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ON AGRICULTURAL GREENHOUSE GASES

Global Research Alliance: Overview and Update

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Challenges

- Agriculture directly contributes 14% of global greenhouse gas emissions and emissions are projected to increase along with increasing demand for food.
- Agriculture should play a part in overall mitigation efforts, however...
- Agriculture makes up a large proportion of many countries' economies and development of the agriculture sector will provide much of the economic growth in these countries.
- Increasing food production is central to food security.
- Mitigation can be difficult to implement and one-off technological fixes won't work for agriculture - we need sustained application of processes and management practices by millions of individuals (farmers).

Opportunities

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- Can meet the multiple objectives of food security, adaptation, mitigation, development, through increased agricultural productivity and efficiency.
- In many cases increased productivity and efficiency is positively correlated with reduced emissions intensity, resilience and food security.
- Improving research and extension is a critical factor in realising these opportunities.
- The good news is that many countries are already investing in this area and we can leverage this collective effort and make the best use of resources.

The importance of R&D

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- The global agriculture sector needs good information and viable options
- R&D is core to this:
 - Critical to measurement and estimation of emissions
 - Critical to improving our knowledge of production systems
 - And the only way we can develop mitigation options that are real, low-cost and fulfil multiple objectives of climate change and food security

The Alliance

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- **Brings countries together to find ways to grow more food (and more climate-resilient systems) without growing greenhouse gas emissions**
 - **Specifically, the Alliance will help:**
 - Find ways to reduce the emissions intensity of agricultural production and increase its potential for soil carbon sequestration, while enhancing food security
 - Improve understanding, measurement and estimation of agricultural emissions
 - Improve farmers' access to agricultural mitigation technologies and best practices
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Ministerial Statement

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“Underlining the need for food security, we decide to establish a Global Research Alliance on agricultural greenhouse gases to help reduce the emissions intensity of agricultural production and increase its potential for soil carbon sequestration thereby contributing to overall mitigation efforts.”

Membership

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Now 32 member countries:

- | | | | |
|------------|-----------|-------------|---------------|
| Argentina | Denmark | Japan | Korea |
| Australia | Finland | Malaysia | Spain |
| Brazil | France | Mexico | Sweden |
| Canada | Germany | Netherlands | Switzerland |
| Chile | Ghana | New Zealand | U.K. |
| China | Indonesia | Norway | United States |
| Colombia | Italy | Peru | Uruguay |
| Costa Rica | Ireland | Philippines | Vietnam |

www.globalresearchalliance.org

Ministerial Summit of the Global Research Alliance

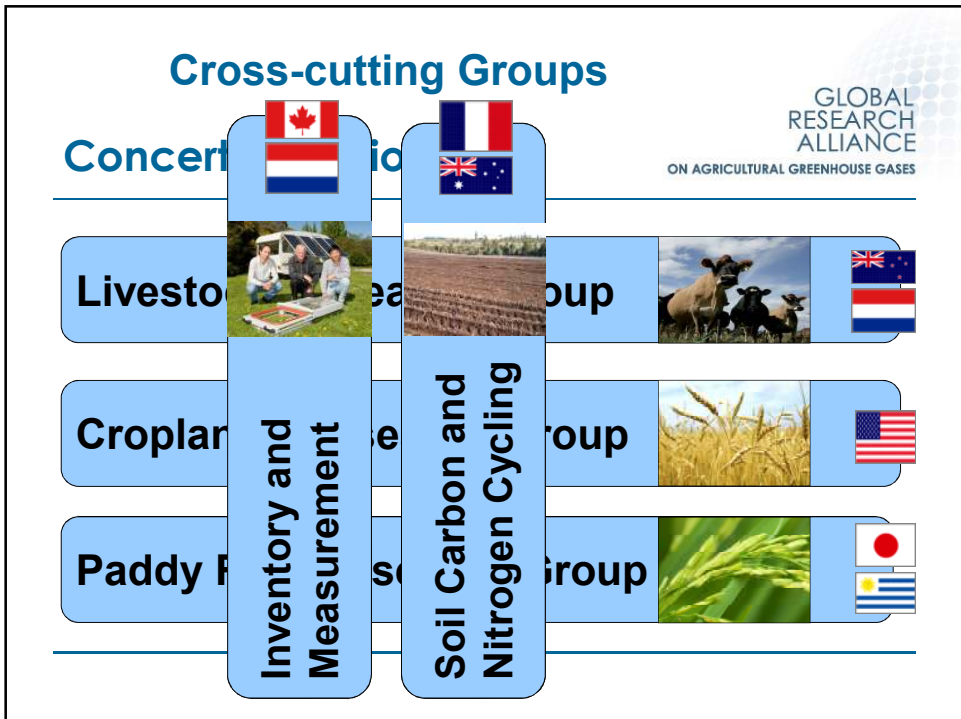
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Enhancing cooperation in agricultural greenhouse gas research

Structure, Vision and Work plans for
Research Groups and Cross-cutting Groups



The Journey So Far

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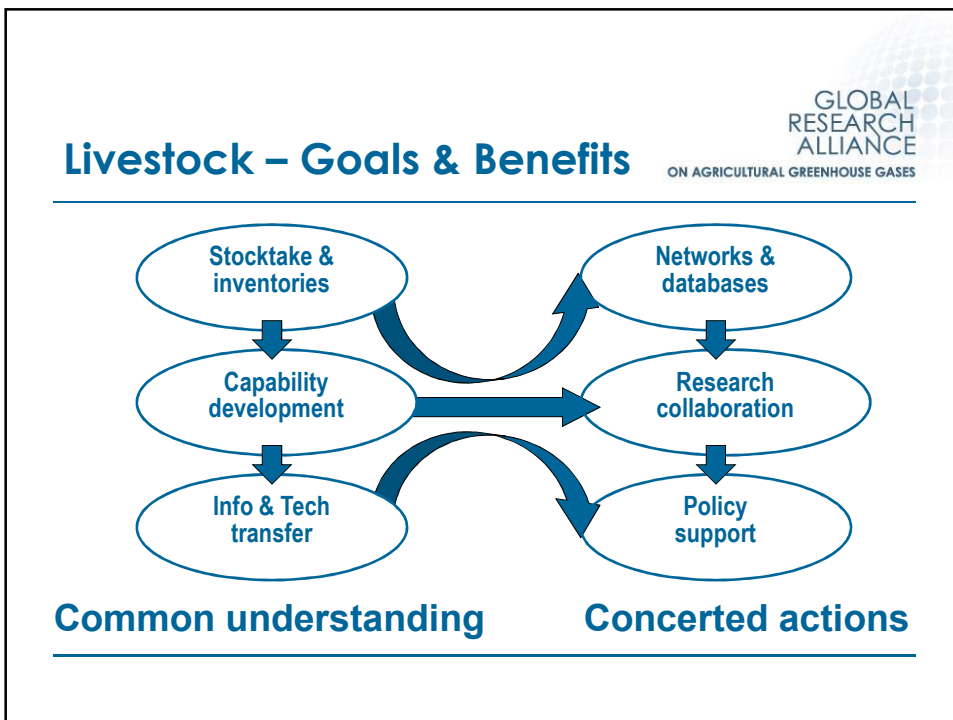
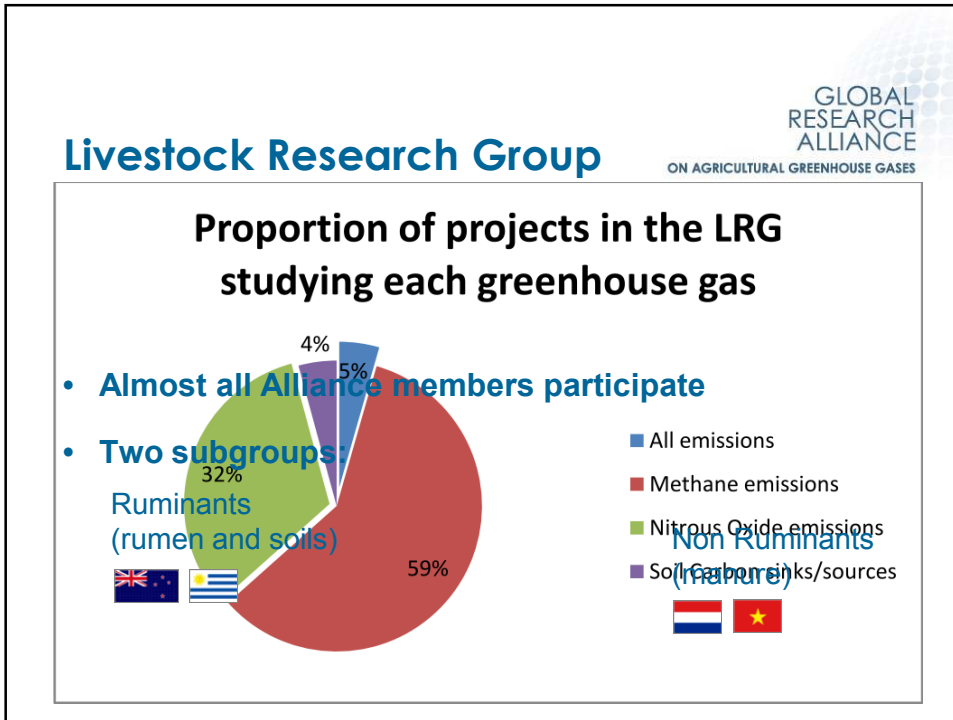
EDITORIAL



Our Collective Vision

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- **Increase agriculture production with lower emissions**
Feeding the world within the carrying capacity of earth
- **Improve global cooperation in research**
Accelerate/strengthen knowledge development that would not happen without the Alliance, with a common research agenda and joint capacity building
- **Work with farmers and partners, provide knowledge**
Develop relevant mitigation options and strengthen resilience of food systems





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Livestock – Action Plan

<p><u>Near-term actions:</u> (achieved / in progress)</p> <ul style="list-style-type: none"> ✓ Stocktake analysis ✓ Best practice guides ✓ Technical manuals ✓ Collaborative projects ✓ Awards / fellowships ✓ Targeted networks ✓ Technical synthesis reports 	<p><u>Medium-term priorities:</u> (planned for 2011/2012)</p> <ul style="list-style-type: none"> • Publish near-term action results • Update the Stocktake • Identify possibilities for joint research • Identify critical factors related to GHG emissions • Identify options for measures • <i>Operationalize our long-term ambition</i>
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Wellington



Banff



Versailles



Amsterdam



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The way forward


- **Expected key achievements over next 12 months**
 - ✓ **Finalize** action plans
 - ✓ **Publish** outcomes from near-term actions
 - ✓ **Use stock-take** to further refine actions of greatest benefit
 - ✓ **Establish** new collaborative research projects
 - ✓ **Link** with regional science and industry partners and existing research and extension programmes
 - ✓ **Build** capability & capacity
 - **Fellowships: Borlaugh (US), LEARN (NZ), GRASS (NZ)**



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Enhancing cooperation in agricultural greenhouse gas research

Project examples



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Global survey of rumen methanogens

Identify the core microbial community of the rumen in
animals from 14 countries around the world

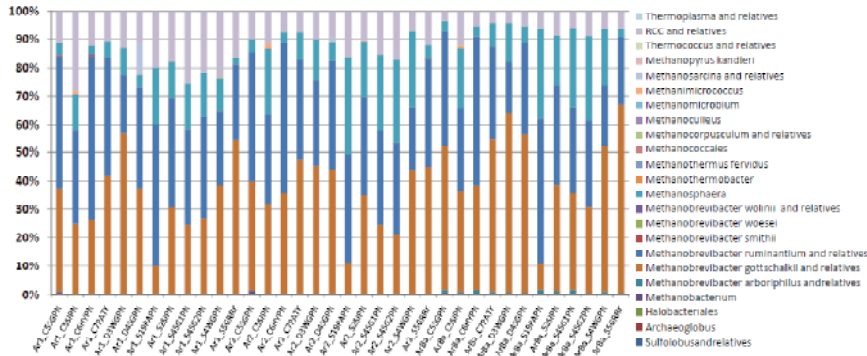
Benefits:

- Compare variability and changes observed in mitigation research programs
- Understand the scale of changes occurring in mitigation research programmes
- Universality or regionality of rumen methanogen populations?
- **Develop global mitigation solutions**

Methanogen framework

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Rumen Microbial Genomics Network

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The two-day workshop involved participants from New Zealand (15), Australia (3), Europe (3), North America (3), South America (1) and Japan (1)

Goals

1. Establish whether there was a need for a global collaborative network
2. Prioritise collaborative research projects



Priority projects

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The 'Hungate 1000'

- Construct a reference set of rumen microbial genome sequences. Support from 30 international research institutes representing 13 countries

Deep metagenomic sequencing of rumen microbiomes from high and low methane-emitting ruminants

- Partnership between NZ, Australian and USA researchers
- Development of a resource for identifying the microbial components that contribute to a high or low emission profile as targets for modification

Improved GHG measurement

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Best practice guide to CH₄ measurements using the SF₆ tracer technique: Argentina, Australia, Brazil, Canada, France, Ireland, New Zealand, United Kingdom, USA

Best practice guide to using chambers to measure N₂O emissions from soils: Argentina, Australia, Canada, Chile, Denmark, Japan, Uruguay, New Zealand, United Kingdom, USA

Technical manual on alternative designs for low cost CH₄ respiration chambers: Australia, Belgium, Brazil, Canada, Denmark, Ireland, New Zealand, Spain, United Kingdom

The New Zealand Fund for Global Partnerships in Livestock Emissions Research

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New Zealand has established a NZ\$25 contestable international fund for research on mitigating GHG from pastoral farming.

The first funding round is expected to open in August 2011.

The fund is open to international scientists.

A balance between innovative science and the achievement of cost-effective and sustainable solutions for livestock farmers.

The way forward

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Croplands Research Group:
San Antonio, TX, USA
19 October 2011
Annual Soil Science Society Int. Meetings



Paddy Rice Research Group:
Tsukuba, Japan
18 November 2011



Livestock Research Group:
Amsterdam, The Netherlands
5-6 November 2011
6th Int. Symposium on Non-CO₂ Greenhouse Gases

Soil C/N Cycling Cross-Cutting Group:
Leuven, Belgium
13-14 July 2011
Int. Symposium on Soil Organic Matter

