GLOBAL RESEARCH ALLIANCE

ON AGRICULTURAL GREENHOUSE GASES

GRA Council meeting, Mexico City

11 October 2016

Research Group Co-chairs' Report

Martin Scholten, Harry Clark, Kazuyuki Yagi, Gonzalo Zorrilla, Jane Johnson, Ladislau Martin-Neto, Jean-Francois Soussana, Brian McConkey, Lee Nelson

Team of CoChairs 2016











4 Research Groups, 3000 Experts



RESEARCH GROUPS



Outline of our Work

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Common understanding

Concerted actions

What it Brings



BETTER UNDERSTANDING

- Networks of Researchers
- Workshops
- Trainings & Fellowships
- Technical Guidelines
- Collaborative Research projects



BETTER PRACTICES

- Knowlegde Hubs & Kiosks
- Technology Transfer
- Mitigation options
- Adaptation options
- Support to Farmers



Key Elements of Succes

Appropriate Governance
 Empowering CoChair's
 Active Networks with Coordinators

Resourcing of Ambitions

Partnerships to align with

- ➢ Projects
- > Authority
- Achievements











Networks & Flagships

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Individual Research Group reports

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CROPLANDS RESEARCH GROUP Co-chairs- Jane Johnson- USA Ladislau Martin- Brazil



- 7th CRG meeting, Brasilia, Brazil, July, 2015. [25 participants, 12 GRA countries. Crop-Livestock Forest (Sustainable Intensification), Brasilia, Brazil, Organized by Embrapa, Brazil; Global Partner CRG/GRA
- 8 thematic networks created,
- Leaders for the networks recruited
- Network leads provided with contact information for interested member, requested groups prepare fact sheet.

Croplands Research Group: Networks

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CRG network	Country	activity
Integrated Nutrient		Draft fact sheet
Management Network	USA	10 countries
Conservation Agriculture		
Network	Canada	None reported
Landscape management		
network	China	None reported
Irrigation Efficiency Network	USA	None reported
Integrated crop-livestock		
systems	USA	Minimal-
Agroforestry systems	Canada	None reported
Peatland management	Norway	None reported



- Measuring Nitrous Oxide Emissions from Soils: Methodology, Instrumentation, Modelling, Data Stewardship and Analysis workshop was held November 2015. The workshop reviewed previously published guidelines by GRA.
- First edition of CRG brochure-was completed and circulated
- Metadata from 318 experiments across 23 countries are included in MAGGnet with improved access, overview paper published. Call for submissions recently circulated.

Croplands Research Group: MAGGnet activities



- Site identification for model inter-comparison exercise (INRA, France):
- Template used by GRA Paddy Rice Research Group (NIAES, Japan): template adapted for rice production in Japan, Indonesia, Philippines, Thailand, and Vietnam.
- Improved availability of metadata template, map, and sharing agreement: Online access to MAGGnet through GRA and GRAMP websites (<u>http://globalresearchalliance.org/maggnet/;</u> <u>http://www.gramp.org.uk/</u>).

Cropland Research Group: Future plans



- Next meeting November 2016 in Phoenix, AZ USA 12 countries registered
- Numerous opportunity for researcher to present results at corresponding International Professional meeting
- Development of mitigation summary fact sheets prepared by for each theme network
- First face to face since adopting thematic networks
- Seek strategies to encourage member involvement

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LIVESTOCK RESEARCH GROUP Co-chairs- Martin Scholten – Netherlands Harry Clark – New Zealand

Summary



- Overview of the LRG membership, structure, collaboration
- Key achievements in the past 12 months
- Key challenges facing the LRG
- Areas where Council input is needed

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100% of GRA members (46 countries) participate in the LRG

Current research landscape

Building capability

Policy support & links to international initiatives

Key achievements

Good practice guidance & methodologies

Collaborative research Research networks & databases

Research networks



Network	Coordinating person(s)	Country	Status
ASGGN	Jan Lassen	Denmark	Active – leadership transferred from Netherlands to Denmark, actively bidding for funds
RMG	Sharon Huws	U.K	Active – current collaborative projects coming to an end but bidding for new funds
FNN	Alex Hristov Andre Bannink	USA Netherlands	Active – existing collaborations continuing plus bidding for new funds
MMN	Jonathon Levin	France	Active but new coordinator needed; actively bidding for new funds
AHN	Tim Robinson	UK	Active but UK unable to continue supporting financially & needs to find the resources to instigate group activities

Active research networks



- Two review papers published by the Feed and Nutrition Network on in vitro and in vivo experiments
- A new regional network for Mediterranean countries
- A practice brief on ruminant genetics published jointly by the Animal Selection, Genetics & Genomics Network and CCAFS for GACSA
- Joint bids submitted to ERA-GAS and GPLER, results pending



A core focus on supporting countries to advance their GHG inventories for livestock



Livestock development and climate change:

The benefits of advanced greenhouse gas inventories

About this booklet

Livestock development and climate change outcomes can support each other. More productive and efficient farm systems generally produce food at much lower greenhouse gas (GHG) emissions per unit of product.

However, many countries use simple (Tier 1) methods for estimating livestock emissions in their GHG inventories. Tier 1 methods are unable to capture the reductions in emissions intensity that result from improvements to livestock farming.

This booklet shows how advanced (Tier 2) inventory methods can support climate change and productivity goals and help broaden countries' policy options.

Inside, you will find information on:

- Why are livestock GHG inventories important?
- The benefits of advanced GHG inventories for livestock development
- The difference between Tier 1 and Tier 2 methods
- How to set up an advanced inventory
- An example of a Tier 2 approach for beef production
- A case study of Uruguay's Tier 2 inventory
- Where to find more information



RESEARCH PROGRAM ON Climate Change, Agriculture and Food Security





- Technical training workshops
- Guidelines
- Regional initiatives
- Country-specific support
- → Delivered in collaboration with key partners e.g. CCAFS, FAO

Reducing emissions intensity through improved productivity and livelihoods



SOUTH AMERICA URUGUAY ARGENTINA SOUTH ASIA BANGLADESH SRI LANKA

SUB SAHARAN AFRICA BENIN KENYA BURKINA FASO TANZANIA MALI ETHIOPIA NIGER UGANDA SENEGAL



- Data gathering
- Desktop modelling
- Analysis of options
- Engagement with stakeholders
- Bid for phase II underway
- → FAO in collaboration with LRG facilitated by NZAGRC
- \rightarrow Funded by CCAC and NZ govt

Collaborative research bearing fruit

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e.g. Global Rumen Census, Methane inhibitors, low methane rumen



Origins of samples and their bacterial and archaeal community compositions in different regions.

Numbers below pie charts represent the number of samples for which data were obtained. The most abundant bacteria and archaea are named in clockwise order starting at the top of the pie chart.



Bacteria (left-hand pie charts) Unclassified Clostridiales Unclassified Bacteroidales Unclassified Ruminococcaceae Unclassified Lachnospiraceae

Archaea (right-hand pie charts) Methanobrevibacter gottschalkii Methanobrevibacter ruminantium Mmc.; Group 12 sp. ISO4-H5 Methanosphaera. sp. ISO3-F5 Methanosphaera, sp. Group 5

Active research networks leading major projects incl. methodological standardisation, data collections and identification of new mitigations

Communications focus



Globai

- Translation of the popular LRG/SAI-Platform farmers good practice guide into Spanish and French (with thanks to LRG colleagues in Chile, Colombia and France for translation assistance)
- Improvements to the GRA website that will benefit all the Research Groups
- Work underway on a LinkedIn presence for the LRG



Reduciendo las emisiones de gases de efecto invernadero de la ganadería: *Mejores prácticas y opciones emergentes*





Interaction with GACSA



- Meetings held with GACSA co-chairs, exploring GRA could serve as basis for KAG (Knowledge Action Group)
- KAG (FAO) welcomed GRA input but emphasised input at an individual scientist level rather than via strategic partnership
- Benefits of a more formal relationship questionable at present as LRG successfully working with key KAG players = GRA Partners (CCAFS & FAO) to co-develop products (e.g. practice briefs on inventory & animal breeding)

Challenges facing the LRG



- Maintaining momentum and engagement on a voluntary basis from the LRG's now very large membership (46 countries)
- Ensuring we continue delivering against the needs and expectations of our increasingly diverse community
- Keeping policy and research sufficiently connected; as well as extension to framers practices
- Securing resourcing for our priority activities, including leadership and support for our research networks

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Paddy Rice Research Group Report

Kazuyuki Yagi and Gonzalo Zorrilla

Paddy Rice Research Group

Gonzalo Zorrilla, INIA, Uruguay



Kazuyuki Yagi, NIAES, Japan



America Sub-Group Meeting

February 2015, EMBRAPA, Brazil



Asia Sub-Group Meeting

September 2015, Nanjing, China



- The Group is structured into two regional sub-Groups: America and Asia, as a practical way of organizing the Group, in order to ensure meetings can be attended by more member countries.
- However, the Groups will share and agree on the same workplan.



Paddy Rice Research Group

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Paddy Rice Research Group Members 2016



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33 countries are members of the paddy rice group



Paddy Rice Research Group – Research Collaboration



- A multi-country research project on AWD for Southeast Asia, MIRSA, was launched in 2013.
- A concept note for similar multi-country project in NS America was prepared.





AWD: Alternate Wetting and Drying

As far as I know, the term "AWD" is now used as a common term that denotes "water management practice during rice growing period."

In our project, the three practices are shared and tested at all the sites.

- **1. Continuous flooding**: as reference practice
- 2. Safe AWD: naturally drained until the surface water table reaches
 -15 cm; and then irrigated...
- **3. Site-specific AWD**: established based on scientific experience of each monitoring site (i.e., can differ in the practice among the sites)



MIRSA Project

(Greenhouse Gas <u>Mitigation in Irrigated Rice Paddies in Southeast Asia</u>)







A research project funded by MAFF, Japan, from 2013 to 2018

 Aiming at assessing the feasibility of GHG mitigation through water saving techniques (AWD) in irrigated rice fields

Results shows effectiveness of AWD to reduce CH_4+N_2O emissions

Paddy Rice Research Group 2016

America Sub-Group Meeting

July 2016 – Dale Bumper's National Rice Research Center USDA

Stuttgart, Arkansas - USA







Paddy Rice Research Group



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Summary of America's PRRG

- July 2016 Meeting USA research groups on board
- Research highlights
 - AWD confirms potential for reducing GHG and increase WUE
 - AWD reduces arsenic concentrations in grain
 - C credits experience
 - Alternative irrigation methods
- Challenges
 - Fine-tuning AWD: when to dry, how dry, how to measure "dryness" for management
 - Barriers for AWD farmer's adoption similar in different regions
 - Genetics for less CH4 emissions and for tolerance to water stress
 - Eddy-covariance field research
 - Europe
- Priority topics for Flagships Projects identified
- New Regional Partner: Latin American Fund for Irrigated Rice -FLAR

Paddy Rice Research Group – Ideas of New Activities



- Multi-country project on water management practices to validate AWD in farmers' fields – based on MIRSA, but also including other regions.
- Global assessment of methane mitigation through water management: AWD feasibility map.
- Selection of rice cultivars that emit less CH₄: summary of past results + new methodologies (plant genetic variability, soil microbe diversity).
- Inter-comparison and improvement of model for simulating GHG emissions from rice cultivation

[Paddy Rice Research Group]: Challenges



- **New activities** of the Group were discussed and integrated into the proposals for Flagship projects.
- Co-chairs opened a dialogue with the Sustainable Rice Project Group of SAI Platform for possible collaborations.
- The Group further plans to develop a standardized methodology of MRV for rice GHG emissions.
- A special issue for rice GHG mitigation in the scientific journal, Soil Science and Plant Nutrition, is planed to publish in early 2018.
- A scientific session for rice GHG mitigation is proposed at the 21st World Congress of Soil Science (WCSS21) in Rio de Janeiro, Brazil, August 12–17, 2018.



 Greater mobilization of resources is requested to the member countries in order to support the workplan activities, at least, support to attend Group meetings.

Problems in some countries:

- Lack of active country counterpart for PRRG
- No research teams for rice GHG emissions
- Funding to participate in PRRG or take actions
- Strengthening the **Sub-groups and Networks**:
 - **Regional Sub-groups:** Americas, Asia (lead by co-chairs)
 - Thematic networks: mitigation & adaptation (Vietnam), rice cultivar (Indonesia), modelling (Japan)
- Links to the projects of CCAFS and other partners with similar objectives



Integrative Research Group

Brian Mc Conkey, Jean-François Soussana, Lee Nelson







IRG: a new group approved by Council end 2015 ON AGRICULTURAL GREENHOUSE GASES



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IRG vision and scope



<u>Vision</u>

- Collaborative work to develop the knowledge and capabilities for *estimation, monitoring,* and *projection* of GHG emissions and soil carbon within and across agricultural systems
- <u>Scope</u>: Address identified *Research, Development, and Knowledge Transfer (R-D-KT)* opportunities
- Integration of scales (local, subnational, national, and supranational scales)
- Applying, reporting, monitoring, and/or verifying greenhouse gas emission estimates across farming systems
- Communicate and coordinate
- Foster the building of capability of member countries.

IRG meetings



Joined session with the Livestock Research Group (Melbourne, February 2016) Briefing during Paddy Rice Research Group America's meeting (Arkansas, July 2016) Briefing session during Council Meeting (Mexico City, October 2016) Joined Session with the Cropland Research Group (Phoenix, November 2016) Network meeting Field Scale Integration (Rome, March 2016)

IRG group meeting, side by side with FAO/IPCC meeting on soil carbon (January 2017, Rome)

Integrative Research Group achievements



- 10 member countries have joined so far
- The group has been set-up with five research networks
- Terms of reference have been established for the group and for the networks
- Each network has expressed 3-5 priority actions, accounting for feedbacks during meetings
- Monthly teleconferences with network leaders and webinars

Integration across scales



Developing strategies for pastures

Quantifying soil carbon potential

Understanding M&A options at field scale

Improving tests of options at farm and region scale

Improving national inventories







Country, or associated partners, could adopt a network

Fund initial meetings and development of activities

Grasslands: F. Lattanzi (Uruguay), K. Richards (Ireland),
Soil carbon sequestration: C. Chenu (France), D. Angers (Canada),
Field scale : JF Soussana (France), P. Smith (UK),
Farm and regional scale : R. Eckard (Australia), P. Havlik (IIASA),
GHG inventories: J. Verhagen (Netherlands), B. Mc Conkey (Canada).

Priorities in each network (1/3)



Grasslands

Guidelines for SOC measurement/monitoring in grasslands, Data base on grazing practices vs. soil C and GHG emissions Mixed systems (temporary grasslands, integrated systems)

Highlight: National project in Uruguay supported by GEF

Soil carbon sequestration

Co-benefits of soil carbon for yields and adaptation, Monitoring, reporting and verification of soil carbon Soil organic carbon dynamics modeling

Highlight: Permanence of soil carbon vs. duration of practices

Priorities in each network (2/3)



Field scale

- Mitigation and adaptation options assessed from multi-model ensemble
- Climate sensitivity of GHG emissions and soil carbon
- Statistical emulators for N₂O emissions and soil C

Highlight: accurate multi-model simulations of N₂O emissions

Farm and regional scale integration

- Demonstration farm network
- Farm calculators and soil carbon
- Pilot region assessment studies
- Regional maps of mitigation and adaptation potentials

Highlight: Corn yield loss and land degradation under climate change

Priorities in each network (3/3)



GHG inventories

Guidance on how to improve inventories, including data on activities, Moving to Tier 2, sharing examples from countries, Country specific emission factors

Highlight: sharing sensor technologies

Highlight (1/5)



A national project by URUGUAY supported by GEF/ FAO (World Bank) to increase beef production and store carbon in soils

60 farms



Highlight (2/5)



Permanence of improved practices is key to achieving soil C sequestration potential



Highlight (3/5)



Without site specific information a multi-model ensemble predicts accurately N₂O emissions from crop and pasture across 4 continents



Highlight (4/5)

Land degradation lowers corn yields by end of century, due to losses in soil fertility in countries with low or negative nutrient surplus



(EPIC model, dynamic soil, RCP 2.6, IIASA)

Highlight (5/5)

Capability building led by NZ and LRG, sharing and collaborating on methodologies, planning inventory meeting in 2017 (UK)



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Joint Research Group Recommendations

Research Group requests to Council Resourcing

- Resourcing continues to be an issue for all RGs
 - Support for co-chairs
 - Support for networks
 - Support for RG activities
 - Support more meaningful participation in the Research Groups, including to lead activities/networks – 'adopt' a network!

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- Encourage member countries to align domestic funding mechanisms with the GRA
- ✓ Welcome the new emphasis on resourcing and flagships

Research Group requests to Council Research Group chairing

- GLOBAL RESEARCH ALLIANCE ON AGRICULTURAL GREENHOUSE GASES
- Country support for, and active involvement in, co-chairing Research Groups is crucial, but variable
- Adopting a tri-chairing arrangement (as for the IRG) would help overcome some the current issues faced, serves succession planning and provide leadership opportunities for other GRA countries
- Current priority is to provide additional leadership for the Croplands Group, as the (geographical) scope is broad
- Request that the Council endorse a tri-chairing arrangement & further that the Council actively seeks an additional co-chair outside America's for the Croplands Research Group as a matter of urgency
- Additional co-chairs should/could be added to the PRRG and LRG in future years

Feedback on the GRA Strategic Plan

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- Welcome the development of a strategic plan
- Currently a mixed Strategic/Operational Plan; should be more ambitious, directive and strategic, with measurable targets/indicators of success (like Objective 4B and Priority Action 50), and less operationally focused
- Far too many priority actions, many of which are operational
- Must be properly resourced if it is to be effective
 - Support more meaningful participation in the Research Groups, including to lead activities/networks
 - Encourage member countries to align domestic funding mechanisms with the GRA

Feedback on the multi-country funding mechanism



- Welcome a focus on resourcing mechanisms
- Positive to see the GRA engage with the European Commission on the possibility of a multi-country funding mechanism for soil carbon
- Also encouraging to see reference to annual GRA Joint Programming in the Strategic Plan
- Question the need to set up another Cross-cutting Group under the Charter – this is a different type of issue
- Prompt action now needed, especially if it is to be a means for resourcing the GRA Flagship Projects and to link with EC time scales

Flagship Projects



- Research Groups are very enthusiastic about this concept
- Have actively engaged in developing the proposals
- But key points for Council to consider:
 - What does 'adopting' a flagship actually mean?
 - How will flagships be prioritised?
 - Commitment to resource the ambitions; link with funding mechanisms?
 - Governance expectations?

ONLY SUBSTANTIAL, RESOURCED FLAGSHIPS MAKE SENSE

GRA conference



- Greater clarity needed on what the conference is trying to achieve; e.g. internally focussed, science focussed, multi-stakeholder focussed
- Co-chairs do not favour a science conference; a very crowded space and hard to see how it adds value to existing initiatives
- Any conference needs to concentrate on GRA achievements and benefits; what has been the added value of the GRA?
- How will the GRA continue to support country needs post the landmark
 Paris agreement?
- Suggest consideration be given to a multimedia approach to meet needs of what is likely to be a diverse audience

Supporting 4/1000 initiative



- Co-chairs strongly supportive of GRA involvement as it aligns strongly with RG focus and activities
- Opportunity for GRA to have a strong input to the shaping of this initiative as it is still in its formative stages; resourcing mechanism (IRC) actively under discussion with EU
- GRA link to 4/1000 seen as beneficial, suggest that this can be facilitated via the Secretariat and the GRA Special Representative.

Questions?