

## **Meeting of the Livestock Research Group**

**USDA National Institute of Food & Agriculture Waterfront Centre**

**Washington D.C.**

**10-12 April 2017**

# **MEETING OUTCOMES AND DETAILED REPORT**

## **SUMMARY**

The annual meeting of the Livestock Research Group (LRG) of the Global Research Alliance on Agricultural Greenhouse Gases (GRA) was hosted by the United States in Washington D.C. from 10-12 April 2017. It was attended by representatives from 28 countries (GRA members and observers), five of the LRG's research networks and eight partner organisations. Co-chairs of the GRA's Integrative Research Group joined the meeting via video-conference.

## **OUTCOMES**

The meeting achieved the following outcomes:

### **Network leadership**

- The LRG has a new regional network, the Platform for Sustainable Intensification of Livestock Production in Latin America and the Caribbean. This builds on years of regional cooperation on livestock GHG emissions research and is funded by FONTAGRO and New Zealand.
- Pending domestic consultations, China will assume leadership of the Manure Management Network. It will be supported in this role by the US and the Netherlands.
- Efforts are underway to revive the Grasslands Network (now part of the GRA's Integrative Research Group) and LRG members are invited to nominate relevant experts to participate.

### **Research collaboration – the GRA's proposed Flagships**

- There was broad support for the proposed GRA Flagship on Enteric Fermentation. A revised proposal, incorporating feedback received during the meeting will be circulated to LRG delegates and the Flagship Taskforce in late May.

- LRG delegates were invited to engage directly in the taskforces for the Soil Carbon and Inventory Flagships and to provide feedback on those draft proposals.

### Capability building

- There was agreement to continue the LRG's capability building focus<sup>1</sup> on advanced GHG inventories and measurement, reporting and verification (MRV), including follow-on activities from the soon-to-be-published white paper on MRV options (see page 11).
- Regional engagement and technical training will take place for East African countries in June 2017, and there are prospects for a more general GRA workshop for West African countries in September 2017.
- Continuation of activities more broadly relating to improving livestock productivity and reducing emissions intensity, in response to needs expressed by countries e.g. a second phase of the highly successful LRG/CCAC/FAO project on reducing enteric fermentation to support food security and livelihoods.
- A new area of focus supporting countries to develop the scientific underpinning for livestock NAMAs<sup>2</sup> - including their social and economic impacts.

### Policy support and implementation

- LRG delegates are encouraged to contribute to several high-profile pieces of work underway in the Intergovernmental Panel on Climate Change (IPCC), including:
  - Special Report on Climate Change and Land (due for publication in September 2019)
  - Comprehensive 6<sup>th</sup> Assessment Report (various chapters due from 2021-2022)
  - Methodology Report to refine the 2006 IPCC Guidelines for National GHG Inventories (May 2019)

### Other business

- The next LRG meeting will take place April/May 2018 in Ho Chi Minh City, Vietnam.
- A Latin American animal agriculture and GHG emissions conference will take place in Uruguay, 4-6 October 2017. The deadline for abstracts closes 31 May.

## DETAILED MEETING REPORT

This report is a summary of key discussions, outcomes and action points from the meeting. Presentation slides and background papers are available via the secure area of the GRA website.

### PARTICIPANTS

The meeting was attended by representatives from 27 GRA member countries and one observer country, five of the LRG's research networks, and eight partner organisations:

- **Countries attending:** Argentina, Brazil, Canada, Chile, China, Colombia, Denmark, Dominican Republic, Finland, France, Ghana, Ireland, Italy, Malaysia, Mexico, Netherlands, New

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<sup>1</sup>This was agreed at the 2016 LRG meeting in Melbourne, Australia.

<sup>2</sup> A NAMA is a Nationally Appropriate Mitigation Action, taken under the UN Framework Convention on Climate Change. It refers to any action that reduces emissions in a developing country, that is prepared under the umbrella of a national governmental initiative. For more, see [here](#).

Zealand, Peru, Philippines, Spain, Sri Lanka, Sweden, Switzerland, Tanzania (observing), Thailand, United States, Uruguay, Vietnam

- **LRG network coordinators attending:** Animal Health Network (via video), Animal Selection, Genetics and Genomics Network, Feed & Nutrition Network, Rumen Microbial Genomics Network, Mediterranean Livestock Network
- **Partners attending:** Tropical Agricultural Research and Higher Education Center (CATIE), UN’s Climate and Clean Air Coalition (CCAC), CGIAR’s Research Program on Climate Change, Agriculture and Food Security (CCAFS), International Center for Tropical Agriculture (CIAT), FONTAGRO, Food and Agriculture Organisation (FAO), Inter-American Institute for Cooperation on Agriculture (IICA), World Bank

The meeting was co-chaired by Martin Scholten (Wageningen UR, the Netherlands) and Harry Clark (New Zealand Agricultural Greenhouse Gas Research Centre). Refer to Appendix 1 for the full participants’ list.

## REPORT

Dr Ann Bartuska, Acting Under Secretary for Research, Education and Economics and Acting Chief Scientist for the United States Department for Agriculture (USDA), opened the meeting. Dr Bartuska reflected on the achievements of the GRA since it was first launched as a concept in 2009. She described its contribution as “crucial”, noting the dual challenges of increasing global food production at the same time as responding to climate change. The GRA offers a unique way forwards, encouraging and facilitating both action and innovation.

## SCENE-SETTING CO-CHAIRS OVERVIEW

The LRG Co-chairs set the scene for the meeting, presenting on the LRG’s achievements in 2016/17 and the challenges and opportunities on the horizon, as well as relevant activities of the GRA Council. In the past twelve months, the LRG has:

- Supported countries to improve their inventory and MRV capabilities, including through workshops and training, the development of guidelines, a white paper and provision of expert review of Tier 2 inventories
- Concluded the highly successful capability building project, ‘Reducing enteric methane for improving food security and livelihoods’ and initiated a funding bid for a second phase for that work
- Produced a number of communication materials, including translating the SAI/LRG good practice guide for industry into Spanish and French, publishing a practice brief on ruminant genetics, and issuing three newsletters
- Provided extensive capability building support in the South and South East Asian region to help countries develop Tier 2 inventories for livestock GHGs

Highlights from the LRG’s research networks included:

<b>Animal Health Network</b>	<ul style="list-style-type: none"> <li>• Peer reviewed paper, ‘Challenges and priorities for modelling livestock health and pathogens in the context of climate change’</li> </ul>
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<b>Animal Selection, Genetics &amp; Genomics Network</b>	<ul style="list-style-type: none"> <li>• Published review of proxy methods for estimating enteric CH<sub>4</sub> in dairy cows</li> <li>• Multi-country dataset to estimate heritability of CH<sub>4</sub> emissions in dairy cows</li> <li>• Published a practice brief on ruminant genetics (jointly with CCAFS and the Global Alliance on Climate Smart Agriculture)</li> </ul>
<b>Feed &amp; Nutrition Network</b>	<ul style="list-style-type: none"> <li>• Two major reviews of experimental methods to improve research practices (<i>in vivo</i> and <i>in vitro</i>)</li> <li>• Development of two databases, on treatment means and prediction</li> </ul>
<b>Manure Management Network</b>	<ul style="list-style-type: none"> <li>• Submission of a project proposal to the EU ERA-GAS funding round</li> </ul>
<b>Rumen Microbial Genomics Network</b>	<ul style="list-style-type: none"> <li>• Creation of a replica of the LRG's Hungate 1000 cultures, to be held in IBERS and made available to scientists on demand</li> <li>• RumenMine – a database tool for mining the Hungate 1000 cultures</li> </ul>

Several networks have sought funding for significant pieces of research, including via New Zealand's Fund for Global Partnerships in Livestock Emissions Research and the European ERA-GAS fund (decisions pending). The Co-chairs commented on the opportunity presented by the GRA Flagships, particularly the Enteric Fermentation Flagship, in providing a renewed focus for network activities.

The Co-chairs noted that two networks are experiencing leadership challenges at present with the end of France's leadership of the Manure Management Network and the UK's leadership of the Animal Health Network. It was hoped that new leaders might be found during the meeting.

The Co-chairs noted the GRA Council's approval of a Strategic Plan, commenting that this will provide useful direction for the initiative over the next four years. Two of the Plan's stated actions are highly relevant to the LRG's efforts: the decision to pursue GRA flagship programmes on enteric fermentation, inventories, and soil carbon; and in parallel to explore joint programming to support this work. The Co-chairs also noted that the GRA has been approved as a formal IPCC Observer (see page 9).

In concluding their overview, the Co-chairs noted that due to the fullness of the meeting agenda, a roundtable of country and partner updates would not be possible. Delegates were invited to share their country or organisation's activities and priorities at the working dinner that evening and discuss ways that the LRG could help support these efforts.

### **New Latin America and Caribbean network**

The Co-chairs warmly welcomed a presentation from FONTAGRO and CATIE launching a 'Platform for Sustainable Intensification of Livestock Production in Latin America and the Caribbean'. This brings 15 countries together to promote the advancement of agriculture in the region through innovation, adaptation/mitigation, sustainable intensification and linkages to markets. It builds on wide-ranging regional cooperation on livestock GHG emissions since 2007. The platform aims to:

- i. Coordinate research and development
- ii. Facilitate knowledge sharing
- iii. Strengthen the capacities of participating countries and institutions to address the challenge of sustainable intensification

- iv. Share good practice policy design for the livestock sector
- v. Jointly mobilise resources from within participating institutions but also supporting them to submit joint bids to external funding sources

It will be a valuable mechanism for the LRG to engage in the LAC region. CATIE will coordinate the network with funding support also coming from FONTAGRO and New Zealand.

## **GRA FLAGSHIP PROGRAMMES**

The GRA's Special Representative, Hayden Montgomery, introduced the concept for the GRA Flagships. Four have been approved by the Council for exploration: enteric fermentation; paddy rice production; GHG inventory issues; and soil carbon. A fifth flagship, on nitrous oxide, has also been floated but is yet to be agreed by Council.

A taskforce has been set up for each of the four flagships, with 'Lead Author/s', 'Contributing Authors' and 'Review Authors' (borrowing from the IPCC format). Membership of each taskforce is not closed and LRG delegates were encouraged to get involved.

An overarching set of principles guide each taskforce's development of the flagships, including making sure that flagship activities: add value, are inclusive, relevant, solution focused, multifaceted, increase capability, and support existing efforts.

A draft proposal for each flagship will be shared with the Council in May/June, outlining the vision and scope of the flagship, potential activities, and resources available or needed. These proposals will continue to be refined during July and will be presented in final form to the Council when it meets in Japan in August.

At the same time that the flagships are being developed, the Secretariat is leading a process to explore the potential for GRA joint programming (see page 8). The idea is that this could support aspects of the flagships, with options to be presented to the Council in August.

## **ADVANCING THE ENTERIC FERMENTATION FLAGSHIP**

A core part of this year's LRG meeting was to advance the proposed flagship on enteric fermentation. Harry Clark, LRG Co-chair and Lead Author of the taskforce for this flagship, presented a proposed structure for the flagship, explaining why we need one on enteric fermentation and how it could be divided into themes. Preliminary ideas for activities were shared and feedback sought from delegates. The three initial themes proposed for this flagship are:

1. *Development of collaborative research solutions for reducing enteric CH<sub>4</sub> emissions*
2. *Improved quantification of livestock emissions*
3. *Identification, testing and implementation of mitigation solutions*

Delegates saw the flagship as an opportunity to mobilise resources – inspiring funding agencies to invest. However, to do this, the flagship requires a clear ambition or vision and present a convincing proposal highlighting how the rumen is the cornerstone of the microbiome for animal-related emissions. There was discussion of the importance of adding value to existing efforts, avoiding

duplication and showing potential investors how and where the benefits will accrue (not just the environmental benefits but the social and economic). There should be a clear process of priority-setting and ranking/selecting project ideas. The potential for overlap with elements of the inventory flagship was also noted. The Lead Authors of the Enteric Fermentation and Inventory Flagships will need to work together closely to ensure this is not an issue.

The meeting then broke into working groups to discuss the three proposed themes and brainstorm ideas for inclusion in a further iteration of the draft proposal. The following is a summary of the main points made in the working groups.

#### *Theme 1: Collaborative research solutions*

There was good discussion of ways to expand existing efforts, although it was difficult to identify wholly new ideas for research collaboration given the depth of work in this field already. Flagship projects in this theme could include:

- Characterizing the rumen microbiome - host interactions for reduced CH<sub>4</sub> emissions and improved production efficiency using single methodologies
- New approaches to developing low methane forages through gene editing (Crispr-CAS)
- Use of industrial feed by-products (e.g. copra, peanut meal, palm kernel cake) to reduce CH<sub>4</sub>
- New tools for use in the selection of low CH<sub>4</sub> emitters
- Plant bioactives and their influence on enteric emissions, production efficiency and ability to replace antibiotics

#### *Theme 2: Improving quantification*

A range of project ideas that build on existing efforts were identified under Theme 2, including:

- Expanding the predictive ability of CH<sub>4</sub> emissions for a wider range of feeds and farm/production systems and region-specific combinations, e.g. build on FNN database, CATIE, IICA and SAMPLES
- Developing guidance on measurement techniques and protocols, including a decision-tree and minimum data needs
- Understanding CH<sub>4</sub> mitigation within the farm system, e.g. simplifying and improving GLEAM
- Guidelines and/or tools for improving activity data (including productivity), working in partnership with CCAFS, e.g. minimum data requirements for Tier 2, characterising uncertainties etc

Several new ideas (not based on existing work) were also identified:

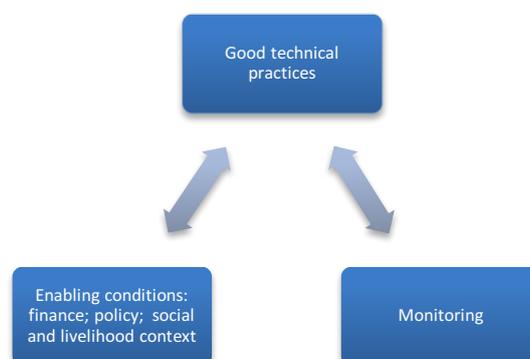
- Remote sensing of activity data, pasture quality, production, seasonality
- Developing proxies for feed intake, production, emissions etc to fill activity data gaps
- Training and capability building
- Consistency of emissions estimates across scales
- Bridging the gap from grey literature to IPCC database
- Sensitivity testing to address uncertainties in methane yield and activity data

### *Theme 3: Identification, testing and implementation of mitigation solutions*

Although assessing costs and benefits came up in relation to project ideas across all of the themes, delegates considered it was particularly important for Theme 3 activities. Work in this area should be guided strongly by the policy interests of countries to ensure that solutions meet need and are appropriate for national circumstances. Engagement with industry and the private sector would also be important. Three possible areas of activity were identified (see diagram).

Examples of good technical practices could include:

- Identifying and validating mitigation options and the production systems and regions to which they are relevant
- Adding a GHG lens to agronomic trials
- Historical analysis of practices and what attributed to changes in GHG emissions
- Training and exchange, e.g. using regional hubs
- Traits for low emissions
- Strengthening extension services and packages



For enabling conditions:

- Baselines and methodology, validation and monitoring support for NAMAs including finance access through the Global Climate Fund
- Support for NDCs
- Assistance with setting policy targets
- Payments schemes, integrated with deforestation
- Quantification and demonstration of benefits and costs from the recommended practice
- Construction of business cases and modelling

For monitoring:

- Proxies for feed efficiency and for farmers to contribution to MRV, and identification of social and economic co-benefits

The Co-chairs welcomed the level of engagement from delegates and the range of ideas shared. It will be important to have a spectrum of ideas for investors to assess, and it was helpful to see some attempts at grouping those ideas. Having a mix of 'quick win' activities (i.e. short term, high profile etc) and longer term projects would also be valuable so that results can be demonstrated.

The revised proposal should make it clear why research collaboration is so needed in this area, and what it will take to bring that research to fruition. The message of emphasising productivity was reinforced, i.e. showing what else the flagship contributes to. Mitigation should be presented as a co-benefit, or one of multiple objectives rather than the singular focus of the flagship.

The need to include a broader view of emissions, e.g. not only enteric methane but also nitrous oxide, was also mentioned in plenary and during the working groups. The knock-on effect on other gases will be considered in the flagship's activities, and the Council's intention to develop a flagship on nitrous oxide in the future was reiterated.

The challenge with developing detailed project ideas in the short timeframe of the meeting was noted and it was agreed that a template would be developed for people to expand on their project ideas. This would give the taskforce more information from which it would be possible to prioritise projects for inclusion in the flagship. However, delegates were encouraged to be realistic about what is achievable – project ideas need champions to develop them and take them forwards. Project ideas should also clearly indicate how they deliver on the flagship principles (see page 5). The session concluded with a commitment to circulate the next draft of the flagship proposal to the LRG, with delegates encouraged to continue engaging.

## RESOURCING OUR AMBITIONS

The second day of the meeting opened with a discussion on possible ways to resource the ambitions of the LRG, including the flagships. Martin Scholten presented on behalf of the Joint Programming Initiative on Agriculture, Food Security and Climate Change (FACCE-JPI) (of which he is a member of the governing board). FACCE-JPI is a European funding model that so far has mobilised resources of around €104 million, supporting 75 collaborative research projects under themes of food security, sustainable intensification, biodiversity and ecosystem services, adaptation, and mitigation. This includes the 2013 GRA multi-partner call on agricultural GHG mitigation. Twenty-two countries belong to FACCE-JPI (15 of which are also in the GRA, including non-Europeans). FACCE-JPI became a GRA Partner in January 2017.

Currently FACCE-JPI is working to set up an International Research Consortium (funding model) on soil, together with the 4 per 1000 research initiative and the GRA's Integrative Research Group. It is also updating its implementation plan for 2018-2020 – an opportunity to align LRG priorities (e.g. via the Enteric Fermentation and Soil Carbon Flagships).

Hayden provided more detail on the prospect of GRA joint programming. A draft 'options paper' is being considered by a working group of countries and partners. Options range from informal and easy to implement to complex international funding models as follows:

- i. **National hosting programmes:** exchanges between member countries
- ii. **Centralised GRA fellowship or exchange programme:** would deliver training or analytical work for GRA priorities
- iii. **Bilateral funding arrangements:** resources mobilised bilaterally to undertake joint activities that align with GRA priorities. Outcomes would be available to the broader membership, mapped onto the work programme of the GRA including the flagships.
- iv. **Thematic annual programming:** agreement of common research areas, no coordinated call or timing. Simply alignment of programmes with some money available to enable data/outcomes to be shared.
- v. **Multi-partner research call:** an agreed topic/s and coordinated call for proposals, drawing on a virtual common pot e.g. members bring cash or in-kind resourcing to support their own

scientists to engage. Shared application and assessment process similar to that of the GRA FACCE-JPI call in 2013.

- vi. **Fund for international consortia:** extension of the preceding concept, with the difference being a centralised fund (e.g. similar to New Zealand's GPLER Fund).

The development of these options is intended to align with the development of the flagships. Once the details of proposed flagship activities are known, these can be mapped against the various joint programming options and a set of recommendations prepared for Council decision in August. Ideally the flagships will be a mix of different types of activities, e.g. some will lend themselves to a research call, others may be able to be achieved through a fellowship or training programme. It would be helpful if the Secretariat could directly request countries to consider resourcing once the flagships are firmed up as this would enable domestic funding processes to be initiated.

Showing how the activities will help a country deliver on its NDC/NAMAs will also be critical for mobilising resources. This means targeting research activities to help countries meet their commitments – showing that research is responding to expressed demand and that this will directly contribute to country commitments. It was noted that a GRA meta-analysis of NDC livestock needs would be helpful.

## CONTRIBUTING TO THE IPCC

Andy Reisinger (New Zealand's LRG representative and also a member of the IPCC Bureau) outlined opportunities for the LRG to contribute to upcoming activities of the IPCC. During the next five years, the IPCC will publish several major pieces of work that address issues of relevance to livestock GHGs. These include:

- A Methodology Report to refine the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (May 2019)
- A Special Report on Climate Change and Land: covering climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems (September 2019)
- The comprehensive 6<sup>th</sup> Assessment Report (by 2022), covering the physical science basis of climate change; impacts, adaptation and vulnerability; mitigation; and a synthesis across the working groups and special reports

LRG members and partners can make a direct contribution to this work by:

- Nominating authors and expert reviewers (working through their country's national IPCC focal point)
- Increasing the availability and relevance of literature, for example:
  - Publishing – the value of this to the IPCC cannot be underestimated. There are few seminal publications that point to the impact of productivity gains on mitigation. The IPCC does not do its own publishing so is reliant on scientists to publish their work.
  - Publishing regional and targeted literature reviews, including to ensure non-English language publications are accessible to IPCC authors
- Communicating informally with IPCC lead authors

Andy clarified that the IPCC has a strong preference for journal-based publications that have gone through the normal scientific peer review process. While the IPCC is not prohibited from using grey literature (e.g. a GRA published document), it is always best if it has been published with a publisher and gone through its own peer review process.

Indicative cut-off points for publications to be considered in upcoming IPCC reports are:

- Special Report on Global Warming of 1.5°C:
  - Submitted to scientific journal, or available as draft technical report, by 1 Nov 2017
  - Accepted by scientific journal or published as technical report, by 15 May 2018
- Methodology Report to refine the 2006 IPCC Guidelines on GHG Inventories:
  - Submitted to scientific journal, or available as draft technical report, by ~ Mar 2018
  - Accepted by scientific journal or published as technical report, by ~ June 2018
- Special Report on Climate Change and Land:
  - Submitted to scientific journal, or available as draft technical report, by ~ Sept 2018
  - Accepted by scientific journal or published as technical report, by ~ Feb 2019
- 6<sup>th</sup> Assessment Report, WGIII (Mitigation):
  - Submitted to scientific journal, or available as draft technical report, by ~ Apr 2020
  - Accepted by scientific journal or published as technical report, by ~ Oct 2020

Andy also noted the recent confirmation of the GRA as a formal IPCC Observer and how this is an excellent opportunity for the GRA to influence that forum. Hayden will be able to attend and speak at IPCC meetings, helping raise awareness of the impact of agricultural productivity gains on mitigation outcomes and the contribution of the GRA.

## INVENTORY FLAGSHIP

Brian McConkey, Lead Author of the Inventory Flagship taskforce (and Co-chair of the Integrative Research Group) gave a presentation on the Inventory Flagship. This responds directly to the increased obligations that the Paris Agreement brings to countries' reporting of greenhouse gas emissions and Nationally Determined Contributions (NDCs). GHG inventories will play a central role in this, however countries need support to increase their capabilities and to overcome barriers to improving their inventories. The Inventory Flagship encompasses four broad themes:

1. *Enhance the inventory structure*: e.g. regional and source-specific guidance for developing advanced inventories
2. *Build capability*: e.g. delivery of targeted technical training to improve emission factors; analyses of current methodologies for estimating GHG emissions
3. *Acquisition and administration of data*: e.g. incorporation of improved emission estimates in emissions databases (e.g. IPCC, SAMPLES); national and regional research projects that validate existing measurements
4. *Demonstrating mitigation in NDCs*: e.g. providing targeted support for countries to use improved inventory methods to include mitigation in NDCs

The next step for the taskforce is to develop concept notes for activities to be included in the flagship. These would be circulated to the wider GRA community to determine interest as well as overlap or synergies with other activities and initial ideas for resourcing.

It was noted that only two members of the LRG are involved in the Inventory Flagship taskforce. The Co-chairs encouraged greater participation in this group – important for ensuring that the potential for overlap between LRG inventory activities, the Enteric Fermentation Flagship and the Inventory Flagship can be addressed.

## **CAPABILITY BUILDING DISCUSSIONS**

Harry introduced the capability building session by reminding delegates that the 2016 LRG meeting had agreed a focus for LRG capability building efforts on inventories and MRV of livestock GHGs. He asked delegates to reflect on whether a new focus is needed, and also how the flagships can help deliver on our capability building needs.

## **MRV FOR LIVESTOCK GHG EMISSIONS**

Lini Wollenberg (CCAFS) gave an update on the joint LRG/CCAFS initiative to develop a white paper on improving the measurement, reporting and verification (MRV) of livestock GHG emissions. This is being authored by Andreas Wilkes, UNIQUE Forestry and Land Use consultant.

With 92 countries including livestock GHGs in their NDCs but many struggling with adequate MRV of those emissions, the white paper aims to provide a baseline of current MRV practice and the barriers and opportunities for improvement to meet countries' needs. Lini outlined MRV in the UNFCCC pre- and post- the Paris Agreement, summarising its principles as being about transparency, consistency, comparability, completeness and accuracy.

The white paper reviewed the MRV practices of 140 developing countries against those five principles. Some of the key findings include:

- Only 15% of countries surveyed use a Tier 2 approach to estimate some/all livestock GHGs and only 5 of those use it to track changes in productivity over time.
- Less than half those countries conduct key source category analysis
- Most countries do not have updated Tier 2 emission factors (e.g. based on trends in production and animal performance) so are unable to reflect the effect of mitigation actions on enteric fermentation
- Over 60% made no analysis of uncertainty in emissions
- There is considerable variation in the quality of reporting
- Institutional coordination (e.g. between different government agencies, government and the private sector etc) can be very difficult

The draft paper challenges the view that improving MRV accuracy should be the top priority or whether it should instead be using MRV to capture trends. It makes five key recommendations:

1. Expand support for analysis, identification and implementation of economically viable, farmer-focused livestock mitigation options
2. Consider updated Tier 2 approaches using activity and livestock production data that reflect changing livestock systems and their productivity
3. Improve synergies among statistical systems, other livestock data systems and MRV

4. Share country experiences on priorities for livestock MRV system development
5. Promote MRV innovation at different levels of mitigation action and MRV (project, jurisdictional, sectoral, national)

There was discussion of moving to a more dynamic Tier 2 inventory and emission factors and the impact that these can have on estimates. In New Zealand's case, it was found that emissions were increasing whereas the previous inventory method had shown them to be decreasing.

The white paper's value as a global record of country progress was noted, with the LRG's capability building focus making it well-placed to help deliver against the recommendations. The potential for overlap with the Inventory Flagship was observed; CCAFS will work with that Flagship's taskforce.

The white paper will be published later in 2017, with a summary for policy-makers made available in mid-May in time for the next UNFCCC negotiating session.

## **LIFE BEEF CARBON PROJECT**

Giacomo Pirlo presented an update on the LIFE BEEF CARBON project, coordinated by Jean-Baptiste Dollè, from the French Institut de l'Élevage (IDELE). The project involves 2,000 farmers across four countries (France, Ireland, Italy and Spain). It follows a typical Life Cycle Assessment approach from cradle to gate, collecting detailed farm data, for example reproductive data, housing, feeds, fertilizers, type of tillage etc. Environmental indicators are assessed including carbon footprint, energy consumption, acidification and eutrophication per kilogram of meat produced, and biodiversity per hectare. The project identifies innovation at the farm level, aiming to build and promote low carbon systems that could be applied across other farms. This includes a commitment from 175 farmers who will voluntarily adopt a number of techniques aimed at reducing the GHG footprint of beef production on their farms by 15% in ten years. The project is an example of a different way to collaborate between countries that also brings very strong engagement with farmers – necessary if we are to see real change at the farm level.

## **LRG PRIORITIES FOR MRV/INVENTORIES**

Harry recapped LRG progress in delivering capability building support to countries over the past year. When it met in 2016, the LRG agreed a focus on inventory and MRV. Several major pieces of work have taken place since then:

- Development of the MRV white paper (see page 11)
- Publication of an [LRG/CCAFS brochure outlining the benefits of advanced inventories](#) for livestock emissions
- Regional workshops and technical training to improve livestock GHG inventories in South and South-East Asia
- Peer review of Tier 2 inventories

However, the LRG's efforts haven't only been focused on inventory and MRV. The flagship project led by FAO and NZAGRC (with funding from CCAC) on reducing enteric methane has been a significant capability building activity for the LRG this year. See <http://www.fao.org/in-action/enteric-methane/en/> for more information. Funding is being sought for a second phase.

Harry also previewed upcoming initiatives, including regional outreach and technical training in East Africa. The recent visit of GRA representatives from the Netherlands and Switzerland to Senegal and Cote D'Ivoire was also noted, with the prospect of a general GRA regional engagement workshop for West Africa in September 2017 in the margins of the annual meeting of the Africa Rice Center.

Brazil shared its experience with developing a Tier 2 inventory for livestock GHGs. This was structured according to Brazilian cattle-raising municipalities, which covers 87% of Brazil's cattle population. It drew on census data from 2006 and used a combination of IPCC Tier 2 and local emission factors. Brazil is keen to share its experiences and learn from other countries on the Tier 2 journey. Noting New Zealand's experience in applying new methodologies/changing the estimates, the possibility of reporting both Brazil's current and new methodologies in its next National Communication was discussed. This was seen as very constructive, easing acceptance of the new model while ironing out any kinks.

There was a general discussion of capability building priorities, with countries confirming that the LRG focus on inventories and MRV should be retained. Several noted that it would also be helpful to receive support to strengthen the science underpinning livestock NAMAs, including quantifying the social and economic impacts.

## SOIL CARBON FLAGSHIP

Jean-Francois Soussana, Lead Author of the Soil Carbon Flagship taskforce (and Co-chair of the Integrative Research Group) provided an overview of the Soil Carbon Flagship. This is focused on agricultural practices that sequester carbon and restore soil health. It links closely to the research program for the ['4 per 1000 Initiative: Soils for Food Security and Climate'](#) that was launched in December 2016, of which a number of GRA members are also involved. The flagship aims to deliver an online, collaborative knowledge hub, including:

- *A decision support toolbox*: e.g. maps of soil carbon sequestration (SCS) potential; implications of SCS practices for yields/drought tolerance etc
- *Enabling methods to certify SCS*: e.g. tiered methodologies for MRV of soil organic carbon; handbooks and guidelines
- *Creating an enabling environment for adopting solutions*: e.g. regional stakeholder workshops on SCS; criteria for sustainable SCS projects

The knowledge hub will help facilitate the development of national and regional SCS projects, with shared data, methods and models. It will help connect funders with projects, as well as linking with existing international initiatives on soil carbon, e.g. FAO Global Soils Partnership, LEAP, IPPS. A FONTAGRO/PROCISUR initiative introducing legumes to eight Latin American countries would also be connected.

A wide-ranging discussion followed, touching on the importance of livestock to the soil carbon cycle, issues of permanence and retention of soil carbon, the cycle of sequestration within silvo-pastoral systems, and the spatial variability in soil organic carbon stock maps. The flagship should address these points, as well as more clearly linking to work underway on carbon cycling and the soil

microbiome. In closing this session, the LRG was encouraged to actively engage in the Soil Carbon Flagship as it develops.

## **OTHER BUSINESS**

Hayden gave a brief update on the Secretariat's efforts to revive the Grasslands Network. This was transferred from the LRG to the Integrative Research Group early in 2016 but has faced ongoing challenges with attracting participation. Work is underway to identify possible activities for the network that would help drive membership. LRG delegates were encouraged to help identify people to get involved.

Uruguay promoted a Latin American animal agriculture and GHG emissions conference taking place 4-6 October 2017, with a deadline of 31 May for abstracts. See [www.conferenciagala2017.uy](http://www.conferenciagala2017.uy) for more information.

## **BRINGING IT BACK TOGETHER: CONCLUSIONS AND NEXT STEPS**

The Co-chairs wrapped up proceedings by summarising the meeting's main outcomes (see pages 1-2). This has been the biggest LRG gathering yet with just under 60 delegates attending from nearly 30 countries and eight partner organisations. Great energy and inspiration was shown in the meeting – the challenge now is to take that back to our home organisations and countries, helping them understand what happens in the LRG and why it is important.

Ho Chi Minh City, Vietnam was announced as the venue for the next LRG meeting, likely taking place in April or May 2018. More information will follow in due course. The LRG's 2019 meeting is likely to be held in the margins of the Greenhouse Gas & Animal Agriculture conference in Foz do Iguaçu, Brazil.

The Co-chairs also reflected on the valuable contribution of the LRG's networks, thanking the coordinators of the Animal Health; Animal Selection, Genetics and Genomics; Feed & Nutrition; Mediterranean Livestock; and Rumen Microbial Genomics networks for their attendance and input over the past two days. China's offer to take up the leadership of the Manure Management Network (pending internal consultations) was warmly welcomed. China will be supported in this role by the US and the Netherlands. The launch of a new regional network for Latin American and Caribbean countries was also welcomed, as was the Secretariat's announcement that it is reviving the Grasslands Network. Options are being explored for a new country to assume leadership of the Animal Health Network, a position the UK has had to step down from. LRG members are encouraged to step forward to assist.

In bringing the meeting to a close, the Co-chairs thanked the United States for their very generous hosting, enabling a highly productive LRG meeting.

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