The 4 ‰ Initiative :

Soils for Food security and Climate

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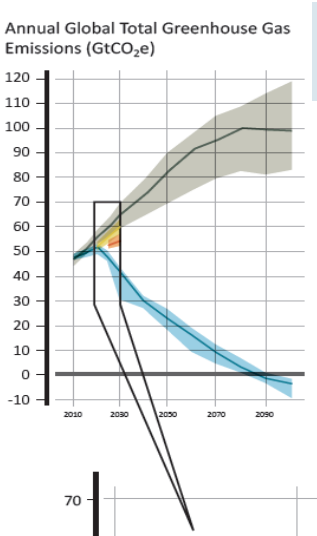
A large gap in emissions reduction by 2030 for 2° C

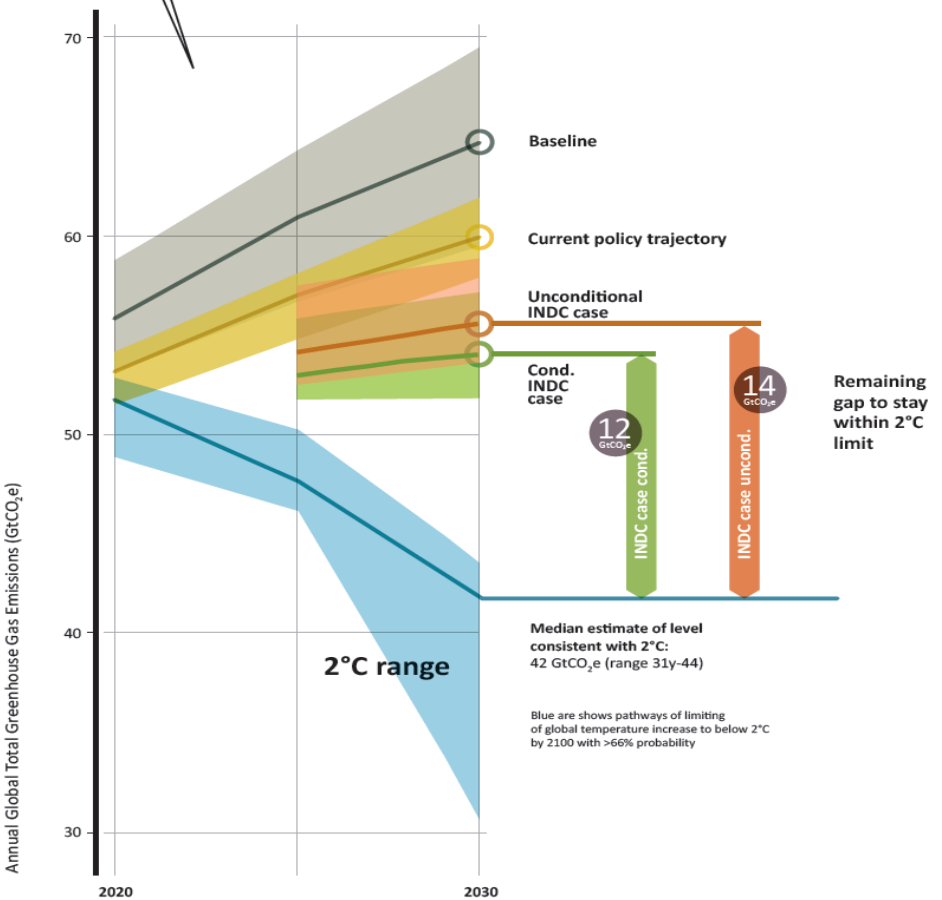
- By 2030, a gap of 12 Gt CO_{2e} with conditional INDCs prevents reaching the targeted +2°C maximum global warming threshold

- 129 countries include the AFOLU sector in their INDCs (Intended Nationally Determined Contributions)
  - **At least 25% of total committed GHG mitigation** ***[as estimated by the International Institute for Applied Systems Analysis, IIASA]***



The Emissions Gap Report 2015 – Executive Summary

[UNEP]



What is « The 4‰ initiative : Soils for food security and climate » ?

=> A multi-stakeholder Initiative launched by France with the support of FAO

⇒ One of the 6 initiatives of the Agriculture focus of the Lima – Paris Action Agenda (LPAA)

=> 1 objective: increase soil fertility thanks to carbon sequestration in soils

=> 3 major outcomes:

- **Improve food security**
- **Adapt** agriculture to climate change
- **Mitigate** GHG emissions

Why Soil Carbon?
Co-benefits for adaptation, land degradation neutrality and food security

2-3 times more carbon in soil organic matter than in atmospheric CO_2 [IPCC, 2013]

1.4 billion metric tons carbon could be stored annually in agricultural soils, equivalent to a storage rate of 0.48%/year in top soil [after IPCC, 2007, 2014]

Half of the agricultural soils are estimated to be degraded [FAO, 2006] The annual cost of fertilizer to replace nutrients lost to erosion is US $ 110 – US $ 200 billion (ITPS, 2016).

Emissions of 0.3–1.0 Gt C/yr through erosion of agricultural land (Chappell et al., 2015, NCC)

24-40 million metric tons additional grains per ton C stored in soils OM in developing countries [Lal , 2006]

Reduced yield variability after soil restoration leading to increased soil organic matter [Pan et al. , 2009]

Technical and economic potential

- There are technical uncertainties about the potential, but 3.4 GtC/yr in soils ('4/1000' target) is technically achievable

- Achieving that potential would double by 2030 the total mitigation encompassed by the currently published INDCs

- Economic potential is estimated at 1 Gt C/yr in agriculture (IIASA)
  - For a price of $120 per metric ton of CO_2 (compatible with the 2°C warming target)
  - In addition, local studies in Asia, Latin America and Africa show that best practices providing a 4/1000 increase in soil carbon have a large co-benefit: on average, a 1.3% increase in crop yields (Rosenstock et al., CGIAR)

Limits and co-benefits of soil carbon sequestration

- Co-benefits with food security (lower mitigation costs) and climate change adaptation (water infiltration and retention)
- Adoption of SOC sequestration measures will take time,
- SOC will increase only **over a finite period (30-50 yrs locally)**, up to the point when a new SOC equilibrium is approached,
- The **additional SOC stock will need to be monitored** and preserved by adapting land management practices to climate change,
- Soil phosphorus (P) and nitrogen (N) should be available (root symbioses could help)
- Soil and water management need to be combined, especially in dry regions

Official launch at the COP 21

- The initiative was officially launched on December 1st at COP21
- More than160 signatories (31 countries) already support the initiative

After the launch, building the initiative

Ahead of COP22, following the meeting in Meknès on April 28, an action plan and a research program consistent with the « Declaration of Paris »:

Action plan	➔ A multistakeholders platform to foster partnerships, ➔ A project assessment mechanism based on a reference framework
Scientific program	➔ An international research and scientific cooperation programme ➔ A digital resource center on soil carbon

A 4‰ consortium for an inclusive and effective governance

A light structure, with no legal personality ⇒
The consortium « 4 per 1000 »
soils for food security and climate

A declaration of intention to create and outline the consortium

Four bodies

Consultation & collaboration body	⇒	Forum of the partners of the initiative
Decision – making body	⇒	Meetings of the members of the consortium
Scientific body	⇒	Scientific and technical committee
Executive body	⇒	International secretariat

Scoping the 4 per 1000 international research program

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Towards an international research program

An evidence based and policy relevant programme…

Aimed at providing options for countries, stakeholders and the private sector and at supporting the multi-partner initiative

… nested in existing international programmes

GRA – Integrative Research Group

CGIAR – CCAFS and WLE (Water, Land & Ecosystems) programmes

… well connected to other research & knowledge programmes

e.g. GSP, Geoglam, ELD, AgMIP, EU FACCE JPI…

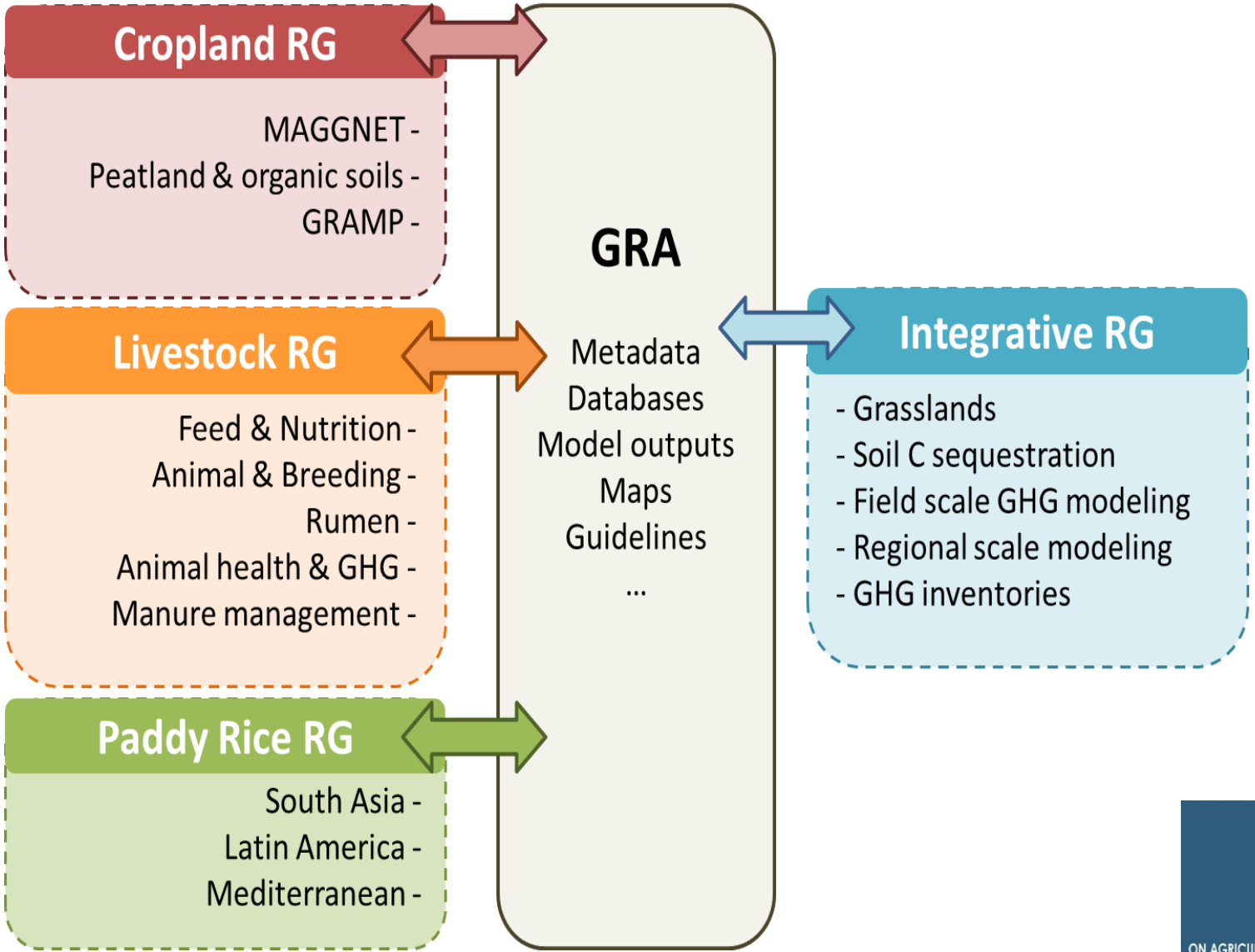
Seed funding provided by French Ministry for Research for 2016-2017

International Research Consortium discussed with GRA and EC

Themes of the international research programme

- Improving estimates of the baseline and of the potential of soil carbon sequestration (or loss) and of current soil carbon stocks;
- Design and co-construction of agronomic strategies and practices for soil carbon sequestration, including an assessment of their performances and of trade-offs among multiple objectives;
- Metrics and methods for monitoring, reporting and verification (MRV) of soil carbon sequestration (farm, landscape, region, country);
- Institutional arrangements and public policies, including financial mechanisms, that aim at promoting and rewarding relevant practices.

Integration of knowledge within GRA



GLOBAL RESEARCH ALLIANCE ON AGRICULTURAL GREENHOUSE GASES

Collaboration with GEOGLAM

GSP, Digital Soil Map
FAO Global Land Cover /GAEZ

Satellite/ Model

- GPP
- NPP

Model intercomparison (GRA)

Statistics/ Models

- HANPP (rangelands: FAO grazing density, IGLEAM also)
- Ecosystem C balance

GSP, Digital Soil Map

Model intercomparison (GRA)

Models

- Soil C maps; LIDAR for above-ground C
- Soil C sequestration

The plan is to build a data/model infrastructure and co-branded products
Can this work?

Thank you for your attention !