

International research and scientific cooperation program

Presentation by the STC

Based on material provided by the science leadership group



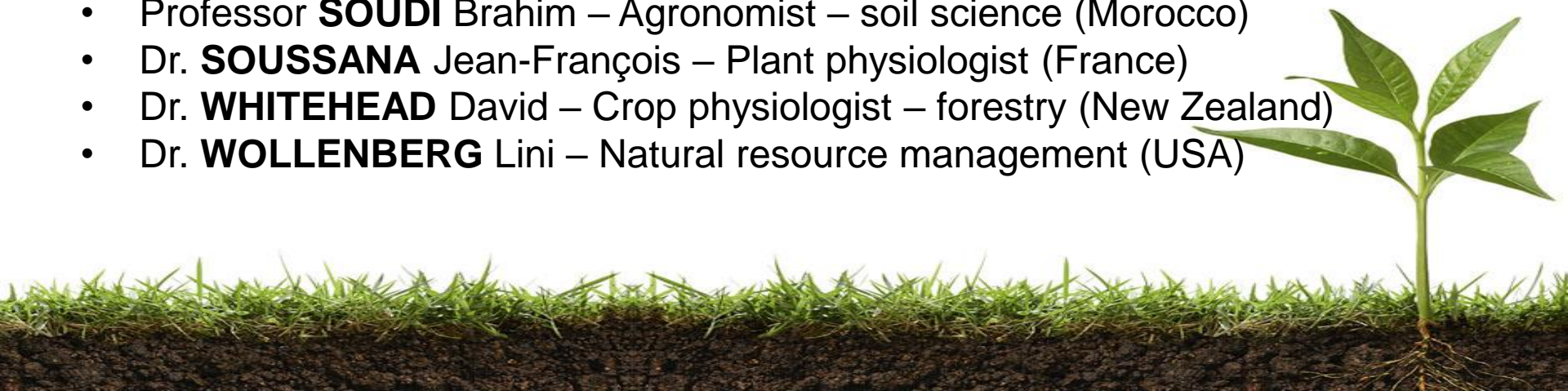
4 PER 1000
SOILS FOR FOOD SECURITY AND CLIMATE

A world map with a light gray background. Countries are outlined in white. A subset of countries is filled with a solid green color, representing the member countries. These include the United States, Canada, Mexico, Brazil, Argentina, Chile, the United Kingdom, France, Germany, Italy, Spain, Portugal, Greece, Turkey, India, China, Japan, South Korea, and Australia. The map is positioned above a layer of green grass and dark brown soil. A small green seedling with four leaves is growing out of the soil on the right side. The text "members are coming from" is written in a green, sans-serif font in the top right corner.

Scientific and technical committee

Who are we?

- Dr. **AMIRASLANI** Farshad – Socio-eco natural resource management (Iran)
- Professor **CHENU** Claire – Soil scientist – soil organic matter (France)
- Dr. **GARCIA CARDENAS** Magali – Agroclimatology (Bolivia)
- Dr. **KAONGA** Martin – Agroforestry carbon biogeochemistry (Zambia)
- Dr. **KOUTIKA** Lydie-Stella – Soil scientist – soil organic matter (Rep of Congo)
- Dr. **LADHA** Jagdish – Soil fertility and plant nutrition (India)
- Dr. **MADARI** Beata – Soil scientist – C and N cycling (Brazil)
- Dr. **RUMPEL** Cornelia – Forester – terrestrial organic matter (Germany)
- Dr. **SHIRATO** Yasuhito – Agricultural and soil scientist (Japan)
- Professor **SMITH** Pete – Soils and global change (United Kingdom)
- Professor **SOUDI** Brahim – Agronomist – soil science (Morocco)
- Dr. **SOUSSANA** Jean-François – Plant physiologist (France)
- Dr. **WHITEHEAD** David – Crop physiologist – forestry (New Zealand)
- Dr. **WOLLENBERG** Lini – Natural resource management (USA)





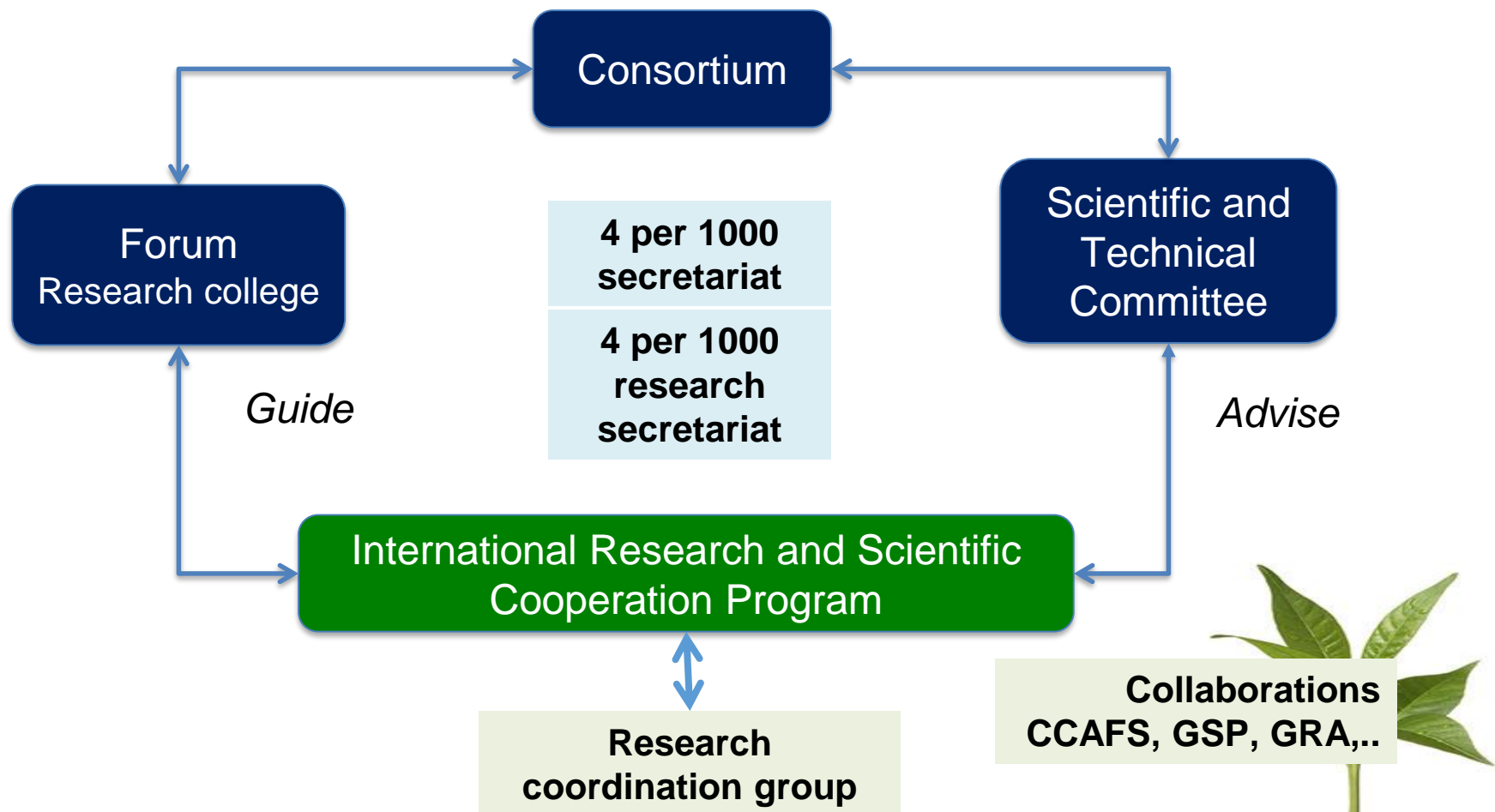
Scientific and technical committee

Missions?

- **propose a set of reference criteria for the evaluation of projects and actions** founded on the principles and goals of the Initiative, as well as on the SDGs;
 - **formulate advice on projects, actions and programs;**
 - **formulate proposals for the orientations of international scientific research and cooperation** and for any cross-cutting issue;
- This presentation*
- **define, produce and/or validate the documents** published in the resource center.



Suggested Governance of the 4 per 1000 International Research Program

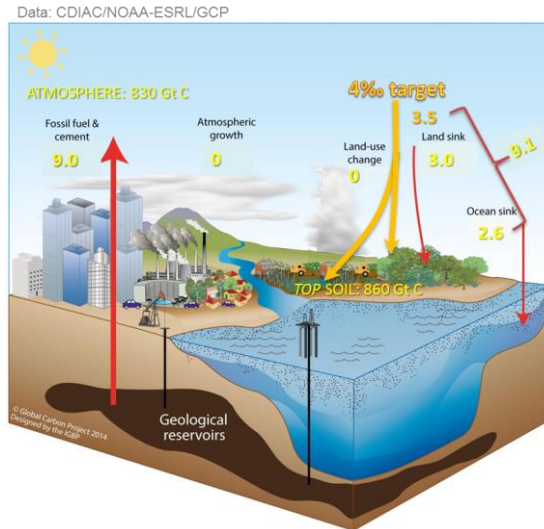


4 per 1000?

Start : a global estimate (Balesdent & Arrouays, 1990)

Soils have a potential major role in climate change mitigation

An aspirational goal

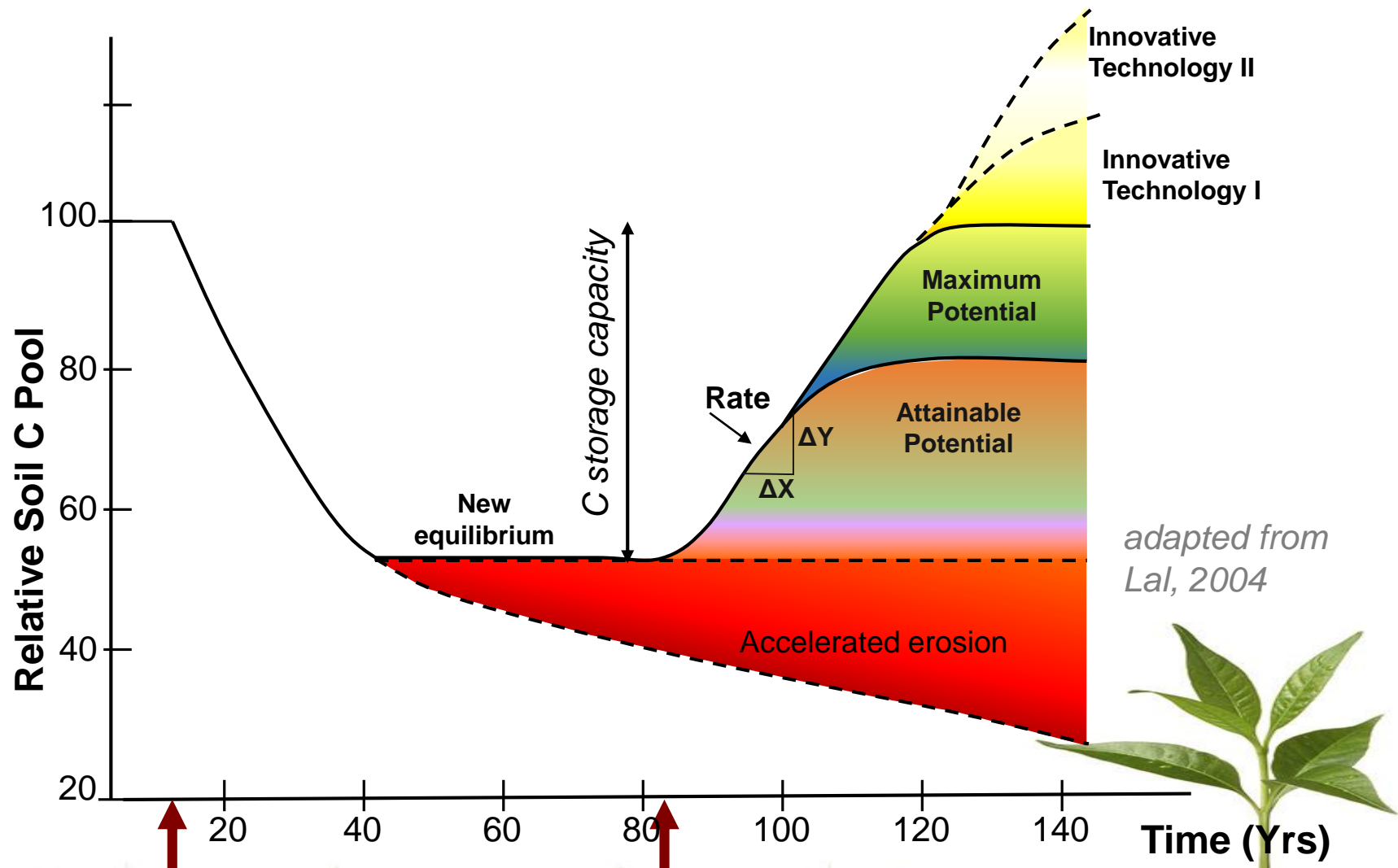


Today, at the local scale : an order of magnitude for a reference (top soil)

Maintain or increase SOC stocks



Soil organic carbon storage potential



Subsistence farming, none or low off-farm input soil degradation

Adoption of better management practices

Why a research program?

- Providing evidence-based options for countries, stakeholders and the private sector and supporting the multi-partner initiative
 - Help answer high level policy questions
 - > action oriented
 - > policy relevant
- research program



Why a research program?

Help answer high-level policy questions

- **National policies** NDCs, Land Degradation Neutrality, national development plans, etc.
 - Mitigating global GHG emissions
 - Contributing to food security, biodiversity and ecosystem services
 - Land-based climate change adaptation
 - Improving GHG inventories
- **Implementation**
 - What are the most efficient technical interventions?
 - Breakthrough technologies
 - Trade-offs between carbon for soils vs. other uses
 - Economics at national scale: benefits for farmers etc.
 - Evidence-based policies
 - Scenarios for soil carbon sequestration implementation



Four main themes

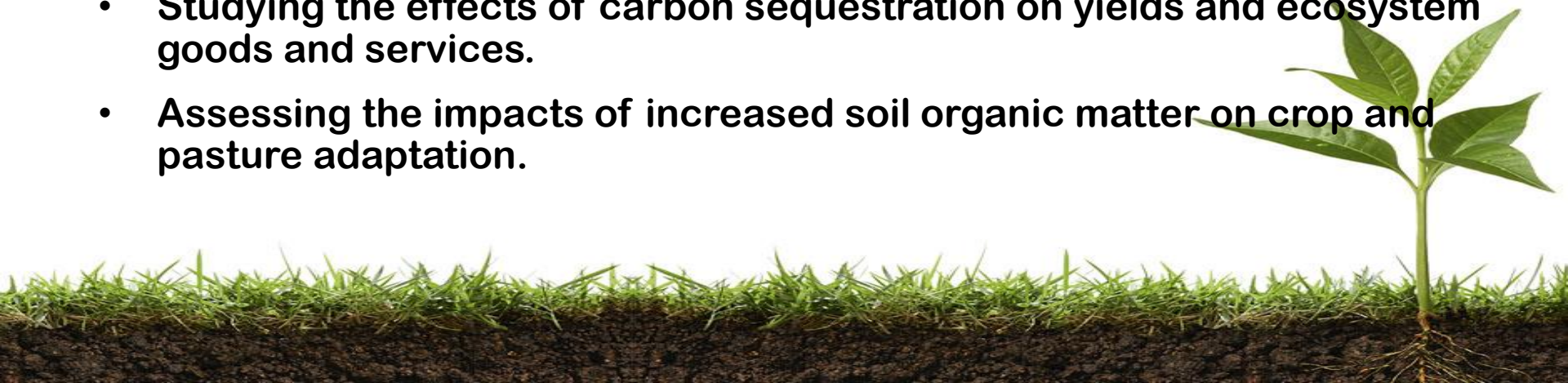
- Estimating the potential of soil carbon sequestration and associated benefits
- Developing practices adapted to specific soil and climate conditions
- Define and strengthen the enabling environment
- Monitoring, reporting and verification of soil carbon





PILLAR 1. Estimating the potential of soil carbon sequestration and associated benefits

- Mapping soil organic carbon (SOC) stocks and changes
- Assessing and mapping soil carbon sequestration technical potential depending on management systems and practices.
- Studying the biophysical and biochemical conditions for SOC sequestration (N, P, water).
- Assessing the vulnerability of SOC stocks and the duration of SOC sequestration in relation to stabilization processes.
- Assessing associated non-CO2 GHG emissions
- Studying the effects of carbon sequestration on yields and ecosystem goods and services.
- Assessing the impacts of increased soil organic matter on crop and pasture adaptation.

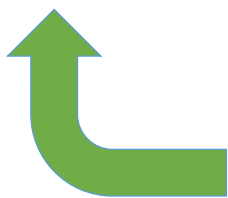




PILLAR 2 Developing practices adapted to specific soil and climate conditions

Provide knowledge for 4 per 1000 agricultural and forestry practices for soil carbon sequestration:

- design and co-design
- assessing their performance,
- assessing trade-offs and synergies (climate change, food security, SDGs)
- assessing costs and benefits at a range of scales



- Review
- Modeling
- Monitoring
- Set up show case systems.



Agricultural practices for soil carbon sequestration



Conservation agriculture

Integrated soil fertility
management



Rangeland
Management



Water
management



Agroecology



Agroforestry



Organic fertilizers



PILLAR 3 Define and strengthen the enabling environment

Enabling environment to promote, perpetuate and reward relevant sustainable practices:

- **effective governance**
- **institutional and organizational arrangements**
- **public policies**
- **incentive and regulatory instruments**
- **financial mechanisms**
- **land tenure rights protection**
- **education and capacity building**

= f(time scales) ?

Improvements and innovations ?

= f(geographical, societal, soil, climate contexts) ?



PILLAR 4 Monitoring, reporting and verification

Elaborate metrics, methodologies and tools for MRV of SOC at different scales (farm, landscape, region, country)

- Direct and indirect methods for monitoring changes in soil organic carbon stock at field scale.
- Combining modeling, land use and remote sensing for assessment of farm to regional scale changes in soil organic carbon stocks & GHG.
- Long term monitoring of soil carbon stock changes in national inventories.
- Assessing *ex-ante* and *ex-post* soil carbon changes in sustainable development projects.



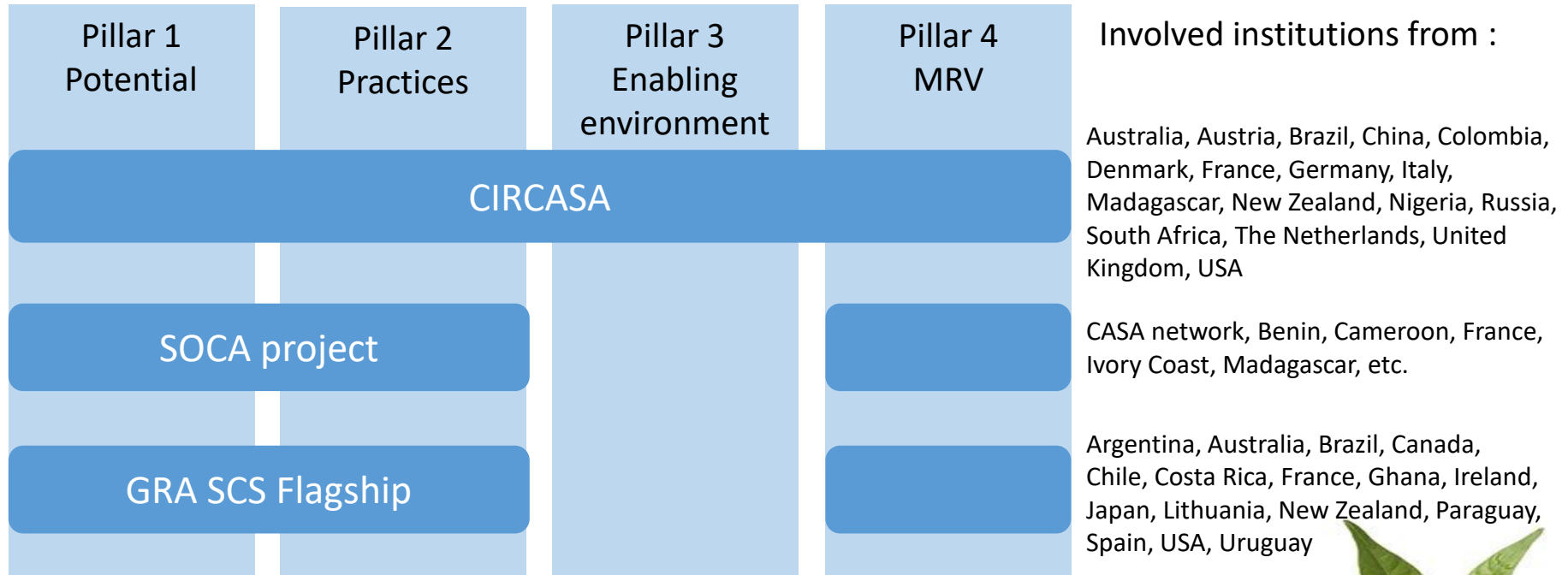
Research secretariat activities



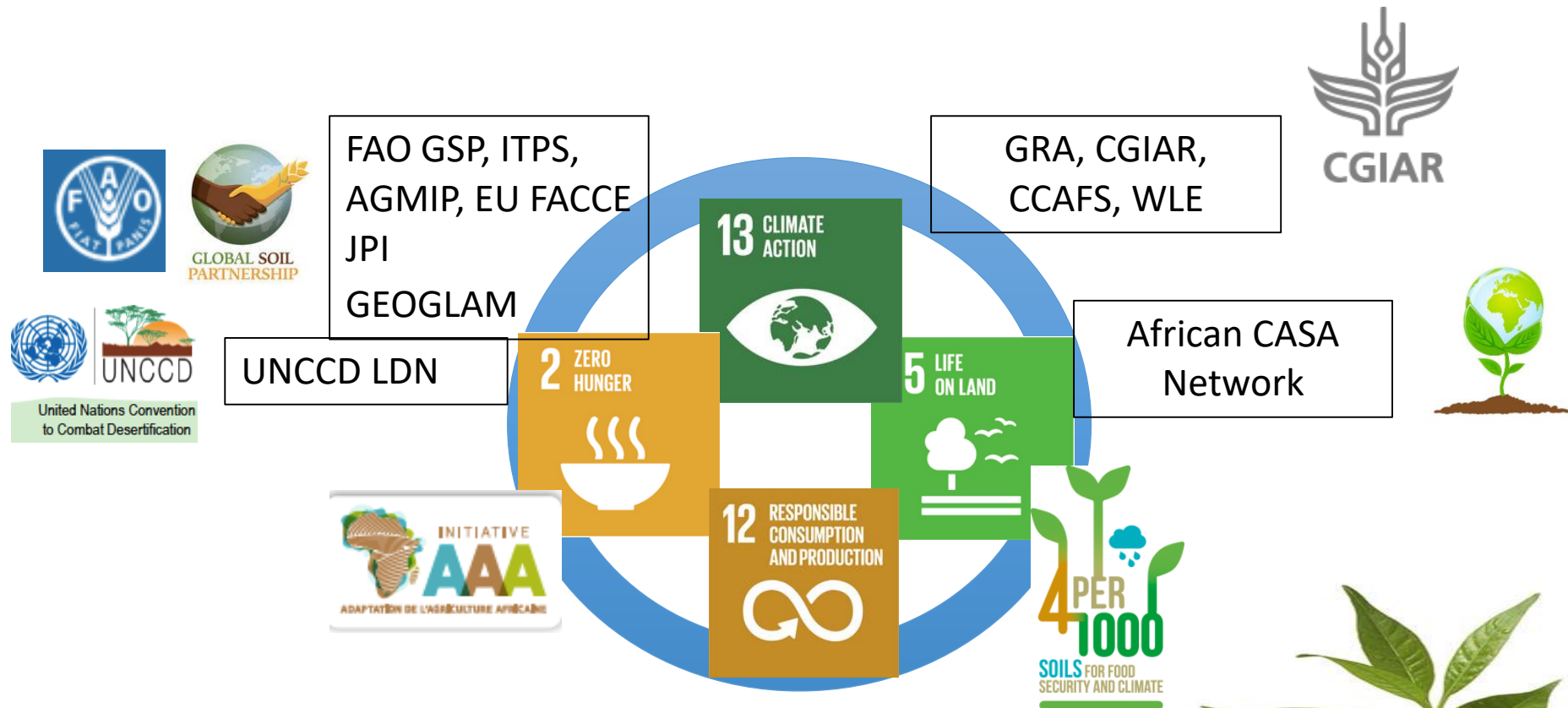
- Interactions with the STC and with the Consortium
- International Events: COPs, OECD, FAO, GSP...
- Research activities and coordination across research programs
- Involvement in calls for proposals (EU)
- Scientific and technical publications
- Thematic Meetings
- Communication: Website, Newsletter
- On-line knowledge sharing platform
- Training and capacity building



Example of international projects



The soil C science policy international “ecosystem”





Montpellier 29th & 30th June 2017 – 2nd CONSORTIUM of MEMBERS

Thank you for your attention!



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Recent developments

- Publications on the topic in the scientific literature: minasny, chabbi, van groeningen, dignac etc
- Publications prepared by individual members of STC and of science leadership group (special issue in STILL journal)
- Many events: Chantilly, Rothamsted, World soil congress 2018
- Project of publication by the STC to explain the scope of the research program



Governance of the initiative

