

Coordination of International Research Cooperation on soil Carbon Sequestration in Agriculture (CIRCASA)



Call: H2020-SFS-2016-2017 (Sustainable Food Security – Resilient and resource-efficient value chains)

Type of action: CSA (Coordination and support action)

Grant Agreement: 774378-CIRCASA

DELIVERABLE NUMBER: D3.3

DELIVERABLE TYPE: REPORT

DELIVERABLE TITLE: Final online conference and conference proceedings.

ABSTRACT: CIRCASA final conference - Towards an International Research Consortium for Soil Organic Carbon

Start date of the project: November 1, 2017

Due date of deliverable: M40

Organization name of lead contractor: EI

Dissemination level: PU/~~PP~~/~~RE~~/~~CO~~

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

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1. Introduction

The CIRCASA project identified a strategic research agenda ([link](#)) with four pillars and initiated task forces to prepare an **International Research Consortium (IRC) on soil organic carbon**. The final event of the CIRCASA project was a stepping stone towards launching the International Research Consortium on soil carbon which will be rolled out in 2022. This IRC will be supported by the European Commission through dedicated action.

The event took place on 10 February 2021. It aimed to provide an overview of the key findings of CIRCASA and views from different world regions and stakeholders on the role of the IRC. A range of stakeholders were invited to express interest to participate in the IRC, as well as explore ways to contribute and benefit. The event attracted a large international audience, spanning the five continents and including academia, private sector, national research and space agencies as well as international organisations.

The **webinar recording** is available [here](#), the **slide-deck**, a brief **summary of the event and the presentations** are available on Circasa [website](#). This document gives an overview of the preparations of the event and a summary of the key discussion points and outcomes.

2. Preparation of the event

The event was organised via Zoom Webinar. The meeting was planned and managed by Ecologic Institute in collaboration with INRAE and WUR. The agenda for the event can be found in Annex 1.

Invitations and registration links (<https://forms.ecologic.eu/CIRCASAFinalConference>) to the event were sent in January and February.

A total of 334 persons registered to the event.

Speakers received personalised emails and links to access the Zoom event, while regular participants received a general link to access the Zoom webinar.

A series of dress rehearsals spread over 3 days (05/08/09 Feb) were organised with all the speakers presenting at the event. The rehearsal included technical checks and a discussion of open question.

Before the dress rehearsal, those speakers expressing commitments, were provided with a template slide that they had to fill out and test at the dress rehearsal. The final copies of the slides are available in Annex 2.

A pre-defined “expression of interest” [template](#) was prepared to offer guests to participate in the IRC after the event.

3. Summary of the event

Key messages

- Six high-level speakers from the policy and research arena introduced the Strategic Research Agenda (SRA) and agreed on its importance.
- The important role of the SRA was emphasized in the context of current European climate ambitions which set farmers and foresters at the heart of climate transition.

- The Strategic Research Agenda (SRA) will facilitate the upscaling of sustainable soil carbon management by addressing knowledge gaps concerning (1) how to unlock soil carbon's potential, (2) MRV (monitoring, reporting, verification), (3) agro-ecological innovation and (4) the creation of an enabling environment for farmers.
- The event was met with a lot of interest from stakeholders across the continents and different fields: 242 participants from 49 countries attended the event
- Stakeholders from various regions and fields expressed their interest in collaborating with the Strategic Research Agenda
- The question & answer part after the speakers' input focused especially on the incorporation of social sciences into the topic of soil organic carbon and on how to improve financial incentives for farmers.

3.1. Setting the context and overview of Circasa

The following six high-level speakers from the European Commission and the Circasa consortium introduced the Strategic Research Agenda (SRA).

Nathalie Sauze-Vandevyver (DG Agriculture, Belgium) opened the conference with highlighting the project's relevance. With the Green Deal, Europe is aiming to be the first carbon neutral continent in 2050. As she said, the Green Deal puts farmers and foresters at the heart of climate transition, with land use management and carbon sequestration being key aspects. For example, the agricultural sector manages currently about 85% of EU carbon sinks. This raises the question of how to best support farmers to leverage this potential and to manage carbon sinks sustainably while also ensuring further ecosystem services. In this context, knowledge gaps remain. CIRCASA's strategic research agenda can contribute to closing these gaps and to reducing trade-offs between carbon sequestration and economical to societal dimensions. Nathalie Sauze-Vandevyver emphasized that the project is conducted in an international co-creative way with stakeholders from science and practice. The results of CIRCASA come right on time to contribute valuable content to the commission's new mission in the area of soil health and food under Horizon Europe.

Dr. Simon Kay (DG Climate, Belgium) outlined current activities of the EU (climate law proposal and climate target plan) which are revised to incorporate GHG emissions and removals on land use into the metrics, thereby improving the EU climate strategy. He identified two key questions regarding climate-neutral agricultural land use: Firstly, how to set ambitious and credible targets for Land Use, Land-Use Change and Forestry (LULUCF) activities and agriculture? Secondly, how to bring better incentives to farmers and foresters and create a better activity/business model for them? He gave a brief overview of current EU policy frameworks. These can be sorted in three categories of (i) production-oriented strategies (e.g. Farm-to Fork strategy), (ii) carbon removal certificates (e.g. EU-wide standards for carbon removals and (iii) demand-oriented strategies (e.g. circular economy action plan). Within this context, he highlighted the importance of monitoring, reporting and verification (MRV – the second pillar of the strategic research agenda) and its international significance.

Cees Veerman (Soil Health Mission Board) cited "Caring for Soil is Caring for Life", the title of the mission proposed by the Soil Health and Food Mission Board. The goal is to ensure 75% of soils to be healthy by 2030 and to change the current baseline of soil health. Soil carbon is one of the key indicators for soil health. Soils should be able to provide essential ecosystem services (food, biomass, biodiversity, regulation). The mission board recommends to conserve high soil carbon stocks and increase stocks in general. To get there, he stressed the importance of improving MRV, mobilising investment, advocating for changes in policies and feasible business models for farmers.

He highlighted the border-crossing approach of CIRCASA on how to bridge knowledge gaps and co-design innovation for soil carbon, acknowledging that the strategic research agenda of CIRCASA forms a useful input for the next stage of the Mission, which will address research and innovation priorities and implementation. He predicted that the international research consortium will be critical in raising awareness of the importance of soil organic carbon.

3.2. CIRCASA Project – General Overview, Strategic Research Agenda and IRC

Dr. Jean-Francois Soussana (INRAE, France) introduced the CIRCASA project and pointed to the large interest in agricultural soil carbon in the EU and globally. The project cooperates with 22 partners from 17 different countries to develop international synergies on carbon sequestration using scientific and technical evidence and practical stakeholder's input to develop a strategic research agenda. He believes that this agenda, together with the commitments of stakeholders and scientists, will greatly facilitate the establishment of an international research consortium (IRC). Later in the event, he also explained CIRCASA's strategic research agenda which supports the alignment of research into an international research consortium. The four pillars range from (1) frontiers research about how to unlock soil carbon's potential in international research calls, to (2) monitoring, reporting and verifying soil carbon stock changes by an international innovation project, to (3) agro-ecological and technological innovations requiring private-public collaboration and (4) the creation of an enabling environment and knowledge co-creation in open collaborative platform.

Prof. Pete Smith (University of Aberdeen, UK) summarized the review of scientific and technical evidence that was conducted through a survey within the scientific community. The survey asked for the main gaps in processes and management of monitoring soils and barriers to implementation of SOC management practices. The findings were synthesized into 14 research challenges and the more general gap when it comes to social science research. These research challenges may be summarized according to three major themes: 1) processes of soil carbon, 2) the management and monitoring of soil carbon and 3) barriers to SOC management in agriculture. In the next step, existing publications concerning these themes were scanned. The result shows that only a limited number of publications respond to the CIRCASA themes. The least research was done concerning barriers. This is crucial as they are the main aspect preventing management practices from changing. Therefore, capacity should be increased here in the future. Additionally, he introduced the findings of a simulation of crop residue inputs (Global EPIC) and soil organic carbon decomposition (RothC) concerning the cost-effectiveness of soil carbon management practices. The example of converting from tillage to no-tillage practices shows that cost-effectiveness varies across regions and crops with northern and southern temperate regions gaining from implementing change while tropical regions face negative economic consequences. These findings inform the problem areas and questions to be tackled in the IRC.

Dr. Ana Freluh-Larsen (Ecologic Institute, Germany) presented the insights of a comprehensive stakeholder consultation through a multilingual online survey and regional workshops. The consultation aimed at understanding actors' perceptions around SOC management and the barriers and solutions to upscaling. Furthermore, it identified knowledge needs, accessibility of knowledge and the demand for new research. A central outcome is that stakeholders perceive the lack of accessible knowledge as a key barrier to upscaling beneficial practices. The main knowledge gaps identified relate to farm level management, economics, policy design and MRV. Farm-level stakeholders perceive a lack of research concerning a better understanding of costs and benefits of SOC management. Other stakeholders (policy makers and civil society) emphasize the importance for research related to social and environmental benefits, effective policy design and improvement of SOC management through a

wider food system change. Another result of the consultation is the need for revision of research practices: more alignment of knowledge needs, participation and accessibility are demanded.

3.3. Polls

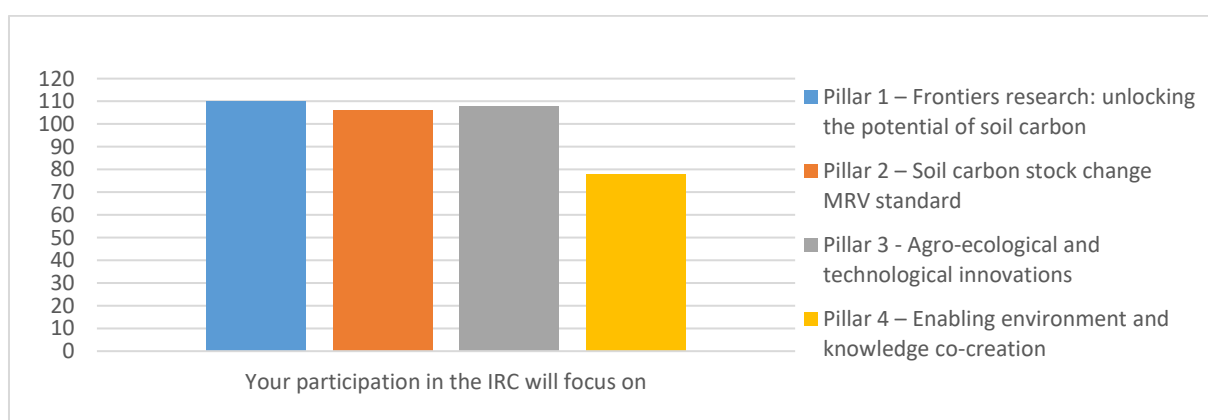
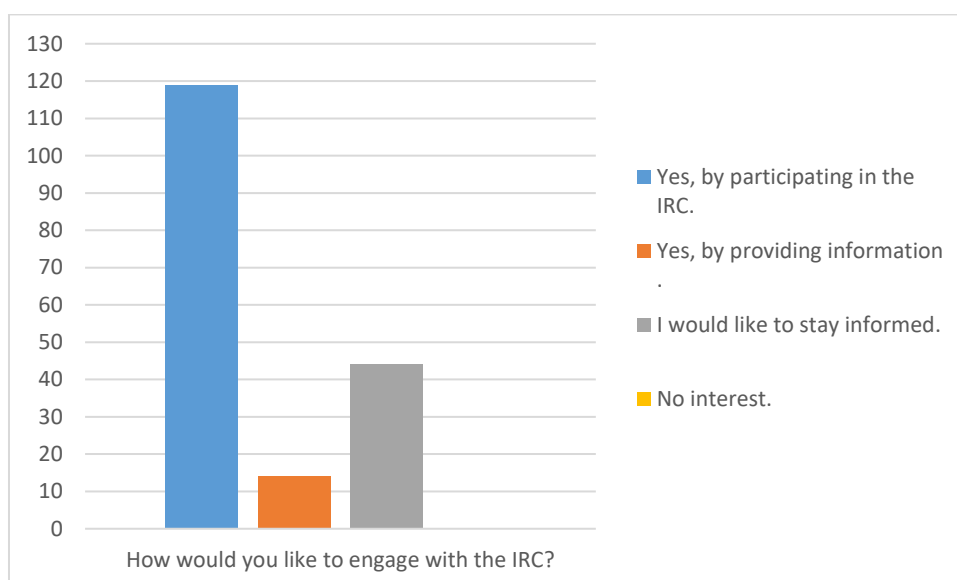
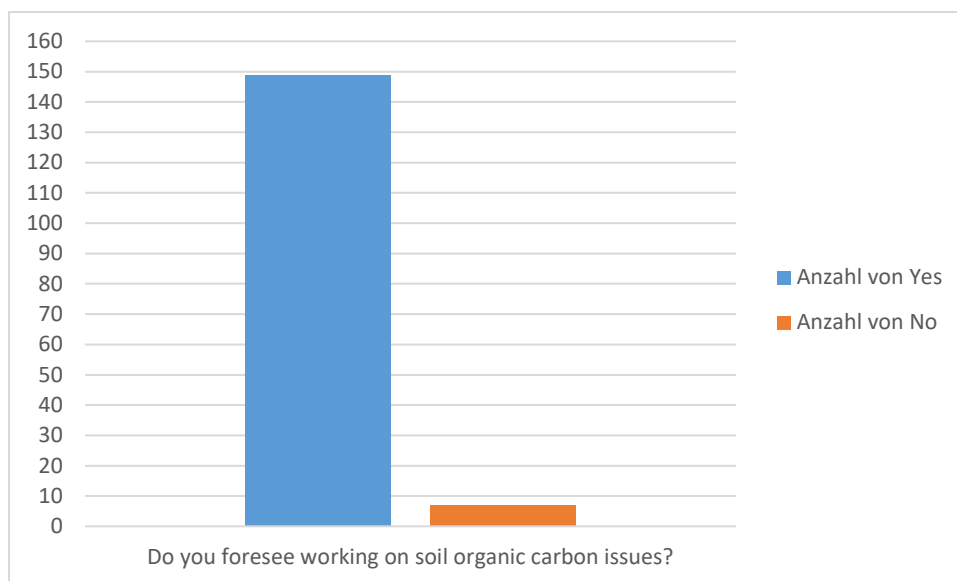
Two Zoom polls were conducted during the event to visualize the audience's background and their interest in participating in the international research consortium. The following questions were directed to the audience throughout the event:

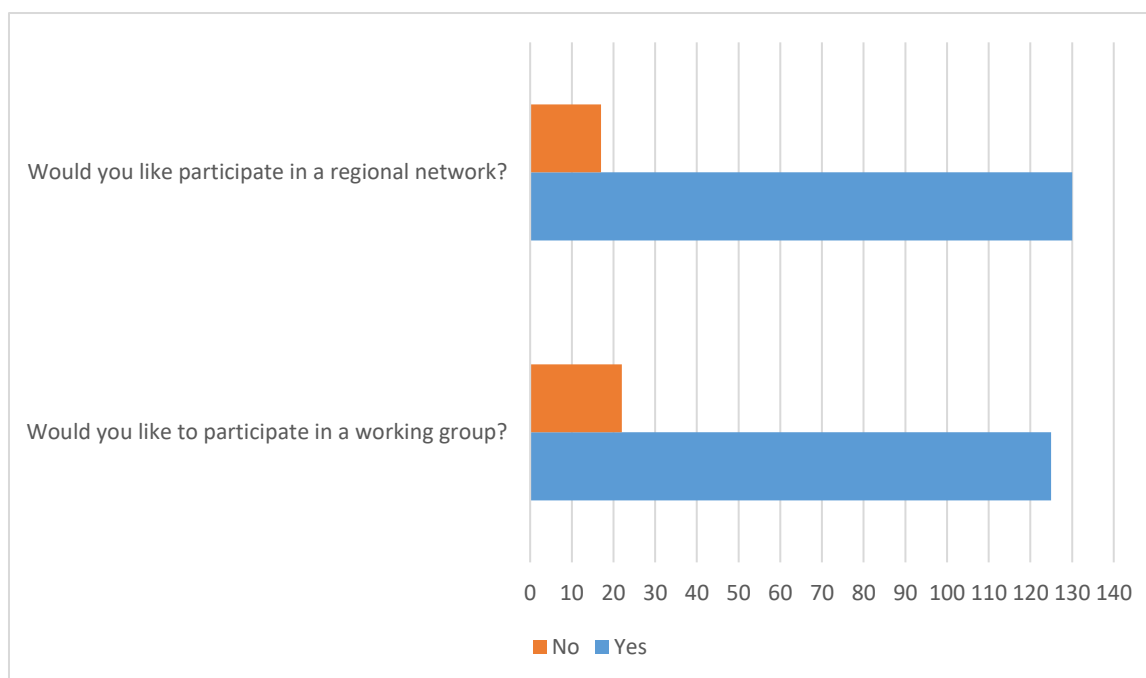
- 1. Do you foresee working on soil organic carbon issues?**
 - Yes
 - No
- 2. How would you like to engage with the IRC? (only one choice)**
 - Yes, by participating in the IRC
 - Yes, by providing information
 - I would like to stay informed
 - No interest
- 3. Your participation in the IRC will focus on [Multiple Choice]**
 - Pillar 1 – Frontiers research: unlocking the potential of soil carbon
 - Pillar 2 – Soil carbon stock change MRV standard
 - Pillar 3 – Agro-ecological and technological innovations (e.g. plant breeding, biochar and organic fertilizers, precision agriculture and machinery)
 - Pillar 4 – Enabling environment and knowledge co-creation

Poll 2 : at the end of the event :

- 1. Would you like to participate in a working group?**
Yes / NO
- 2. Would you like participate in a regional network?**
Yes/ NO

The following screenshots show the results of the poll:





3.4. Expression of interests and commitments by stakeholders

Annex 2 shows the specific expressions of interests, presented by the following participants:

- Prof. Tantely Razafimbelo, Tantaranivo U., Madagascar
- Prof. Hongmin Dong, CAAS, China
- Dr. Beata Eموke Madari, EMBRAPA, Brazil
- Prof. Pavel Krasilnikov, Lomonosov U., Russia
- Dr. Ben Macdonald, CSIRO, Australia

Annex 3 shows commitments made by different stakeholders to participate in the IRC:

- Laura Hoijer, Director, BSAG, Carbon Action, Finland
- Dionys Forster, Sourcing Lead, Nestlé, Switzerland
- Stefan Jirka, Program Manager, Verra, USA
- Lee Nelson, Program Manager, ACIAR, Australia
- Michaël Ehmann, CEO, Nataïs, France
- Deborah Bossio, Lead Soil Scientist, The Nature Conservancy, USA
- Ronald Vargas, Secretary, Global Soil Partnership, FAO
- Hayden Montgomery, Special Representative, Global Research Alliance
- Paul Luu, Secretary, "4 per 1000" Initiative

3.5. Key issues raised in the discussion

During the event, guests were invited to pose their questions in the chat. The moderator, Saskia Keesstra, made sure that as many questions as possible were addressed to the respective speakers.

Some questions concerned the consortium's consideration of topics beside carbon management on crop-land. They raised aspects like biodiversity and carbon sequestration on grasslands or wetlands. The speakers agreed with the importance of these aspects and confirmed that SOC management practices will not only benefit soil carbon sequestration but has wider sustainability benefits.

Commentators in the chat stressed the importance of knowledge management and transfer (pillar 4 of the SRA). Furthermore, they raised the question on how to better integrate social science research and findings into the topic of soil organic carbon.

A topic of interest was the economics of SOC management. The speakers emphasized the linkage of soil carbon with economic sciences. In this context, upcoming topics are adaptations in supply-chains, business solutions and linking policies with carbon pricing and labels. Furthermore, the network of living labs which include social sciences' input and participation can provide further insights into behavioral decision making, assessing policy mixes and making advisory systems more effective. Several speakers declared themselves in favor of hybrid system approaches: financial instruments that are activity and result based. Ideally these continue over longer time periods to offer stability for practitioners. Hereby the preserving of stocks should be considered, rather than just rewarding for carbon sequestration. This would ensure that stakeholders keep carbon stocks high where they already could regenerate.

Appendix 1: Agenda

CIRCASA final conference - Towards an International Research Consortium for Soil Organic Carbon

10 February 2021, 13:00 – 15:30 PM CET

Agenda

Moderator: Saskia Keesstra, Wageningen University & Research, Netherlands

13:00 – 13:05	Welcome • Dr. Jean-Francois Soussana, INRAE, France
13:05 – 13:30	Policy and Research Context • DG Agriculture Introduction (Nathalie Sauze-Vandevyver) • DG Climate (Simon Kay) • Soil Health Mission Board (Cees Veerman)
13:30 – 14:00	CIRCASA Project – General Overview • Dr. Jean-Francois Soussana, INRAE, France • Prof. Pete Smith, University of Aberdeen, UK • Dr. Ana Frelih-Larsen, Ecologic Institute, Berlin Strategic Research Agenda and IRC • Pillar 1 – Frontiers research: unlocking the potential of soil carbon • Pillar 2 – Soil carbon monitoring, reporting and verification (MRV) system • Pillar 3 – Agro-ecological and technological innovations • Pillar 4 – Enabling environment and knowledge co-creation
14:00 – 14:15	Expressions of interest of global regions • Prof. Tantely Razafimbelo, Tantaranivo U., Madagascar • Prof. Hongmin Dong, CAAS, China

	• Dr. Beata Eموke Madari, EMBRAPA, Brazil • Prof. Pavel Krasilnikov, Lomonosov U., Russia • Dr. Ben Macdonald, CSIRO, Australia
14:15 – 14:25	Polling
14:25 – 14:35	Governance and funding of the IRC • Dr. Jean-Francois Soussana, INRAE, France
14:35 – 15:10	Commitments of stakeholders • Laura Hoijer, Director, BSAG, Carbon Action, Finland • Dionys Forster, Sourcing Lead, Nestlé, Switzerland • Stefan Jirka, Program Manager, Verra, USA • Lee Nelson, Program Manager, ACIAR, Australia • Michaël Ehmann, CEO, Nataïs, France • Deborah Bossio, Lead Soil Scientist, The Nature Conservancy, USA • Ronald Vargas, Secretary, Global Soil Partnership, FAO • Hayden Montgomery, Special Representative, Global Research Alliance • Paul Luu, Secretary, "4 per 1000" Initiative
15:10 – 15:20	Q&A
15:20 – 15:30	Closing remarks & next steps • Dr. Jean-Francois Soussana, INRAE, France

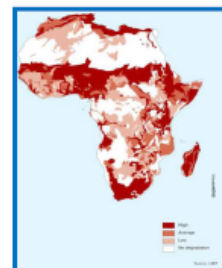
Appendix 2: Presentation slides - Expressions of interest of global regions

Prof. Tantely Razafimbelo, Antananarivo U., Madagascar

University of Antananarivo | Madagascar | Tantely Razafimbelo

Challenge(s) in our region

In Africa, degraded soils are estimated at 22% of the surface of the continent. There is a high need of innovations to restore these soils and to avoid SOC depletion. In addition, to document on their GHG emission, African countries need soil carbon data in AFOLU sector and need to put in place MRV.



Pillars 1-2-3-4



IRC in our region

IRC will provide a network allowing :

- support for African scientists (specific research, echoing data, results and diversity, data quality),
- capacity building for African countries on SOC and GHG MRV, on construction of shared databases,
- exchange of experiences and techniques on implementation of appropriate innovations to reduce SOC loss and restore SOC in depleted soils in Africa.



www.laboradioisotopes.mg
www.ird.fr ; www.cirad.fr



Prof. Hongmin Dong, CAAS, China

Chinese Academy of Agricultural Sciences | China | Hongmin Dong

Challenge(s) in our region

Difficult to scale up existing technologies due to the small householder dominated agricultural production system in Asia, with average cropland area less than 0.3 ha per householder in China. Innovation technologies will provide solutions.



Pillar 3



IRC in our region

- Share knowledge and practices to promote soil carbon sequestration, improve soil health, ensure food safety and farmer's benefits.
- Learn the experience and mechanism to incentivize private sector to invest nature positive agricultural production system.
- Enhance the establishment of national network under the framework of global network.



Website: caas.cn



Dr. Beata Eموke Madari, EMBRAPA, Brazil

Embrapa | Brazil | Beata Madari

Challenge(s) in our region

Knowledge and technology transfer, technical support and financial incentives as well as raising awareness about soil organic carbon's importance for sustainability of production is of vital importance. Research should provide best regional and system specific solutions for all farm sizes and business models.



Source: Portal Embrapa

Pillars 1, 2, 3, 4



Source: Embrapa Carbioma pr.

IRC in our region

A global research network with an active regional hub

- Should support and make incentives for regional and sub-regional collaboration, including institutional, administrative and financial terms
- Should help identify regional and sub-regional specific issues, priorities, challenges (research and policy)
- Should identify and help set up networks to support information flow (existing solutions) and to solve problems.



www.embrapa.br



Prof. Pavel Krasilnikov, Lomonosov Moscow State University, Russia

Lomonosov Moscow State University | Russia | Pavel Krasilnikov

Challenge(s) in our region

Russia has a big proportion of soils with initially high SOC concentration, which are subjected to intensive C loss under cultivation. Soils with lower SOC stock are located in cold areas, and their use in agriculture is limited.



Pillar 1



IRC in our region

The contribution from the IRC to the research in Russia may include:

- improvement of models used for the prediction of SOC dynamics under various climatic scenarios;
- introduction and implementation of novel low-carbon technologies for C sequestration in soils;
- joint action aimed at awareness raising.



<http://soil.msu.ru/>



Dr. Ben Macdonald, CSIRO, Australia

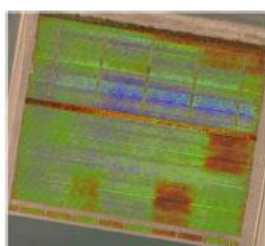
CSIRO | Australia | Ben Macdonald

Challenge(s) in our region

The development of measurement technology and modelling approaches to critically assess management practices that modify the terrestrial ecosystem carbon cycle.



Pillars 1-2



IRC in our region

The Australian Federal Government has set a stretch goal for soil carbon measurement of under \$AU3 per hectare per year. Research links to the IRC will help deliver the goal by improving remote and proximal sensing technologies, regional soil carbon datasets and the development of the next generation of soil carbon computer models.



www.csiro.au



Appendix 3 : Presentation Slides - Commitments of Stakeholders

Dr. Laura Hoijer , Director, BSAG, Carbon Action, Finland

Baltic Sea Action Group / Carbon Action | Finland | Laura Höijer

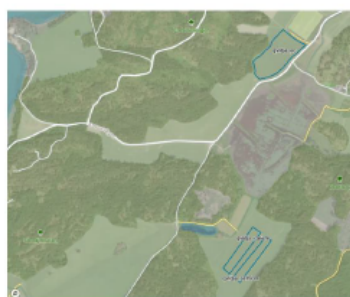
Challenge(s) in our activity domain

To develop a measurement and verification system to determine the amount of carbon stored in the soil. Carbon sequestration, additionality, persistence, and carbon leakage should be determined scientifically.



Pillar 2, 4

CARBON ACTION
FIELD OBSERVATORY



IRC and our activity domain

Co-operation and co-creation in developing MRV system and knowledge. Our Field Observatory service illustrates the effects of carbon farming on Finnish farms, and the development of an international carbon sequestration verification system. With this service, we want to present the current state of science and envision the future possibilities of carbon sequestration: <https://www.fieldobservatory.org/>



<https://carbonaction.org>



Dr. Dionys Forster, Sourcing Lead, Nestlé, Switzerland

Nestlé S.A. | Switzerland | Dionys Forster

Soil

Processes in soils are complex and methods to assess GHG emissions incomplete, which makes trustful monitoring difficult. A standard for GHG MRV is urgently needed for the sector transformation towards Net Zero.

Pillar 3**IRC and our activity domain**

Nestlé has a genuine interest in a standard for soil GHG MRV. The CIRCASA IRC would be highly welcome. If approved, Nestlé would consider supporting the consortium by piloting some of the innovations with suppliers and farmers.


www.nestle.com


Mr. Stefan Jirka , Program Manager, Verra , USA

Verra | USA | Stefan Jirka

Challenge(s) in our activity domain

Quantifying SOC stock change across temporal and spatial scales with sufficient rigour and cost efficiency to comply with our VCS Program requirements and meet the needs of stakeholders seeking carbon offsets.



Pillars 2, 3



Verra and our activity domain

- Share details on VCS requirements for SOC projects e.g. MRV, uncertainty assessment
- Contribute ideas on SOC research needs to advance market actions e.g. SOC performance benchmarks for baseline setting
- Test SOC research agenda and outcomes in carbon market setting i.e. VCS Program



<https://verra.org/>



Mr. Lee Nelson, Program Manager, ACIAR, Australia

Australian Centre for International Agricultural Research | Australia | Lee Nelson

Challenges

Matching policy response to the science
Take the cost out of measurement
Whole greenhouse gas accounting (soils as a source and a sink)
Climate variability and climate change



Pillars 1 to 4

IRC and our activity domain

Australia's National Soils Advocate
Sharing knowledge and experience
Collaborating on science and methodology development

- Whole farm system carbon accounting protocols
- Reducing the cost of soil carbon measurement



<https://aciarc.gov.au/>
Check out this short video about who ACIAR is and what we do



ACIAR

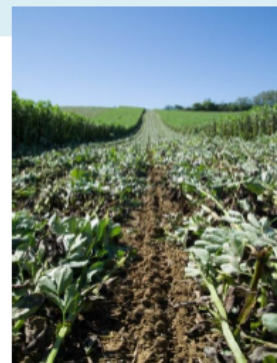
Mr. Michaël Ehmann, CEO, Nataïs , France

Nataïs | France | Michael Ehmann



Challenge(s) in our activity domain

We empower our farmer-partners to commit, and to join the agroecological transition, by rewarding their environmental services such as sustainable carbon storage in their fields.



Pillar 3



IRC and our activity domain

For the past two years, Nataïs has been building a strong partnership with CESBIO in Toulouse . Our common goal is the development of a carbon footprint calculation method, thanks to modelling and remote sensing. This method, set up for popcorn could be applied to other crops and geographical contexts. This tool enables us to objectively measure carbon footprint data at the level of the agricultural parcel.



<https://www.popcorn.fr/>

nataïs

Dr. Deborah Bossio , Lead Soil Scientist, The Nature Conservancy, USA

The Nature Conservancy | Global | Deborah Bossio, PhD

Closing the gap between potential and action

Healthy food production systems can contribute to climate change mitigation and saving nature. To realize this promise, we want to close the gap between the strong potential for soil carbon building and the weak action on the ground.



Pillars 1,2,3,4



IRC and Nature Conservancy programs

We are excited to contribute and translate the work of the IRC into action through our global network of food system projects. In this regard, improving enabling conditions for adoption is crucial. Frontier research to build confidence around what is possible, improved MRV to measure outcomes, and technological advancements will all help increase ambition.



www.nature.org

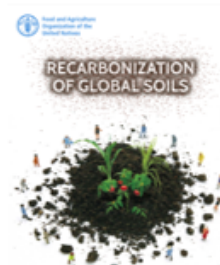
The Nature Conservancy 

Dr. Ronald Vargas, Secretary, Global Soil Partnership, FAO

FAO | Italy | Ronald Vargas

Aim of the initiative

The Global Soil Partnership aims to promote sustainable soil management at all levels and through various channels including recarbonization of global soils.



Pillar 2/3



Our engagement with the IRC

We will benefit from targeted research on: a) cost and time effective methods and tools for SOC measurement on the ground (reduce uncertainty); b) network of observatories on actual productive farms using reference management practices (business as usual vs improved); c) use and improvement of our GSOC-MRV; d) Innovative practices to avoid emissions and foster sequestration.



<http://www.fao.org/global-soil-partnership/en/>



Food and Agriculture
Organization of the
United Nations



Mr. Hayden Montgomery, Special Representative, Global Research Alliance on Agricultural Greenhouse Gases (GRA)

Global Research Alliance on Agricultural Greenhouse Gases | Hayden Montgomery

“

Aim of the initiative

We bring countries together to increase cooperation in research activities to help reduce the emissions intensity of agricultural production systems and increase their potential for soil carbon sequestration.



”

Pillars 1 - 4

	Croplands
	Integrative
	Livestock
	Paddy Rice

“

Our engagement with the IRC

- A coordinated agenda addressing strategic research priorities, ensuring high scientific rigour will benefit all.
- GRA brings national governments and their associated research institutions to the table – with a direct link to the NDC process.
- Development of low-cost, high quality SOC monitoring systems at national level is a priority.

”



www.globalresearchalliance.org



Dr. Paul Luu, Executive Secretary, “4 per 1000” Initiative



“4 per 1000” Initiative | France | Paul LUU

Aim of the “4 per 1000” International initiative

With its 560 partners & members, this Initiative is one of the leading international multi-stakeholder partnerships promoting soil carbon sequestration and soil health to fight climate change (through adaptation and mitigation) and food insecurity.



Pillars 2, 3, 4



Our engagement with the IRC

By its links with the Initiative, the IRC will provide the coordination, cooperation and scientific responses needed by the partners and members of the Initiative for their projects and achievements in the field.

In return, IRC will benefit from privileged access to different categories of actors outside the scientific world, starting with farmers who are at the center of soil carbon sequestration.



www.4p1000.org





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