



This project has received funding from
the European Union's Horizon 2020
research and innovation programme
under grant agreement No **774378**

CIRCASA

Coordination of International Research Cooperation on soil CARbon Sequestration in Agriculture

Towards an International Research Consortium on Soil Carbon

www.circasa-project.eu

Open Collaborative Platform: <https://www.ocp.circasa-project.eu/>



@CIRCASApject

CIRCASA Project

General Overview

CIRCASA in context

Large interest on agricultural soil carbon both at global and EU scales

- At global scale, the **RECSOIL project** (Recarbonizing soils) by FAO and GSP with support of GEF and UNCCD
- The **UNFCCC Koronivia** workshop on soil carbon
- A number of **private sector initiatives** (linked to regenerative agriculture), e.g. Terraton challenge,
- The development of **certification schemes** for agricultural soil carbon, including national **low carbon labels** (e.g. in France)
- In the EU, the **Mission Board on Soil Health and Food** that recommends to increase arable soil organic carbon stocks, in line with EU commitment to land degradation neutrality
- Conserving and increasing soil carbon contributes to several **EU Green Deal strategies**
- Also in the EU, the launch of the **European Joint Program on soils**



RECSOIL:
Recarbonización de
los suelos mundiales



CIRCASA Project



- H2020 CIRCASA has **22 partners (17 countries)** including the research secretariats of **4p1000**, **GRA**, **FACCE-JPI** and collaborations with the **Global Soil Partnership (GSP)**
- Started Nov. 2017 for a duration of three years (Covid-19, delayed to Feb. 2021)
- Aimed at developing international synergies concerning research and knowledge exchange in the field of carbon sequestration in agricultural soils at European Union and global levels, with the active engagement of all relevant stakeholders.



Countries partners of CIRCASA, 4p1000, GRA, FACCE-JPI and CCAFS

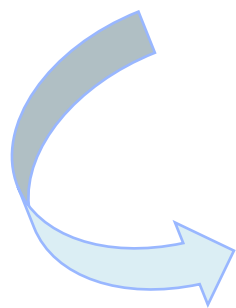
WORK PLAN



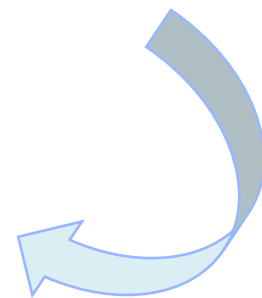
Review Scientific &
Technical Evidence



Stakeholders' views: solutions,
barriers, knowledge & research
needs



Co-design a Strategic
Research Agenda

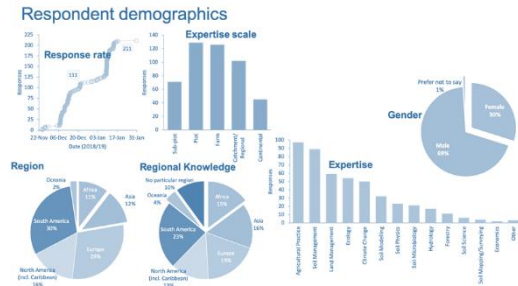


Facilitating the establishment of an
International Research Consortium (IRC)



Review Scientific & Technical Evidence

14 Research Challenges to SOC in agriculture



- 211 responses
- Responses from all continents
- Strong representation of Agricultural Practice, Soil and Land Management researchers
- Poor representation Social Science disciplines

Theme 1

Theme 2

Theme 3



1. Stabilisation of soil carbon
2. Soil C saturation
3. Role of Microorganisms in soil C dynamics
4. SOC and greenhouse gas emissions

5. Deep soil stabilisation
6. Measuring and Monitoring
7. Vegetation management
8. Organic amendment management
9. Mixed agricultural practices

10. Preventing soil organic loss
11. Economic
12. Socio-cultural barriers
13. Institutional/legal barriers
14. Technological readiness for SCS



[CIRCASA, 2019. The science base of a strategic research agenda]



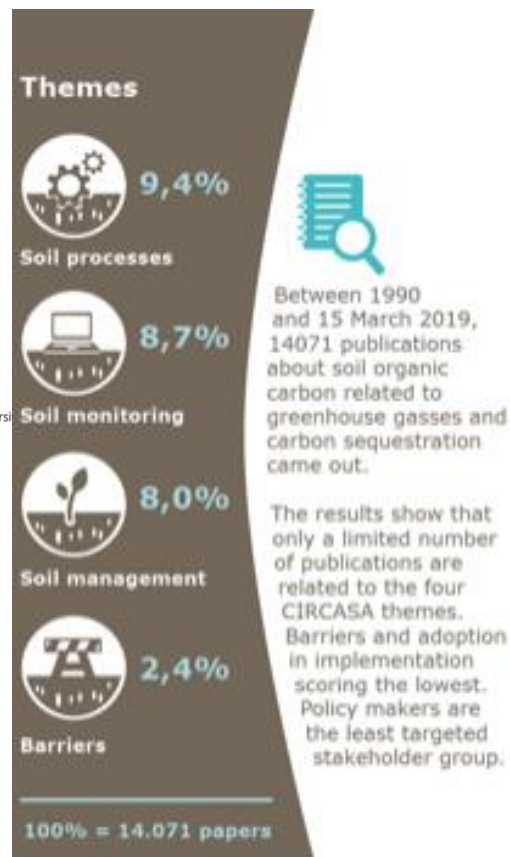
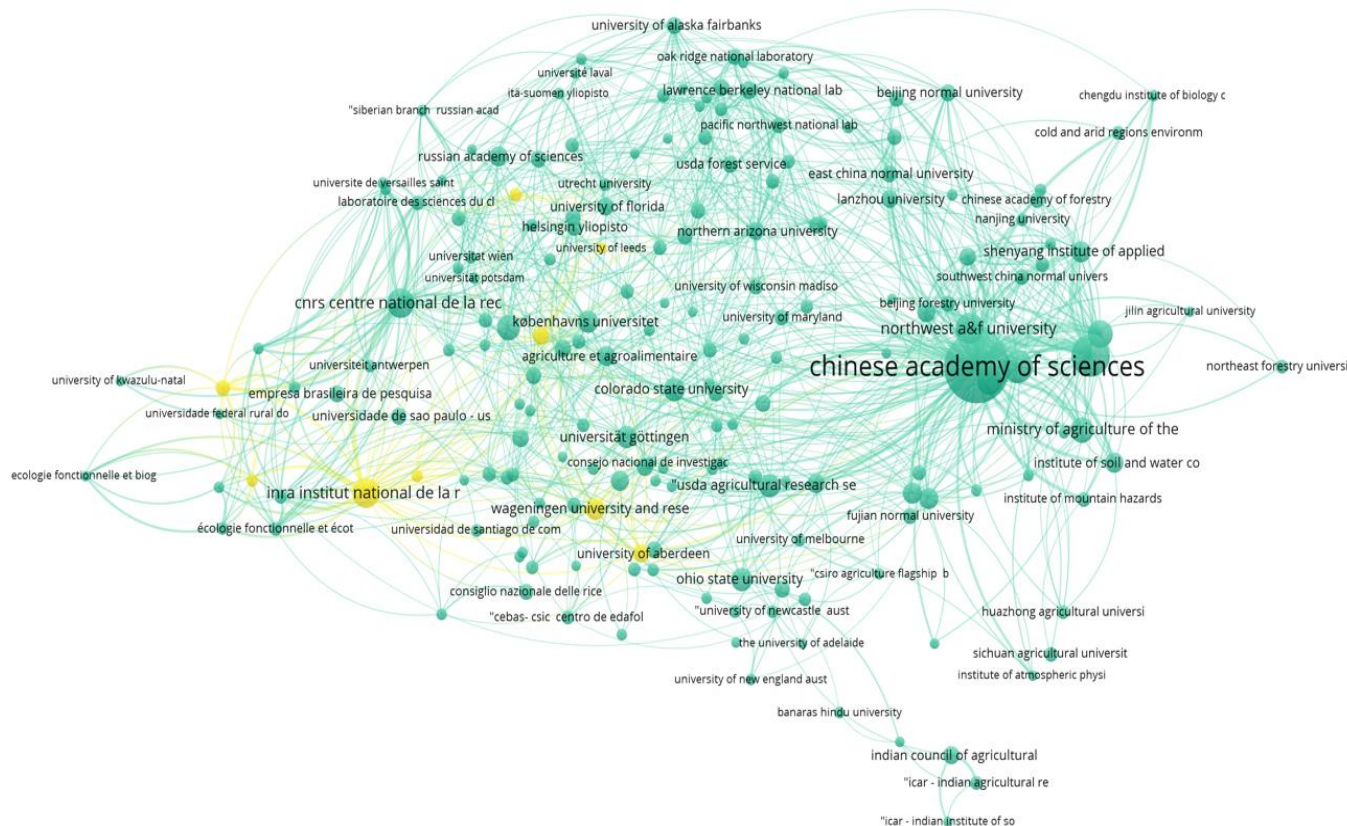
Review Scientific & Technical Evidence

Stocktake:

To identify gaps in research based on the CIRCASA themes

To identify complementary networks

14,071 journal articles



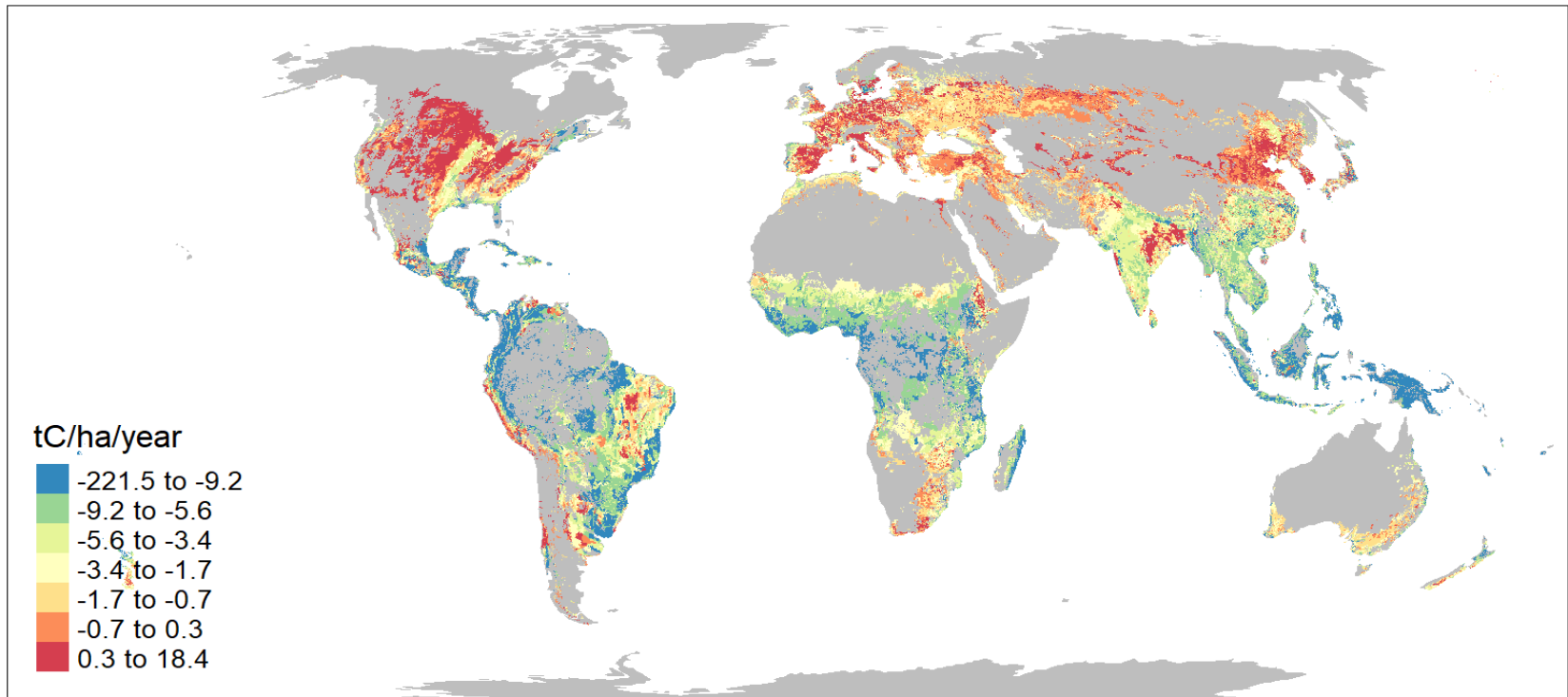
[CIRCASA 2019, “The Network map and dialogue”]



Review Scientific & Technical Evidence

Reaching the 4 per 1000 aspirational target in global croplands?

Simulated balance between crop residue inputs (Global EPIC)
and soil organic carbon decomposition (RothC)



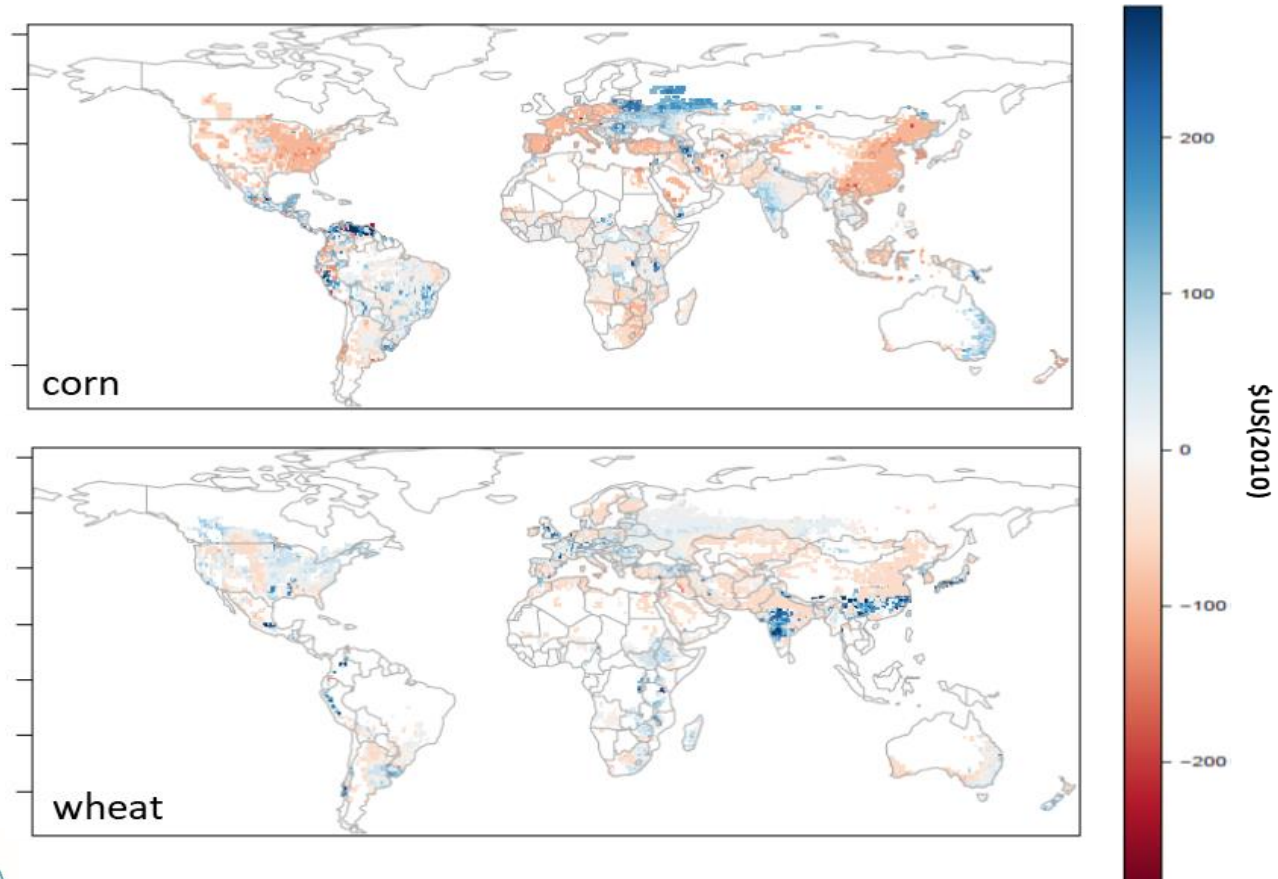
Note: soil decomposition may be overestimated in some hot
and wet tropical environments



Review Scientific & Technical Evidence

International Knowledge Synthesis activities

Costing the change from conventional tillage to no-till
in global croplands (US\$2010 per hectare)





Stakeholder Consultation

Online Survey



7 languages (English, French, German, Danish, Portuguese, Spanish, Russian)

1369 respondents
+ 1807 Danish farmers

Knowledge needed by farmers / other stakeholders

Knowledge available but not accessible

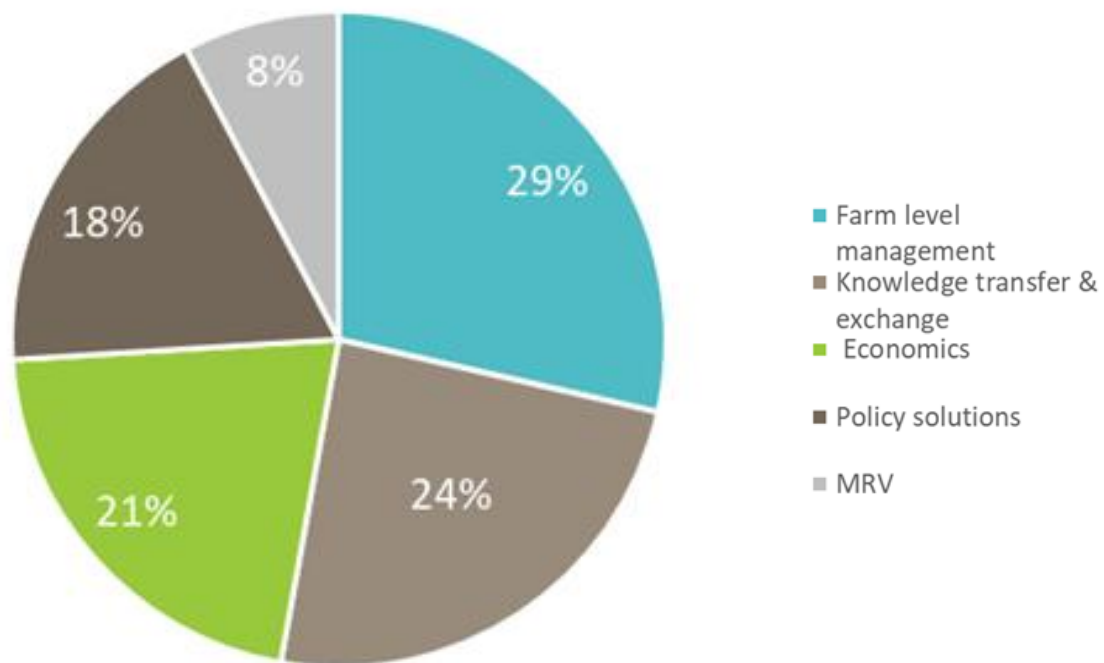
New research needed

10 Regional Workshops





Knowledge Needs



Share of responses per theme (global survey)



Research Needs

Farmers / Farm Advisors

- **Costs and benefits of SOC management**
 - Productivity / yields / water
 - Financial returns / net income
 - Risks / trade-offs, time and effort involved
- **Crop choice and combinations, interactions among practices, role of microorganisms**

Other Stakeholders

- **Demonstrate societal and environmental benefits**
- **Develop policy mechanisms to better incentivize SOC management (targeting, tailoring)**
- **Improve reliability & standardisation of MRV at a reasonable cost (including farm level sampling, crowd sourcing)**
- **Agri-food system transformations (cost of food, external costs ...)**





How we do research

**Better alignment with
knowledge needs**

**Contextual, place-based
knowledge
Tailored guidance**

Co-creation

Enable access

Strategic Research Agenda

SRA supporting the alignment of research into an International Research Consortium

Research Priorities

Pillar 1 – Frontiers research: unlocking the potential of soil carbon

=> International research calls with EJP Soil

Pillar 2 – Soil carbon stock change MRV: international standard

=> International innovation project

Pillar 3 – Agro-ecological and technological innovations

=> Private-Public innovation projects

Pillar 4 – Enabling environment and knowledge co-creation

=> Open online collaborative platforms

Pillar 1 - Frontiers research: unlocking the potential of soil C

International calls: Frontiers Research

Deep soil carbon dynamics

Soil biota diversity and SOC stock change

Overcoming N₂O – SOC trade-offs

SOC stabilisation and saturation

Climate proofed SOC sequestration

WHO?

National research agencies
Research organizations and Universities

HOW?

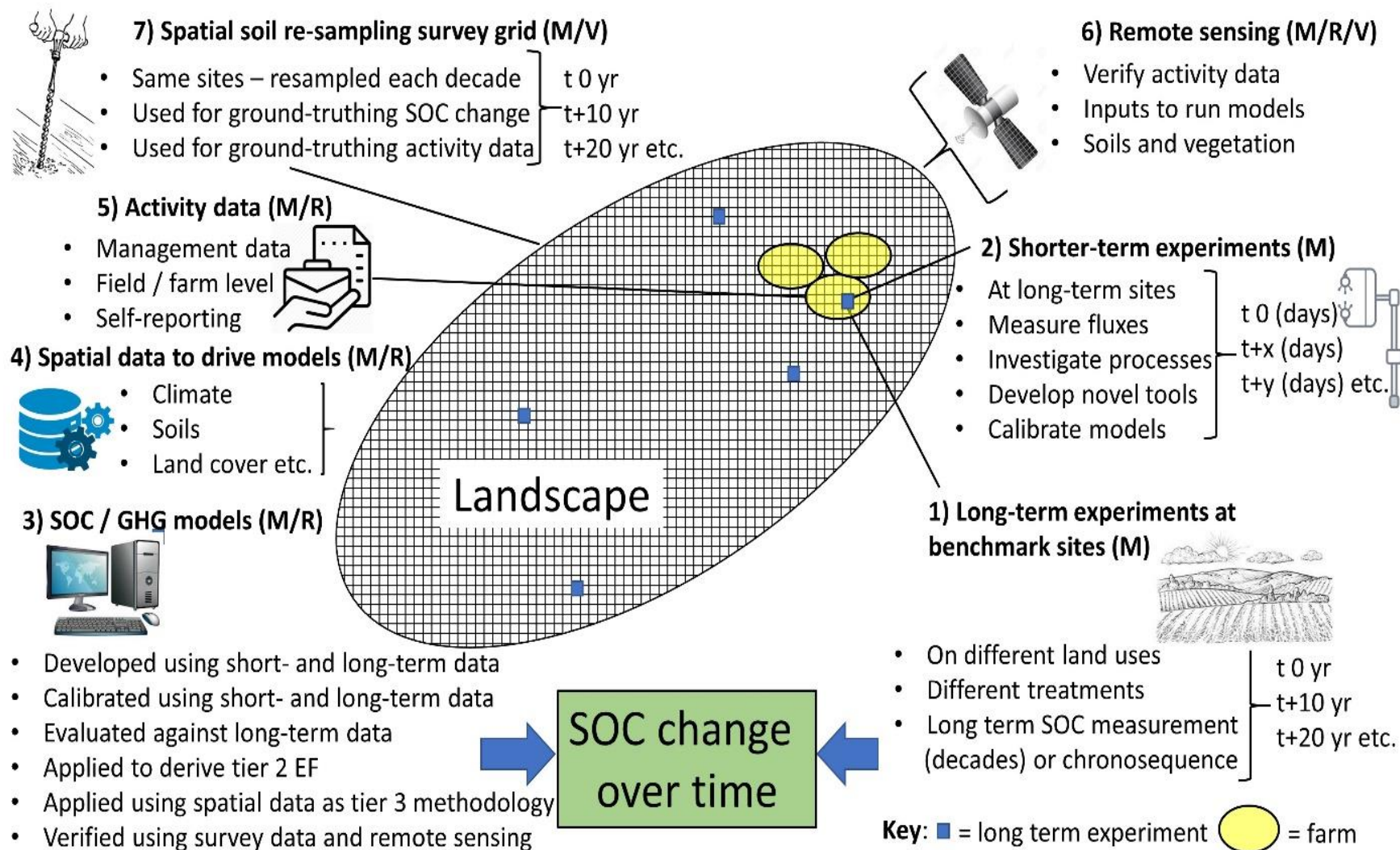
- Research calls based on shared research priorities
- Each agency pays for national research teams
- Project evaluation is delegated to an international review panel with observers from each agency
- Open to private sector research

WHEN?

- International dimension for second external call of EJP Soil in 2022

Other opportunities for international research calls to be explored

Pillar 2: Vision for a global framework for Monitoring, Reporting and Verification of SOC change (Smith, Soussana et al. 2019, Global Change Biology)



Pillar 2 - Soil carbon stock change. Towards an international MRV standard

=> International projects with space and innovation agencies

WHO?

GSP, EJP soil, EU Soil Observatory (JRC)
COPERNICUS, GEOS, ESA, NASA Harvest...
NIVA project (IAVS)
ICOS, Fluxnet, Long-term field experiments.

HOW?

- A design study (stage 1)
- Two implementation stages
- Private-Public consortium

WHEN?

- Private funding in 2020 for a proxy (change in annual duration of vegetation cover in global croplands)
- Create consortium in 2021, funding and work plan, start with launch of IRC

Soil C change monitoring system

Soil C pillar

Vegetation remote sensing pillar

Activity data pillar

Modelling SOC stock change

Verification pillar

Pillar 3 - Agro-ecological and technological innovations

Agro-ecological and technological innovations

Breeding deep-rooted and perennial crops

Precision and digital agriculture for soil C

Circular agriculture (e.g. organic fertilizers, digestates, biochar)

Biodiversity, agroecology for soil C

WHO?

Public – Private partnerships by sub-topic
e.g. plant breeding sector,
digital agriculture,
agri-food, organic wastes,
bioenergy sector

HOW?

- Portfolio of projects by topics
- Pre-competitive innovation

WHEN?

- Seek engagement in 2021
- Design stage for each sub-topic
- Pipeline of innovation projects

Pillar 4 - Enabling environment and knowledge co-creation

Enabling environment and knowledge co-creation knowledge co-creation

Sharing knowledge from local/regional experimentations

Co-creation with regional networks

Testing and assessing scaling out mechanisms

Assessing co-benefits and trade-offs for adaptation, food security..

Knowledge Platform

WHO?

Knowledge platform: upgrade CIRCASA OCP together with EJP SOIL

HOW?

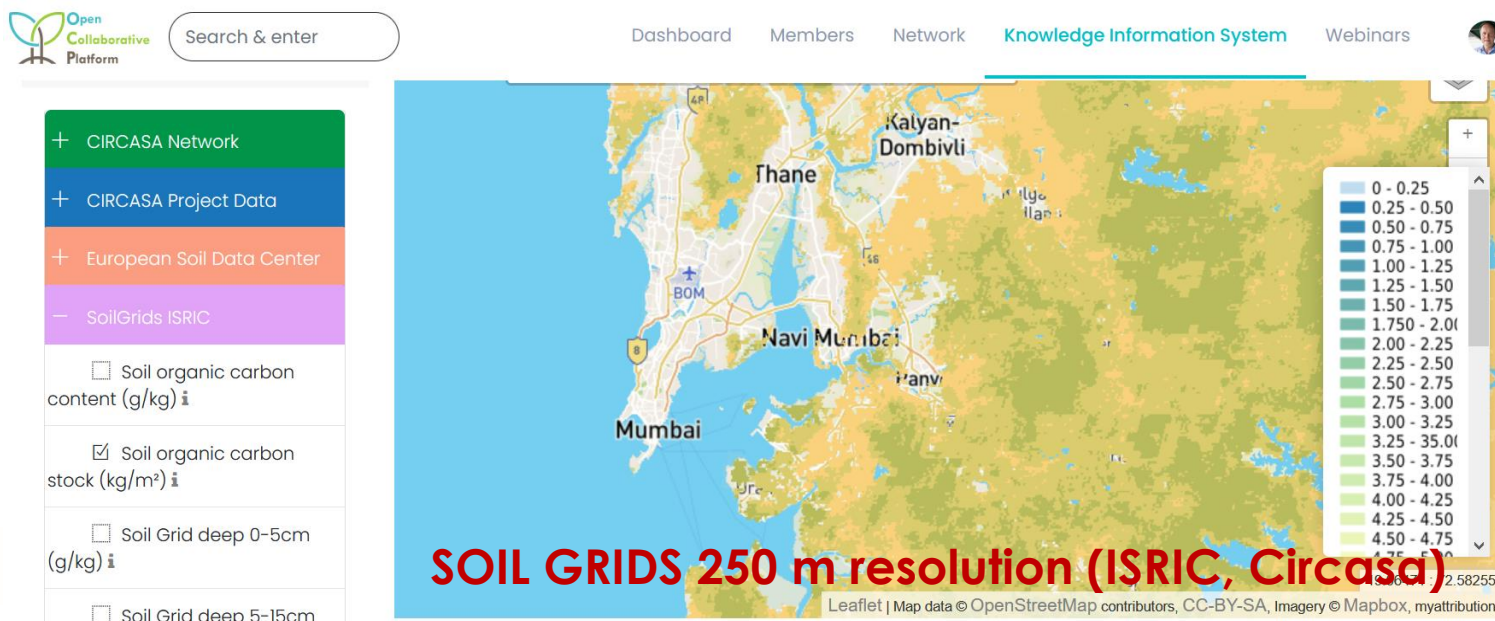
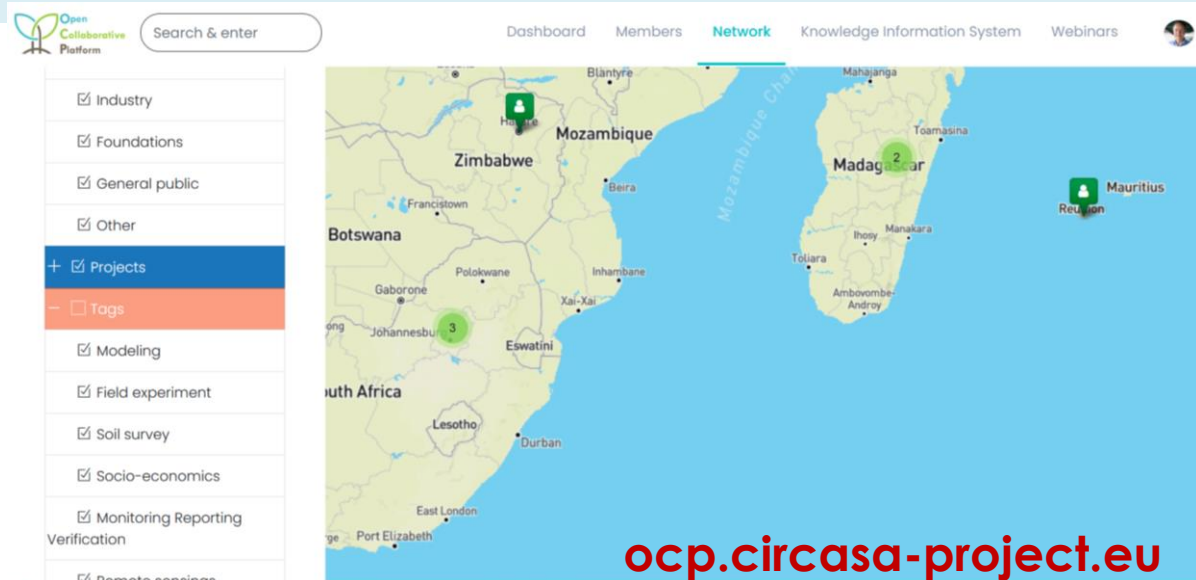
- Crowdsourcing with knowledge platforms,
- Regional networks
- Language and cultural diversity

WHEN?

- Seek engagement in 2021
- Design stage for each sub-topic
- Pipeline of regional knowledge co-creation projects

CIRCASA Open Collaborative Platform services: matchmaking, knowledge sharing, information system (data and maps)

An open data repository (Data Verse) with geospatial and modelling data



Governance & funding of the IRC

INTERNATIONAL RESEARCH CONSORTIUM ON Soil Organic Carbon

- **CIRCASA's preparatory work** underlines the need to develop an international research consortium (IRC) on soil organic carbon in agriculture and the **large benefits of international research cooperation in this field for stakeholders both in the EU and in other world regions.**
- **Goal:** align R&I activities in order to create breakthroughs, avoid duplication of activities and develop innovation on a large scale
- **No single country and no single corporate can develop alone R&I activities at scale.**
- Moreover, as shown by the SRA of CIRCASA and by the EC Mission Board on Soil Health and Food, R&I activities in this field need to be highly interdisciplinary and to be guided by stakeholder's demands. This **requires a dedicated tool to carry ambitious international R&I programs.**

VISION OF THE INTERNATIONAL RESEARCH CONSORTIUM

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

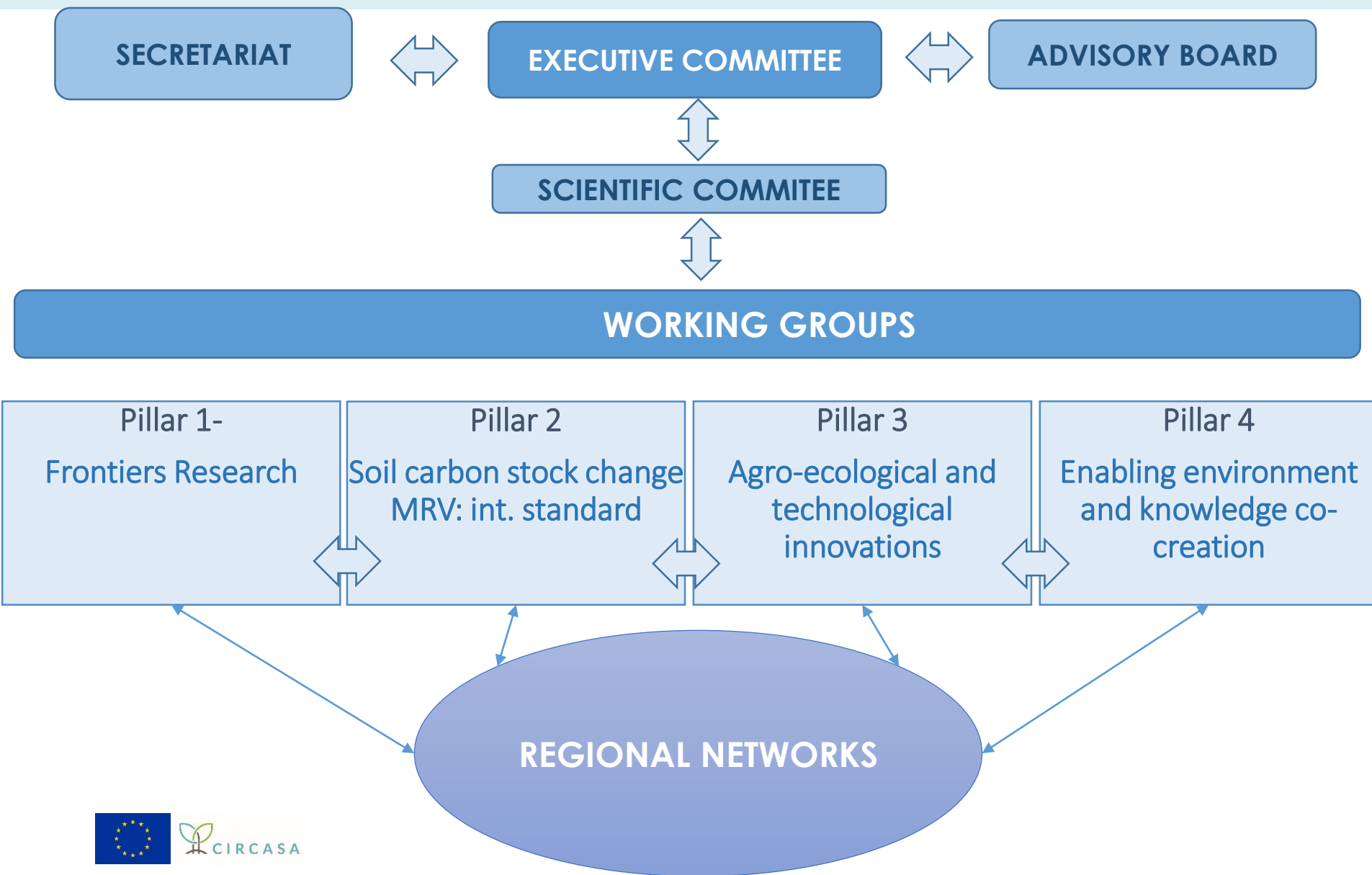
Coordination

Governance

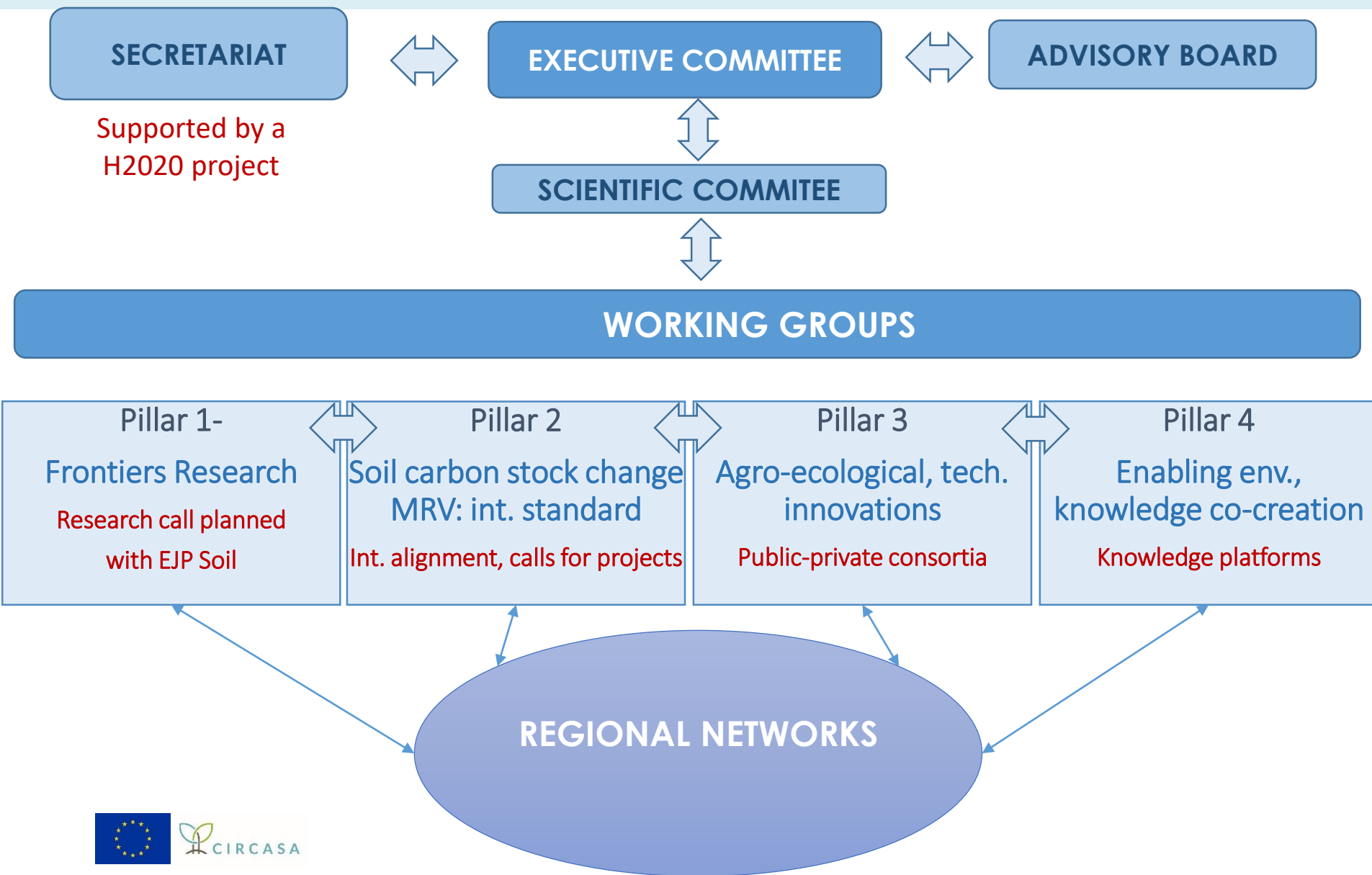
CATEGORY	Potential partners of the IRC
Funders / Users	Research & Development Agencies
	Financial sector / banks
	Fundations / NGOs
Funders Users Developers	Space Agencies
	GHG inventory / C credits /
	Soil partnership / soil agencies
	Agri-food businesses
	Breeding companies
	Equipment (machinery)
	Fertilizers, wastes and energy
Users / Developers	Starts ups / Consultancies
Funders / Users	International organisations
Developers / Users	Research organisations
Users	Farmers and extensions



Proposed IRC structure and governance



Proposed IRC structure and governance



In 2021, CIRCASA consortium will prepare the IRC

- Formal dialog with **potential partners** (including funders, developers and users of the IRC) has been engaged to broker interest, develop use cases, customer stories and seek expressions of interest.
- Preliminary discussions on the **level of commitment** (considering both **in kind** and **cash contributions**) required to become a member of the Consortium
- **Letters of interest** to inform that the funding body/ research institution/ company is willing to join the IRC collaborative effort

Thank you for your attention!

 Follow us on Twitter! [@CIRCASApject](https://twitter.com/CIRCASApject)

Visit our website www.circasa-project.eu

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