newsletter

GLOBAL RESEARCH ALLIANCE
ON AGRICULTURAL GREENHOUSE GASES

From the Co-Chairs

The year has again started at a rapid pace for the LRG with the launch of the Climate and Clean Air Coalition (CCAC) funded LRG manure management project for which Harry is on the Steering Group, and confirmation that the LRG/FAO GLEAM project has now enough support to go ahead.

These two are significant research projects; and over the next 2-3 years will produce globally relevant results that without collaborations across the LRG member countries would otherwise not have happened. Details of both projects and how to become involved will be made available of the LRG pages of the Global Research Alliance website (www.globalresearchalliance.org)

Looking ahead, the year will be particularly busy with a number of key meetings planned for the Group. The first is an engagement workshop for the Alliance and LRG in Poland to be held on the 8-9 April. This is followed by the AnimalChange conference and associated side events in Madrid, Spain (19-23 May). AnimalChange is a partner of the LRG, and as such interactions and attendance by LRG members at both the open science conference (19-20 May) and the closed AnimalChange meeting (22-23 May) will be significant for planning future collaborative opportunities. These two events are bridged by a joint FACCE-JPI:LRG Animal Health Network workshop (chaired by Harry Clark) on the 21 May.

Hot on the heels of AnimalChange is the meeting of the Alliance Council in The Netherlands (15-20 June), which will see the annual gathering of senior representatives of the 40 member countries. The LRG will showcase its work at this meeting and promote the collaborations and science outputs being generated by member countries of the LRG. The Council meeting will be preceded by a meeting of all the Alliance Research Group co-chairs. Both Martin and Harry will represent the LRG at this meeting.

Next comes the annual meeting of the LRG. This will be held 14-15 November 2014 at Gadjah Mada University, Yogyakarta, Indonesia in the margins of the AAAP congress. The

agenda will focus on five of the key work areas of the Alliance; Research Networks, Capability Development, Collaborative Projects, International Partners, and Knowledge Transfer. The agenda will be fully developed in the next while and circulated to members shortly thereafter.

To register for the AAAP 2014 and find out more detail about Congress go to www.aaap2014.ugm.ac.id

Enjoy reading the newsletter which introduces four new global research projects funded through FACCE-JPI in addition to the usual update from the Research Networks.

Harry and Martin

The 16th AAAP Congress
Asian Australasian Animal Production
November 10-14, 2014

ISPI
IKATAN SARJANA
PETERNAKAN INDONESIA

aaap

The 16th AAAP Animal Congress is to be held in Yogyakarta, Indonesia from Monday 10 to Friday 14 November 2014. The theme of the AAAP 2014 is "Sustainable Livestock Production in the Perspective of Food Security, Policy, Genetic Resources and Climate Change". The congress will attract speakers and delegates from throughout the globe and will build on previous successful meetings in the series.

For more information and registrations please visit www.aaap2014.ugm.ac.id

Collaborative research projects funded under the FACCE-JPI

In the last LRG newsletter, we reported that a number of research projects to better quantify and mitigate agricultural greenhouse gases had been funded under the multi stakeholder call administered by FACCE_JPI, the European Union's Joint Programming Initiative on Agriculture, Food Security and Climate Change.

Of the projects recommended for funding, a number directly support and deliver on priorities identified in the work plan of the Livestock Research Group and its various Research Networks. Outlines of four such projects are included here for your interest. Further information about the projects can be directed at the project leaders for the individual projects.

Global Network

A Global Network for the development and maintenance of nutrition-related strategies for the mitigation of methane and nitrous oxide emissions from ruminant livestock has been funded.

Partners of this collaborative project include:

- **Pennsylvania State University, USA; A. N. Hristov (Project Leader)**
- University of California, Davis, USA; *E. Kebreab*
- The Ohio State University, USA; *Z. T. Yu*
- INRA, France; *C. Martin and M. Eugene*
- Animal Nutrition Institute, Estacion Experimental del Zaidin, CSIC; *D. R. Yanez-Ruiz*
- Animal Production Research, MTT, Finland; *K. Shingfield*
- TEAGASC, Ireland; *P. O'Kiely*
- University of Reading, UK; *C. Reynolds*

Collaborators are: Wageningen University, The Netherlands; J. Dijkstra and A. Bannink and University of Zurich, Switzerland; M. Kreuzer.

The specific goals of the consortium are to:

(1) Create, update, and expand animal and feed databases for mitigation of enteric methane (CH_4);
(2) Gain understanding of the contribution of genetic and microbial factors to variation in enteric CH_4 production, digestion, and nutrient utilization;
(3) Validate markers of enteric methanogenesis for the development and monitoring of CH_4 mitigation strategies in ruminants;
(4) Create, update, and expand a database of mitigation strategies aimed at improving dietary N utilization and lowering N excretion and NH_3 and nitrous oxide (N_2O) emissions from manure;
(5) Develop Standard Operating Procedures (SOP) and guidelines for conducting and assessing data from in vitro and in vivo studies designed to evaluate nutritional strategies for mitigation of CH_4, ammonia (NH_3), and N_2O emissions;
(6) Develop new and evaluate existing models for predicting CH_4 emission and N excretions under various nutritional, animal, and farm management scenarios; and
(7) Identify and recommend CH_4, NH_3, and N_2O mitigation technologies that are practical and feasible for the specific conditions of various livestock production systems.

These activities will be integrated with the activities of the "Network and Database on Feed and Nutrition in Relation to Greenhouse Gas Emissions" (FNN; http://animalscience.psu.edu/fnn), which is an activity of the Livestock Research Group.

The newly created GLOBAL NETWORK consortium intends to fill important knowledge gaps and provide the much needed expert recommendations for future research priorities, methodologies, and science-based GHG mitigation solutions to government and non-governmental organizations, advisory/extension networks, and the ruminant livestock sector. Animal scientists with an interest in GHG mitigation research are encouraged to contact consortium members to identify mechanisms for future collaboration.

Models4Pastures

Models4Pastures or "Robust models for assessing the effectiveness of technologies and managements to reduce N_2O emissions from grazed pastures" has seven partner organisations in this collaborative project:

- **AgResearch, New Zealand; Dr Val Snow - Project Leader**
- University of Aberdeen, UK; *Prof. Pete Smith*
- Scottish Rural University College, UK; *Dr Kairsty Topp*
- Rothamsted Research, UK; *Dr Laura Cardenas*
- INRA, France; *Dr Katja Klumpp*
- University of Florence, Italy; *Prof. Marco Bindi*
- ETH Zurich; Switzerland; *Dr Lutz Merbold*

Models4Pastures will test, improve, and then use, simulation models to provide robust assessments of the impact of N_2O mitigation options in grassland systems across a large geographic and climatic range. Our models and assessments will take into account the effects of the mitigation option, and its follow-on consequences (e.g. changes in grazing intensity) for other gases to understand the net ecosystem effect, food production and variability of production, and the effects on the ability of the soil to sustain production. This work will be done in the company of current and proposed FACCE-JPI projects and other international activities.

We will use model inter-comparisons and development to provide improved tools for climate change research. In our case we will concentrate on exploring N_2O mitigation options for grassland systems and the flow-on impacts of those mitigations on the ability of the soil to sustain production and on the needs for changed inputs or management of the grasslands. The inclusion of New Zealand and European teams provides a wide range of datasets, including a new dataset collected at high temporal resolution and covering different climatic conditions and management practices, and a range of models that have different formulation (assumptions and parameters) and approaches. This is the ideal situation to explore the most effective model features and develop models that are robust across a range of situations that is as wide as possible.

The suite of diverse models also forms an ideal ensemble with which to approach the study of mitigation options. We expect that this combined approach (challenging/improving existing models and ensemble modelling) will result in modelling tools that can be used with confidence by scientists and mitigation assessments that policymakers can be assured are robust. Because many of the scientists in our project are also involved in other modelling inter-comparison initiatives we expect our findings will be rapidly and effectively disseminated to end users who will initially be other scientists wishing to explore potential mitigation options and their consequences.

RumenStability

This project seeks to better understand the development and control of stability in the rumen microbiome as a basis for new strategies to reduce methanogenesis.

This new FACCE-JPI project will identify effects of dietary treatments that are imposed for short periods of time, but designed to have long-term effects on methane production or subsequent responses to methane mitigation interventions. There will be a focus on treatments in early life, when animals are often more accessible and the rumen community is developing, but also work on diet transitions in older animals. The idea is to reduce the cost and effort of methane mitigation strategies by reducing the duration and/or quantity of treatment required and/or to increase the size of responses if treatments have to be reapplied.

Whilst earlier studies by partners in Spain and Wales used potent anti-methanogenic compounds with young ruminants (Abecia et al., 2013), this work focuses on some of the dramatic diet transitions experienced on-farm, including weaning and transitions to grazing or high-density finishing diets.

The hypothesis is that the initial microbial implantation in the rumen [comma deleted] influences the microbial ecosystem later in life. We are also interested in the way in which the host immune system and epigenome respond to the developing rumen. A further aspect of the project is transfer of the maternal microbiome to offspring, which may contribute to stability of the rumen microbiome in later life.

The project runs from 2014-2017.

Partners of this collaborative project include:

- **Scottish Rural University College, Edinburgh, UK; Richard Dewhurst – Project Leader.**
- Teagasc, Ireland; *Sinead Waters*
- CSIC, Spain; *David Yáñez-Ruiz*
- University College Dublin, Ireland; *Evelyn Doyle*
- University of Ghent, Belgium; *Veerle Fievez*
- INRA, France; *Diego Morgavi*
- ILVO, Belgium; *Sam De Campeneere*
- FBN, Germany: *Björn Kuhla*
- AgResearch, New Zealand: *Stefan Muetzel*
- Aberystwyth University, UK: *Jamie Newbold*

Increasing Adoption of Mitigation Options to Minimise Agricultural GHG Emissions (INCOME)

Grass-based pastoral farming is a major source of income for many countries active in the Alliance. For example, agriculture contributes more than half of New Zealand's total export earnings. However, emissions from agricultural production comprise almost half the country's emissions, implying considerable pressure to reduce emissions without jeopardising economic growth.

Despite important advances in potential GHG reduction strategies which simultaneously deliver improved productivity, profitability and sustainability, there remain significant gaps in our understanding of technology transfer and barriers to farmer adoption. This project aims to advance our understanding of practise change at the farm-level, in order to realize gains in the mitigation of greenhouse gas emissions both domestically and internationally.

Partners of this collaborative opportunity include:

- **Landcare Research New Zealand: Nicholas Cradock-Henry**
- AgResearch, New Zealand: *Sue Peoples, Val Snow*
- Scottish Rural College (SRUC), UK: *Dominic Moran*
- Institut de National Recherche Agronomique (INRA), France: *Stephane de Cara*
- Teagasc, Ireland: *Pat Heaphy*

This three-year project is using a multi-disciplinary approach, drawing on social and behavioural sciences, economic and farm-systems modelling, and research on learning and innovation. Focussing on the dairy sectors as the basis for comparison, the objectives for this project are to:

1. Critically review existing cost negative management practices;
2. Develop a framework for identifying the barriers to adoption; and,
3. Provide empirical evidence and direction on how barriers might be overcome through targeted information outreach and extension.

This will provide information to public and agricultural sector agencies to help facilitate the provision of more informed cost-effective policies, programmes and strategies to increase farmer adoption of GHG mitigation options. Furthermore, by identifying and supporting the adoption of 'win-win' practices, the GHG emissions from the dairy sector will be reduced and the resilience of dairying and overall pastoral production increased through greater efficiency, increased profitability and productivity.

Rumen Microbial Genomics Network (RMG)

The Rumen Microbial Genomics (RMG) Network was initiated in 2011 through funding from the New Zealand Government in support of the Livestock Research Group of the Global Research Alliance on Agricultural Greenhouse Gases as a global research effort with clear benefits addressing Alliance aims.

The RMG Network is a virtual global network of researchers who collaborate to speed up the development of rumen microbial genomics approaches for improved animal production and reducing methane emissions from ruminant livestock. The RMG Network has developed a framework for the international coordination of rumen microbial genomics projects, with the RMG Network allowing information to easily be accessed by researchers in the field via the website and newsletters. The website is well-linked to enable easy access to methods, genome sequence and metagenome data relevant to the rumen microbial community.

The fourth RMG Network workshop will be held jointly with RuminOmics (www.ruminomics.eu/) and ECO-FCE (www.eco-fce.eu/) on the day preceding the main Rowett-INRA 2014 conference (www.abdn.ac.uk/events/rowett-inra2014/); Monday 16 June 2014. Its aim will be to compare and contrast methodologies, results and problems from the different projects, with a theme How does the gut microbiota influence feed efficiency? Thus far, Graeme Attwood, Chris Creevey, Matthias Hess, Barbara Metzler, Peadar Lawlor and Katarzyna Stadnicka have accepted invitations to present.

For more information about the RMG Network, including how to register your interest/participate and register for the up-coming workshop, please contact the network coordinator: hnh@aber.ac.uk (Dr Sharon Huws, University of Aberystwyth, UK).

Grasslands Research Network (GRN)

The livestock sector is the largest user of agricultural land. Therefore, implementing better management strategies trending to improve production efficiency of grazing livestock could have an important impact on global GHG emissions of agriculture. The Grassland Research Network brings scientists together to focus on the development of best management practices related to soil carbon sequestration on both rangelands and pastureland. Other main objectives include understanding the implications of soil C losses and degradation, and looking at synergies between adaptation and mitigation.

As the first step towards international collaboration in these areas, the GRN has started working on a stock take that will summarize the current knowledge and research efforts of six continental regions of the globe. A summary report on the state of the art of the networks' main interest will allow identifying knowledge gaps and focusing science efforts towards climate change adaptation and mitigation options for grassland agriculture. Regional GRN coordinators have been already identified and the new network in the process of engaging more participants from all GRA country members that would like to join and support regional coordinators in this initiative.

The GRN will be working in close collaboration with the 'Soil C & N cycling cross-cutting group' of the GRA. In that sense, the network will be participating at the workshop 'Grasslands sensitivity to climate change' to be held in Madrid on May 21st, 2014, organized by this cross-cutting group following the conference on Livestock, Climate Change and Food security (**http://animalchange.wordpress.com/**).

For more information on the Grassland Research Network, or to join this initiative, please contact the network coordinator in your region:

Africa: Klaus Butterbach-Bahl (**K.Butterbach-Bahl@cgiar.org**),

Asia: Qingzhu Gao (**gaoqingzhu@caas.cn**),

Australia & New Zealand: Peter Grace (**pr.grace@qut.edu.au**)

Europe: Gary Lanigan (**Gary.Lanigan@teagasc.ie**)

Latin America and also global coordinator: Virginia Pravia (**vpravia@inia.org.uy**)

United States & Canada: Rick Todd (**Richard.Todd@ARS.USDA.GOV**)

Animal Health Network

The Animal Health Network aims to explore links and synergies between efforts to reduce livestock disease and reducing GHG emissions intensity.

The Network has recently welcomed Timothy Robinson of the International Livestock Research Institute (ILRI) as a Network co-coordinator. ILRI works to improve food security and reduce poverty in developing countries through research for better and more sustainable use of livestock. Timothy joined the livestock systems and environment group of ILRI in April 2013 after 11 years working in the livestock policy group of the United Nations Food and Agriculture Organisation (FAO). His current research includes exploration of the environmental impacts of animal health interventions and of intensifying livestock production systems more generally.

The Network is holding its first workshop in the margins of the Society for Veterinary Epidemiology and Preventative Medicine in Dublin, Ireland, on the 25th March 2014. This international workshop will bring together scientists in animal health, veterinary science, GHG research and other relevant fields to get to know one another, to set the Network objectives and define tangible outputs and priority activities for the Network to achieve.

The Network aims to establish links with relevant organisations, networks and initiatives. For example, it is developing links with the Agriculture, Food Security and Climate Change Joint Programming Initiative (FACCE-JPI) which has a work area focussed on animal health/disease and GHG mitigation. There is a joint FACCE JPI and LRG Animal Health network workshop in Madrid (21 May 2014) which aims to align efforts in Animal Health research.

For further information or to join the Network please contact animalhealthnetwork@adas.co.uk. You can follow us on twitter @AHGHGN.

Animal Selection Genetics Genomics Network (ASGGN)

The ASGGN is focused on bringing together scientists working in the area of reducing greenhouse gas emissions from ruminant livestock using animal selection, genetics and genomics techniques.

Dr Yvette de Haas (Wageningen UR Livestock Research) and Dr Natalie Pickering are the convenors of ASGGN. The network was initiated at a May 2011 workshop in Auckland, NZ and endorsed by the Livestock Research Group of the Global Research Alliance on agricultural greenhouse gases. It provides a forum to debate and reach agreement on a variety of topics including:

- common protocols for measurement of methane emissions(and associated traits)
- calibrations of measurement procedures between countries
- co-measurement of appropriate correlated and productive traits
- formalised protocols for collection and storage of DNA from all animals measured and also protocols for collection and storage of rumen samples from all animals measured
- criteria for data sharing and analysis (including meta analysis) among all contributing parties

Recently, a working group of the ASGGN has written a white paper entitled "Breeding ruminants that emit less methane – development of consensus methods for measurement of methane" by N. K. Pickering, Y. de Haas, J. Basarab, K. Cammack, B. Hayes, R. S. Hegarty, J. Lassen, J. C. McEwan, S. Miller, C. S. Pinares-Patiño, G. Shackell, P. Vercoe, and V. H. Oddy. This white paper is a summary of published and yet to be published work, the purpose of which is to evaluate methods that are potentially useful for measuring methane emissions in individual animals to initially obtain genetic parameters and to subsequently screen animals for use in selective breeding programs.

This white paper shows:

- Methane emissions are a heritable and repeatable trait at least in sheep.
- Repeated measurements of methane emissions on individual animals add most value when separated by at least 3-14 days.
- Repeatability estimates are lower when short term measurements are used, possibly due to variation in time and amount of ingested feed prior to the measurement. This needs to be investigated further.
- Given the above issues are resolved, short term (over minutes to hours) measurements of methane emissions show promise. However, we believe that for short term measurements to be useful for genetic evaluation, measurements will be required over an extended period of time (weeks to months).
- Opportunities exist for "brief measurements" in standardised feeding situations such as "sniffers" attached to milking parlours or total mixed ration feeding bins, but we anticipate these are also subject to the caveats above about use of short term measurements.
- Genomic selection offers potential to reduce methane emissions and methane yield, however, methane measurements on thousands of individuals will still be required.
- In summary, we feel genetic and genomic selection offers a significant opportunity, but attention needs to be directed to a number of issues, if brief low cost measurements are to be implemented in industry.

We expect the ASGGN to meet formally once per year at an International Conference that members will be attending independently. The next meeting of ASGGN will be held in Vancouver, Canada on Sunday 17th August 2014 as a satellite meeting of the World Congress of Genetics Applied to Livestock Production.

More information on: www.asggn.org or contact Yvette.deHaas@wur.nl

Network and Database on Feed and Nutrition in Relation to Greenhouse Gas Emissions (FNN)

The 2014 FNN meeting will take place during the 2014 ADSA/ASAS meeting in Kansas City, USA (https://www.asas.org/meetings/jam2014/home). The day for the meeting is July 20th, 2014. A room has been reserved but a specific time and meeting agenda have not been decided yet. More information will be made available on the website closer to the event.

A 4-yr, multi-national project (GLOBAL NETWORK for the development of nutrition-related strategies for mitigation of methane and nitrous oxide emissions from ruminant livestock) that is closely integrated with FNN activities was funded through The Joint Programming Initiative on Agriculture, Food Security and Climate Change (FACCE-JPI). This project is an excellent opportunity for some of the FNN member country representatives to travel to the meeting and conduct Network activities.

Details about the FACCE-JPI consortium are going to be presented through a poster at the ADSA/ASAS meeting (GLOBAL NETWORK for the development of nutrition-related strategies for mitigation of methane and nitrous oxide emissions from ruminant livestock. 2014. A. N. Hristov, E. Kebreab, Z. T. Yu, C. Martin, M. Eugène, D. R. Yáñez –Ruiz, K. J. Shingfield, S. Ahvenjärvi, P. O'Kiely, C. K. Reynolds, K. J. Hammond, J. Dijkstra, A. Bannink, A. Schwarm, and M. Kreuzer). The main message of the presentation is to encourage animal scientists with an interest in GHG mitigation research to contact members of the consortium to identify areas and opportunities for future collaboration and contribution of data. There is already a preliminary collaborative agreement with AgResearch Ltd, New Zealand through Dr. David Pacheco.

Dr Mark Hanigan pictured here (seated) with Dr. Charlie Stallings (and his wife) also from Virginia Tech on a recent wine tasting trip around New Zealand.

Improvements to a cow rumen model are facilitated through a GRASS award

Dr. Mark Hanigan is visiting AgResearch, Grasslands, New Zealand from the Department of Dairy Science at Virginia Tech University on a GRASS award where he works on nutrient metabolism using experimental and mathematical modeling approaches. The long-term objective of his work is to improve animal efficiency and reduce the impact of animal based production systems on the environment while maintaining a viable dairy industry.

While at AgResearch, Mark is collaborating with David Pacheco, Peter Janssen, Stefan Muetzel, and Mike Tavendale to further develop a rumen model for cows that is based on a sheep rumen model started through a collaborative effort based at Grasslands between R. Lee Baldwin (UC Davis) and Mark Ulyatt (DSIR, Grasslands, New Zealand) 40 years ago. While predictions of nutrient digestion by the model are good, predictions of the end products of fermentation, i.e volatile fatty acids, are not so good. As the pattern of volatile fatty acids dictates a portion of methane production and plays an important role in determining overall animal

performance and efficiency, it is important to develop a better method of predicting fermentation outcomes. Mark is working with data from the literature to assess model performance in predicting fresh grass digestibility and subsequently with the large database of volatile fatty acid concentrations and methane production collected in the metabolic chambers at Grasslands.

Mark began his career as a dairy farmer in Western Iowa, and subsequently earned a B.S. in Dairy Science from Iowa State University, a M.S. in Animal Science and a Ph.D. in Nutrition from the University of

California, Davis under the guidance of R. Lee Baldwin. He worked as a post-doctoral scientist in the Department of Biochemistry and Biophysics at UC-Davis until 1993 when he joined Purina Mills, Inc. as a research scientist where he worked on nitrogen metabolism in the lactating animal, energy and protein requirement systems, and calf growth until 2005.

Scaling up Nitrous Oxide fluxes from Urine Patches to better understand the effects of mitigation strategies

Adjunct Professor Freeman Cook, from Freeman Cook and Associates Pty Ltd based in the Glasshouse Mountains in Australia, has received a GRASS award to work with Professor Frank Kelliher from AgResearch at Lincoln, New Zealand on "Scaling up Nitrous Oxide fluxes from Urine Patches to better understand the effects of mitigation strategies".

Freeman has been developing the enabling scaling theory to allow the effect of measurements made on urine patches to be scaled to paddock, farm and regional scale. This will allow the scaling effect to be isolated from other effects to understand how the different parameters affect the nitrous oxide (N_2O) flux to the atmosphere at different scales.

This work has developed a relationship between the N_2O flux and time from a urine patch based on analysis of data. This is then combined with the timing of the application of urine during the annual cycle using the appropriate mathematical methods to estimate the average N_2O flux with time and annual N_2O mass lost per hectare at the different scales. The equations can then be used to determine which of the parameters the model is most sensitive too. This helps to understand which of the parameters measured at the patch scale need to be estimated with the greatest precision. The model can be used to understand the residual effect from continual grazing on the N_2O flux and the rest time needed before the flux will return to background levels. The latter is important when measuring background N_2O levels. Examples of the fluxes a paddock and farm scale are shown to the right.
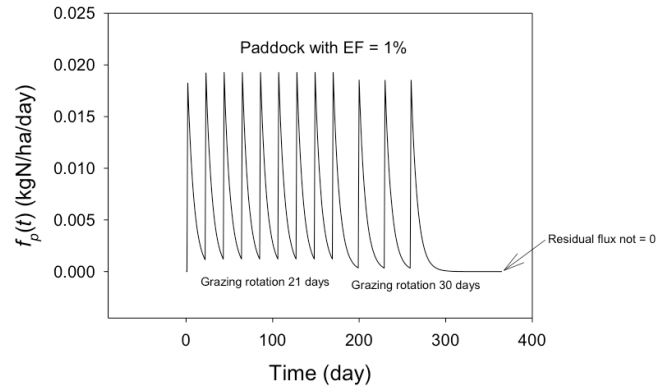

Figure 1. Predicted potential N_2O flux (f_p) with time at the paddock scale. The patch flux has an emission factor (EF) of 1% of the applied nitrogen in the urine.
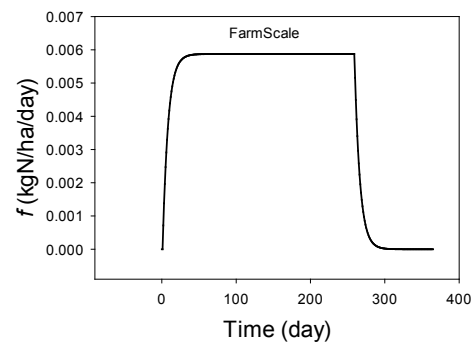

Figure 2. Predicted potential N_2O flux (f) with time at the farm scale. The patch flux has an emission factor (EF) of 1% of the applied nitrogen in the urine.

Freeman (in the dark shirt) enjoying catching up with former colleagues in Wellington.

Capability Building Opportunities

Global Research Alliance Senior Scientist (GRASS) Award

Supporting research in Agricultural Greenhouse Gases

The New Zealand Government provides funding for senior scientists to participate in an exchange programme to enhance collaboration and the building of mutually beneficial research partnerships between New Zealand and other Global Research Alliance countries.

Focus areas

- Methane emissions from livestock and livestock wastes
- Nitrous oxide emissions from livestock wastes
- Enhancement of pastoral soil carbon sinks
- Integrated whole farming systems impacts at all scales as they relate to livestock emissions.
- National inventory development as it relates to livestock emissions

Eligibility

To be eligible, you must:

- Have a PhD or be a scientist with at least 5 years experience participating in/ leading major projects that align to the priorities of LEARN, the Alliance or other relevant national strategies.
- Demonstrate impact and leadership in your professional field.
- Be able to contribute to scientific research and its application in your home region and the larger Alliance network, based on your networking record.
- Work in collaboration with a New Zealand research organisation.
- Be resident and normally employed on a permanent contract by a research organisation in an Alliance member country.
- Be fluent in English

Funding

The exchange must be between 6 weeks and 6 months duration.

- Up to $30,000 for 6 months (pro rata for less than 6 months) will be provided to recipients to cover actual and reasonable living expenses.
- Up to $5,000 will be provided for economy airfares and travel/medical insurance.
- Up to $5,000 will be awarded for associated research costs.
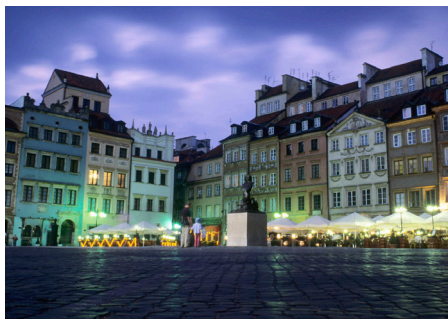
For more details refer to the LEARN Website:
www.livestockemissions.net

Or email the New Zealand Agricultural Greenhouse Gas Research Centre:
enquiry@nzagrc.org.nz

Upcoming events

Engagement workshop for the Alliance and the LRG Warsaw, Poland
8 and 9 April 2014

The Polish Ministry for Agriculture and Rural Development (MARD) welcomes the organisation of an engaging workshop on the Alliance in Poland. The workshop is planned for 8/9 April 2014; invitations will be sent to interested policy makers and researchers from institutions across central Europe. The LRG will organise the workshop and will call on many of its members to be involved when the agenda has been developed.

If you would like to be included on the invitation list please contact Dr Henk van der Mheen (henk.vandermheen@wur.nl).

Livestock, Climate Change and Food Security

Open science conference
19-20 May 2014
Hotel Miguel Angel, Madrid, Spain

This scientific meeting will attract speakers and delegates from around the globe and will provide a platform for discussions on the challenges faced by the livestock sector in an effort to efficiently enhance its contribution to sustainable food supply in the context of climate variability.

Call for abstracts:
The call for abstracts will open on January 13th 2014. Details on submission guidelines will be available soon.

Proposed deadlines for on-line registration and abstract submission:
- Early bird registration: **from 28th of January to 31st of March 2014**
- Late registration: **from 1st of April to 28th of April 2014**
- Deadline for abstract submission: **15th of April 2014**

To register for the conference please visit the Animal Change website: www.animalchange.eu/

EU FP7 Ruminomics

Connecting the animal genome, gastrointestinal microbiomes and nutrition to improve digestion efficiency and the environmental impacts of ruminant livestock production

Summer School
8-10 July 2014
Università Cattolica del Sacro Cuore, Piacenza, Italy

For information and application go to
www.ruminomics.eu/index.php/2014-summer-school/

Contacts

GLOBAL RESEARCH ALLIANCE
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Co-chairs of the LRG are:
Martin Scholten (martin.scholten@wur.nl) and Harry Clark (harry.clark@nzagrc.org.nz)

LRG co-chair team are:
Andy Reisinger (andy.reisinger@nzagrc.org.nz),
Jac Meijs (jac.meijs@wur.nl)
and Henk van der Mheen (henk.vandermheen@wur.nl)

For information or to provide an article for the newsletter contact:
Victoria Hatton (Victoria.hatton@nzagrc.org.nz)