



GLOBAL RESEARCH ALLIANCE

ON AGRICULTURAL GREENHOUSE GASES

Integrative Research Group Meeting

CIAT, Cali, Feb. 4-5, 2019

Pamela Joosse



Jean-François Soussana



Richard Eckard



Climate negotiations & Agriculture



Renewed interest in land based mitigation options (ca. 120 countries include the land sector in their NDCs)

NDCs also include adaptation for developing countries

Soil carbon sequestration initiative (4/1000) in the Lima-Paris Action Agenda

Outline

Context: climate negotiations on agriculture and IPCC reports

IRG vision and scope

IRG networks, collaborations and activities

IRG ambitions

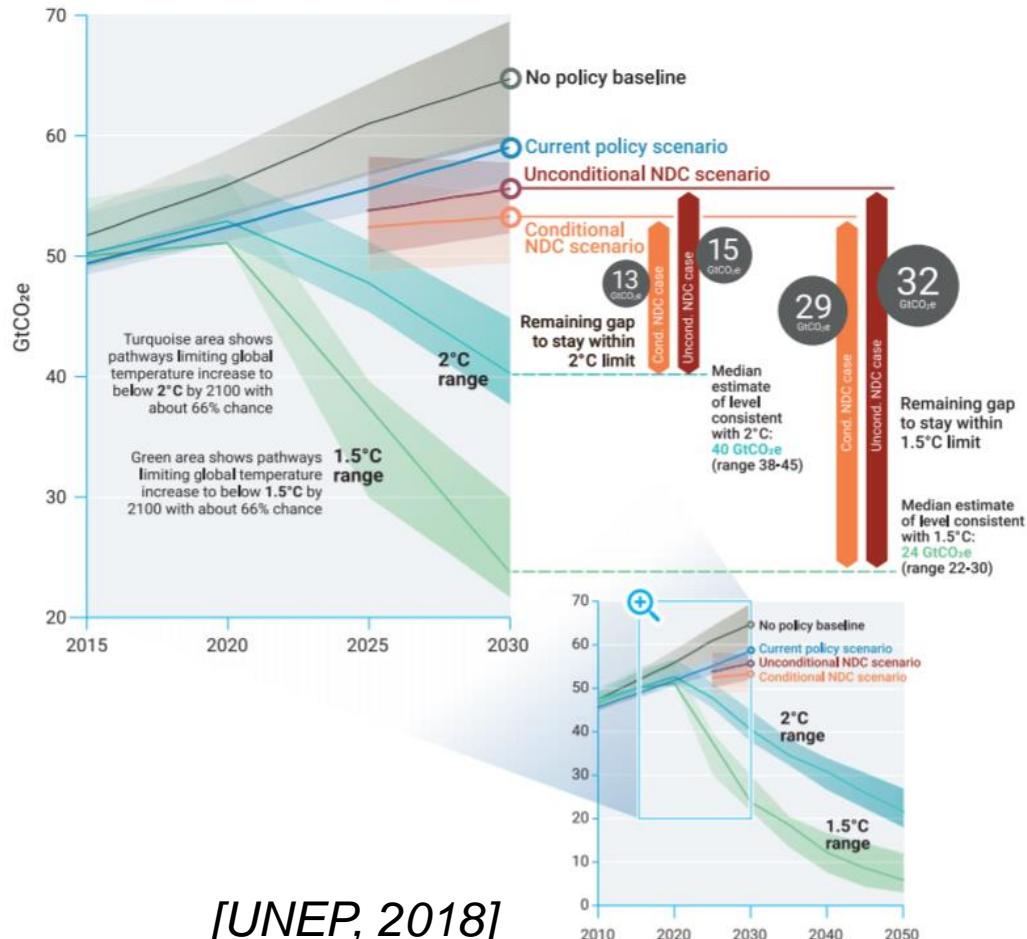
Pledges for the Paris Agreement

Emissions Gap Report 2018

November 2018

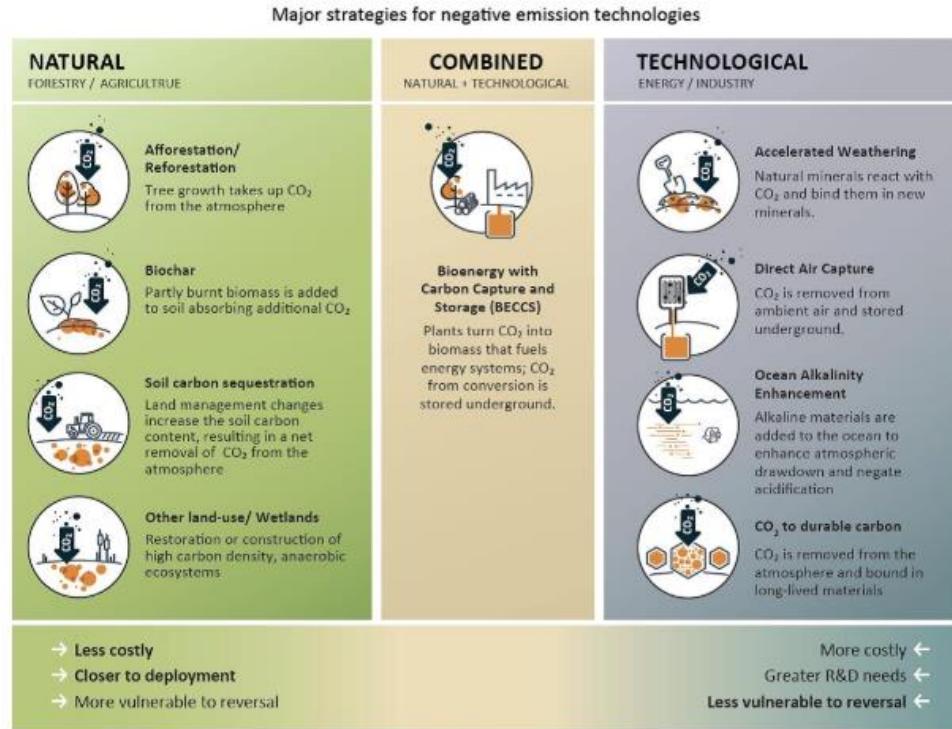
- 128 countries include the Agriculture, Forestry and Land Use sector in their pledges
- By 2030, a gap of 13 billion tons CO₂eq prevents reaching the targeted +2°C maximum global warming threshold (29 GtCO₂eq in the case of the 1.5 °C target)

Figure ES.3: Global greenhouse gas emissions under different scenarios and the emissions gap in 2030 (median estimate and 10th to 90th percentile range).



What role will ‘negative emissions’ play in limiting warming to 1.5C?

“Under emissions in line with current pledges under the Paris Agreement, global warming is expected to surpass 1.5°C, even if they are supplemented with very challenging increases in the scale and ambition of mitigation after 2030.” [IPCC,2018]

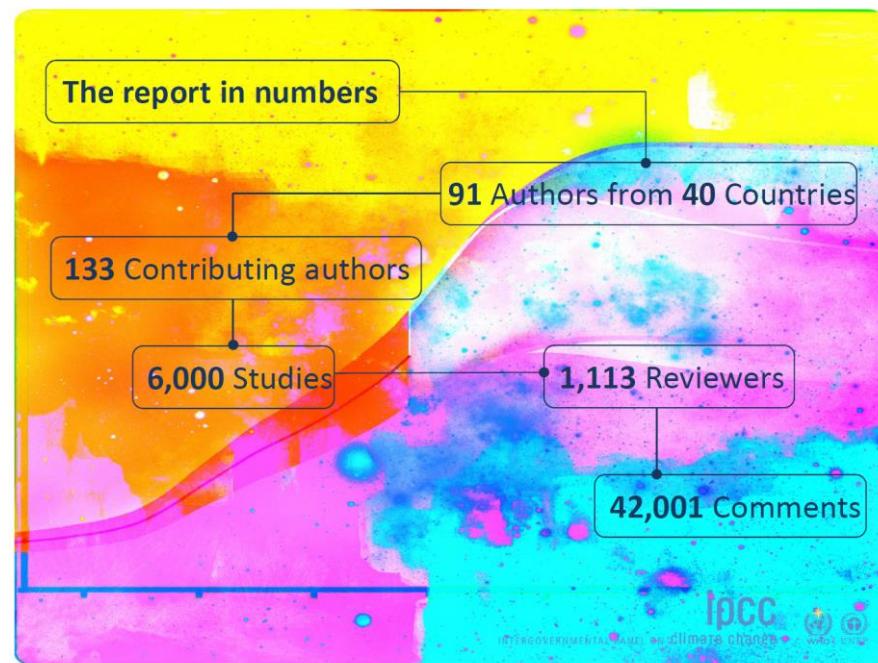
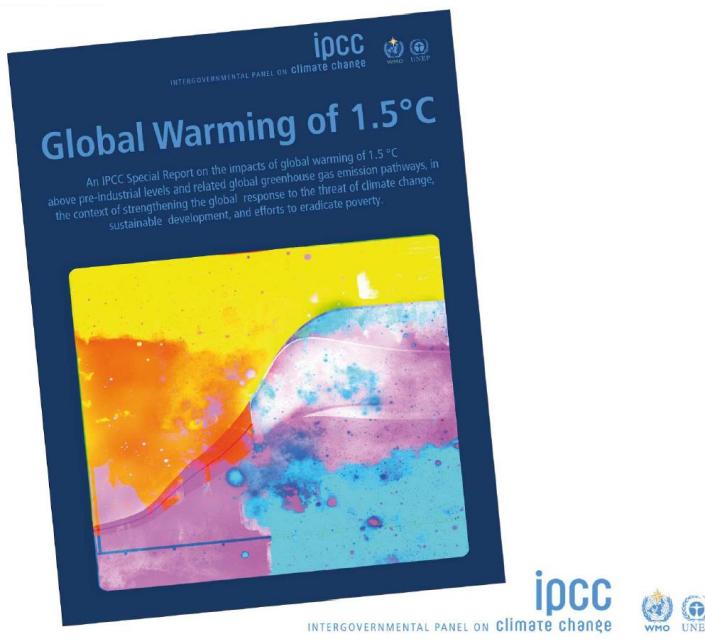


The emissions gap report- Bridging the gap-sectorial GHG emission reductions potentials in 2030 [UNEP,2017]

- The IPCC report acknowledges that limiting warming to 1.5° C will require the use of “negative emissions technologies” – methods that remove CO₂ from the atmosphere.
- SOC sequestration is among the cheapest methods with the greatest potential [UNEP,2017]

Introduction and Context

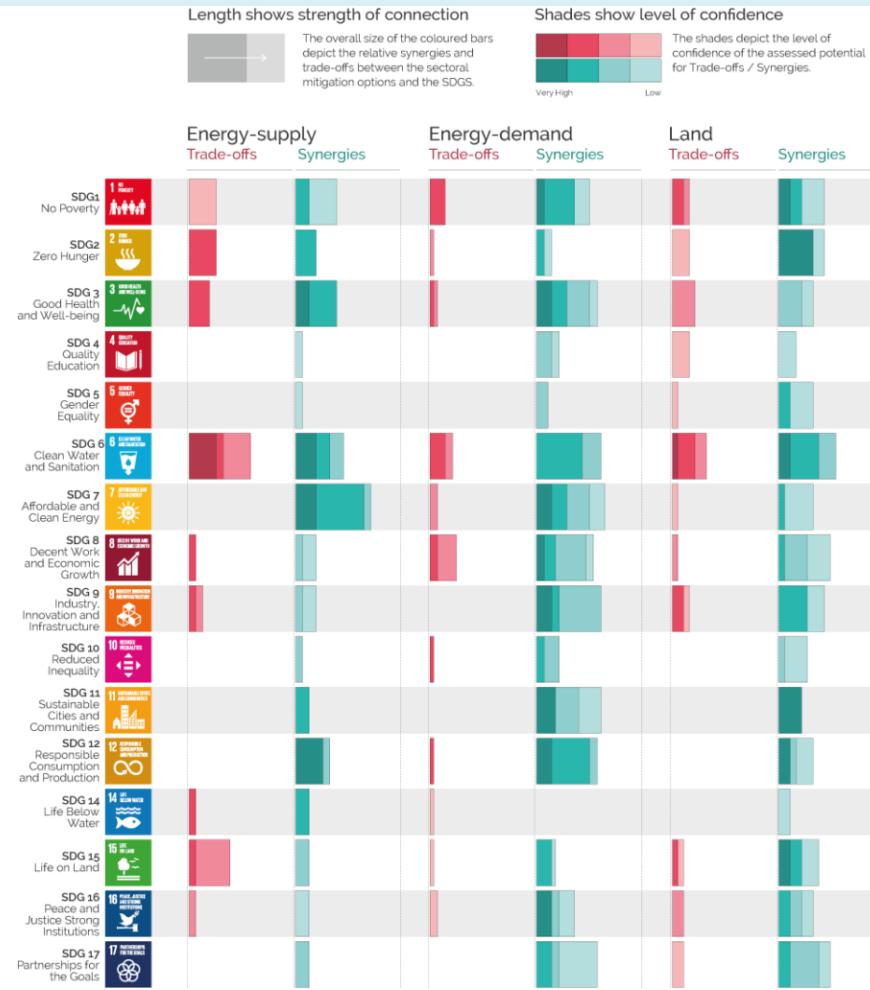
IPCC SR 1.5 report



Mitigation options and SDGs

“Trade-offs between mitigation and adaptation, when limiting global warming to 1.5C, such as when bioenergy crops, reforestation or afforestation encroach on land needed for agricultural adaptation, can undermine food security, livelihoods, ecosystem functions and services and other aspects of sustainable development.”

- Options from land sector could come with considerable impacts on clean water and sanitation, as well as on life on land
- These options rely on BECCS and afforestation, which, if implemented on a large scale, are expected to take up large amounts of land and other resources, such as water.



[Summary for Policymakers, IPCC 2021]

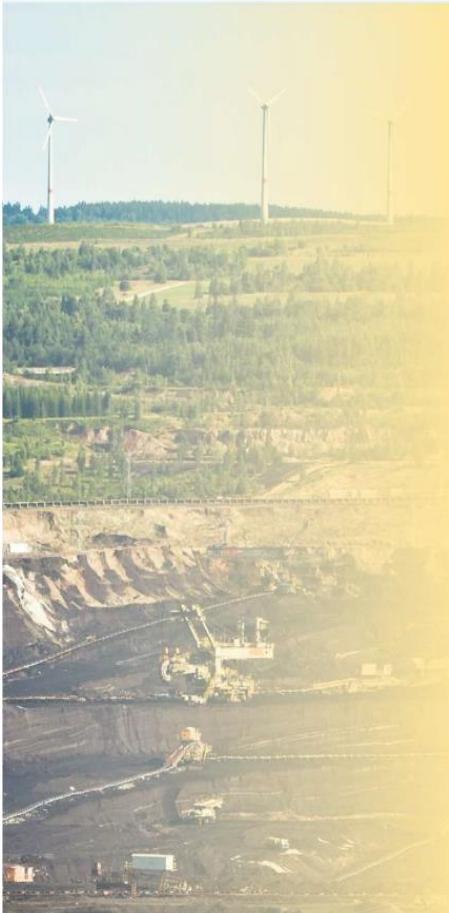


Ashley Cooper / Aurora Photos

Where are we now?

Since pre-industrial times, human activities have caused approximately 1°C of global warming.

- Already seeing consequences for people, nature and livelihoods
- At current rate, would reach 1.5°C between 2030 and 2052
- Past emissions alone do not commit the world to 1.5°C



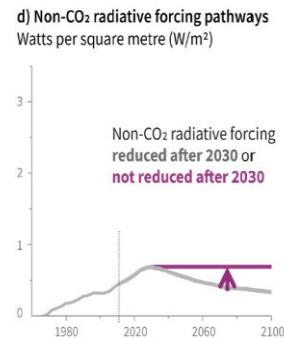
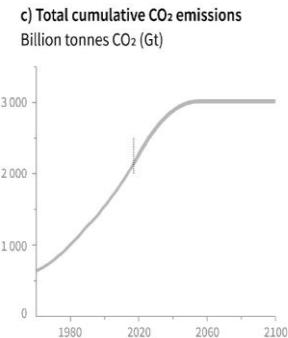
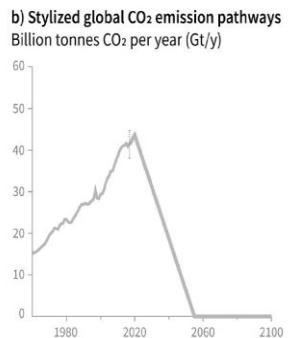
Greenhouse gas emissions pathways

- To limit warming to 1.5°C, CO₂ emissions fall by about 45% by 2030 (from 2010 levels)
↳ Compared to 20% for 2°C
- To limit warming to 1.5°C, CO₂ emissions would need to reach 'net zero' around 2050
↳ Compared to around 2075 for 2°C
- Reducing non-CO₂ emissions would have direct and immediate health benefits

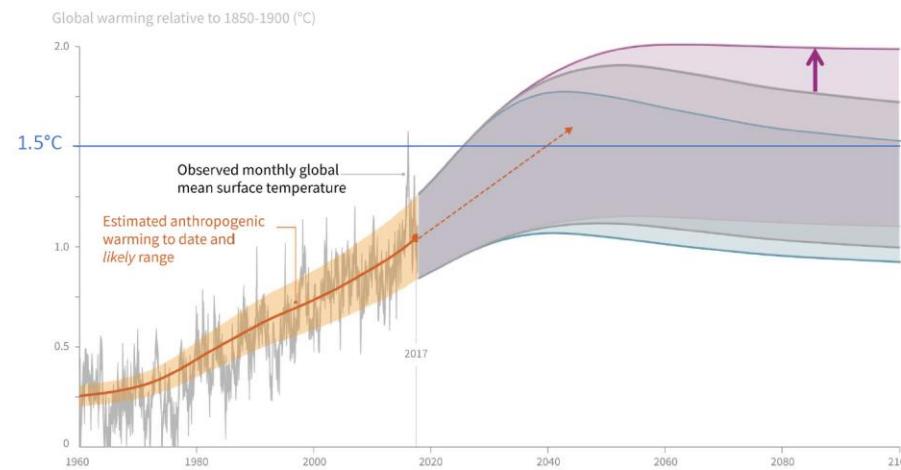
Robert van Waarden / Aurora Photos

Role of agriculture for methane and nitrous oxide emissions

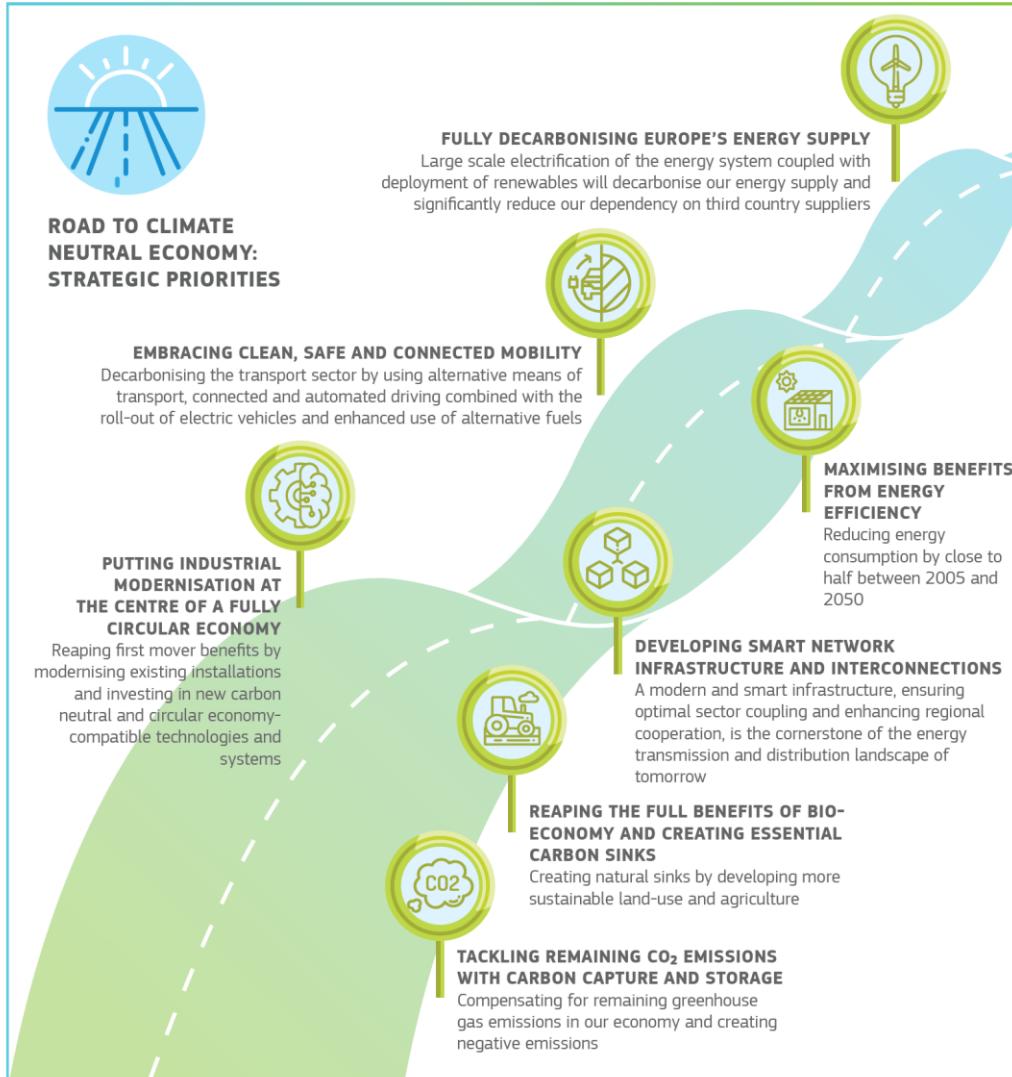
Future temperatures are also affected by radiative forcing due to methane, aerosols, nitrous oxide and other forcing agents



No reduction of non-CO₂ radiative forcing after 2030 results in a lower probability of limiting warming to 1.5°C



In the EU, a commitment towards carbon neutrality by 2050



IRG vision and scope

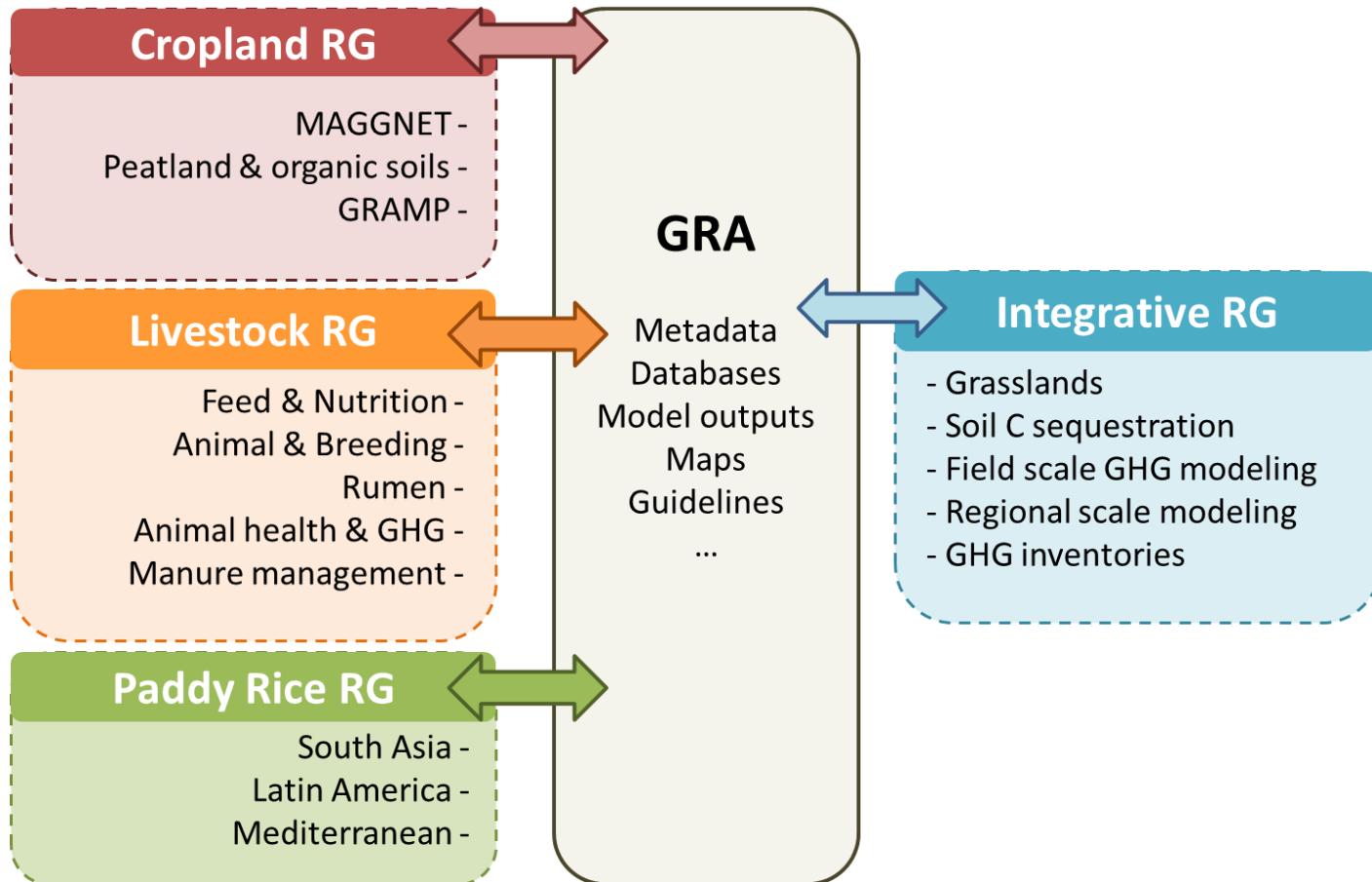
Vision

- Collaborative work to develop the knowledge and capabilities for *estimation, monitoring, and projection* of GHG emissions within and across agricultural systems with focus on soil carbon sequestration

Scope: 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.

Knowledge integration and scaling



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 meetings

- Side by side with FAO/IPCC meeting on soil carbon (January 2017, Rome)
- January 2018, Paris
- Side by side with CIRCASA meeting (CIAT, Cali, February 2019)

INTEGRATIVE RESEARCH GROUP

OBJECTIVES

- Estimate greenhouse gases (GHG) emissions across agricultural systems at different scales, from the field to the region, to mitigate the impact of agriculture on climate change,

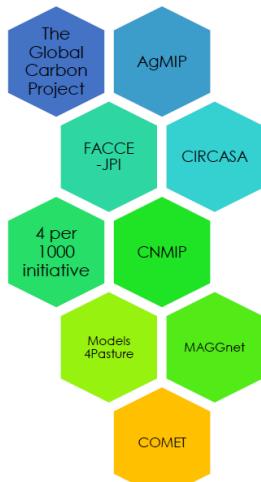
MEANS

- Based on voluntary efforts of countries members of the GRA
- By bringing together efforts of countries that are already supporting research projects
- Rely on activities led by the three other Research Groups of the GRA (Livestock, Croplands and Paddy Rice)

ACTIONS

- Enhance international collaboration
- Facilitate cooperation
- Disseminate knowledge on data, models and assessment tools through members and partners
- Contribute to capacity building (e.g. support mitigation policy design, including Nationally Determined Contributions (NDCs) to meet the Paris agreement on climate change)

COLLABORATIVE PARTNERS AND PROJECTS



Countries contributing to IRG

Argentina, Australia, Belgium, Bolivia, Brazil, Canada, Chile, China, Colombia, Denmark, Ecuador, Egypt, Finland, France, Germany, Ghana, Honduras, Ireland, Italy, Japan, Lithuania, Mexico, Netherlands, New Zealand, Nicaragua, Norway, Panama, Paraguay, Peru, Philippines, Republic of Korea, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Thailand, Tunisia, United Kingdom, United States, Uruguay

Integrative Research Group: Recent achievements (1)

Second IRG meeting: Paris, January 2018, 34 participants, representing 14 Alliance member countries and invited experts.

Next IRG meeting: CIAT, Colombia, in Feb. 2019.

Workplan of the IRG and of the four networks adopted

Changes in Co-chairs:

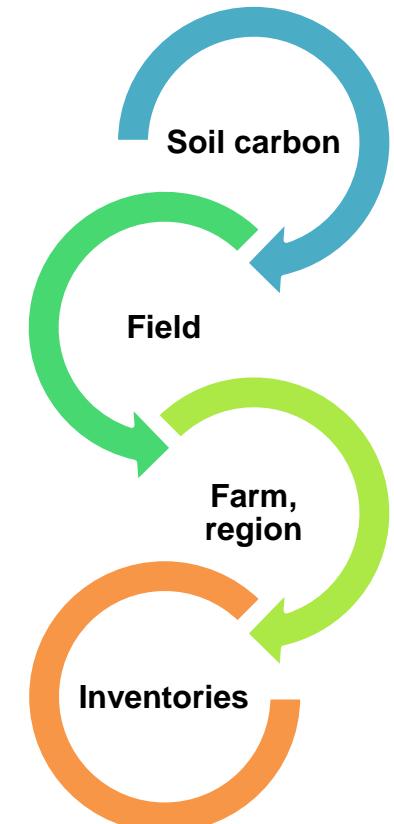
- Canada : Brian McConkey (AAC) → Pamela Joosse (AAC)
- Australia : Robyn Johnston (ACIAR) → Richard Eckard (Melbourne U.)

IRG streamlined into 4 networks providing cross-scale knowledge integration, including grasslands and delivering to 2 flagships

- Soil Carbon Sequestration
- Field scale
- Farm to Regional scale
- Greenhouse Gas Inventories

Flagship

Flagship



First workshop of the Farm 2 Regional network in Paris, January 2018
Agreement on the F2R short and longer-term plan, including further meetings and on the scope and expectations of the network

Integrative Research Group: Recent achievements (2)

SOIL CARBON SEQUESTRATION NETWORK

- Intercomparison of soil carbon models with bare fallows
- Planning for systematic review of tropical agriculture on soil C sequestration

FIELD INTEGRATION NETWORK

- Comparison of 24 models for simulating yield, GHG emissions and soil carbon published.
- Testing the sensitivity of models to climate change, with AgMIP.
- Testing models and their limitations for ability to model mitigation options published

FARM AND REGIONAL SCALE INTEGRATION NETWORK

- Integrating farm data and farm emission models across countries
- Improving global maps of land degradation and soil carbon (CIRCASA H2020)
- Modelling global land degradation impacts on crop yields
- Modelling global soil carbon sequestration potentials and comparing with agriculture GHG emissions (CIRCASA H2020)
- Contribution to global maps and global modelling developed by Chapter 6 of IPCC Land and Climate Change report (SRLCC)

Integrative Research Group Further ambitions for networks

SOIL CARBON SEQUESTRATION NETWORK

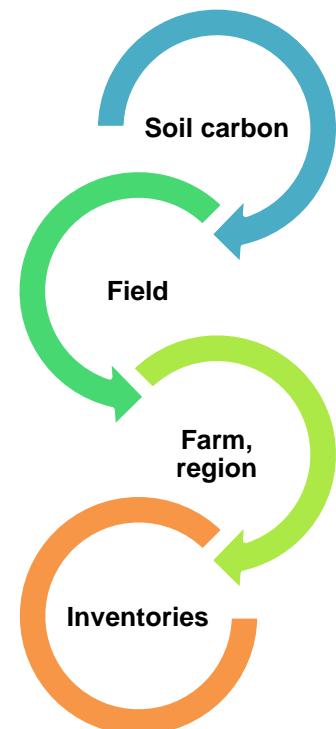
- Synthesis of existing indirect carbon budgeting methods estimating changes in SOC stocks (H2020 NIVA project submitted) and of offsetting methods for domestic carbon projects (regional carbon demonstrators, submitted for French ADEME funding)
- Developing regional projects, such as the Latin America project on legumes in grasslands and similar projects in Europe

FARM AND REGIONAL SCALE INTEGRATION NETWORK

- Estimating costs of changes in farming practices providing SOC sequestration
- Training and capability building for the next generation of modellers
 - Soil carbon modelling workshop proposed for GGAA2019 in Brazil

GREENHOUSE GAS INVENTORIES NETWORK

- Comparison between bottom-up and top-down inventory approaches
- GRAMP for Tier3, using model ensembles
- Characterisation of GHG emissions from analogous production systems



Associated international projects



Coordination of International Research
Cooperation on soil CCarbon Sequestration
in Agriculture (EC funded)



Associated international initiatives



Outreach of the IRG

(tbc)



**THE BUSINESS CASE
FOR INVESTING IN
SOIL HEALTH**



Integrative Research Group

Further ambitions for the Group

- Develop a group communication plan (leaflet, website, social media, ...)
- Develop regionally funded projects, based on a template format for project proposal to help identifying opportunities, funding source, ...
- Identify partners that can support IRG
- Identify funding opportunities
- Develop a work plan for training activities
- Provide capability building to developing countries on methodologies to help validate GHG inventories and national plans (e.g. NDCs)
- Contribute on the science base of climate negotiations (Koronivia process)

Thank you for your attention!