Water management</b> – conducting multi-country experiments on commercial size farms to assess the effects of AWD as a mitigation solution</li> <li>• <b>Organic matter management</b> – identification, testing &amp; quantification of improved management of crop residue and manure as a mitigation solution</li> <li>• <b>Cultivar selection</b> – identification, testing &amp; quantification of high yielding rice cultivars with low CH<sub>4</sub> emission</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Database compilation</b> – sharing experimental information and emission data among members</li> <li>• <b>Improved ‘emission factors’</b> – improving emission and scaling factors for CH<sub>4</sub>/N<sub>2</sub>O emissions and soil C stock changes in country/region by analysing emission monitoring data</li> <li>• <b>Modelling</b> – development and inter-comparison of process-based models to simulate CH<sub>4</sub>/N<sub>2</sub>O emissions soil C stock changes</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Identification</b> – of areas where AWD can be applied and optimized to reduce yield loss risks, water and carbon footprints of rice systems</li> <li>• <b>MRV guidelines</b> – measurement, reporting, and verification (MRV) guidelines for implementing the solutions to GHG mitigation actions</li> <li>• <b>Promotion</b> of solutions – by communication of tested mitigation solutions with stakeholders to support NAMAs and NDC</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Workshops</b> – to enhance the technical and institutional capacity to conduct relevant GHG research in the Group</li> <li>• <b>Coordinated networks</b> – of scientists and extensionists, private-sector, and farmers for accelerating the wide-scale adoption of best-fit management options</li> </ul>

GRA facilitates linking:



FONDO LATINOAMERICANO  
PARA ARROZ DE RIEGO



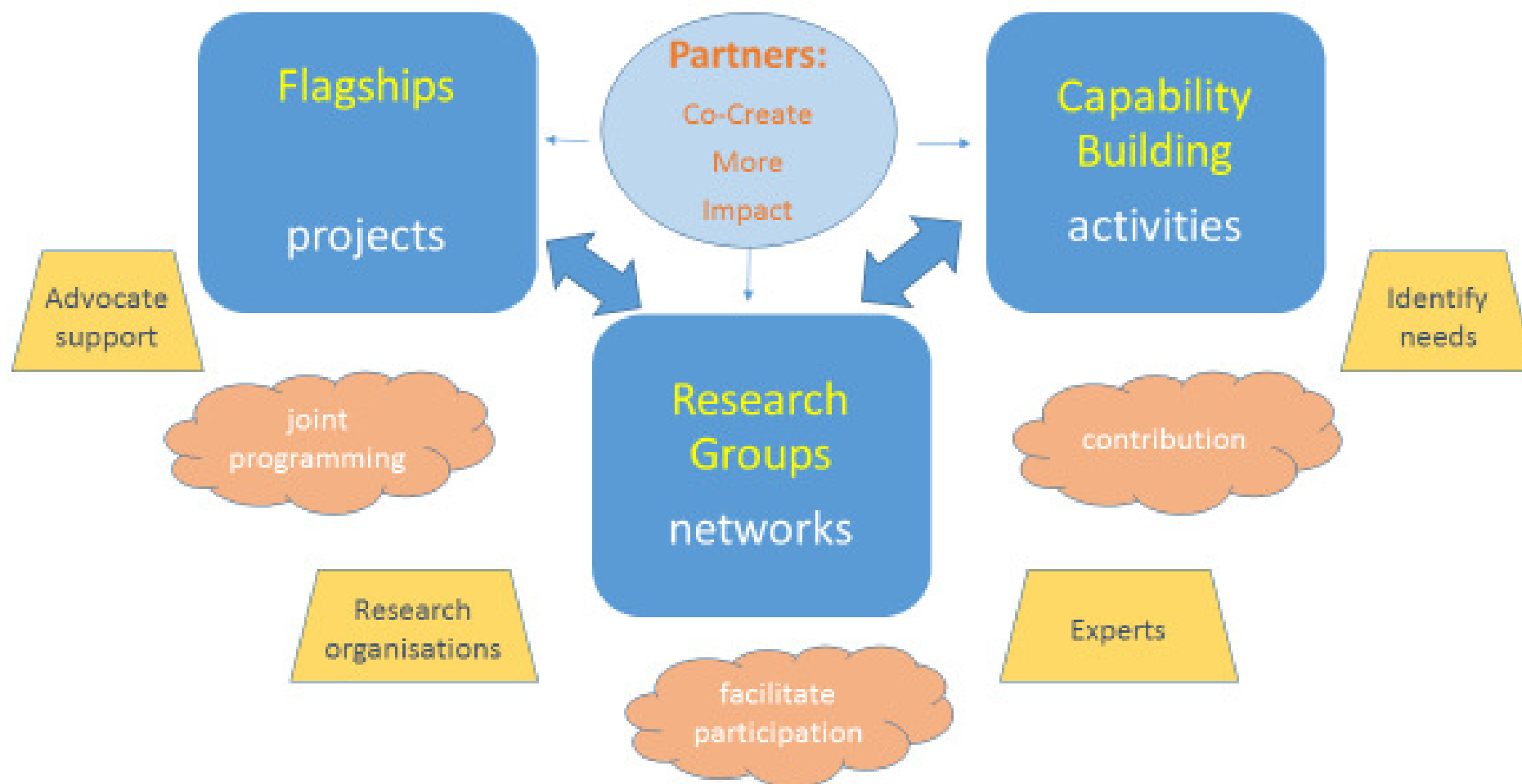
Asia-Pacific  
Economic Cooperation



# You can't mitigate what you can't measure: building institutional capability

- Identification of institutional capability and training requirements needed for the initial preparation, updating and continuous improvement of GHG inventories
- Identify possible regional approach to characterize and analyze typical systems of production in different sub-regions to develop regionally appropriate approaches.
- Integrating: Depts of Environment, Agriculture, Statistics and associated agricultural research institutions, industry associations, farm associations.
- Development of a detailed country plan for the development of an improved accounting methodology that takes into account locally available resources (human, data, research infrastructure etc.) and systems of production and locally appropriate mitigation options.
- Assessment of financial resources required and development of proposals to financial mechanisms (national, GEF, GCF, UNFCCC, etc.).
- Design of policy actions to promote development and adoption of locally appropriate mitigation actions.

# Facilitation, not institutionalization, but...



# ...how to ensure progress

## Challenges

- How to generate a funding/resource response to priorities when voluntary and facilitative?
- Institutional support for national experts is key barrier to more activity in GRA (mobility and linking)

## Relevance of GRA to MACS-G20

- All but four G20 members are members of GRA
- Research cooperation and knowledge sharing is G20 agriculture ministers priority – core missions of GRA
- Identify how to include national research collaboration opportunities and priorities into global efforts and avoid duplication
- Visibility and political support required



# Thank you

More information:

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