GLOBAL RESEARCH ALLIANCE
ON AGRICULTURAL GREENHOUSE GASES

Livestock Research Group Meeting

Punta del Este, Uruguay

1-2 November 2012

Meeting Report

OVERVIEW

1 The fourth meeting of the Livestock Research Group (LRG) of the Global Research Alliance on Agricultural Greenhouse Gases ("the Alliance") was held in Punta del Este from 1-2 November, 2012 immediately following the Global Conference on Agricultural Research for Development (GCARD) 29 October – 1 November, 2012 (http://www.egfar.org/gcard-2012). The meeting was co-chaired by New Zealand (Dr Harry Clark, New Zealand Agricultural Greenhouse Gas Research Centre) and the Netherlands (Dr Martin Scholten, Wageningen UR) as the country co-chairs of the Livestock Research Group.

2 This report is a summary of key discussions, action points and outcomes from the meeting. Presentations are provided separately as PDFs.

PARTICIPANTS

3 The meeting was attended by 27 Alliance representatives (from 15 member countries and 3 organisations) and other invited guests:

- **Alliance Members attending:** Argentina, Canada, Colombia, Germany, Indonesia, Ireland, Japan, Mexico, The Netherlands, New Zealand, Switzerland, United Kingdom, United States of America, Uruguay, Vietnam.
- **Alliance Members unable to attend:** Australia, Brazil, Chile, China, Costa Rica, Denmark, Finland, France, Ghana, Italy, Korea, Malaysia, Norway, Peru, Philippines, Sweden, Thailand.
- **Observer countries unable to attend:** Pakistan, Russia, South Africa.
- **Invited Guests attending:** African Development Bank, Animal Taskforce, FONTAGRO, UN Food and Agriculture Organisation (FAO), World Bank.
- **Invited Guests unable to attend:** Asian Development Bank, European Commission, European Union Joint Programming Initiative on Food Security, Agriculture and Climate Change (FACCE-JPI), International Livestock Research Institute (ILRI), International Meat Secretariat (IMS), Climate Change, Agriculture and Food Security program (CCAFS), Sustainable Agriculture

Initiative platform (SAI), Tropical Agricultural Research and Higher Education Centre (CATIE), International Fund for Agricultural Development (IFAD), International Development Research Centre (IRDC).

MEETING OUTCOMES

4 The meeting achieved the following outcomes:

- Updates on relevant research activities underway in participating countries of the LRG.

- Review of activities since the last LRG meeting, 4-5 November 2011, (held in the Netherlands); collaborative research projects directly supporting the LRG are progressing and more projects have been initiated; best practice guidelines and technical manuals have been or are about to be completed; regional capability building workshops held in Asia and Africa with more planned around the world; successful start to multiple Research Networks; existing fellowships have been successful and further fellowships have been developed; a multi-country research call has been set up by the FACCE-JPI and members are encouraged to engage with their FACCE-JPI contacts on this call.

- A successful poster session was held that highlighted work from across a broad spectrum of activities including country overviews and systems approaches, specific research areas directed at mitigation, the research networks and their topic areas, and the good practice guidelines.

- Identification of additional future areas of focus for the LRG, with lead countries to coordinate, including:

    - Establishment of a network on Animal Health and scoping of another network on Grassland Management.

    - Further workshops with the aim to identify collaborative capability building projects in regions such as Central and Eastern Europe, Andean and Central America and South Asia.

    - Lead or contribute to additional guidelines on soil carbon stock, micrometeorological measurements and guidelines on measurement of emissions from manure in all stages of the manure chain.

    - Further work on the Greenfeed methane measurement system, development of a Biofilter to reduce methane from small-scale manure ponds, understanding risks in adopting mitigating practices, a farm manure management improvement program and decision-support models.

    - Research projects in collaboration with partners including Andean and Central America projects working collaboratively with FONTAGRO, and cooperation with the FAO in improvement, broadening and application of the Global Livestock Environmental Accounting Model (GLEAM).

- Further discussion with international organisations by the Co-Chairs on behalf of the LRG on projects where the LRG could add value. SAI/LRG workshop to be mentioned separately?

5 The Co-Chairs would like feedback on their performance. The Secretariat will run an anonymous feedback process. A call from the Secretariat will be sent out shortly.

6 The next LRG meeting will be held in Ireland following the Greenhouse Gases and Animal Agriculture (GGAA) conference. The LRG will meet on 28-29 June, while 27 June will be an opportunity for Research Networks to meet, including a meeting of network coordinators.

SUMMARY OF DISCUSSIONS

Thursday 1

OPENING REMARKS

7 On behalf of Uruguay, Walter Oyhantcabal welcomed the LRG to Punta del Este and later the Minister of Livestock, Agriculture and Fisheries, Tabare Aguerre officially welcomed participants and opened the fourth LRG meeting.

8 The Minister stated that he has a lot of expectations of the Global Research Alliance and believes that by having an environmental, social and economic focus it allows a holistic view of issues to be addressed. The Minister noted that Uruguay has a strong commitment to the Alliance and has dedicated many resources in support of the activities of the Alliance. He believes innovation is the key for success in the future but it needs to be addressed now. Ways to reduce the intensity of emissions that are also applicable to farmers must be found to successfully reduce agricultural emissions. Mitigation and adaption are two sides of same coin and work plans need to address the issue of developing more resilient systems while reducing their environmental impact.

9 The co-chairs thanked Uruguay for hosting the fourth LRG meeting. The co-chairs also noted that since the last meeting, Thailand had endorsed the Charter. Spain sent apologies but helpfully had transmitted an update of their activities to be provided later in the meeting.

10 The main objective of this meeting was to update the work plan to meet the objectives of the Alliance, with the remainder of the first day focused on reviewing the 2012 work plan, and the second day focused on developing an updated work plan for 2013.

REVIEWING THE 2012 WORKPLAN

11 The Co-Chairs briefly updated the activities of the LRG 2012 work plan:

Actions on the Stock take

- The first stocktake of research activities is now completed and the Group decided at the previous meeting not to repeat it on an annual basis. This action is therefore complete. Members had been invited and encouraged to get scientists to subscribe to the LEARN network to provide researcher-to-researcher contacts. New Zealand as host of the LEARN website and database questioned the effectiveness of the current arrangements and suggested that the future of the LEARN network and database would be revisited on day 2.

Actions to build Capability and Capacity (CC)

- CC1: Information on relevant training and fellowships that has been received by the Secretariat has been made available on the Alliance website. Members are urged to supply the Secretariat with updates and more information about country-specific training opportunities and fellowships that foster collaborative learning and scientific exchanges.

- CC2: LRG Regional capability building workshops for livestock systems in South-East Asia and Africa have been held in Bangkok and Nairobi. A further workshop on agricultural greenhouse gas inventories in general will be held in Accra 19 – 21 November 2012, led by the Inventories & Measurements Cross Cutting (I&M) Group and supported by the LRG.
- CC3 – CC5: Both the New Zealand funded LEARN Fellowships and United States of America funded Borlaug fellowships have been very successful. More applications are encouraged.
- CC6: Initial FONTAGRO capability building project is on-going. An update on this project was presented on day 2 of the meeting.
- CC7: The New Zealand Government is funding a pilot project to develop consistent livestock classification systems and identify priority areas for emissions research, building on the conclusions of the South-East Asia regional capability building workshop.

Actions on Information and Technology Transfer (IT)

- IT1: There was a delay in the start of the SF_6 good practice guidelines but this has now formally started, and should be completed in time for presentation at GGAA (June 2013). It is currently co-authored by nine countries.
- IT2: Writing of the good practice guide to N_2O chambers is now complete. There has been a slight delay in the publishing but it is expected to be finalised and published on the LRG website before the end of 2012.

Actions on Networks and Databases (ND)

- ND – general: detailed updates on the Networks were presented on the second day of the meeting. The Manure Management; Feed and Nutrition; Animal Selection, Genetics and Genomics; and Rumen Microbial Genomics Networks are all established and have recently held meetings. Several projects are underway as a result of these Networks. A proposal was also presented on establishing a research network on the links between animal health status and greenhouse gas emissions intensity on day 2 of the meeting.

Actions on Research Collaboration (RC)

- RC1: There was some delay in the low CH_4 emitting phenotype project due to the Post-Doctorate candidate withdrawing. A post-doc has now been employed and the project has started.
- RC2: There are in excess of 20 partners worldwide involved in the rumen microbial community diversity project, including substantial co-funding for genome sequencing by the Joint Genome Institute.
- RC3: A proposal for the establishment of an Animal Health and Greenhouse Gas (GHG) Network was presented to the LRG by the United Kingdom on the second day. Details of this are later in the report.
- RC4: A short overview of the joint research funding call between the FACCE-JPI and other countries was provided. Details of this are later in the report.
- RC5: Discussions on collaboration between the LRG and the EU AnimalCHANGE project have occurred. These included;

- Cled Thomas, leader of the extension work stream in AnimalCHANGE, attending the Nairobi capability development workshop, September 2012. The coordination of AnimalCHANGE and LRG with New Zealand and participating East African countries was discussed;
- A general meeting of the AnimalCHANGE extension workstream was held in Brussels, October 2012. The broad links between AnimalCHANGE and LRG capability and capacity building initiatives were discussed.

Actions on Policy Support (PS)

- PS1: The action on supporting the IPCC 5th Assessment Report has been overtaken by other events as the FAO has undertaken an extensive global review of mitigation options for the livestock sector. This current work by FAO was discussed on day 2 of the meeting. As a result, this item would be removed from the LRG work plan.

Items that had been completed during 2012 before the meeting

The co-chairs also noted that a number of work plan items had been completed during 2012:

- The technical manual on respiration chambers has been published on the LRG website. It was noted that this was intended as a 'living document' and countries with respiration chambers that are not currently listed in the manual were invited to contact New Zealand if they were interested in contributing their designs.
- The trial of the Greenfeed system for rapid measurement of CH_4 emissions from individual cows under New Zealand grazing conditions was completed. However, it was noted that other countries (Australia, UK) had also purchased units and that further trials in those countries were on-going. The New Zealand evaluation had also highlighted areas for potential improvement that would be tackled as a collaborative follow-up project.

UPDATE FROM THE SECRETARIAT

12 The Secretariat updated participants on developments in the Alliance since the LRG last met in November 2011 (refer separate PDF presentation). This concentrated on the outcomes of the Council meeting in Saskatoon, 5-8 June, and gave a brief overview of the improvements that the Secretariat have made to the Global Alliance website.

Council Meeting

13 Key outcomes of the Council meeting included:

- Canada takes over Council chairing responsibilities from New Zealand.
- Uruguay confirmed as vice-chair of Alliance Council.
- Brazil confirmed as co-chair of Croplands Research Group.
- New Zealand confirmed to continue as Alliance Secretariat.
- The Communications plan was agreed and adopted. Points in the adopted Communication policy that directly affect the Groups include:
  - External communication on behalf of a Group about Group activities will need to be approved by the Group by consensus of Members' nominated contact points. However,

Groups may decide to authorise Co-Chairs to communicate information above on its behalf.

  - A disclaimer needs to be used by Members communicating about activities of Groups that they participating in. The disclaimer can be found in the Communication Policy.

- There will be a teleconference every three months between the Council Chair, Vice-Chair, Secretariat and Group Co-Chairs to improve co-ordination between Groups and provide updates on Group activities.
- Once finalised, action plans of the Groups need to be made available to the Council.
- Six monthly and annual reporting to the Council using a common reporting template is required. The template will be developed with Group Co-Chairs and is based on the layout of the LRG workplan. It was pointed out that this should not be seen as a burden, rather it is a way for Council members to know what is going on in the Groups which, amongst other things, will help to mobilise research funding.
- Alliance Partners need to be integrated into the Groups' work, something the LRG is already doing.

Alliance Website

14 The Alliance Website has been updated to make it easier to use. Some of these updates include; multiple sub-pages for each Group, the ability to feature news and events, increased capability for downloading documents, further functionality to help navigate the website's pages, a new search function, and links to Alliance Partners and Networks. Refer to full presentation for further detail.

COUNTRY ACTIVITIES: ROUNDTABLE DISCUSSION

15 Members provided an update to the Group on relevant activities underway in their country.

16 **Argentina** is part of a FONTAGRO project (see update in second day) which is making good progress. Work in this project includes calibration of SF_6 and respiration chambers. They are assisted in this work by scientists from New Zealand. The Argentine International Beef Institute is Funding a project on measure methane emissions lead by UNICEN. They are interested in having international collaboration on this project to consult on the respiration chambers. They are looking for ways to get more engagement of farmers in the projects with GHG emission reduction.

17 **Canada** – As a result of Canada joining the Alliance the government developed a domestic funding programme of 20 million dollars for Canadian research at the industry and university level. This program aims to encourage farmers to adopt best management practices and extends/builds capacity of universities in GHG research. Also, Canada has on-going support to the GHG research conducted at Agriculture and Agri-Food Canada's research centres across the country. There is multi-scale measurement capability in Canada. They have also devoted a lot of time to modelling the systems impacts of mitigation interventions to ensure the total footprint is reduced on-farm. For this, they have developed the Holos model, which uses country specific emissions factors, and are working closely with Norway on the development of a Norwegian version of the model. They are approaching the end of the 5 year cycle of funding, but the recently announced new funding program is expected to emphasize environment and GHGs, as well as international cooperation. Canada is very interested in the Feed and Nutrition Network because a third of the country's agricultural GHGs

comes from enteric methane and ruminant diets are highly managed so there is opportunity to reduce emissions through nutrition. Coordination with respect to GHG research and technology issues has improved in Canada recently and in part due to the Alliance membership. Canada is an active participant in the Ghana I&M workshop. While there is no formal scholarship program for international students to study GHG issues in Canada, there is significant ad-hoc training of students from all over the world.

18 **Colombia** – need to know how the sharing of DNA and microbes in the rumen microbiology network is conducted so that Colombia's involvement can be determined (national biodiversity law). They are trying to involve more Universities from Colombia in the work of the Alliance and linking to National Institutes. This will help to capture the diversity of systems in Colombia. The National Government is funding work on GHGs involving farmers and different ecosystems. Columbia is trying to have a common technique in place in all institutions in order to determine what is happening across different systems. Their new 5 year project plan will include all institutes. They currently use a Tier 1 inventory approach, but are trying to get real estimates in the future. Columbia would like to participate in all of the networks of the LRG. They also want to learn more about modelling as there is not currently a lot of work in Colombia on this area, particularly in grazing systems.

19 **Germany** is currently researching manipulating the diets of dairy cattle to check the impact this has on methane emissions. There is an Innovation programme in Germany with Federal funding to continue work on GHGs. An initiative across Germany, the "protein initiative", which involves Federal Government and States, could be linked to the nitrogen potential work of the United Kingdom. Germany is working on updating values of different feeds in terms of varieties and location of production. Also, under the general topic of more efficient utilisation of nutrients, there is a lot of work that is very relevant to the LRG. Germany noted the need for improved coordination between its Government, Institutes and Universities.

20 **Indonesia** reported on three main areas. 1) Recent activities that directly support or are strongly aligned with the goals of the LRG. These include: Updating the data inventory system for livestock (this was last done 5 years ago); mitigation of methane produced in the rumen by using probiotics, secondary compounds and legumes to provide a balance of nutrients in a complete feed; building of respiration chamber facilities for enteric methane emission measurement in Research Institutions and Universities, for example cattle respiration chambers are being built in the Indonesian Research Institution for Animal production. 2) Restructuring? the domestic funding system to enable better coordination of research projects. The Ministry of Agriculture through the Indonesian Agency of Agricultural Research and Development (IAARD) are providing financial support for some projects developed in some Research Institutes; The Ministry of Research and Technology are financially supporting some projects developed in some Universities and Research Institutes. 3) Specific projects that Indonesia is involved in. These include: A preliminary project funded by the New Zealand Government on the inventory data of livestock system to estimate the contribution of methane from livestock in Indonesia, Thailand, Malaysia and Viet Nam; A project on selecting and identifying rumen microbes than can reduce methane production in the rumen of animals fed by-products of palm oil approved by the Indonesian Government and funding by IAARD; A project on identifying characteristics of some feed sources (grass, legume, agricultural by-products, by-products of plantations) in relation to their nutrient content, digestibility, animal response and methane production is still currently seeking funding.

21 **Ireland** – The Irish Ministry of Agriculture has developed three new initiatives. The first is a program that integrates all programs into one of three areas - N_2O emissions, carbon sequestration

in grasslands, and modelling of the first two parts in order to move to a Tier 3 system. The second initiative is the GIANT program initiative. It is open to all Alliance members. The third initiative encourages farmers to engage in GHG initiatives with a decision support system. The first stage of this is an on line assessment of GHG (beef) to help them chart a way forward. A Dairy farmer equivalent will be released next year. The on-line assessment identifies six technologies that would help reduce GHG on farm and also increase profitability.

22 **Japan** provided a summary of some research projects funded by MAFF (see presentation attached separately for further details). These include mitigation of rumen methane production from dairy cattle, precision measurement of the greenhouse gas in livestock waste treatment process, respiration Chamber and Tracer method, GHGs from livestock and paddy field, research into Biological Nitrification inhibitors, the use of eco-feed, and capacity building work on Greenhouse Gases and Sustainable Agriculture in Southeast Asia.

23 **Mexico** recently put in place a new law on Climate Change that regulates activities. It focuses on mitigation and adaptation. In the research area Mexico has a rumen project involving different researchers within Mexico from tropical to temperate climates with a special focus of effects of grassland quality on GHG emissions. Also a microbiology project that is looking at isolating bacteria that produces GHG emissions, in collaboration with INRA in France. This project focuses on isolating methane bacteria in order to later develop an inoculum. Mexico is currently developing a technique to measure methane GHG and would be appreciative of any assistance that other countries may be able to give. Special attention was also asked for the economic viability of fermentation of manure.

24 **The Netherlands** provided a hand-out on their activities (for further details please refer to this pdf attached). In summary, the Netherlands leads the Manure Management Network and is carrying out research in support of this. They also have various research programs in the areas of Animal Nutrition, Genetics and Genomics, and System Integration and on-farm application. The Manure Management Network is an area where the Netherlands would like to encourage international collaboration. A Manure Management Improvement Program is being developed jointly with the FAO Livestock Dialogue. Two areas in particular were identified in this program , the Manure Kiosk and pilot projects. Further details on the Manure Management Network where presented later. It was noted that there were no international restrictions to collaborate, the more countries that were involved in specific projects the better.

25 **New Zealand** co-chairs the LRG and provides support and funding for two of the four current research networks. Four new research projects will be funded from the first round of the New Zealand Fund for Global Partnerships and projects on a preliminary investigation of the C-Lock system, the N_2O chambers best practice manual, and the technical manual for respiration chambers are now complete. Two further targeted projects are planed; further work on the C-Lock system in collaboration with the United Kingdom and Australia, and a methane bio-filter in collaboration with Canada. New Zealand is also interested in funding a number of additional projects that are detailed later in the report and is seeking feedback from other interested countries. New Zealand organised on behalf of the LRG and participated in regional capability building workshops and projects have been organised in Latin America, South East Asia, Africa (Nairobi) and a workshop in Accra. The I&M Group contributed to those workshops and co-hosted the Accra workshop.

26 **Spain** - In the nutrition area, there are around 5 institutions working on the effect of using different rations as well as nutritional additives on methane emissions by ruminants. A significant effort is also put on the microbial processes occurring in the rumen and the potential means of manipulation. Methane chambers and modelling are the methods of use. Around 6 more

institutions focus their research on manure management, mostly in pig production, but also in ruminants. In pigs research groups work on monitoring the evolution of physical-chemical composition and GHG emissions during outdoor storage conditions and the optimization of methane emissions in digestion fermenters. In ruminants, the effect of protein rationing on N inefficiency and in turn N_2O emissions represents the main research interest in northern Spain. Modelling GHG emissions from livestock at farm level and full life cycle analysis are also emerging activities within the Spanish research community. The problem faced within the Spanish system is the lack of a national program/network to coordinate all the research activities focusing on mitigation strategies in the livestock sector. To try to fill this gap a new network called REMEDIA has been created, which covers over 60 research groups working on mitigation strategies in agriculture and livestock activities (www.remedia.org). The first workshop was held last April and a second one will be held next year, which hopefully will strength the collaboration and capacity building activities in Spain. Spain will report on this second workshop at the next LRG meeting in Dublin (GGAA 2013).

27 **Switzerland** leads the Feed and Nutrition Network, is an active member of the Manure Management Network and is very interested in the proposed Animal Health Network. Switzerland has been actively involved in the technical manual for respiration chambers, and research in the production/reduction? of ammonia and GHG from manure management, and optimal field and barn management systems; the measurement of nitrous oxide in croplands and pasture, and the effects of grazing intensity in different environments. Switzerland sees further opportunities for collaboration in agricultural GHG mitigation research.

28 The **United Kingdom** is engaged across many activities which are listed in LRG work plan. Recently they have contracted ADAS to coordinate activities in this area and they have found having a central coordination point very useful. The United Kingdom's major platform (fund) in this area totals £12.6 million. The United Kingdom has been instrumental in developing the proposal on the Animal Health Network (discussed later). It is a major challenge globally and no single country can tackle it by themselves. The United Kingdom has also contracted University of Reading (£3.5 million) to research protein intake in dairy cattle over three consecutive lactations. This project is also linked to the Feed and Nutrition network.

29 The **United States of America** informed the LRG that Animal GRACENET has now been organised. The United States of America has also developed information for producers in order to help them reduce their emissions. These include: Poultry production – in house environment, how to manage emissions and banding poultry litter beneath the soil surface; Swine – intestinal ecology based on animal diet, enterprise waste treatment systems, calibration of techniques to measure emissions off lagoons, and how to measure microbial communities in lagoons; Dairy – feeding of animals including the addition of tannins, manure management; and Beef - using respiration chambers to assess the feed impacts on production efficiency.

30 **Uruguay** is part of a FONTAGRO project (see update in second day) which is making good progress. Two bids related to this project are: a capacity building bid to CYTED with Argentina, and a technical research equipment bid with the University of Queensland to acquire the automatic N_2O measurement chamber system developed by the University. A project with New Zealand has also been approved that focuses on improving profitability and viability of Uruguayan small farm holders without compromising the environment. A PhD student is working in Australia on the Greenfeed C-Lock system. Other activities include: seminars and workshops through the recently opened Centre for Climate Change and Variability, hosting a United States of America Borlaug fellow, a publication on enteric methane quantification using the first methane emission measurements from Uruguay, a

presentation of the carbon footprint for Uruguayan dairy systems, and work on beef carbon footprints under different production systems. New domestic funding opportunities includes a $ 4M fund for promoting agricultural technology open to both international and national research institutes (http://www,inia.org.uy/online/site/1066774l1.php). Also a fund on strengthening human capacity that includes Post-Doctoral fellowships in Uruguay and short stays for visiting scientists and technicians,

31 **Vietnam** currently has a project with three areas. These areas are; Capacity building for students to be trained by other organisations, Seminars on improving the public knowledge on what GHG in Agriculture is, and has some projects supported by the Netherlands, Denmark, European Union and New Zealand. Currently there is limited work but hopefully from next year it will increase. This year a new initiative started where the Vietnam Government supports one Post Doctorate each year for a student in Hanoi.

32 **General discussion –** There was a general discussion on how countries coordinated their Alliance activities. Some countries contract a central organisation to coordinate their work and have found it very efficient. Large countries that do not do this noted that coordination was a problem. However smaller countries found informal coordination was efficient although in these countries there were relatively small number of people involved in the work. The Co-Chairs pointed out that they have regular contact with the Council so feedback may be able to be given to the Council that may help if there are issues with countries internal communication.

33 A key area that stood out from the member updates was that the breadth and number of activities is large and growing. However, there is commonality between members for example; nitrogen efficiencies, effects of feed and grassland composition, manure management etc. The commonality between members demonstrates the importance of research networks and highlights how useful it is for scientists from member countries to join the Networks.

OVERVIEW OF POSTERS PRESENTED AT THE LRG MEETING

34 This session was an opportunity to showcase and discuss the research activities that are relevant to the goals of the LRG. All posters can be downloaded from the Alliance website.

FRIDAY 2 NOVEMBER

RESEARCH NETWORKS AND DATABASES

35 The second day of the meeting started with an update on the progress of the respective Networks including their activities, network members and opportunities for further collaborations. A proposal on a fifth network on “Animal Health and Greenhouse Gas Emissions Intensity” was also presented. Anybody that is interested in joining any of the groups should contact the Network coordinators. All presentations are provided separately.

36 Industry participation is important in all of the Networks and a key role for the Networks is to be a link between countries and industries. It was suggested that Networks and Groups should remember that when they are determining which organisations to invite, the most beneficial will be the umbrella global organisations, not necessarily individual companies. This will also help avoid competitiveness between companies.

Rumen Microbial Genomics Network

37 Harry Clark presented an update on the Rumen Microbial Genomics Network (RMGN) on behalf of the Network coordinators. The Network currently has financial assistance from the New Zealand Government and has 175 members from 29 countries. The latest meeting was held in France in June 2012.

38 The Networks key goals are:

- Enhanced communication and collaboration between research groups
- Improved ability to attract funding with integrated, international studies
- Streamline future RMGN research to prevent duplication
- Training – exchange of students, technicians, staff
- Accelerated access to protocols, cultures, primer sets and facilitate sharing of knowledge and technologies

39 It was noted that if countries not currently involved in the sequencing project, but would like to be, and they have any samples that they would like to contribute, to please contact the Network coordinator Adrian Cookson (rmg.network@agresearch.co.nz).

Animal Selection, Genetics and Genomics Network

40 Harry Clark also presented on behalf of the Animal Selection, Genetics and Genomics Network (ASGGN) coordinators. The Network has financial assistance from the organisations that support the Australian coordinator and the New Zealand Government which pays for a secretariat to work on the Network. There are currently 151 members from 27 countries and meetings are organised around existing meetings to aid in travel.

41 The Network's key goal is to align international research efforts for animal breeding solutions to reduce enteric methane emissions from livestock. This is achieved through:

- an international community and forum for collaboration
- linkage with the aspirations of the Alliance/LRG
- growth to include researchers in all countries
- establish a succession plan for the network to continue

42 Members should contact Network coordinators Hutton Oddy (hutton.oddy@dpi.nsw.gov.au) or Grant Shackell (grant.shackell@agresearch.co.nz) if they are interested in being part of the Network.

Feed and Nutrition Network

43 Johanna Zeitz (johanna.zeitz@inw.agrl.ethz.ch) presented to the LRG on behalf of the Feed and Nutrition Network (FNN). The Network has decided to change its name slightly from the original proposed by removing "database". Fourteen of the 23 interested countries attended this first meeting in Switzerland in September of this year.

44 The goals of the Network are to:

- Summarize and evaluate the available data on mitigating GHG emissions of ruminants by nutritional means

- Developing sound recommendations for stakeholders on CH_4 mitigation by nutrition
- Identifying gaps in knowledge, avoid duplication in research and focus research on priority issues

45 During the question time it was noted that feed and nutrition was identified as being a common interest among countries during the round table on day 1, therefore it is hoped that countries will be able mobilise funds for participants to attend the FNN meetings.

46 The idea of a database on feeds and their influences on GHG emissions was discussed. This was endorsed by the Group but the need of a sustainable owner was stressed.

47 The discussion also noted that rather than the Network scaling back its ambition to match currently available funding, it should generate an ambitious vision in the expectation that appropriate funding and participation could be generated once countries and organisations see the value that the network can provide.

Manure Management Network

48 Paul Vriesekoop presented on behalf of the Manure Management Network (MMN). Their first meeting was held in Rome in September 2012 with 19 participants from 12 countries attending. The Network is Co-coordinated by La van Kinh from Vietnam and Paul Vriesekoop from the Netherlands with limited funding also supplied by the Netherlands.

49 Network goals for the coming year include:

- Develop a best practice guide to measure emissions from manure in all stages of the manure chain (start with project description lead by Matt Smith, United States of America).
- Make a position paper and leaflet to be used for external communication dealing with goals, role, position/boundaries etc. (start with set up by Theun Vellinga, the Netherlands).
- Create a concise list of practical mitigation options for farmers and policy showing best practices of mitigation options (start with set up by Dave Chadwick, United Kingdom)

50 A new program, the Manure Management Improvement Program (MMIP) (see separate handout), was also presented on. This program consists of a Manure Kiosk database and regional pilot projects. The MMN organisers have requested feedback on the draft MMIP, and encourage people to join both the MMN and the MMIP. Please send feed back to Theun Vellinga (theun.vellinga@wur.nl) the new Netherlands co- coordinator of MMN.

Animal Health Network Proposal

51 The idea for a network on the links between animal health status and greenhouse gas emissions intensity was originally proposed at the LRG meeting in Amsterdam, November 2011. A short presentation was given by the United Kingdom outlining the rationale and proposed scope for this network, and then the floor was opened for discussion.

52 A scoping workshop was held in Bangkok in the margins of a STAR-IDAZ Global Network – "Global Strategic Alliances for the Coordination of Research on the Major Infectious Diseases of Animals and Zoonoses" meeting. The main conclusion of the workshop was that a well-scoped and well-connected network would be of considerable value.

53 The United Kingdom has offered to co-ordinate the Network with any other interested countries. They have a lot of animal health experience and would welcome a second coordinator to ensure perspectives from developing countries, where the largest co-benefits between improving

animal health status and reduced emissions intensity are expected, would be well captured. Interested countries should contact Luke Dalton (luke.dalton@defra.gsi.gov.uk) or Pinder Gill (Pinder.Gill@defra.gsi.gov.uk).

54 The Group suggested that the Network try not to do everything at once, but to try and focus on certain areas. However, the Network does need to look at the holistic approach and not just investigate animal disease to capture co-benefits with broader development goals and improving resilience and farmer livelihoods. It would also be good for the Network to have members from multi disciplines that represent broader perspectives on animal health status and production diseases, i.e. not just veterinarians. Inclusion of the FAO and ILRI are also important in the holistic approach.

55 The LRG fully endorsed the formation of the Animal Health Network.

TECHNICAL INFORMATION AND KNOWLEDGE

56 This session was a chance to discuss the progress of the guidelines and manuals, potential work emerging from the Networks and LRG endorsed projects, and links with other Groups.

57 Prior to the meeting, New Zealand distributed to all members documentation on potential emerging work asking for feedback from members on if they felt it was a priority work area. This included two other good practice guides; micrometeorological measurements, and soil carbon stock measurements. Many countries were interested, but it was felt that both should have a holistic approach and therefore it was important to talk to the other groups and possibly be led by other Groups, for example the I&M Group. Once feedback from all of the Groups has been obtained it will then be determined the best Group to lead such projects.

58 The question of grassland management and where it is being looked at was also discussed. It was proposed that a scoping paper for setting up a dedicated research network on Grasslands be developed. Ireland, New Zealand, the United States and Uruguay agreed to collaborate on this.

59 Modelling of GHG intensity and what metric/unit should be used was discussed. It was felt that this concept should also be passed onto the I&M Group since it is a valuable discussion as applies to all areas.

CAPABILITY BUILDING

South East Asian workshops

60 An initial scoping workshop, organised by New Zealand on behalf of the LRG, was held in South East Asia (Bangkok) in March 2012. The workshop was supported by scientists from a range of LRG member countries (Australia, Canada, the Netherlands, and the United Kingdom) and international organisations (CGIAR, FAO, ILRI, and IPCC). Four activities that would help build regional capacity and advance knowledge on emissions and mitigation options were identified. Concept notes that summarise the goals, benefits, existing capacity, relevant institutions and individuals, and critical capacity and support needs in each country and collectively in the region were developed for each activity. The areas identified and the lead countries for preparing concept notes on these activities are:

- Inventories - Thailand

- Mitigation (feed systems) - Indonesia
- Mitigation (feed additives) - Malaysia
- Mitigation (manure) - Vietnam

61 Based on the concept notes, an initial project (stage one of an anticipated much larger project) was identified to develop a full understanding of livestock systems in South East Asia and use this to identify priority areas for improving the quantification and mitigation of non-CO_2 GHG emissions. This proposal was detailed at a workshop in Vietnam (Hanoi) in September. The New Zealand Government has subsequently agreed to fund this pilot project. The outcomes from this pilot project are intended to serve as input to a much larger potential project to identify and develop region-specific mitigation options.

Latin America – FONTAGRO

62 A summary of the project on climate change and beef cattle production that is jointly funded by FONTAGRO and the New Zealand Government was given.

63 Participating countries include: Argentina, Chile, Colombia, Dominican Republic and Uruguay. Uruguay leads the coordination of the project. New Zealand also provides the expertise of scientists to aid this project. The aim of the project is to align all five countries using same the methodologies and develop country specific emission factors.

64 The project started at the end of 2011 and is progressing well. A Colombian student is working in Uruguay and a student from the Dominican Republic has been in Chile. Technicians from this project will also be attending a methane measurement workshop in New Zealand in January 2013. Argentina and Uruguay have already bought Gas Chromatographers set up for GHG analysis. Actual measurements will start next March. A website is being developed that should be completed by the end of the year and will be linked to Alliance website.

Africa - Nairobi

65 A regional capability building workshop was held in Nairobi in September, co-funded by New Zealand, CGIAR-CCAFS and ILRI as the host organisation. The workshop was supported by scientists from a range of LRG member countries (Australia, Germany, Ireland, New Zealand and the United Kingdom) and international organisations (CGIAR, EAAP, ILRI). Ten African countries (Burkina Faso, Ethiopia, Ghana, Kenya, Mali, Niger, Senegal, South Africa, Tanzania, and Uganda) attended with participants ranging from policy makers to scientists.

66 This initial African workshop was to gauge interest in GHG emissions from livestock systems and to increase interest in the Alliance. It was also used to gauge what work is needed in those countries. The main interest in mitigation was related to improved efficiencies in production.

67 There was strong interest in sourcing equipment for GHG measurements. The key focus of the countries was on inventories as they recognise that there are gaps that need to be investigated.

68 Key outcomes of the workshop included:

- A working group to continue to improve coordination between countries.
- Identifying available training and training opportunities; Ethiopia and South Africa expressed interest in the LEARN scholarships, and a need for training courses on methane measurements was identified.
- Two countries expressed their interest in joining the Alliance.

Africa - Accra

69 A regional capability building workshop will be held in Accra, Ghana, 19-21 November, addressing agricultural GHG emissions and mitigation options from different sectors. This workshop is jointly hosted by the I&M and LRG Groups with funding from Canada, France, the Netherlands and New Zealand. It will be supported by scientists from a range of LRG member countries (Australia, Canada, Ghana, the Netherlands, New Zealand, the Philippines, and Uruguay) and international organisations (The Inter-professional Technical Centre for Studies on Air Pollution (CITEPA), CGIAR, International Institute of Tropical Agriculture (IITA), FAO). Its focus is similar to other capability building workshops, but encompasses all agricultural emissions, not just those from livestock.

70 The group discussed options and opportunities for further capability building workshops in other regions. Next key opportunities were identified in Central and Eastern Europe and Central America and the Caribbean, and also in south Asia. New Zealand agreed to continue to lead capability building activities on behalf of the LRG and to pursue those opportunities.

The LEARN Network

71 New Zealand noted that membership of the current LEARN network (website and database) had increased and now covered almost 200 scientists from 35 countries, but its utility appeared to be limited, with no obvious discussions or exchange of information taking place within the network. New Zealand therefore requested feedback from LRG Members on the future of the LEARN Network – whether members felt that there was still a role to be played by the Network, if it should be discontinued, or if further resources should be invested into the Network to increase the benefit of being a Member of it. If further work was to be put into the Network, New Zealand would like to gauge the interest of others in helping with this.

72 As the Network is separate from the LEARN and GRASS awards, the outcome on the future of the Network does not influence these awards.

73 New Zealand will develop a document setting out the issues and options for the future of the LEARN network for further discussion by the LRG. Members are to get back to New Zealand by the end of the year with suggestions and opinions on this issue.

LINKS TO POLICY AND INTERNATIONAL INITIATIVES

74 Representatives from international organisations were invited to present to the LRG on specific linkages and opportunities for collaboration between their work programmes and that of the LRG. All presentations are provided separately.

United Nations Food and Agriculture Organisation (FAO)

75 Ben Henderson from the FAO provided a description of the Global Livestock Environmental Accounting Model (GLEAM). Areas of this model that relate to the LRG include manure deposition on pasture, direct and indirect N_2O form stored manure, methane emissions from stored manure, and methane from enteric fermentation from ruminants and pigs.

76 Preliminary analysis of results has identified entry points for mitigation including:

- Ruminants: digestibility of diets, milk yield, manure management, land use change.
- Monogastrics: diet balancing sourcing, feed conversion ratio, feed production and sourcing, manure management.

77 Using GLEAM as the basic model and database for this work, FAO proposes to lead an effort together with the LRG to help quantify mitigation potentials at species, systems & Agro-Ecological Zone level. FAO would rely on the LRG for information of emission factors & characterization of mitigation strategies appropriate at a country level.

78 Suggested priorities for the future improvement of the model are: better quantification of emissions and of mitigation options, more use of Croplands models and attention to water use efficiency.

79 There was strong support from the LRG to work closely with FAO on this. Further discussions between LRG Co-Chairs and the FAO will investigate details of how to work together on this and LRG Co-Chairs will report back to the Group.

African Development Bank (AFDB)

80 Bouchaib Boulanouar from the AFDB presented to the LRG on AFDB efforts in developing a GHG accounting system.

81 The Bank has started developing accounting systems to assist Regional Member Countries (RMCs) adopt GHG emission accounting systems. The LRG can play a role, in both the design of accounting of these systems, capacity building and technical solutions to reduce GHG. However, firstly:

- A better understanding of the major production systems and their needs in terms of knowledge and capacity building is needed.
- Capitalise / develop a portfolio of applicable / realistic innovations and technologies to mitigate livestock gas emissions.
- Keep tuned to the ongoing exercise in the International Finance Institutions, countries and regional bodies regarding the subject matter and develop a good understanding for their specificities and constraints.

82 Food security is very important to the Bank. Research activities that have a clear link with food security are more likely to be supported. However, he noted that the Bank was currently considering its position with regard to the importance of GHG emissions and mitigation objectives in its funding priorities.

FONTAGRO

83 Hugo Li Pun, Executive Secretary of FONTAGRO (Regional Fund for Agricultural Technology) provided the LRG an overview of FONTAGRO and the Inter-American Development bank (IDB), including some example projects that have been funded by FONTAGRO. Member countries of FONTAGRO include Argentina, Bolivia, Colombia, Costa Rica, Chile, Ecuador, Spain, Honduras, Nicaragua, Panama, Paraguay, Peru, Dominican Republic, Uruguay and Venezuela.

84 He noted that FONTAGRO saw reducing GHG emissions (intensity) as a key part of its priority funding areas. Currently there are two further projects that FONTAGRO is interested in investing in to expand the initiative that was started by New Zealand (see Latin America FONTAGRO project details previously). Both projects are at the early concept development stage. New Zealand and Canada indicated an interest in being involved in these. Other interested Members should contact Hugo Li Pun.

FAACE-JPI Multicounty research funding call

85 The FACCE-JPI addresses research themes within the scope of food security, agriculture and climate change, one being mitigation. There has been strong interest from member countries of the FACCE-JPI in a multicounty research call focusing on agricultural mitigation as a way to mobilise resources.

86 A memorandum of Understand (MoU) has been developed for a pilot multi-country research call addressing this mitigation theme. Countries can either be JPI or non-JPI countries and can make cash or in-kind contributions towards a "virtual common pot" of resources.

87 Countries that have currently indicated their interest include; Belgium, Switzerland, Cyprus, Germany, Spain, Finland, France, Ireland, Israel, Romania, Italy, the United Kingdom, New Zealand, the United States, and Canada.

88 LRG members interested in this are encouraged to talk to colleagues involved in the FACCE-JPI for more information. Members who are involved are encouraged to promote LRG priorities to be advanced through this call. Members are also encouraged to discuss with their FACCE-JPI colleagues how funding might help countries outside those already in the call, therefore aligning with other Alliance objectives, including capability development.

89 The LRG Co-Chairs will keep the Group up to date on this initiative.

Sustainable Agriculture Initiative (SAI)

90 Unfortunately the SAI was unable to attend the meeting. However, the SAI are very interested in identifying areas in which it can work with the LRG and so sent a proposal for the Group to consider.

91 The SAI is keen to explore further opportunities for accelerating research and supporting global implementation of technologies and farming practices that can reduce emissions intensity of livestock production across a diversity of production systems and geographies. To progress this engagement, SAI proposed a joint LRG-SAI workshop, involving suitable experts and institutions, to:

- Take stock of current knowledge and research programmes in LRG member countries and SAI industry members, focusing on new technologies and improving existing practices to reduce the emissions intensity of CH_4 and N_2O from livestock systems
- Identify opportunities for enhanced collaboration between the research community represented by LRG member countries and industry (commercial marketplace) experts in SAI members that would accelerate the discovery and/or testing of mitigation approaches, and/or support the dissemination of known technologies and practices throughout the supply chain
- Prioritise areas where a collaborative and shared approach between LRG and SAI members could most accelerate the discovery, testing and dissemination of mitigation options, recognising the potential for regionally different approaches and priorities.

92 The LRG fully endorsed the holding of such a workshop and agreed that the LRG Co-chairs should discuss next steps to organising such a workshop with representatives from SAI.

Other ideas to provide policy support

93 Members discussed the desire by governments to demonstrate practical on-farm mitigation options and engage with farmers. The discussion noted that given the diversity of farm systems and

regulatory environments, it would be very difficult for the group to undertake coordinated action, as most countries struggle with this even within their national borders.

94 The group agreed that the LRG newsletter, compiled by the co-chairs on a quarterly basis, provided an excellent vehicle to showcase country-specific approaches and to share success stories as well as challenges in engaging with farmers. It was suggested that there should be a routine effort to showcase country-specific experiences.

95 The group also agreed to devote a dedicated space at its next meeting for countries to discuss their experiences and consider any further actions to support engagement with farmers.

96 Research networks were interested in how they could contribute to the current 5th Assessment Report being prepared by the Intergovernmental Panel on Climate Change (IPCC). Scientists who are currently serving on the IPCC outlined key ways of engaging and agreed to circulate this information to all members.

SUMMARY OF MEETING

97 This section summarises the work that is planned under the 2013 LRG work plan.

Stocktake and inventories

- New Zealand will circulate issues and options for the future of the LEARN network, for feedback from LRG member countries (including offers of support if increased activities for the LEARN are seen as important and valuable).

Capability Development

- Andean and Central America – scoping workshop for additional capability building projects planned with FONTAGRO, New Zealand, Canada, CATIE, IICA and possibly others. Any other countries interested should contact Hugo Li Pun of FONTAGRO.
- Central and Eastern Europe – New Zealand will aim to organise a work shop in the second half of 2013. The workshop would be in the same vein as those already held in South-East Asia and Africa. Countries interested in participating in and supporting the workshop should contact New Zealand.
- South-East Asia – New Zealand and Japan to coordinate their efforts in this area to ensure existing capability building initiatives are well aligned.
- Latin America – Current project underway with FONTAGRO and New Zealand.
- South Asia - New Zealand is considering holding a capability development workshop in South Asia. This would be similar to that held in South-East Asia but is still currently in the concept stage. Countries with relevant contacts, and/or interested in participating in and supporting the workshop, should contact New Zealand.
- Africa – Along with follow up on the workshops in Nairobi and Accra, a technician training course in methane measurements has been identified as a need. New Zealand and ILRI are developing this concept further.

Technology Transfer

- The SF_6 best practice manual is now being written; countries with relevant experts wishing to contribute as contributing authors or reviewers should contact the Secretariat as soon as possible.
- Countries with respiration chambers wishing to add their designs to the current technical manual should contact New Zealand for information on how to contribute.
- Good practice guidelines on Soil carbon measurement and Micro-Met guidelines have been identified as being potentially important to the LRG. However, these both need to be discussed with other Research Groups as these issues are relevant to more than one Group. Support from the other Groups would also be required, or the scope of the work modified to be applicable to the LRG. MMN has taken the initiative to develop a best practice guide to measure emissions from manure in all stages of the manure chain.

Research Networks

- The Animal Health and GHG Network – the LRG endorsed the set-up of this Network. The United Kingdom are happy to co-ordinate this Network, but would like another Member to join them in this role. Interested Members should contact Luke Dalton (luke.dalton@defra.gsi.gov.uk) or Pinder Gill (Pinder.Gill@defra.gsi.gov.uk). A call to participate in this Network will go out in the next 6 months (early 2013).
- Feed and Nutrition Network – the LRG discussed the proposed objectives for this Network and suggested that the scope needs to be more specific and industry needs to become involved. This will help encourage more Members to participate in the Network. The idea of a database on feeds and their influences on GHG emissions was fully endorsed by the LRG.
- Rumen Microbial Genomics Network – any countries not currently involved in the sequencing project but would like to be please contact the Network Coordinators (rmg.network@agresearch.co.nz)
- Manure Management Network – work planned for 2013:

  - Make a position paper and leaflet to be used for external communication dealing with goals, role, position/boundaries etc.
  - Make a concise list on practical mitigation options for farmers and policy; a kind of user guide ; showing best practices of mitigation options.
- Animal Selection, Genetics and Genomics Network – for a description of on-going activities and opportunities to become involved, please see www.asggn.org.
- New Network proposal: Grassland Management Network – Uruguay, New Zealand, Ireland, and the United States of America all expressed an interest in developing a scoping paper for discussion at the next LRG meeting in June 2013. Other LRG Members are welcome to participate in this.

Research Collaborations

- FACCE-JPI multicounty research call – any projects identified by the LRG or its Networks as being priorities should be fed back to Members' JPI contacts so they can be incorporated into this research call. LRG Co-Chairs will keep the LRG updated.

- LRG newsletter – it was identified as a useful vehicle to make announcements when a research call is being launched.
- Manure Management Network – A new joint program is being developed. Members to provide any feedback on the Manure Management Improvement Programme they may have to Network coordinators (theun.vellinga@wur.nl).
- Several new projects were added to the LRG work plan, which are at various stages of concept development and implementation:
    - Four projects agreed for funding during 2012 under the New Zealand Fund for Global Partnerships in Livestock Emissions Research (deep sequencing rumen microbiome; accelerated discovery of methane-specific inhibitors; methane vaccine development: production of antibodies; provision of the nitrification inhibitor DCD via feed)
    - Further evaluation and improvement of the C-Lock system involving New Zealand, the United Kingdom and Australia
    - Development of a biofilter to mitigate methane emissions from small manure ponds, involving New Zealand and Canada, in liaison with the LRG Manure Management Network
    - Model that explores the feasibility of using predicted soil water status to help mitigate N_2O emissions from grazing lands. Interested countries are Australia, Ireland New Zealand and the United Kingdom,. New Zealand to pursue the scope of this project with other countries
    - Project on identifying barriers to the adoption of low-cost mitigation options. Interest expressed by Australia, the Netherlands, New Zealand, and the United Kingdom, and. New Zealand to lead a scoping exercise with other countries to determine future steps.
- Animal Task Force – the Task Force is currently discussing the research priorities that they will suggest to be included as part of the EU Horizon 2020 research framework. The Netherlands will seek feedback on ideas for this.

Policy Support and Links with International Organisations

- IPCC 5th assessment report - Members of the LRG can be part of this through the open expert review mechanism. Any individual can register as a reviewer but the review comments can reflect a collaborative effort between individuals of any LRG Network or the Group. New Zealand will circulate an email with guidance on how to go about this, including the key deadlines for the IPCC review process.
- SAI workshop – LRG Co-Chairs will engage with representatives of SAI and organise a meeting with SAI to plan for a workshop before the next LRG meeting.
- FAO GLEAM model – the Group supports the idea to work closely with the FAO on developing this model further. LRG Co-Chairs will discuss with the FAO how to proceed and report back to the Group.
- Continued showcasing of country-specific experiences with engaging with farmers and demonstrating on-farm mitigation options.

- At the next LRG meeting the Group agreed to discuss how Members are engaging with farmers in their countries and share experiences of what does and doesn't work.

NEXT MEETING / CLOSING REMARKS

98 Members are encouraged to indicate those research activities where they have an interest, even if they do not necessarily have the resources available at this time to support their involvement. Once it is determined who is interested in working in a particular area, steps can be taken in order to try to mobilise the resources needed.

99 The next LRG meeting will be held in Ireland in the margins of the GGAA. It is proposed to have LRG Network meetings on 27 June after the GGAA and follow those meetings with the LRG meeting on 28 – 29 June. The LRG has been offered a plenary presentation slot on Wednesday morning of the GGAA, this session is on developing countries and tropical regions.

100 While the poster session was deemed to be a success, the Group decided not to have a poster session at the next meeting as it would be duplicating the GGAA conference poster session. However, as it was so successful it is recommended for future meetings where there isn't a duplication.

101 The Co-Chairs thanked all countries that have been contributing to the LRG Newsletters. If any members have anything of interest that they would like have included in the Newsletter please send to Victoria Hatton (victoria.hatton@nzagrc.org.nz). Information from external organisations that might be of interest to group is also appreciated.

102 The Co-Chairs requested feedback on their performance to date. They would like to identify areas where Members feel they are performing well and those areas that could be improved. The Secretariat will run an anonymous survey process that will be sent to LRG members soon.

103 Finally, the Co-Chairs thanked Uruguay for hosting a successful meeting and all of the participants for attending.

PARTICIPANTS LIST

Livestock Research Group,

1-2 November, Punta del Este, Uruguay

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