

GLOBAL RESEARCH ALLIANCE

ON AGRICULTURAL GREENHOUSE GASES

GRA Council meeting, webcast from Chile

21 - 23 February 2022

Croplands Research Group Report

María Rosa Mosquera-Losada, Mark Liebig and Ladislau Martin-Neto

Team of Co-Chairs

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Ladislau Martin-Neto,
CRG co-chair
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Maria Rosa Mosquera-Losada,
CRG co-chair
USC, Spain



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CRG co-chair
USDA/ARS, USA

CROPLANDS RESEARCH GROUP

RECENT ACHIEVEMENTS

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Annual CRG Meeting, 2021, was held in January, 19, 2022

- 40 participants, 14 countries

- **Agenda:**

- Updates: annual countries report, networks and activities
- **Mitigation Co-benefits** General Concepts: **Charles Rice**
- Exercise Mitigation Co-benefits (all participants) based in 5 Networks Themes: Agroforestry, Conservation Agriculture, Integrated Crop-Livestock Systems, Nutrient Management and Peatland management

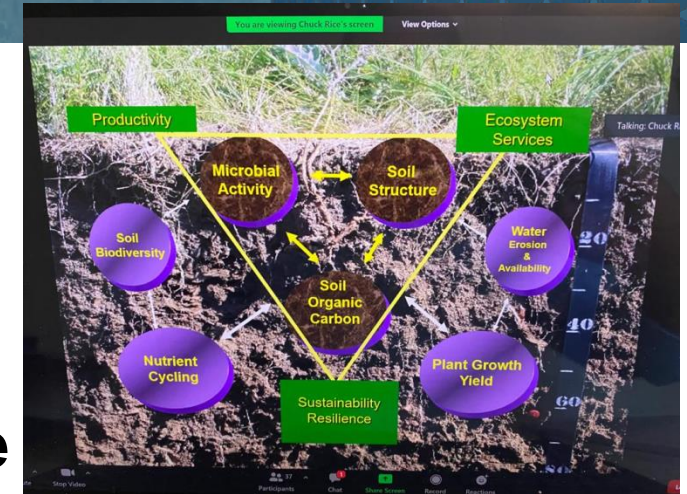
- **Main aspects:**

Carbon neutrality - engagement of **private corporations** in the **ESG (Environmental, Social and Governance)** context

Circularity

Co-benefits due to mitigation activities practices

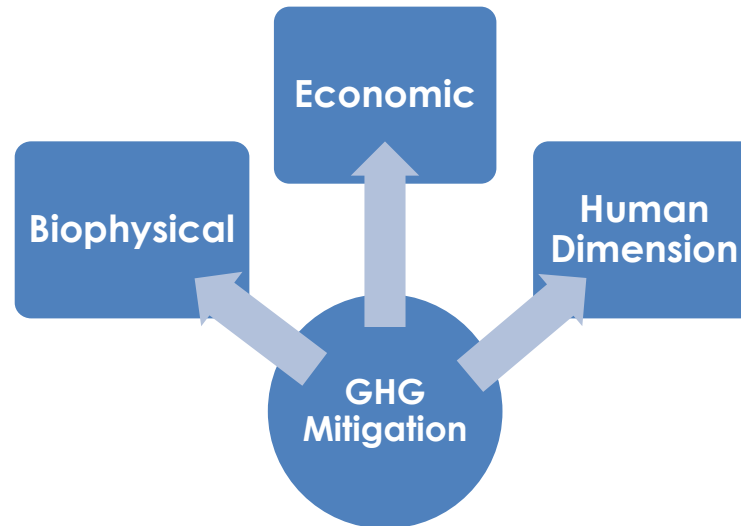
Opportunities for **new initiatives**



What are mitigation co-benefits?

- *“Outcomes that arise subsequently from GHG mitigation practices.”*

Deng et al. (2018)



- Co-benefits can serve as additional motives in the design and implementation of GHG mitigation policies

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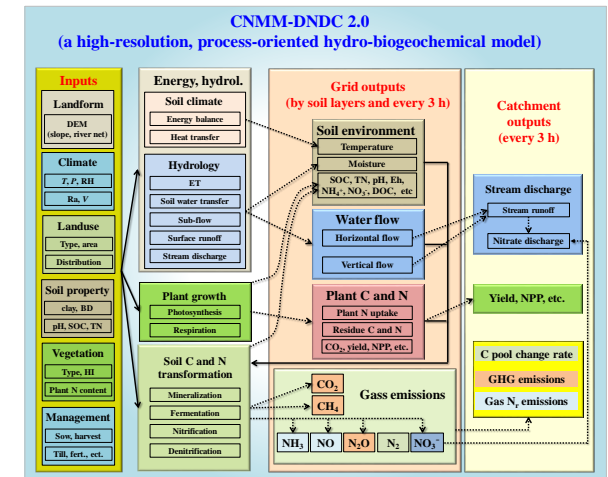
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Research Networks Activities

- **Peatland Management**
- **Nutrient Management**
- **Agroforestry**
 - AFINET handbook and online platform
 - AE4EU new European networking project
- **Conservation Agriculture**
 - Special Section in SSSAJ- Sep/Oct 21
- **Landscape Management**
 - CNMM-DNDC enhancements
- **Integrated Crop-Livestock Systems**
 - II World Congress on ICLFS



AE4EU



Soil pH **Frozen soils**

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The role of conservation agriculture on mitigation of GHG emissions and enhancing C sequestration in soils

-Special Section Published in the Soil Science Society of America Journal

<https://doi.org/10.1002/saj2.20323> (Sep/Oct 2021)

- Guest Editors: Jane Johnson (USDA), Charles Rice (KSU) and Craig Drury (AAFC)
- 10 peer- reviewed papers published (7 field studies, 2 modelling studies, 1 meta-analysis paper)
- CA practices included: conservation tillage, crop rotations, cover crops, residue management

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Barley on a long-term conservation agriculture trial plot at CIMMYT's headquarters in El Batán, Mexico. Here, barley grows in rotation with maize, under zero tillage on the flat, with removal of wheat residues for fodder and retention of maize residues. Photo courtesy of CIMMYT/Flickr.

FEATURES

Conservation Agriculture, Condensed

Synthesizing Its Impact on Greenhouse Gases and Carbon Sequestration

| By DJ McCauley

Researchers walk a tightrope strung between two competing poles. One pole is the constant, monumental effort to concisely communicate research in

the hopes of seeing it put into practice. The other is the simple fact that scientists on the ground are conducting research in specific locations, under specific conditions.

"It is a challenge to come up with soil and crop management recommendations that cover different soils and climatic

DOI: 10.1002/csan.20610

December 2021

CSA News Article. (Dec 2021) highlighted special section & meta- analysis paper

Received: 14 December 2020 | Accepted: 13 April 2021 | Published online: 5 August 2021
DOI: 10.1002/saj2.20260

SPECIAL SECTION: THE ROLE OF
CONSERVATION AGRICULTURAL PRACTICES
ON REDUCING GREENHOUSE GAS EMISSIONS
AND ENHANCING C SEQUESTRATION

Soil Science Society of America Journal

Intensification of no-till agricultural systems: An opportunity for carbon sequestration

Rodrigo S. Nicoloso¹ | Charles W. Rice²

Meta-analysis data highlighted results from:

- 121 Field sites
- 19 Countries
- 6 Continents

<https://doi.org/10.1002/csan.20610>

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Collaborative / Capacity Building Activities

• Webinar Series 2021

- March (Soil C seq. potential map; Argentina)
- May (Full Inversion Tillage; New Zealand)
- December (Agroforestry; Greece)



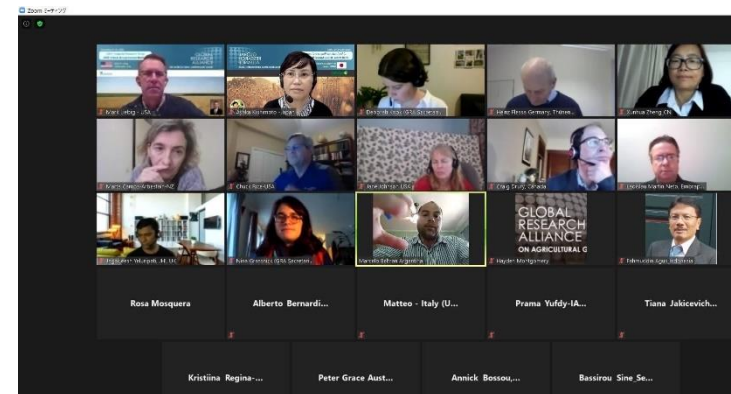
• CRG Newsletter

- Released quarterly
- 160 subscribers



• Engagement and Outreach

- Annual meeting (19 January 2022)
- Social media to amplify activities



@GroupGra



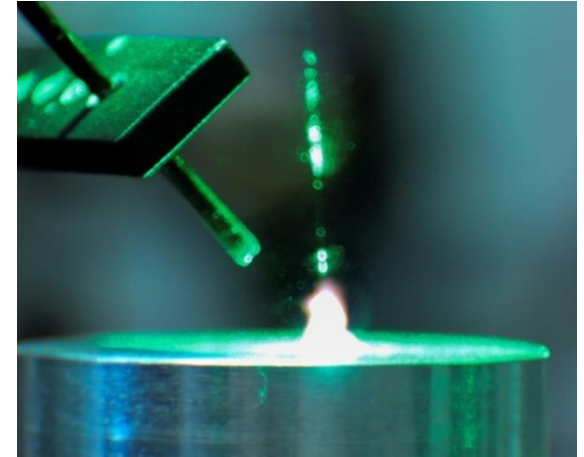
@GRAcroplands

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MAIN AMBITIONS

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- To maintain Networks and Special Activities of CRG running with new initiatives and scientific themes, as Inorganic C balance (ongoing effort)
- To support scientific cooperation in new projects and elaboration of new Flagships, as NFert (ongoing effort)
- To provide guidance to all potential stakeholders on topics of C neutrality, co-benefits and circularity. Such guidance can take the form of decision aids, outcomes from CRG-led publications, etc.
- To include with emphasis those aspects related to Co-benefits on Mitigation GHG emissions practices within CRG activities.



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GRA Council meeting, webcast from Australia

23 - 25 March 2021

Joint Research Group Recommendations

Research Group requests to Council Supporting the Co-Chairs & Networks

CRG input

- To consider GRA strategy and countries members interest to work in efficient mechanisms to establish close cooperation with private corporations on Carbon Neutrality, Circularity and Mitigation Co-benefits in the ESG (Environmental, Social and Governance) context
- Identify research topics where synergistic outcomes are likely between GRA research groups
- Provide explicit allocation of time for co-chair position, not an add-on duty. Also, incentivize the position.
- Consider a set duration of service as co-chair (e.g., up to X years)



- Thank you very much for your kind attention!

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Livestock Research Group Report

Harry Clark, Richard Dewhurst and Sinéad Waters

LIVESTOCK RESEARCH GROUP

RECENT ACHIEVEMENTS

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13th Annual Livestock Research Group Meeting

6-7 October 2021 (virtual)

Fuller report available:

<https://globalresearchalliance.org/publication-library/?doctype=220&research-group=212>

Co-Chairs:

Sinéad Waters (Ireland),
Richard Dewhurst (United Kingdom)
and Harry Clark (New Zealand)

Participants:

92 participants, from 43 member
countries and 9 partner organisations

LRG network coordinators:

Provided updates

Science priorities identified:

Flagship ideas – feed additives;
rumen microbiome;
‘Science into Practice’ – behavioural
change and KE;
Collaboration between networks
(e.g. large databases held by FNN
and MMN; methane proxies and
microbial genomics);
LMIC involvement (e.g. recent
ERANET ‘circularity’ call)

2022 meeting also now planned as virtual – increased participation

LIVESTOCK RESEARCH GROUP

RECENT ACHIEVEMENTS

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Delivery from Networks

Animal Selection Genetics and Genomics Network

Strong global community of well over 150 members.

3-hour workshop on rumen proxies held June 2021 – well attended and great discussion

Produced a review on proxies and now developing a collaborative project

Animal Health Network

New leadership (Nick Wheelhouse and Seyda Özkan) with exciting ideas for linking to other global animal health networks – GBAD, FAO, Galvmed.....)

Most recent webinar with 32 participants

Rumen Microbial Genomics Network

Funded collaborative projects – RumenPredict, MASTER and new EU project **HoloRuminant** provide a strong core to this network

Network meeting linked to 12th International Symposium on Gut Microbiology (INRAE/Rowett)



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Delivery from Networks

Feed and Nutrition Network

New chair David Yanez-Ruiz, CSIC (Spain)

Members contributed to a major review paper on feed additives

Projects

Global Network and Capturing Effects of Diet on Emissions from Ruminant Systems (CEDERS) has been a unifying project

Development of two enteric methane mitigation databases – now increasing work with partners in South America and SE Asia (including through GRA role in recent calls)

Virtual workshop in November 2021 reviewed these international projects

Manure Management Network

Webinar in February 2021 about the DATAMAN and MELS (Mitigation Emissions from Livestock Systems) projects.

MELS – focus on Housing and Storage systems is an extension of the DATAMAN project - running until end of 2022.

Linking many other projects around the globe – refining inventories; investigating mitigation technologies; improving nutrient efficiency and informing policy



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MAIN AMBITIONS

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Networks

Continued Support of networks

Significant support to help networks – especially those without major core projects

Programme of webinars

Has worked well for most networks and will continue alongside meetings allied to conferences in each field

Refreshing leadership

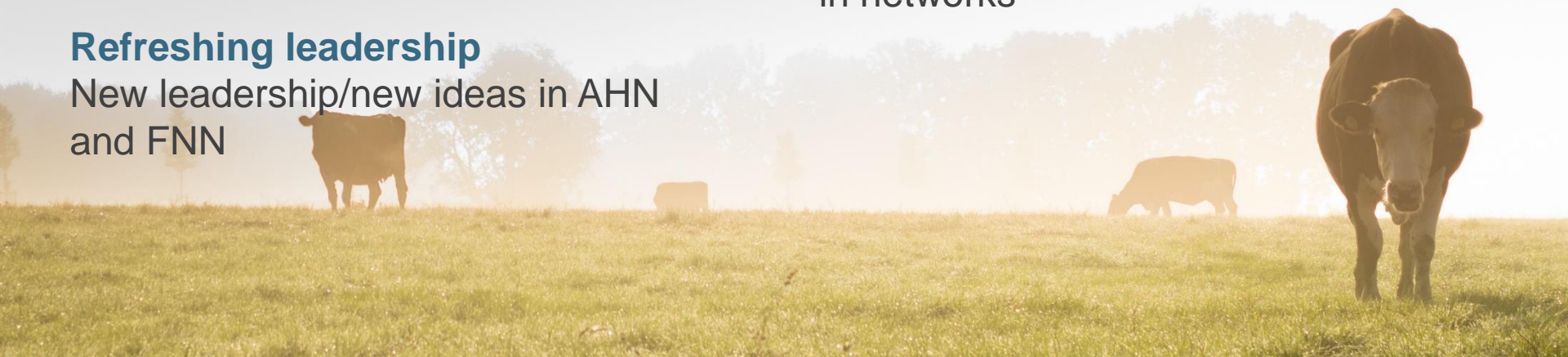
New leadership/new ideas in AHN and FNN

Funding

Signposting funding for smaller items, such as capability development, and always looking for opportunities for large collaborative projects

Network Activity

Facilitate **dialogue among scientists** from different GRA member nations to increase membership and involvement in networks



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Capacity Building, inventory and mitigation support

Collaboration with key organisations working on capability development and improved livestock inventories, including:

GRA providing technical support for a new project for the Global dairy Platform - working with FAO and partner organisations on **'Pathways to Dairy Net Zero'**

CAAFS – production of a technical manual providing evidence for **effects and mechanisms of different methane inhibitors**

Implementing **Tier 2 inventory development & mitigation research support** in East Africa (6 countries) & ASEAN region (6 countries) – NZ Government funding.

Undertake **strategic literature reviews & horizon scans** to identify priority science areas for LRG collaborative mitigation activities. We have recently produced reviews on:

Methane proxy measurements

Rumen microbiology and enteric methane

Biological Nitrogen Inhibitors



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Integrative Research Group Report

Jean-François Soussana, Pamela Joosse and Lee Nelson

CO-CHAIRS

- Jean-Francois Soussana, INRAE, France;
- Pamela Joosse, AAFC, Canada;
- Lee Nelson, ACIAR → *Matthew Bartlett, AWE, Australia

FOUR NETWORKS

SOIL CARBON SEQUESTRATION

- Peter Smith (University of Aberdeen)
- Jean-François Soussana (INRAE)

FARM to REGIONAL SCALE INTEGRATION

- Claus Deblitz, Yelto Zimmer and Nina Grassnick (Thunen Institute of Farm Economics/ *agri benchmark*)

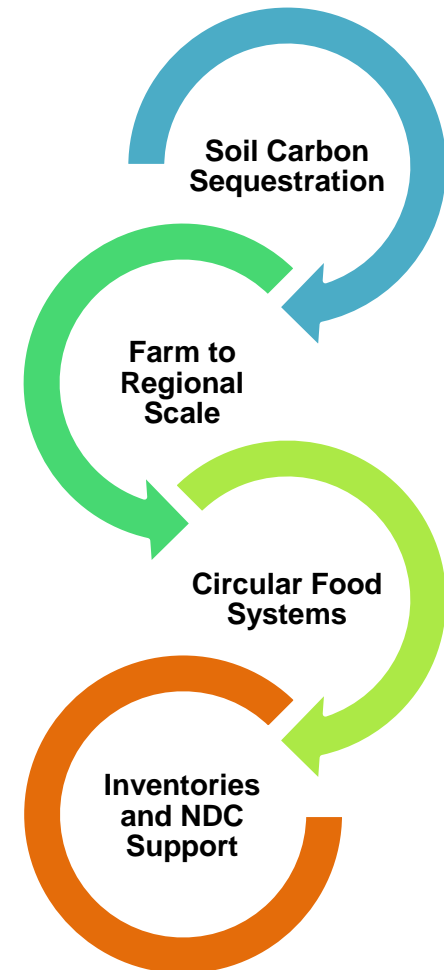
CIRCULAR FOOD SYSTEMS

- Karin Andeweg, Flavia Casu and Henk van der Mheen (WUR)

INVENTORIES & NDC SUPPORT

- Hazelle Tomlin (MPI, New Zealand)
- Ngondzasche Chirinda (Mohammed VI Polytechnic University)
- Richard Eckard → *Natalie Doran Brown (University of Melbourne)
- *Mai Van Trinh (Vietnam)

*incoming



INTEGRATIVE RESEARCH GROUP

ACHIEVEMENTS & AMBITIONS

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FARM to REGIONAL SCALE INTEGRATION





- Webinar Series:
 - (1) economic analysis of climate change,
 - (2) carbon farming with no-tillage and straw incorporation,
 - (3) silvopastoral systems
- Flagship project initiated:
“GHG mitigation in cattle farming – how much is possible where and what are the economic implications on-farm?”
- Flagship project development:
 - Get support from GRA council members
 - Produce first results for beef and dairy with selected countries by June 2022
 - Produce joint publication by end of 2022; identify funding opportunities
- Examine options for flagship project on GHG mitigation economics in crop production
- Continue Webinar series
- Update website after Council meeting

INTEGRATIVE RESEARCH GROUP ACHIEVEMENTS & AMBITIONS

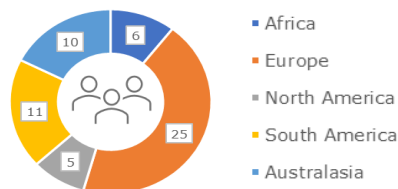
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CIRCULAR FOOD SYSTEMS

Kick-off workshop 22-23 June 2021

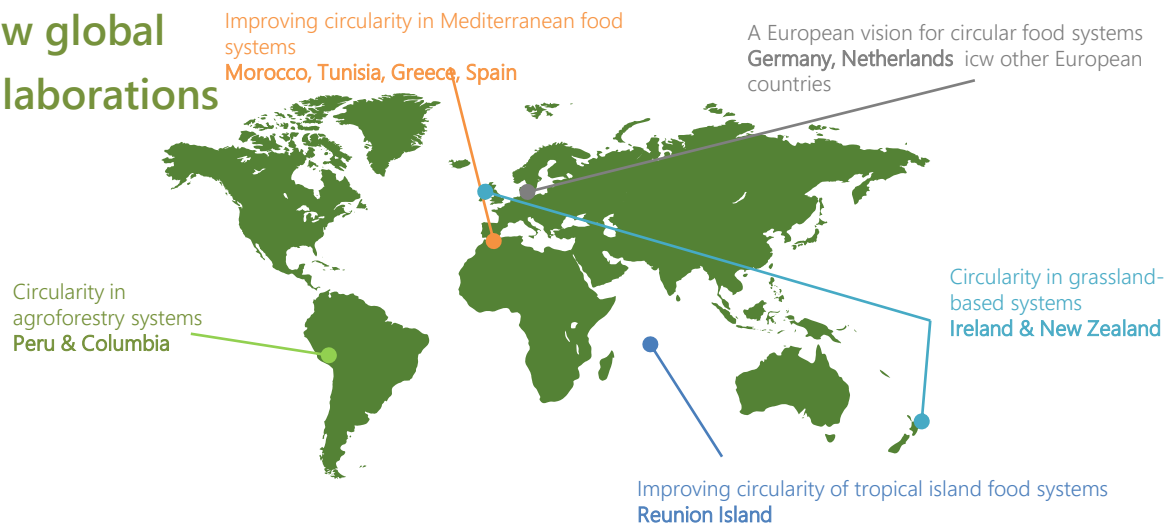
-  3 Presentation
-  10 Interactive sessions
-  Workshop report
-  Blogpost

57 PARTICIPANTS from 36 countries



-  4 **Abstracts** on circularity in different food system from across the world
-  11 Short communications (publication in preparation)
-  12 Short **video's** on circularity in food systems

New global collaborations



Outlook to 2022

- White paper 'Circular Food Systems across the world'.
- Results of case studies
- Aligning with ERA-net projects
- Session at Circular@WUR conference
- Thematic discussion groups – exploring useful indicator(s) for circularity



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SOIL CARBON NETWORK

STRATEGIC RESEARCH AGENDA

PILLAR 4:
Enabling environmental
and knowledge co-
creation

PILLAR 3:
Agro-ecological
& technological
innovations

PILLAR 2:
Monitoring Reporting
and Verification (MRV)
system

PILLAR 1:
Frontier Science

INTERNATIONAL RESEARCH CONSORTIUM

Collaborative Knowledge

Capacity Building

Coordination

Governance

Research

- Universities
- National and International Institutes

Private
sector

- Corporates, SME's, Startups
- Consultancies, extension services,
- Associations of farmers, foresters, land owners, etc.
- NGOs, Foundations
- Financial sector

Public

- Research agencies,
- Development and Environment agencies
- Space agencies
- International partnerships and initiatives



Transition from CIRCASA to ORCASA (Operationalising the International Research Consortium on Soil Carbon)

Extension of the strategic R&I agenda to non-agricultural land uses

Launch of the governance (General Assembly, Steering Committee)

International standard for monitoring soil organic carbon change combining data, models and remote sensing

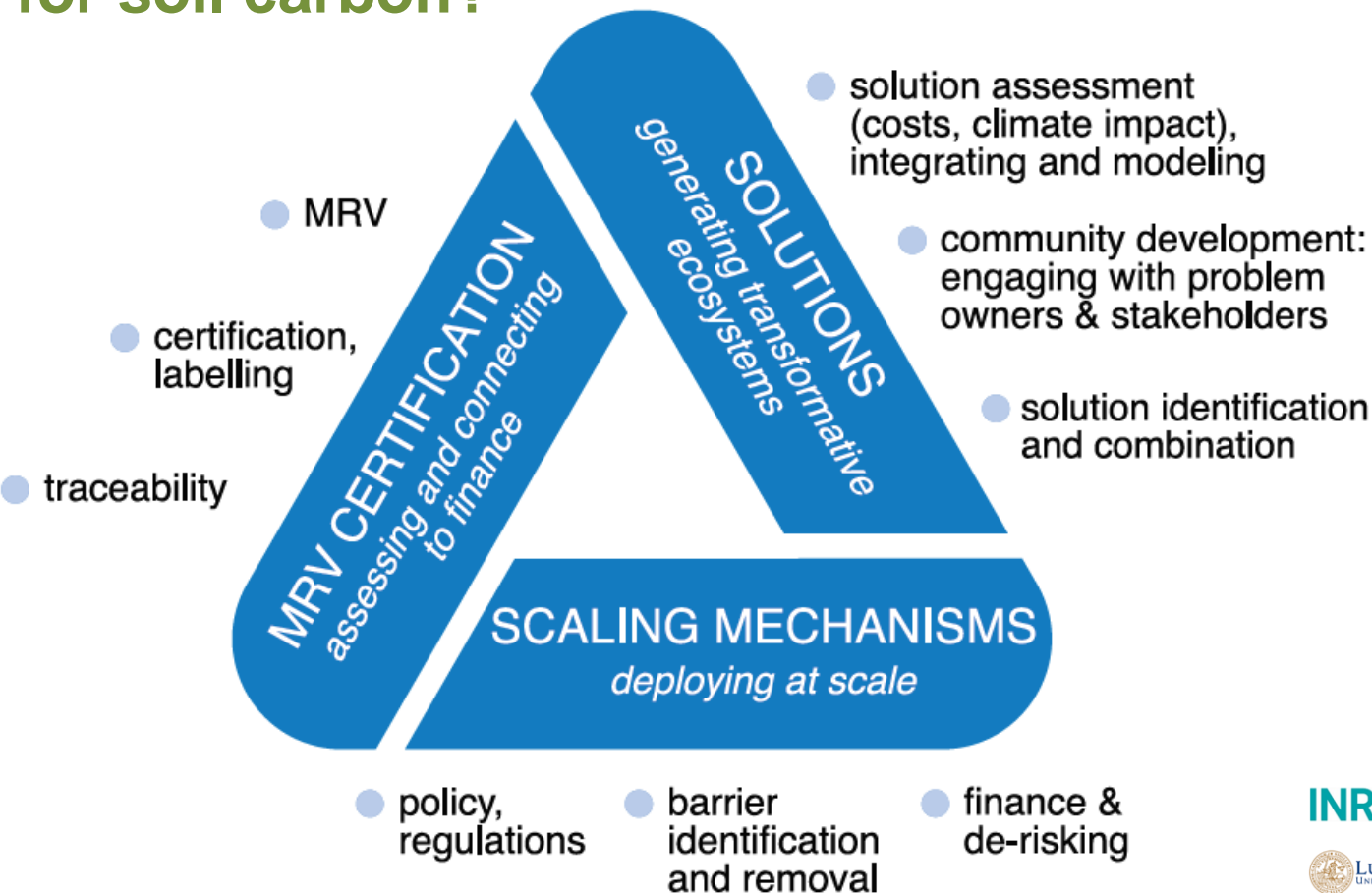
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SOIL CARBON NETWORK

How to accelerate socio-technical transitions for soil carbon?



Funded by the
European Union



SCARF

Soil CARbon Farming
network

INRAE



ICCE INSTITUTE FOR CLIMATE ECONOMICS



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INVENTORIES & NDC NETWORK

Network Meeting held June 2 and 3, 2021

- 60 participants from Africa, Europe, North American, ASEAN and LAC countries with diverse backgrounds in Inventory development and agriculture mitigation policy.

Agricultural Compilers Meeting, 17 Jan 2022

- **Participation: 35 countries** were represented from Africa, Europe, LAC and Asia, North America and Oceania.
- **Pre-survey data:** inventory compilers struggle with i) data, ii) financial constraints, iii) emission factors, iv) expertise and v) inventory relationships.
- **Two focus areas :**
 - **a resource** summarizing ag. sector methods of emission calculation (with keyword search across multiple countries' methods)
 - **a set of guidelines** on capturing mitigation in national level inventories, for **proper validation of emission reductions and potential for Governments to formally issue carbon credits.**

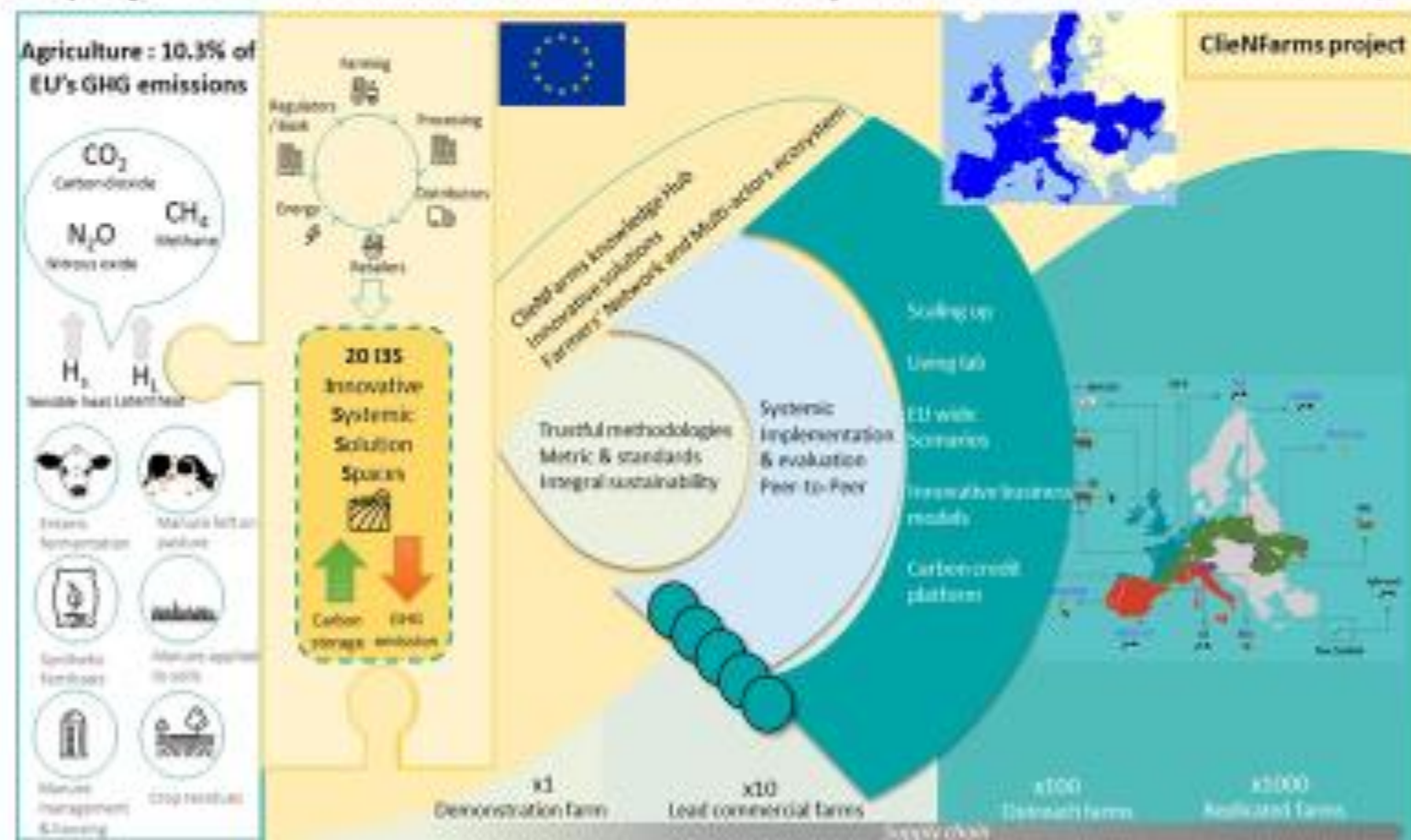
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PILOT CARBON NEUTRAL FARMS?

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Studying pilot carbon neutral farms across world regions: integrating across IRG networks, and with LRG (e.g. Net Zero Carbon Dairying), CRG and RRG groups.

New project on carbon neutral farms in Europe: H2020. Kick-off: Feb. 22, 2022





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Paddy Rice Research Group Report

Yasukazu Hosen, Álvaro Roel and Ghislain Kanfany

PADDY RICE RESEARCH GROUP

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Webinar “New tools for monitoring, reporting, and verification of GHG mitigation in rice”

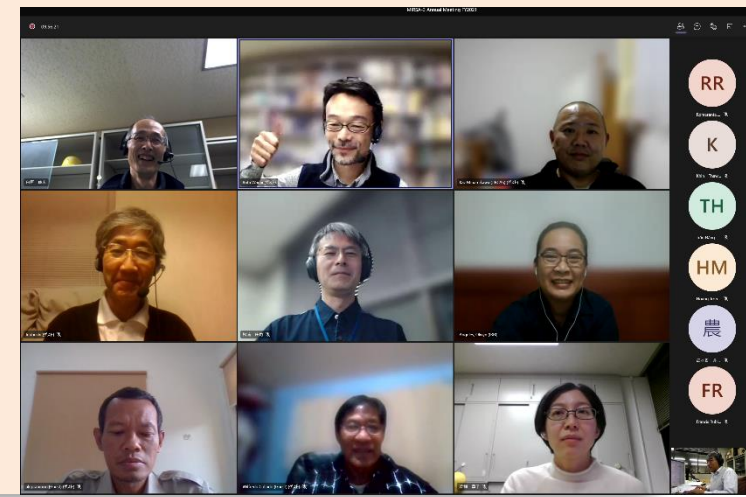
- 28 April and 18 May 2021
- *Organizer:* GRA and CGIAR (IRRI)
- *Target group:* PRRG, researchers, government officers from rice-growing countries



MIRSA-3 Project (27 Nov 2018 – 31 Mar 2023)

- *Target region:* Southeast Asia
- *Key indicators:* ① GHG, ② grain yield, and ③ sustainability
- *Examined:* ① water mgmt. x ② org. appl. x ③ cultivar
- *Approaches:* ① direct measurement in the field, ② detailed understanding of the quality and quantity of soil C, and ③ modeling
- *Fund contributor:* Japan's MAFF
- *Members/Partners:* Indonesia, Japan, Philippines, Vietnam, CGIAR (IRRI)
- *Lead:* Yasukazu Hosen (NARO, Japan)
- *Project meeting:* 18 Nov 2021, 17 participants

Asia



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“More rice with less emissions and less water consumption” Project (2017–2022)

- To improve adoption of AWD by farmers, validating appropriate AWD in farmers' fields in South America
- *Fund contributor:* FONTAGRO
- *Members/Partners:* Colombia, Perú, Chile, CGIAR (CIAT, CCAFS), FONTAGRO + FLAR
- *Lead:* Patricia Guzman (Fedearroz), INIA Chile, and Universidad de la Molina

“More productive and sustainable rice for Latin America” Project (2019–2021)

- To disseminate the knowledge generated in the countries where the Intensive Rice Farming System methodology has already been adapted, validated and used, in order to advance in the regional scaling of this technology
- *Fund contributor:* FONTAGRO
- *Members/Partners:* Chile, Panama, Argentina

Publication: Hube S, Donoso G, Alfaro M, Becerra V & Paredes M. 2021.

“Greenhouse gas emissions in rice cultivation in Chile.” Chap. 25 In *100 years of rice crop in Chile within an international context 1920–2020 (INIA Book No. 40)*, edited by Paredes M, Becerra V & Donoso G, 674–686. Chillán: INIA. (in Spanish)

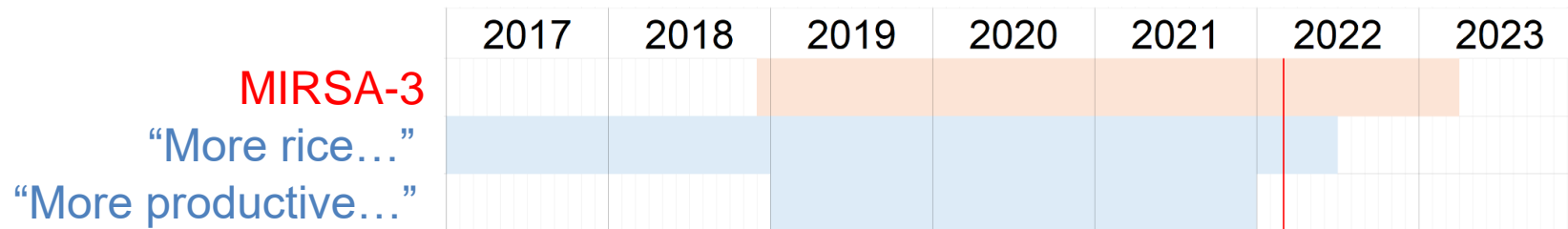
Americas



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MAIN AMBITIONS

Steady implementation of ongoing projects and publication of results



- **MIRSA-3:** publication plan

- ✓ Rice yield and GHG emission results of field and/or laboratory experiments:
 - in Vietnam
 - in Indonesia
 - Meta-analysis for IR64 cultivar
 - Validation results of a modified DNDC-Rice model and GHG emission projections
- ✓ Soil C sequestration:
 - A study of the quality and quantity of soil C from measured data
 - Validation results of a modified RothC model and C sequestration projections

PADDY RICE RESEARCH GROUP

MAIN AMBITIONS

Creation of new projects

- **Asia:**

- ✓ The possibility of a successor project of **MIRSA-3** is being explored.
- ✓ Planning for “MARDI-NARO collaboration program on agricultural GHG inventory” is underway.
 - *Expected outcomes:* Development of local emission factors in Malaysia
 - *Fund contributor:* Malaysian Agricultural Research and Development Institute (MARDI), Ministry of Agriculture and Food Industry, Malaysia
 - *Members:* Japan (National Agriculture and Food Research Organization (NARO)), Malaysia

- **Asia-Americas:**

- ✓ “Japan-U.S. Research Collaboration on Climate Change” is being prepared (expected to start in this year).
 - *Fund contributors:* Japan’s MAFF and USDA

- **Americas:** discussed at the next Americas Sub-Group meeting planned to be held on 12 July 2022 at the Delta Water Management Research Unit, USDA-ARS, Jonesboro, Arkansas, USA (with web).

- **Africa:** we would like to start some kind of activity.

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Joint Research Group Key messages

Research Group Key messages to Council

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General

Challenges continued in 2021 due to disruptions from Covid-19

Research Groups & networks continued to adopt new ways of working and have been able to advance collaborative efforts – e.g. webinars

Greater reach by virtual interactions has strong benefits for the GRA community

Networks continue to need support/encouragement to seek opportunities to involve LMICs (success ERA-GAS call 2021)

A need to develop greater links from research to knowledge transfer and policy



Research Group Key messages to Council

General

Need assistance from council to publicise resources available within networks to policy and industry for application (e.g., DATAMAN)

Work with council to develop country pages and keep live. Include case studies

Capability development continuing although international travel restrictions impose limitations

Thanks to GRA member countries for their continued support in very challenging situations



Research Group Key messages to Council

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Co-Chairs & Networks

Tri-chairing arrangements in place for most Research Groups and these arrangement are working well

Regular virtual meetings continued

Thank you to those countries who increased their support to existing co-chairs and provided support for new co-chairs; it makes a big difference!

Some co-chairs are still unsupported which limits their ability to engage; if support cannot be provided, countries should reconsider their offer to co-chair research groups



Research Group Key messages to Council

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Flagships

Strongly support the Flagship concept although its success will depend on adequate resourcing

Successful call for **new flagships in 2021** – shortlisting process completed and a number being developed

Refining and seeking support for Flagship Project proposals underway

Acknowledge the key role of the Special Representative and his efforts to develop Flagship concepts and coordinate and mobilise resources

