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Update from the Co-Chairs

Welcome to the September 2016 edition of the Livestock Research Group's (LRG) newsletter.

For those of you who are new to our community, the LRG is part of the [Global Research Alliance on Agricultural Greenhouse Gases](#) (GRA). We are an international group of scientists and policy makers working together to reduce the emissions intensity of livestock production systems and increase its soil carbon storage. We work with farmers, farm advisors, industry and other international organisations to research mitigation options, share knowledge and experiences and help strengthen the resilience of livestock farming. This newsletter is one of the ways

we showcase our work – you can read previous editions (and find out more about us) [here](#).

We always welcome your feedback on the newsletter, including ideas for new features, initiatives to celebrate and events to showcase. Please contact us with your suggestions.

With warm regards and thanks for your interest in the LRG,

Harry and Martin

Next LRG meeting: 10-12 April 2017

The next meeting of the LRG will be hosted by the US in Washington DC, 10-12 April 2017. This will take in our usual two-day meeting plus a field trip to the headquarters of the USDA Agricultural Research Service. Please put these dates into your diary now. More information will be included in the December newsletter but if you have any questions, please email secretariat@globalresearchalliance.org.

This month's newsletter brings you:

- P2** A major LRG activity to support countries move towards Tier 2 inventories for livestock greenhouse gas (GHG) emissions and to connect this with wider efforts on monitoring, reporting and verifying GHGs
- P4** New research guidelines from the LRG's Feed and Nutrition Network to help scientists improve how *in vitro* experiments are conducted

- P6** News from our other research networks, including urgent requests from the Animal Health & GHG Emissions Intensity Network (for funding support) and the Manure Management Network (for a new coordinator)

- P8** A preview of the upcoming GRA Council meeting, including approving the 2016-2020 Strategic Plan

- P9** Details on ways the LRG can engage with the IPCC on livestock GHGs

- P10** Highlights from one of our key partners, the CGIAR Research Program on Climate Change, Agriculture and Food Security

- P11** A profile of a recent Global Research Alliance Senior Scientist Fellowship, Dr Rebecca McCulley from the University of Kentucky in the US

- P12-13** Upcoming fellowship and award opportunities and other events of interest to our LRG community

Supporting countries to set up advanced GHG inventories for livestock emissions

The LRG has been working with countries in South and South East Asia to develop Tier 2 inventories for livestock GHG emissions.

Helping countries move towards Tier 2 inventories and designing improved systems for measuring, reporting and verifying (MRV) livestock GHG emissions is at the heart of the LRG's capability building efforts.

The impact of productivity on the emissions intensity of livestock farming is significant. More productive and efficient farm systems generally produce food at much lower GHG emissions per unit of product. However, if a country's livestock GHG inventory does not use methods more advanced than Tier 1, the impact of any productivity gains is missed.

This issue becomes even more important as countries move to include agriculture in their 'Intended Nationally Determined Contributions' (INDCs) under the UNFCCC Paris Agreement. "MRV" for livestock GHGs is gaining a lot of attention internationally and GHG inventories will be a critical part of implementing the Agreement through its 'enhanced transparency framework' for countries' reporting of emissions.



Bess Tiasnamurti from the Indonesian Centre for Animal Research and Development addresses the LRG workshop.

The LRG has a package of activities underway to help countries advance their inventories for livestock GHGs, including regional projects (see below); a joint programme with key GRA partners (see side bar, page 3); and ongoing technical training. The LRG will also be contributing to wider GRA activities on inventories, to be led by the newly established [Integrative Research Group](#) and through a potential GRA flagship project (see page 8). Our work is helping raise countries' awareness that enhanced GHG inventories for livestock can support both climate change and productivity goals.

Below is a summary of recent events in the South and South East Asian region where the LRG is working with a core group of countries to develop Tier 2 inventories for livestock GHGs. Note that these events build on earlier activities reported in our [December 2015 newsletter](#).

FAO workshop on enhanced transparency for INDC implementation, 27-29 June 2016

The LRG contributed to an FAO regional workshop in Thailand in late June aimed at providing greater transparency in countries' implementation of their INDCs for agriculture. This covered the full range of MRV issues for both adaptation and mitigation actions on agriculture. Rather than seeing MRV obligations as a burden, participants learned how the design of MRV systems for agriculture (including choice of inventory Tier) could support objectives for food security and improved productivity. These policy linkages were further strengthened by sponsoring technical participants from GRA countries, with funding provided by the New Zealand Government in support of the LRG. The workshop also highlighted available financial support to help countries improve the transparency of their reporting, e.g. the [Capacity Building Initiative for Transparency](#); the [Initiative for Climate Action Transparency](#); and the [International Partnership on Mitigation and MRV](#). Note that these initiatives are much broader than just livestock/agricultural production.



LRG workshop on improving GHG inventories for livestock, 16-17 August 2016

In mid-August, Indonesia hosted the second in a series of LRG regional workshops aimed at improving GHG inventories for livestock. The first workshop was held in Thailand in September 2015 and sought to demonstrate the benefits of higher Tier inventories for livestock systems.

Inventory experts and scientists from Vietnam, Thailand, the Philippines, Malaysia, Sri Lanka and Indonesia participated in the Bali workshop, with a representative from Papua New Guinea attending as an observer. During the two day event, participants:

- Discussed progress in their countries on developing Tier 2 inventories, and shared experiences on barriers and enabling factors for improving inventories
- Learned from the experiences of Indonesia and Uruguay in developing their Tier 2 inventories for livestock, and the associated benefits
- Identified key next steps (individually or regionally coordinated), including links with other regional projects

FAO (South-East Asia Regional Office, Bangkok) and CCAFS also participated in the workshop. They shared information on MRV/inventory development and regional research programmes on livestock improvement, including funding mechanisms. At this



Participants at the LRG's regional workshop on improving livestock GHG inventories.

event, the LRG and CCAFS also launched a joint booklet on advanced Tier inventories (see side bar).

Participating countries were highly motivated at the workshop and by the end of the meeting had developed detailed work plans for improving their livestock GHG inventories. These plans revealed a need for collective training on inventory development and measurement techniques to improve the quality of the data. The LRG will now work with countries to develop a regional initiative to help address these needs, as well as country-specific actions where appropriate. Funding will be sought from donors and GRA members to support countries in their endeavours to move to a higher Tier inventory.

Exploring the potential for a regional project to improve the efficiency of livestock production

The LRG took advantage of the presence of so many country experts in Bali to explore interest in a regional project to help improve the efficiency of livestock production. This would extend the existing LRG/FAO project, '[Reducing enteric methane for improving food security and livelihoods](#)', underway in 13 countries in West and East Africa, South America and South Asia.

The scoping meeting in Bali enabled initial exploration of each country's livestock production system, policy objectives and perceived drivers and barriers for improving livestock efficiency. Attendees learned how the existing project is assisting with understanding baseline emissions, identifying production system-specific mitigation options and modelling their potential. Further discussions to progress the regional initiative will be held in the coming months.

For more information on the LRG's inventory development programme, please contact LRG-enquiries@nzagrc.org.nz

Making it count: capturing the benefits of improved livestock productivity through advanced GHG inventories

The LRG has been working with CCAFS to develop a joint programme on inventories and MRV of livestock GHGs, also linking with FAO and the World Bank. The first output from this programme was the publication of a booklet on the benefits of advanced GHG inventories for livestock production.

"70 nations included mitigation in the livestock sector in their INDCs submitted to the UNFCCC in 2015", Lini Wollenberg, leader of the CCAFS Low Emissions Development research program based at the University of Vermont's Gund Institute for Ecological Economics, said. "They need advanced GHG inventories to report on changes in emissions and the reductions in emissions intensity that result from more productive and efficient livestock systems."

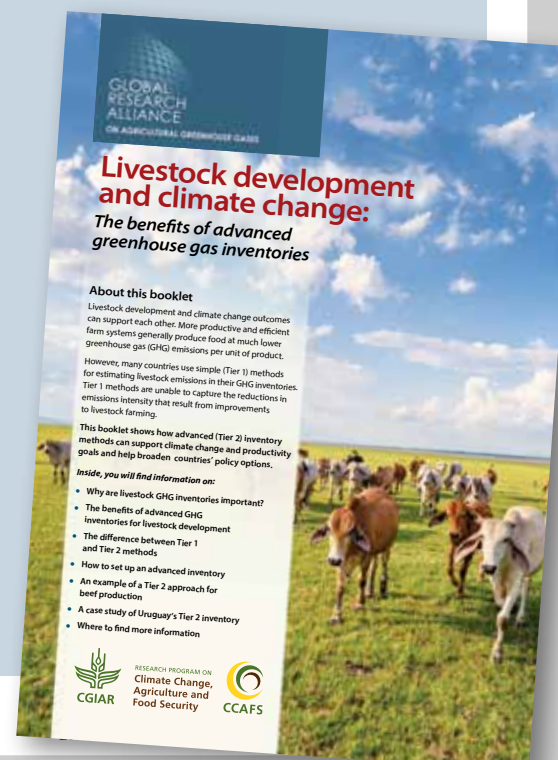
"Many countries know that a Tier 2 inventory would be incredibly helpful for them, but they are deterred by the perceived complexity and the resources required. An inventory based on Tier 2 methods is by its nature more detailed than the simple Tier 1 methods that most countries start out with, but it does not have to be much more complicated," explained Harry Clark, Co-chair of the GRA's Livestock Research Group and Director of the New Zealand Agricultural Greenhouse Gas Research Centre.

The booklet shows how improved inventories can help meet international requirements, support climate change and productivity goals and broaden

countries' policy options. See [here](#) to read the full press release and download the booklet.

Future outputs from the joint programme include:

- An online platform to access existing MRV resources for livestock GHG emissions
- A case study series documenting countries' experiences with moving from Tier 1 to Tier 2
- A white paper and workshop on the key requirements, challenges and solutions for MRV
- Follow-up work with individual countries to provide technical support



Feed and Nutrition Network project delivers valuable guidance for using *in vitro* techniques to assess the impact of animal nutrition on livestock emissions

Robust, representative and reproducible *in vitro* experiments are a critical part of the search for solutions to reduce emissions from enteric fermentation.

A major collaborative project led by the LRG's Feed and Nutrition Network is helping advance research into animal nutrition as a mitigation tool for reducing methane emissions from ruminants. This 4-year project is known as 'GLOBAL NETWORK' and is funded by Europe's FACCE-JPI and participating countries.

The project recently published a [review paper](#) that identified the main factors to consider when using *in vitro* fermentation techniques to investigate the mitigation potential of animal nutrition.

Enteric methane, generated in the rumen, forms a large proportion of GHG emissions from ruminant animals such as cattle, sheep and goats. It is a by-product of the animal's natural digestive processes and, as such, is influenced by diet composition and nutrient intake.

A number of nutritional strategies for reducing enteric methane and enhancing productivity are being explored by scientists and farmers, for example improving forage quality, feed substitutes and supplements, and precision feeding. These different strategies are usually tested in laboratory conditions, *in vitro* (outside the living organism, e.g. in incubated syringes, bottles etc), before they can be scaled up to *in vivo* (inside the living organism) and eventually applied on-farm.



Use of *in vitro* fermentation techniques has increased significantly in the last decade. For many research groups with limited resources, the *in vitro* technique is often the only option available for investigating the mitigation potential of feed additives or other compounds. Depending on the research question, *in vitro* studies can be essential for screening compounds before further evaluation *in vivo*. However, there are some key factors that influence the viability of research findings from *in vitro* experiments relating to enteric methane. For example, a positive outcome *in vitro* does not guarantee that the same treatment will have a similar effect *in vivo*. Also, the goals, experimental design, results and conclusions of *in vitro* experiments require cautious interpretation.

The Feed and Nutrition Network paper reviewed the available literature to establish essential criteria for the

successful design and implementation of *in vitro* techniques. The different aspects involved in an *in vitro* experiment were assessed (see Figure 1) and a series of technical recommendations made. These findings will be invaluable for:

- Helping research groups ensure that their experiment objectives can be met through *in vitro* techniques
- Harmonising laboratory methods
- Allowing for better interpretation of results
- Facilitating inter-study comparisons

Fundamentally, this output from the GLOBAL NETWORK project will help improve the use of *in vitro* experiments for feed evaluation, assessment of rumen function and enteric methane production.

Dr David Yáñez-Ruiz, who led the review, says "*In vitro* systems are great tools for initial evaluation of nutrition-related



Dairy cows feeding in a free stall barn in Wisconsin, USA.

effects – it's like having lots of simplified little rumens in your lab. However, even those little baby rumens need to be prepared and handled with care if we want the answers they give to be meaningful.”

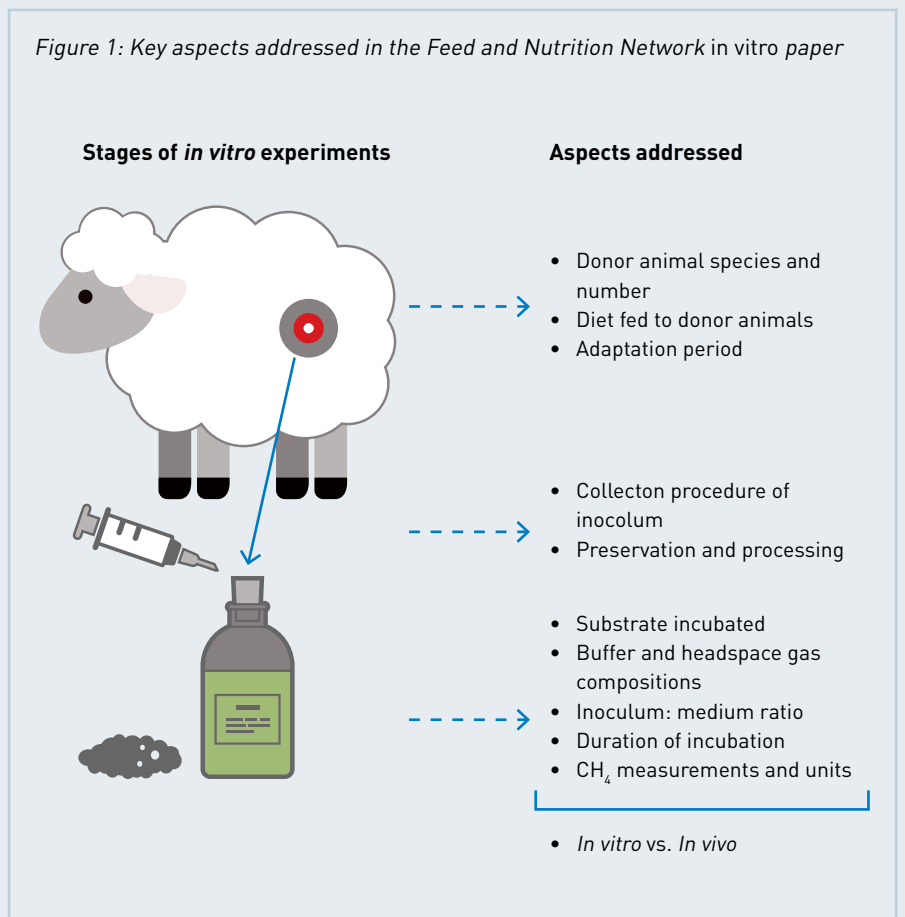
Because the *in vitro* review paper is not open access, the LRG co-chairs team will work with the authors to develop a simple fact sheet presenting the paper's key findings and recommendations. (This will form part of a 'Showcasing the Science' series of fact sheets highlighting research conducted in support of the LRG's objectives).

Note that the GLOBAL NETWORK project has also very recently published a similar set of guidelines for conducting *in vivo* experiments. This second [review paper](#) will be covered in the next LRG newsletter and in the Showcasing the Science series.

For more information on the *in vitro* review paper, contact Dr David R. Yáñez-Ruiz david.yanez@eez.csic.es

For more information on the LRG, contact LRG-enquiries@nzagrc.org.nz or visit www.globalresearchalliance.org/livestock

Figure 1: Key aspects addressed in the Feed and Nutrition Network *in vitro* paper



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Updates from the Research Networks

In this section we bring you news from LRG's engine room – our research networks. These groups unite researchers and policy makers from across the world around six common areas of interest, all focused on different aspects of livestock production and GHG emissions. Countries volunteer to lead these networks, organising meetings, collaborative activities and other initiatives.

Actions for Mitigation of and Adaptation to Climate Change in the Livestock Sector in the Mediterranean Area (MLN)

We are very pleased to bring you an update from the LRG's newest research network, focused on livestock and climate change issues affecting the Mediterranean region. This is led by Italy and has participants from Egypt, France, Greece, Italy, Morocco, Portugal, Spain and Turkey. The

Mediterranean Livestock Network held its inaugural meeting on 20 July in Italy, where participants agreed that the network would focus on three key areas: water; mycotoxins; and good practices of mitigation and adaptation. In the short term the MLN is concentrating on gathering literature

on these themes of interest as well as information about relevant national and international programmes.

For more information on the MLN, please contact the network coordinator Giacomo Pirlo (giacomo.pirlo@crea.gov.it).

Animal Health & GHG Emissions Intensity Network

Improved animal health results in productivity and efficiency gains and consequently lower GHG emissions per unit of output; therefore animal health interventions could play an important role in GHG abatement. There are also obvious co-benefits from improved animal health, such as improved farmer livelihoods, animal welfare and potentially human health.

The LRG's [Animal Health and GHG Emissions Intensity Network](#) brings together researchers from a variety of disciplines to explore links and synergies between livestock health and GHG emissions intensity, and possible GHG mitigation through disease control. It focuses on both infectious and non-infectious health challenges.

The network began in June 2013 and has grown from an initial teleconference involving 18 researchers to an active network of 114 members across 30 countries. The network held its third annual workshop in March 2016, read more in the [workshop report](#).

Note that network coordination is currently funded only until March 2017 – a new funding source is urgently required to support its continued work.

For more information on the AHN, and to offer resourcing, please contact animalhealthnetwork@adas.co.uk.



Vaccinating calves in northern Tanzania.

Animal Selection, Genetics and Genomics Network

The LRG's Animal Selection, Genetics and Genomics Network (ASGGN) is a global forum for scientists to share information and data relating to breeding for low methane emitting animals.

This year the ASGGN has been developing criteria to improve data sharing and analysis between countries. This aims to resolve issues with countries using different approaches for recording data, as well as challenges arising from different genetic origin even within breed. The initial results are promising with good prospects for combining data across countries and undertaking joint analysis.

The network led the development of a practice brief on improved ruminant genetics for the Global Alliance for Climate-Smart Agriculture (GACSA). This has been jointly published by the LRG and CCAFS and provides implementation guidance for policymakers and investors. It is focused on the role of breeding to achieve livestock productivity gains and meet mitigation and adaptation outcomes as well as to address food security needs. You can download the practice brief [here](#).

The ASGGN also initiated a review on the genetics of adaptation in relation to climate change, which should be submitted in early

2017. In the future, it will focus on genetic selection in relation to adaptation and resilience. The network will next meet in the margins of the final meeting of METHAGENE in October 2017. The venue for this has not yet been decided.

For more information on the ASGGN, please contact the network coordinator Dr Jan Lassen, Aarhus University (jan.lassen@mbg.au.dk).

Feed and Nutrition Network

The Feed and Nutrition Network (FNN) explores the impacts of feed and nutrition on GHG emissions from ruminant livestock and animal productivity.

Network members are part of a major global project underway to advance research into nutritional means to mitigate methane emissions and nitrogen losses from ruminants. This is known as 'GLOBAL NETWORK' – a 4-year project funded by [FACCE-JPI](#) and involving eight countries.

A key output from this project, the publication of a review paper on the use of *in vitro* techniques for assessing nutritional strategies to reduce methane emissions (Yáñez-Ruiz, D.R. et al. 2016) is showcased on page 4 of this newsletter. The Animal Feed Science & Technology journal published a second review paper from this project this month, reviewing *in vivo* measurement techniques (Hammond, K.J. et al 2016). This will be featured in the December LRG newsletter.

The next meeting of the FNN will take place in the margins of the American Dairy Science Association annual meeting in Pittsburgh, US, in late June 2017.

For more information on the FNN, please contact the network coordinator Professor Alex Hristov, Pennsylvania State University (anh13@psu.edu).

Manure Management Network

The Manure Management Network (MMN) brings together scientists focused on reducing GHG emissions from livestock through improved manure management.

Network members have been working on a compilation of mitigation methods and strategies, on metadata reporting requirements for different GHG sources, and on harmonising protocols for GHG measurements from the different stages

of the manure management chain. Several bids were submitted to a recent European funding round (ERA-GAS) and the outcomes of those are pending.

The network is urgently seeking a new coordinator to replace Dr Jonathan Levin (INRA) from the end of this year. Please email levin@supagro.inra.fr if you are able to assist.



Manure management is a key aspect of soil fertility maintenance in Ghana.

Rumen Microbial Genomics Network

The [Rumen Microbial Genomics Network \(RMG\)](#) fosters international communication and collaboration between rumen microbiologists.

The RMG held its annual meeting in June in the margins of the INRA-Rowett gut microbiology conference in France. Over 80 people attended, the network's largest ever event. Discussions reflected on the success of the RMG's two flagship projects that concluded in 2015 – the Global Rumen Census and the Hungate 1000 – and on how best to utilise the advances made by this work. RMG members are interested in developing a searchable database that combines the Hungate 1000 genomes and all other published metataxonomic/metagenomic data. A need for standard operating procedures was also identified.

Participants agreed to initiate a [special research topic](#) in the *Frontiers in Microbiology* journal. This will focus on 'metaomic' approaches to studying the rumen microbiome and the current challenges and innovation. Metaomics-based techniques use high-throughput, global analysis of genetic material (DNA, RNA, proteins, metabolites) to study complex symbiotic ecosystems such as the rumen. Use of these techniques has grown exponentially since the onset of next generation sequencing and this has resulted in the production of vast quantities of data. However, a lack of standardised pre- and post-sequencing approaches has meant that data is often not comparable across studies, which greatly limits the value of their findings. Special research topics unify the most influential researchers, the latest key development

and historical advances. Authors submitting relevant papers and a panel of 'topic editors' review the findings. The metaomics edition will assist with consolidating current data and enabling the development of methodological recommendations for future studies. This will better support the much-needed increase in functional-based understanding of the rumen microbiome alongside our understanding of the whole animal.

For more information on the RMG, please contact its coordinator Dr Sharon Huws, Aberystwyth (hnh@aber.ac.uk).



Note: We are in the midst of a major overhaul of the LRG's part of the GRA website. In the coming months you can look forward to easy-access information on our research networks, links to their own websites, profiles of key individuals and flagship activities. Keep an eye on: www.globalresearchalliance.org/livestock

Looking ahead to the GRA Council meeting, 11-12 October

The GRA's Council will hold its annual meeting next month in Mexico City with a full agenda of discussions. The Council is the representative body of all GRA member countries and oversees our work and the relationships with key partner organisations.

This meeting will see the US hand over to Mexico as the incoming Council Chair and a new country appointed as Vice Chair. It will also hear from Hayden Montgomery, the GRA's Special Representative. Hayden started this two-year role in May to help raise the profile of the GRA internationally, better link with partners and other relevant initiatives, support the Research Groups to deliver their work programmes, work with member countries and engage with potential funders for GRA activities. Hayden will be a familiar face to many of you in the LRG, having been involved in the Secretariat during the early years of the GRA before leaving to become New Zealand's Ambassador to Argentina, Paraguay and Uruguay.

The Council will receive a report from a working group that has been exploring the

potential to develop GRA multi-country funding mechanisms, and the Research Group co-chairs will present on recent achievements and challenges.

The Council will agree a set of GRA 'flagship projects' as a means of focusing attention on the GRA's research priorities and attracting potential funding. The Council requested initial ideas from the Research Group co-chairs, a process that has been underway since late August. We submitted a number of suggestions, including from the LRG's research networks, which are now being incorporated with those received from the other Groups. A final list will be presented at the Council meeting. The intent is that these activities be able to attract resourcing and strengthen collaboration with GRA partners, and ultimately support policy development. They also need to demonstrate the power of GRA collaboration across countries. We expect to see a mix of research and capability building flagships that span the core areas of paddy rice, cropping and livestock production, as well as the intersecting issues of soil carbon, GHG inventory development, and synergies between GHG mitigation and adaptation.

Importantly, the Council meeting will finalise and adopt the GRA's inaugural 4-year Strategic Plan; a document that will also take forwards the agreed flagship projects. A working group of Council members has developed the Strategic Plan, with input from the Research Group co-chairs and GRA partners. The Plan aims to track the GRA's continued effectiveness and ensure progress towards implementation of the Charter. It is divided into four areas, each with a set of strategic objectives and priority actions:

1. Further research collaboration
2. Foster outreach, knowledge sharing and information exchange
3. Build effective partnerships
4. Leverage financial and other resourcing

Many of the actions addressed in the Strategic Plan are ones that are already underway in the LRG, for example fellowships, work to support countries to develop their GHG inventories, regular reporting from member



countries, and processes for addressing cross-cutting issues with other Groups. However, the idea is that the Plan stretches our ambitions, encouraging us to be more active and engaged in the work we do for the GRA and to be more effective in securing international recognition and support. Countries will discuss and hopefully approve this Plan at the October meeting, including specific targets on funding and funding mechanisms, development of a GRA communications plan, links with the 2030 Agenda for Sustainable Development, observer status with the IPCC (see also page 9), and new partnerships with development assistance organisations.

We expect that the Strategic Plan will lift the level of engagement that the Council has with the Research Groups. We will meet with the other Research Group co-chairs immediately before the Council meeting to discuss any expectations that the Plan may create for the Research Groups and their resourcing requirements.

We urge that you get to know your country's Council representative and help them understand how you're involved in the LRG (and any other Groups or networks) and what you think the priorities are. It is only through informed discussions that the Council can be truly aware of what we do at the Research Group level and how we can collectively take the GRA's vision forwards.

For more information or to get in touch with your country's Council representative, please contact secretariat@globalresearchalliance.org.



Hayden Montgomery [R], with New Zealand Minister Tim Groser, at the GRA Ministerial Summit in June 2010.

Working with the IPCC to raise the profile of livestock GHG issues



There is an exciting opportunity for the LRG, and the wider GRA, to contribute to influential Intergovernmental Panel on Climate Change (IPCC) reports over the next few years.

The IPCC is the dedicated science advisory body to the UNFCCC. The IPCC prepares regular comprehensive Assessment Reports covering global knowledge on climate change and response options, as well as Special Reports that address specific issues. IPCC reports carry weight in both science and science-based policy decisions. Three Special Reports are being prepared over the next three to four years, including one dedicated to land-based issues ranging from desertification to food security and greenhouse gas fluxes in terrestrial ecosystems. Expertise from the GRA on mitigation options for agricultural GHG emissions and how this can be achieved in ways that also supports food security and rural livelihoods will be highly relevant.

Another report will focus on impacts and emission pathways if the world is to limit

warming to 1.5 degrees above pre-industrial levels. GRA expertise will be valuable here as well, particularly on the potential to expand mitigation options in a way that addresses sustainable development and poverty alleviation at the same time as responding to climate change.

The IPCC is also planning to update the existing 2006 Guidelines on GHG inventories, including for the AFOLU (agriculture, forestry and other land-uses) sector. GRA members are well placed to contribute here too.

These IPCC processes rely on the nomination of scientists to serve as report authors – nominations that must come from the countries where the scientists are based. If you are interested in contributing to this important work, please contact your national IPCC focal point (usually located in Environment Ministries or Meteorological Offices) as soon as possible.

GRA Research Group co-chairs will also discuss with their groups the possibility of

conducting targeted literature reviews that could support the IPCC assessment process. A common challenge in IPCC assessments is the limited recognition of non-English language literature. The GRA, with its broad reach, could perform a very useful service in ensuring that regional studies are better recognised. Co-chairs will also seek to mobilise GRA experts across the different regions in the formal peer review process – an essential part of all IPCC products.

Finally, the GRA Council will consider at its meeting in October 2016 whether it should obtain formal observer status with the IPCC (see also page 8). This would mean the GRA could participate in IPCC Panel meetings and more directly identify opportunities to contribute to IPCC processes. (Note that any actual inputs are reliant on individual scientists acting in their individual capacities and depending on the support of their home countries and institutions).

For more information, please contact Andy.Reisinger@nzagrc.org.nz, who is a vice-chair for the IPCC's Working Group III (mitigation) as well as the New Zealand representative in the LRG.



IPCC in action - meeting of a contact group to discuss planned Special Reports.

Partner Update: Highlights from CCAFS



RESEARCH PROGRAM ON
Climate Change,
Agriculture and
Food Security



[CCAFS](#) is the CGIAR's Research Program on Climate Change, Agriculture and Food Security. Its research aims to develop and scale up agricultural practices and policies that are adaptive to climate change, reduce GHGs and increase farmers' resilience. Over 200 scientists working in five regions of the developing world are part of the CCAFS program.



©CCAFS/Urrea

Livestock grazing in South America. Producers that adopt sustainability programmes gain financially and reduce emissions.



©CCAFS/Vishanathan

Improved nitrogen fertilizer management reduces emissions of nitrous oxide. However, cost data to support widespread implementation of this mitigation practice is lacking.

Highlights from CCAFS low emissions agriculture work programme

CCAFS' [SAMPLES](#) program has published a guide to field measurement of GHG sources and sinks in book form (hard copy or freely downloadable e-book). The guide is intended to inform the field measurements of agricultural GHG sources and sinks, especially to assess low emissions development options in smallholder agriculture in tropical developing countries. It can be used to support improved emissions factors for country inventories, to assess the mitigation impacts of projects, or as methods for scientific studies. It includes a chapter on enteric methane emissions from livestock. Download the e-book [here](#).

In a [Nature Climate Change article](#) earlier in 2016, researchers estimated that from 1995-2005, the livestock sector was responsible for GHG emissions of 5.6-7.5 GtCO₂e yr⁻¹. Livestock's technical mitigation potential is substantial but the economic feasibility is impacted by adoption constraints, costs and trade-offs. More research and investment is needed to increase the affordability and adoption of mitigation practices, to moderate consumption of livestock products where appropriate, and to avoid negative impacts on livelihoods, economic activities and the environment.

A number of CCAFS and LRG researchers came together to publish an article in *Global Change Biology* in July that identifies an [aspirational global target for reducing emissions from agriculture](#). The authors note the urgent need for more transformative technical and policy options for agriculture if it is to contribute successfully.

A practice brief for the Global Alliance on Climate-Smart Agriculture (GACSA) has been published, '[Manure helps feed the world: Integrated Manure Management demonstrates manure is a valuable resource](#)'. Note that the LRG's Animal Selection, Genetics and Genomics Network has been working with CCAFS on a similar GACSA brief on animal breeding. See page 6.

In an article in [Scientific Reports](#), researchers found that many GHG calculators may poorly estimate emissions in tropical developing countries. These findings raise concerns about applying such calculators to tropical farming systems and emphasise the need to broaden the scope of the underlying data.

An [article in Biogeosciences](#) summarises available data on GHG emissions from African natural ecosystems and agricultural lands. It uses this to synthesise current understanding of the drivers of change in GHG emissions, identify knowledge gaps and suggest future directions and strategies for GHG emissions research.

CCAFS has published several studies on sustainable beef production in Brazil, aiming to support its transition to low emissions agriculture. See [here](#) and [here](#).

CCAFS is an important partner for the LRG with many shared priorities. We have been working with CCAFS for over five years on a range of capability building and collaborative research activities. Current efforts are focused on a joint programme on measuring, reporting and verifying livestock GHGs, including how they are addressed in national GHG inventories.

New Zealand and the US collaborate in a GRA Senior Scientist exchange on high sugar grasses and endophytes

Rebecca McCulley recently spent three months with AgResearch in Palmerston North supported by the New Zealand Government's Global Research Alliance Senior Scientist fellowship scheme (also known as 'LEARN').

Rebecca is a Professor at the University of Kentucky in the US, and is the Interim Director of the Tracy Farmer Institute for Sustainability & the Environment. The visit was to look more closely at the effects of

endophytes on nitrous oxide emissions from pastures – an interest shared by both Rebecca's group and by the AgResearch team.

An experiment was established in the Free Air Carbon Dioxide facility operated by AgResearch (an outdoor field laboratory looking at the impacts of elevated CO₂ on grazed pasture) using high sugar grasses and controls with and without endophytes. Measurements of nitrous oxide emissions were made after urine was applied together with a range of plant and soil variables. In

addition, methane oxidation was measured and samples are being used for an in vitro estimation of ruminant methane output.

The study has led to further research evaluating plant alkaloid concentrations under climate change with collaboration between AgResearch and the Universities of Kentucky and Tasmania now in progress.

See page 12 for more information on the New Zealand Government's LEARN fellowship scheme in support of the GRA.



Prof Rebecca McCulley (L), GRASS Fellow from the University of Kentucky, and AgResearch research associate Shona Brock (R) sample nitrous oxide chambers.

International fellowship opportunities

LEARN Awards (sponsored by the New Zealand Government)

[LEARN](#) is an awards scheme sponsored by the New Zealand Government to build international capability in livestock emissions research. It is part of New Zealand's support for the [Global Research Alliance on Agricultural Greenhouse Gases](#).

LEARN is focused on:

- Supporting technical staff and scientists from developing countries and GRA member countries to work alongside New Zealand colleagues
- Sharing knowledge on livestock GHG emissions measurement, modeling and mitigation practices to increase the level of scientific skills and technological capabilities internationally.
- Supporting strategic research and capability building activities that align with the priorities of the GRA as well as relevant New Zealand science priorities.
- Advancing common research interests between countries and building enduring relationships.

There are four LEARN awards offered:

- Co-funded PhD Scholarship
- Postdoctoral Fellowship
- Technical Training Award
- Global Research Alliance Senior Scientist (GRASS) Award

All applications must be developed in close collaboration with a New Zealand research institution.

For more information, please see www.livestockemissions.net or email awards@nzagrc.org.nz

Borlaug Fellowship Program (sponsored by the US Government)

The 2017 Norman E. Borlaug International Agricultural Science and Technology Fellowship program provides opportunities for short-term research projects to improve agricultural productivity, economic development and food security. It offers training and collaborative opportunities for agricultural research, international agricultural economics, leadership, and policy to researchers.

Competitively selected fellows will work one-on-one with a US mentor who will coordinate the training program. After completion of the 10-12 week fellowship, the mentor will visit the fellow's home institution to continue collaboration. USDA will select US host institutions and mentors for each fellow and will only accept applications on approved topics for each country.

Applications for the 2017 program close on 31 October 2016.

For more information including eligibility requirements, approved topics per country, and other application details, please see: www.fas.usda.gov/programs/borlaug-fellowship-program/applying-borlaug-fellowship-program

Upcoming events

Global Conference on Sustainable Beef

The Global Conference on Sustainable Beef brings together the world's leading beef producers, environmental organizations, beef processors, retailers and many other key stakeholders to share work being done on enhancing the sustainability of all segments of the beef value chain.

Date: 4-7 October 2016

Location: Banff Springs, Canada

Website: <https://grfsb.wildapricot.org/2016-Global-Conference>

GRA Council meeting

The GRA's Council will meet in Mexico City (see page 8). The LRG will be represented at the Council meeting by its co-chairs. Please note that all GRA member countries are individually represented at the Council, along with representatives from the GRA Partner organisations.

Date: 11-12 October 2016

Location: Mexico City, Mexico

Contact: secretariat@globalresearchalliance.org

World Food Day

The theme for this year's World Food Day is "Climate is changing. Food and agriculture must too". Various events are planned around the world, with the FAO's website offering plenty of suggestions of different ways to get involved. You can increase awareness and understanding of the important link between climate change and food security by sharing the promotional materials with government offices, community institutions such as schools, local farmers' associations, and businesses, or bring them to the attention of local and national media outlets.

Date: 16 October 2016

Location: Worldwide

Website: www.fao.org/world-food-day/2016/home/en/



World Dairy Summit

The 2016 World Dairy Summit will facilitate a dialogue on how dairy can sustainably contribute to feeding 9 billion people.

Date: 16-21 October 2016

Location: Rotterdam, Netherlands

Website: www.idfwds2016.com

2nd Agriculture and Climate Change Conference: Climate ready resource use-efficient crops to food and nutritional security

The 2nd Agriculture and Climate Change Conference will focus on the likely impact of climate change on crop production and explore approaches to maintain and increase crop productivity into the future. Topics include increased agricultural uncertainty, effects of CO₂ on plant growth, impacts on nutrition, quality and resource use efficiency, and new crops for a new climate.

Submissions deadline: 17 October 2016

Date of event: 26-28 March 2017

Location: Sitges (near Barcelona), Spain

Website: www.agricultureandclimatechange.com

Committee On World Food Security: Livestock Side Event

The Committee on World Food Security is meeting from 17-21 October this year and includes a side event on sustainable livestock. The focus for this event is "Livestock as a key driver for sustainable agricultural development: how can livestock practices foster sustainable development in agriculture towards the implementation of the 2030 Agenda".

Date: 18 October 2016

Location: Rome, Italy

Website: www.fao.org/cfs/en/

Workshop on Environmental Indicators in Animal Production

The Argentine Association of Animal Production (AAPA) is convening its 5th Workshop on Environmental Indicators in Animal Production in the margins of the 39th AAPA Congress. These workshops provide a regional forum, which this year is focusing on GHG emissions with a particular emphasis on animal production in an uncertain climate. Contributions to the workshop will be compiled in a special edition of the Argentine Journal of Animal Production.

Date: 21 October 2016

Location: Tandil, Buenos Aires, Argentina

Website: www.aapa.org.ar



World Meat Congress

The International Meat Secretariat and the National Meat Institute of Uruguay have developed an agenda for this 21st World Meat Congress that deals with the major topics affecting the global meat sector. This includes key trends, trade and policies, consumer trust, sustainability, animal care and health, human health and nutrition and governance.

Date: 7-9 November 2016

Location: Punta del Este, Uruguay

Website: <http://wmc2016.uy/en/>

International Agricultural Research Cooperation for Climate Change

Japan is hosting a G7 side event at the UNFCCC 22nd Conference of the Parties to hear from key international research initiatives on the challenges facing agriculture and climate change research. The GRA has a speaking slot at this event.

Date: 10 November 2016

Location: Marrakech, Morocco

Contact: secretariat@globalresearchalliance.org

GRA Croplands Research Group meeting

The GRA's Croplands Research Group (CRG) will hold its annual meeting in the margins of the combined conference of [American Society of Agronomy](#), [Crop Science Society of America](#), and [Soil Science Society of America](#). This year's CRG meeting will also incorporate a joint session with the co-chairs of the GRA's Integrative Research Group.

Date: 10-11 November 2016

Location: Phoenix, Arizona, USA

Contact: secretariat@globalresearchalliance.org

International Nitrogen Initiative Conference

The 7th International Nitrogen Initiative conference is focused on solutions to improve nitrogen use efficiency for the world.

Date: 4-8 December 2016

Location: Melbourne, Australia

Website: www.ini2016.com

GRA Livestock Research Group meeting

The LRG will hold its 2017 meeting in Washington DC. More information on the agenda and related meeting activities will be circulated towards the end of 2016.

Date: 10-11 April 2017

Location: Washington DC, USA

Contact: secretariat@globalresearchalliance.org

International symposium on emissions of gas and dust from livestock (EMILI 2017)

EMILI 2017 will be an opportunity to share the latest scientific advances in research on gas (ammonia, GHG, odors) and dust emissions from Livestock. It will help provide information that industry and governments need to achieve cost-effective gas and dust mitigation outcomes.

Date: 21-24 May 2017

Location: Saint-Malo, France

Website: https://colloque.inra.fr/emili2017_eng/

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