ORCaSa

Operationalising International Research Cooperation on Soil carbon

Deliverable D3.3

Report on outcomes of TAP 2025

Due date of deliverable: M34

Actual submission date: M34

Start date of the project: September 1st, 2022 **Duration:** 36 months

Organisation name of lead contractor: ANR

Funded by the European Union

Document Information

Grant agreement n°101059863	
Project title	Operationalising the International Research Cooperation on Soil Carbon
Project acronym	**ORCaSa**
Project duration	36 months (01/09/2022 – 31/08/2025)
Coordinator	Suzanne Reynders - INRAE
Related work package(s)	WP 3
Related task(s)	T 3.2
Lead organisation	ANR
Contributing partner(s)	
Due date	**30/06/2025**
Submission date	17/04/2026
Dissemination level	PU

History

Date	Version	Submitted by	Reviewed by
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Table of contents

1. Summary

Objectives:

The task 3.3 targeted an international alignment of national projects on soil carbon sequestration. The objectives were to have discussions with international funders collaborating with ANR, find an agreement to collaborate on the alignment of national research projects, develop a cluster of projects and identify with the researchers the benefits of aligning their projects to increase the research impacts.

Rationale:

We have established collaborations with international funding agencies to draw attention to the collective interests in soils. We discussed our respective interests in collaborating on soil issues, and we presented the Thematic Annual Programming (TAP) instrument as an option to strengthen collaborations and establish new ones while capitalizing on existing national initiatives. We have set up a cluster of projects, organized workshops with the researchers and launched discussions about shared scientific questions and areas of collaborations. The workshops were a real opportunity for international networking, for discussions on the challenges to align methodologies and data, align levels in the given field, better understand research priorities and approaches in other countries, brainstorm with international experts about soil data, soil health and soil management practices. The first publication of the TAP cluster is the Who is Who brochure, which was designed and developed by the ANR, then formatted by our partner ARTIK (WP6). The second publication is a policy brief about the collaboration opportunities with African partners. This publication is still under revision. Other future deliverables of the TAP cluster target publications and a joint response to a call for projects.

Teams involved:

ANR

2. Introduction

What is a TAP?

A Thematic Annual Programming (TAP) action consists in establishing a network of national projects focused on specific research needs from new or already started national calls in order to partner them, creating a critical mass of research and technological excellence, and ensuring the integration and sharing of knowledge. The desired outcome is increased efficiency of public funding and research by avoiding duplication across Europe and beyond.

Positioning of the Soil Carbon TAP in the OrcaSa project

The ANR contribution in OrcaSa project has focused towards the mobilization of the international funders to strengthen cooperation on soil research. First, in task 3.1, the ANR mobilised them to participate to a joint call with EJP Soil launched in 2022 and funded in 2023 (see DEL3.1). Second, the ANR has set up the Knowledge Hub and the TAP action for a better alignment, coordination and co-creation of research activities to attract European and international funders around the SRIA. The ANR organized workshops with research funding agencies to discuss future possible actions on alignment, on co-creation and co-funding processes for research partnerships. Along these workshops, participants shared their insights regarding research funding needs. We ended with a Policy Brief that highlighted several opportunities for collaborations across national initiatives funded worldwide (see DEL3.2). International researchers who joined the Knowledge Hub (see DEL3.2) and researchers involved in defining the OrcaSa SRIA (see WP2) were invited to share their (regional or general) research priorities that were used to delineate the TAP cluster of projects. All the OrcaSa regional nodes were invited to contribute to the action. The FARA and several African partners have actively participated in this building process.

Strategic role of the Soil Carbon TAP

The TAP developed focuses on the soil carbon across national programmes with a larger frame (soil health, agroecology) and was named Soil Carbon TAP. The action plays a strategic role in all of OrcaSa's efforts to set up the Soil Carbon Futures initiative. It allows for the development of collaborations without resorting to a call for proposals. We wouldn't have the budget to launch a call for proposals in the short term of the project. These collaborations during the TAP frame included interactions among funders, the establishment of new interactions between researchers; and numerous back and forths between funders to discuss common needs for the future.

Expected impacts

The expected impacts of the Soil Carbon TAP Action include:

- To enhance the overall impact of cross-sector collaboration to address together the critical questions about management, climate change, climate mitigation and policy integration related to soil carbon stocks and their dynamics and conservation.

- To promote the exchange of knowledge, data and research methodologies as well as the sharing of critical insights and research findings to enhance the collective understanding

of soil carbon dynamics, providing research teams with the possibility to expand their expertise in the domain and identify possible areas for cooperation and results valorisation.

- To encourage North-South and South-South partnerships and collaborations across sectors, disciplines and countries to maximize the impact and potential of the network.

- To identify research gaps and proposing ways to mitigate them by addressing areas where further research is needed to progress on soil carbon sequestration and its role in climate change mitigation.

3. Results

Workshops organized to set up the Soil Carbon TAP

A scoping document presenting the objectives and tasks needed for the knowledge hub and TAP actions was prepared in 2023. ANR shared this document with its international partners and launched a series of meetings with them to discuss the potential of such initiatives and possible interest from international public funders. In 2023-2024, six workshops and 21 individual meetings were organized besides informal meetings, representing above 50 hours of meetings. In July 2023, ANR organized two workshops to introduce the knowledge hub and TAP actions. These upstream discussions relied on scientific presentations to overview the goals, some work already achieved to build international research consortia on soil carbon and reports from previous similar initiatives undertaken by the Facce JPI and the Water JPI. They were followed by discussions about the steps needed to launch similar activities about soil carbon. In total, 50 participants attended the workshops, representing 11 countries from Europe, 9 countries from Africa, 5 countries from Asia, 5 countries from the Americas and Australia. ANR organized several meetings with institutions unable to attend the workshops. Moreover, we organized workshops with regional partners to discuss their specific needs and limitations to launch a call. In total, during the first year of the project, ANR undertook discussions with 85 organizations from 53 countries. This phase of the project was particularly long due to a lack of feedbacks from some partners and to the numerous individual meetings we had to organize to present and explain the initiative.

Few European partners have joined our TAP action. Several of them considered it as a parallel action to other initiatives and were already very busy with the EJP SOIL. To involve German partners collaborated already strongly with ANR, including the EJP SOIL and with the Soil Carbon IRC in particular though the 4p1000 initiative, a meeting was organized in December 2023 with the German Soil Mission Mirror Group. It served as an opportunity for the ANR to present the ORCaSa project to the German representatives from the Ministry of Food and Agriculture, the Ministry of Education and Research, the Ministry of Environment, various agencies, and state research organizations. Through this online session, the aim was to inform members about the progress and objectives of ORCaSa and to explore potential areas of collaboration in the TAP action. This approach was interesting since the research from the humus program was mobilized for our action.

To involve African partners in our action, several individual meetings were also organized (07/08/2023, 13/09/2023 and 15/09/2023, 21/02/2024) with African funders and FARA (OrcaSa partner). It was another opportunity to explain the TAP initiative, its participation conditions, and gather feedback. In the end, these meetings resulted in the participation of several African teams.

To involve South American partners, we also organized several meetings with representatives from Chile and Brazil. Ultimately, they were unable to participate and withdrew at the very end in 2025.

To make the Soil Carbon TAP a reality, we needed a critical mass of researchers, which was still very compromised until mid-2024. Indeed, 15 organizations from 13 countries rejected our invitation to contribute to the TAP action mainly arguing a lack of human and financial resources. Different research priorities from those of ORCaSa may also explain the lack of interest from some countries which have not a climate-centric vision of challenges in agriculture. To resolve this impasse, we tolerated more flexibility in participation by including ongoing projects relevant with the chosen theme. Thus, we considered two scenarios: A) a new call involving some budget for networking launched by national funders; B) no new call launched but some funding is allocated to participate to the TAP. In these conditions, partners from 16 countries agreed to explore the interest in launching a TAP action in 2024, to negotiate the topics, calendar and modality of participation. Several funder representatives expressed their interest to join the TAP steering committee coordinated by ANR.

In June 2024, the TAP Steering committee met to chose among the scientific topics to include in the cluster of projects. Two directions were chosen in socioeconomics and in soil sciences with five subtopics in both scientific fields. Finally, the general theme was chosen in soil sciences about the role of soil carbon in climate change mitigation. More specifically, the objective is to deepen our understanding of the effects of soil management practices on carbon stocks, the impacts of climate change on soil carbon sequestration and the influence of soil health and land cover on the soil carbon dynamics. Several subtopics were also encouraged:

- the socioeconomics and policy framework
- C sequestration and natural resources including water issues
- C sequestration in different farming systems: annual and perennial crops, tree-based systems
- Interaction between C sequestration issues and climate/environmental issues

Soil Carbon TAP cluster

Finally, the Soil Carbon TAP cluster involved 27 projects from 13 countries (Table 1). All projects proposed by the funders were enrolled. They represented 8 new projects and 19 ongoing projects. The projects encompassed a wide geographical representation.

Most of the projects were national projects, as expected. However, in a few cases, the teams could only participate through some funding recently received from the European Commission via the HORIZON TMA MSCA Postdoctoral Fellowships (EWRECA from Spain), or the PRIMA programme (Soils4Med from Lebanon), or the EJP SOIL programme (C-AROUND from Ghana and CARBOGRASS from Kenya). These PRIMA and EJP SOIL projects bring a more regional view which was also interesting to include.

It should be noted that there was a strong participation of researchers funded under the Humus programme. This programme is a flagship programme launched in 2019 by the federal German government as part of its "Climate Protection Programme 2030". It is completely aligned with the objectives of our action since it pursues the overarching goal of increasingly activating the carbon storage potential of agriculturally used soils. It supports both model and demonstration projects and research projects. The demonstration projects have the advantage of directly involving farmers, enabling the adoption of humus-building methods as standard best practices. The research and development projects explore biochar's use and potential benefits.

Table 1: Researchers and projects involved in the network

Country	Funder, initiative	Project	Project dates	Researchers and organisations
CANADA	Natural Sciences and Engineering Research Council of Canada, Alliance Missions: Anthropogenic greenhouse gas research	BioSoil North: Local solutions for soil health resilience and mitigation of greenhouse gases	2023-2026	Adrian Unc, Memorial University of Newfoundland Maren Oelbermann, University of Waterloo
		On-farm monitoring of subsurface carbon sequestration in regenerative	2023-2026	Kira Borden, Trent University
	Weston Family Foundation	Soils Impact People	2023-2027	Laura Van Eerd and Inderjot Chahal, University of Guelph Daniel Saurette, Ontario Ministry of Agriculture, Food and Agribusiness
FRANCE	ANR, France 2030 : PEPR FAIRCARBON	ALAMOD: Shared, accurate models and open datasets	2023-2028	Pierre Barré and Bertrand Guenet , CNRS, National Institute for Earth Sciences and Astronomy
		PEACE: Permafrost Ecosystem changes across the Arctic: Carbon and nutrients cycling in terrestrial-aquatic Environments	2023-2028	Liudmila Shirokova, CNRS
	ANR, Generic call	C-COS2: Carbon storage in non-cropped ecosystem soils: toward a global understanding of the impact of grazing and logging	2024-2028	Tanguy Daufresne, French National Institute for Agriculture, Food, and Environment
	ANR, PRIMA initiative	EcoFertis: Innovative processing of manures and biowastes of Eco-friendly Fertilizers	2024-2027	Ramla Saddem, University of Reims Champagne-Ardenne
	ANR, European Joint Programme SOIL	FAMOSOS: FArm MOnitoring via Real-time Soil	2023-2026	Elise Saoutieff, Commissariat à l'énergie atomique et aux énergies alternatives CEA LETI
GERMANY	Federal Office for Agriculture and Food, Germany, HUMUS programme	HUMAX: Potentials of agroforestry and agri-PV systems for maximizing humus built-up and carbon sequestration on agricultural land	2023-2029	Sven Marhan and Tanja Weinand, University of Hohenheim Daniel Kray, Offenburg University of Applied Science
		PK-BODENABC: Long-term opportunities and risks of using biochar in soils: Analysis of changed soil fertility parameters, C storage behaviour and ecotoxicological and environmental effects	2025-2026	Jörg Oehlmann, Goethe University Frankfurt
		CarbonTillage: Fractional deep tillage - Technical and technological solutions for climate protection and yield security in agriculture	2022-2025	Michael Sommer, Leibniz Centre for Agricultural Landscape Research
		CarboVino: On-farm demonstration of best-practice for soil organic matter build-up and carbon sequestration in viticulture	2024-2030	Claudia Kamman, Hochschule Geisenheim University
		SKHum: Scientific monitoring of the model and demonstration projects in the field of "Humus formation in fruit and vegetable cultivation as well as in the cultivation of wine and hops"	2023-2030	Til Feike and Hildegard Garming, Julius Kühn-Institut - Federal Research Centre for Cultivated Plants Johann Heinrich von Thünen Institute

GHANA	Global Research Alliance, European Joint Programme SOIL	C-AROUND: Refining Soil Conservation and Regenerative Practices to Enhance Carbon Sequestration and Reduce Greenhouse Gas Emissions	2023-2026	Edward Yeboah, Vincent Logah and Caleb Melenya Ocansey Council for Scientific and Industrial Research - Soil Research Institute
IVORY COAST	European Commission, Horizon Europe	AfroGrow: Informed Decision-Making for Agroforestry Systems in Africa through a Network of Living Labs	2025-2028	Jérôme E. Tondoh, Serge Zon Demeango and Kpangui Bruno Nangui Abrogoua University
KENYA	National Research Fund Kenya, European Joint Programme SOIL	CARBOGRASS: Impact of grassland management on soil carbon storage	2023-2026	Felix Ngetich, Jaramogi Oginga Odinga University of Science and Technology
	Foreign, Commonwealth & Development Office (FCDO), UK Pact	Delivering nature-based solution outcomes by addressing policy, institutional and monitoring gaps in forest and landscape restoration	2023-2025	Leigh Ann Winowiecki, Center for International Forestry Research and World Agroforestry
LAOS	Food and Agriculture Organization, Global Soil Partnership	GLOSOLAN: Global Soil Laboratory Network	Ongoing since 2017	Christian Hartmann, Global Soil Laboratory Network
LEBANON	Lebanese Agricultural Research Institute, PRIMA initiative	Soils4Med: SOIL health monitoring and information systems FOR sustainable soil management in the MEDiterranean region	2023-2027	Ihab Jomaa, Lebanese Agriculture Research Institute
MOROCCO	OCP Foundation	ACFP: The Africa Carbon Flagship Programme	2023-2029	Ngonidzashe Chirinda and Mohamed Louay Metougui, Mohammed VI Polytechnic University
SENEGAL	OCP Foundation	ClimAgraCS: Climate effects on Agriculture and carbon sequestration	2025-2027	Cheikh Modou Noreyni Fall, University of Dakar
	Université Alioune Diop, on own funds	SOC_BIOGERENAT: Spatial variability of carbon stocks in forest and agroforestry ecosystems in Senegal	Ongoing since 2021	Elhadji Faye, Université Alioune Diop
SOUTH AFRICA	National Research Foundation (NRF), South Africa	EROSION 4D: Temporal Three-Dimensional Land Surface Reconstruction to Quantify Soil Erosion and Land Degradation	2024-2026	Mohamed A. M. Abd Elbasit, Sol Plaatje University
		Improving productivity, resilience and sustainability of smallholder farmers' crop production systems through conservation agriculture in the eastern Cape province, South Africa	2015-2020	Patrick Nyambo, University of Fort Hare Faculty of Science and Agriculture
	Water Research Commission	LEWSSA: Towards a Landslide Early Warning System for South Africa	2023-2026	Johan van Tol, University of the Free State
SOUTH KOREA	National Research Foundation of Korea	Impact of land-use change from rice paddy to upland on soil carbon stock	2023-2028	Pil Joo Kim, Gyeongsang National University
SPAIN	The European commission, MSCA programme	EWRECA: Enhanced silicate weathering in agricultural rice paddies: maximisation of soil carbon sequestration and crop production, while reducing the overall greenhouse gas emissions	2025-2027	Sílvia Poblador,University of Barcelona

Structure of the network

Management team

The management of the TAP action was handled by the ANR. This management team has several roles:

- organising meetings (agenda, documentation, minutes);
- facilitating communication within the TAP Action members and with the TAP Steering Committee;
- supporting the cluster in the preparation of the Implementation Plan of the TAP Action and its implementation;
- external communication- disseminating and creating dissemination leaflets/contents for OrcaSa web pages;
- supporting the TAP Scientific Coordinator;
- circulating exploratory survey about expectations of the TAP members

Steering Committee

It was set up in 2024 based on a voluntary basis among the institutions interested in participating to the cluster. It was animated by the ANR. It participates to:

- Control the designing of the content of the call text
- Establish the composition of the cluster of projects
- Ensures the efficiency of the clustering activities
- Name the TAP scientific coordinators

Scientific coordination

Given the size of the network and the work that implies coordinating our meetings and deliverables, the Soil Carbon TAP network will be coordinated by a team of scientific coordinators. Their roles are to:

- Ensure the scientific coordination of the TAP Action activities
- Lead the work in developing the TAP Implementation Plan
- Lead de work in developing the proposed TAP action outputs
- Meet with the subclusters quarterly
- Represent the cluster at midterm meetings if any
- Lead the work in developing the final follow up of the TAP Implementation Plan
- If requested, support additional foresight exercises carried out by ORCaSa in the selected scientific area of the TAP Action

Given the size of the cluster, we invited several experts in a scientific coordination team. Four researchers have shown their interest to join the scientific coordination team:

- Dr. Abad Chabbi, INRAe, France
- Dr. Maren Oelbermann, University of Waterloo, Canada
- Dr. Sílvia Poblador, University of Barcelona, Spain
- Dr. Leigh Ann Winowiecki, CIFOR, Kenya

Observers

The TAP observers represent independence and transparency. They have scientific and technical expertise from a broad range of areas that reflect TAP's priorities. In their role, observers participate in TAP decision-making meetings at the global level, act as mediators and hence consensus building. They have participated to the set up of the cluster and provided recommendations throughout the project.

- Prof. Joann Whalen, Mc Gill University, Canada
- Dr. Talal Darwish, CNRS-Lebanon
- Prof. Allassane Ouattara, Université Nangui Abrogoua, Ivory Coast
- Dr. Andrews Opoku, Kwame Nkrumah University of Science and Technology, Ghana

Kick off

The TAP kick off was held on April 2025 with the INRAe participation (see agenda in Annex 1) presenting the Soil Carbon IRC. This meeting organized by ANR involved 39 persons : 6 organizers from ANR and the Soil Carbon IRC and 35 participants. The participants included 27 researchers and 6 representatives of funding organizations. Jean-François Soussana, chair of the Soil Carbon IRC steering committee, presented an overview of the Soil Carbon IRC's development and its ambitions to foster a unified approach to global soil carbon research. Esther Diez Cebollero, Water JPI coordinator, shared experiences from TAP actions developed under the umbrella of the European Water4All initiative, whose achievements offer valuable inspiration for the emerging Soil Carbon TAP community. ARTIK communicated about this event (Annex 2; https://irc-orcasa.eu/newsevents/soil-carbon-tap-kicks-off/). On this occasion the letter of interest to contribute to Soil Carbon Futures initiative was distributed again.

Workshop about scientific shared questions

A workshop was organized on April 24, 2025 to discuss the following shared scientific questions.

• Knowledge, information and kind of resources available (data, methodologies, infrastructures, good practices, etc…)

- TAP creates the frame for handling the heterogeneity in soil organic carbon due to soil pedology and land management, across larger spatio-temporal regions

The country-specific projects in Ghana focuses on data collection, including current and historical datasets, and document the protocols associated with the datasets.

- Data collection is underway to combine datasets from across the French territories, including carbon stocks and vegetation parameters, with the goal of making an interoperational dataset for modeling.
- Spatially-explicit soil mapping, including repeated sampling in the Mediterranean region aimed at measuring, monitoring and modeling (including time-series analysis) will include soil organic carbon as a component of the overall soil health assessment.
- Technical work is underway to assess the underlying data quality and comparability (e.g., at a methodological basis, comparing Walkley-Black and dry combustion methods). The focus is on internal quality control and quality assurance, to set the standard for reproducible methods of analysis across laboratories. There needs to be good practices to distinguish carbonate-C from organic C.
- The Global Soil Partnership is also involved in the technical laboratory QA/QC assessment.

- Procedures to assure consistency in sample collection across field sites and considering complex field designs (e.g. agroforestry) were discussed.
- Many political/policy/programming decisions are based on the outcomes of meta-analysis. The discussion centered around the importance of having robust data at the core (from the field sampling to the lab analysis to the compilation and data interpretations steps).
- Heterogeneity in data types to be used, formats, and quality : assuming that data has been collected using accepted statistical and analytical protocols the heterogeneity will stem from the types of data collected (different response variable, covariates, sampling intensity and stricture) we do require an approach to data harmonization. This can be carried out by employing metadata analysis tools along supportable, testable hypotheses. Much will depend on the desire and possibility of sharing particular datasets in the first place.

• Identifying the added value of the TAP for each project (what the TAP initiative can enhance or what kind of new perspectives the TAP provides for each project)

- There is a general agreement on the added value of TAP to support collaborations in the near, mid and long-term future in each country. The expertise of TAP is valued in the country projects. There is also an interest to share experiences from outside Europe.
- Developing countries need to have access to resources that they may not have (and vice versa: in some cases developing nations have infrastructure that developed countries don't) which could be achieved through international exchanges.

• Identifying strengths of each team

- The proponents of each country project were clear in expressing their strengths and goals.

• Needs of each project to build on creating a concept of how the group will work together, on what and to what end

- Each project has clearly defined goals and deliverables in a fixed timeline.

The key messages of this meeting were:

- The TAP added value is to support collaborations in the near, mid and long-term future in each country and in sharing experiences from outside Europe
- TAP is a valuable resource to discuss uncertainties related to soil organic carbon
- Useful for data architecture supporting mapping and modeling efforts, and to create time-series datasets
- TAP can enhance exchange on methodologies for sampling and analyses, including the gold standard practices and suitable QA/QC protocols for assessing soil carbon and soil carbon fractions
- TAP fosters discussions centered around the importance of having robust data at the core to support political/policy/programming since decisions are based on the outcomes of meta-analysis
- There is a need to organize the network well into subgroups with each subgroup having specific goals, outputs and timelines.
- Try to involve partners from Central and South America

Workshop about the concrete actions for collaborative actions

We organized a workshop on April 25, to discuss how to put in place the collaborations among the TAP members. The following questions were addressed:

1) What common deliverables could we propose for the TAP? what is the realistic timeline?
2) What data can/should be shared among partners?
3) What concrete actions can we take for student/researcher mobility or co-supervision?

The key messages of this meeting were:

- There are opportunities for scientist mobility either through grants received by some of the TAP projects or though application to new ones
- We can establish discussion threads, idea shops to brainstorm on the current state of the science, integration of science in the society, theory to application, etc., development of concepts, that can lead to preparation of commentaries and opinions
  These can be a low-cost opportunity to establish relationships and gel networks
  These can be informally proposed by any member of the network, and they may become formalized as there is interest
- The TAP cluster represents an opportunity to better know each other and apply for large grants that feed on existing research and build new research
- Assuming that data has been collected using accepted statistical and analytical protocols the heterogeneity will stem from the types of data collected (different response variable, covariates, sampling intensity and stricture) we do require an approach to data harmonization. This can be carried out by employing metadata analysis tools along supportable, testable hypotheses. Much will depend on the desire and possibility of sharing particular datasets in the first place.
- The key risks or difficulties are : data misalignment, goal misalignment, geographic distances and associated costs. To address them : harmonize tools/team, idea-shops: recurrent discussion groups to build up exchanges and stimulate interest, one on one interaction along common lines of interests
- It was proposed that the management team compiles a list of funding opportunities for the mobility of researchers or students between the cluster's laboratories. Some of the participating projects have already funds available for such activities.

Workshop with the African partners to engage local expertise

As part of the Africa Chapter of the International Research Consortium on Soil Carbon, Dr. Fatunbi (FARA, OrcaSa partner) organized a workshop about “Exploring the State of Knowledge and Action for Optimizing Soil Carbon in Africa” in Nairobi in May 2025. We organized a session to engage more expertise in the TAP action and shape collaborative agendas. ANR disseminated a qualitative questionnaire to 35 African participants representing a diverse range of countries including Kenya, Ghana, Tanzania, Lesotho, Côte d’Ivoire, and South Africa. This initiative aimed to foster an open dialogue around TAP activities and to actively collect the insights and perspectives of African stakeholders. This gathering convened a diverse spectrum of stakeholders—including researchers, farmers, NGOs, and private sector actors—who jointly engaged in shaping the future of soil carbon science in the region.

During the workshop, three key questions guided the discussions and the survey:

1) What would fair and effective international cooperation look like for you?
2) How can we, together, make soil carbon science work for farmers, not just for funders?
3) What do African researchers need that goes beyond 'being included'?

The responses revealed a strong consensus on the need for equitable partnerships that position African stakeholders as true co-leaders in research and funding decisions rather than passive beneficiaries. There was a clear call for co-ownership of research agendas to ensure relevance and respect for local contexts.

Moreover, participants emphasized the importance of translating scientific advances into practical, farmer-centric solutions, highlighting the necessity of tailored capacity building and the deployment of accessible, field-adapted measurement tools. These tools must be user-friendly and scalable, empowering local actors to monitor and manage soil carbon effectively.

Beyond technical needs, the survey brought to light systemic barriers—such as infrastructural constraints and socio-political challenges—that limit implementation and uptake. Addressing these requires sustained commitment to building inclusive, resilient networks that integrate scientific innovation, local expertise, and policy frameworks.

This participatory approach has strengthened TAP 2025's international collaboration network and deepened its understanding of the complex realities faced by soil carbon initiatives on the ground. It lays a solid foundation for future research directions and policy recommendations that are not only scientifically robust but socially equitable and contextually grounded.

Outputs

Materials for team presentation

To start getting to know each other, several documents were produced. The researchers prepared powerpoint and video presentations to present their team and their research project. These documents were shared throughout the network on a secure IT platform by the ANR team.

Publications

Several publications are in progress or anticipated among our future activities: the Who is who brochure, a policy brief, a guideline document and scientific papers.

- ✓ Who is who brochure

Based on information provided by the funders and researchers, we have prepared a Who-is-who brochure. This document describes the cluster, includes an introduction and references to the projects and participating teams. It was designed and prepared by the ANR. The draft version is available on demand (RGPD limitations).

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✓ Policy brief

We have drafted a policy brief following the African workshop held in Nairobi in May 2025. The draft is circulating among the co-authors. An important aspect of the discussions will be to make the results usable for decision-making, particularly by funders.

✓ Guidelines

Several researchers agreed on the relevance to report on guidelines (ultimately to turn into a policy) on carbon accounting: monitoring, verification is needed due to the many discrepancies in how soil (and plant, but mostly soil) samples are taken and processed. There is a lot of discrepancy and therefore how true/accurate are the reported results in the literature that are also frequently used for meta-analyses.

✓ Scientific papers

Several co-authors were identified to work on a position paper on soil carbon, the issue of the quality and comparability of the data. There needs to be some sort of position paper that should be flexible enough so it can be adapted globally. We need to strive for more consistency in sampling and analysis. One objective would be to convince the public that short term gains are not sustainable. Given the diversity of projects/teams involved in the TAP cluster, it was also suggested to contribute to common special collection publications along common threads.

The next workshop to be organized

The goals of the next workshop are to:

- further introduce projects developed in the network. The TAP members agree that the following topics should be developed through two-three invited conferences:
    - Carbon: agriculture, forests, aquatic systems
    - Amendments e.g., biochar, compost etc.
    - Conventional Management e.g., row crop, pasture etc.
    - Sustainable Management e.g., agroforestry practices, intercropping etc.
    - Non conventional crops : bioenergy, hemp, etc.
- write the implementation plan of the TAP and define the timeline.
- attempt to develop a reasoned, science focused summary of the information we have on each project. This can be focused on its development as a map to identify synergies

4. Conclusions

Integration of the TAP action with other OrcaSa tasks

The fact that we codeveloped the Knowledge Hub in 2023 and the TAP action in 2024 with the contribution of the funding agencies was a great help : i) Knowledge Hub members were nominated by the funders which ensured that regional/local research priorities were discussed; ii) the Knowledge Hub workshops were organized upstream of the implementation of the TAP action which enable to delineate quite early the topics we would work on for the TAP; iii) Several Knowledge Hub members suggested to invite their contact points from their national funding agencies which enabled to enlarge our network of funders. Thus, budling the Knowledge Hub and the TAP were complementary actions within WP3.

The TAP action was also complementary to other tasks developed in the project such as the SRIA update and the extension of the regional nodes. Discussing the research priorities with our SRIA task leader (see WP2) was instrumental in the TAP process since the work led in WP2 provided an exhaustive overview of research priorities on soils worldwide.

Challenges and recommendations for future research alignment actions

The TAP instrument is still new and we had to introduce it many times. Understanding the mechanism, confusion with European and international projects were challenges throughout the project. We used examples and know-how from the JPI Water experience and collaborated with colleagues from the JPI Water initiative experiences with the aquatic pollutant TAP and SD-Wishes. Since the TAP is not a France-specific instrument but a transferable multi-country modality, we hope that other countries will take ownership of this instrument.

We have centered our actions towards carbon sequestration as an OrcaSa brand. However, if the TAP cluster can extend in the future, a soil-health oriented action may have a wider be unifying potential. Several countries may have rejected our collaborative offer because their agriculture policy are not climate-centric. As highlighted by the OrcaSa SRIA, a broader soil health angle could improve international buy-in and downstream impact.

The complexity level of the implementation of an international TAP may have been underestimated. Moreover, despite being ANR partners, many contacted institutions did not provide any substantial feedback regarding our TAP action. The lack of budget dedicated to soil research may hamper to launch the expected TAP call. In such case, an alternative is to include in the cluster ongoing projects. Some institutions that wanted to participate but did not have the financial means proposed to base themselves on regional or European projects.

Another difficulty is to find a mechanism to remunerate coordinators. Due to fund management rules, no compensation was granted to the scientific coordinators of the cluster. We recommend including this expense during the project design. This remuneration would be welcome and justified.

The project sought to establish numerous international links, which made it difficult to hold workshops and consider the varying availability of researchers due to time differences, seasonal differences, holiday periods, working weeks and fieldwork. We conducted on line meetings mainly and took the opportunity of a workshop organized by the OrcaSa African regional node in 2025 to explore new possibilities to extend the TAP cluster among the African partners.

We also pay attention to not being too overwhelmed with projects. The target size of the network was 20 projects. In the end, we had more projects, which meant more difficulties in setting up the workshops. Practices vary from country to country, and it is not always easy to align between countries.

Perspectives for the Soil Carbon TAP

Such an action takes a long time to set up. Today, an amazing network has been structured and mobilized. If it continues to be managed and supported, results should be achieved in the medium term: a joint publication, a reflection on the possibilities of participating in a call for joint projects, and researcher mobility. We expect more results to come after the end of OrcaSa. The ANR has managed the TAP action during the OrcaSa project. Without further

funding, it will not be possible to continue managing and following the cluster, and such activities are needed for its survival.

Depending on the availabilities of funds, other topics (already identified by the TAP steering committee) could be added in the TAP cluster. An implementation plan still needs to be written to achieve the collectively defined deliverables:

- Data collection and sharing: identify the baseline and specificities of the countries/regions
- Homogenization of protocols and accessibility (through the Impact4Soil developed by OrcaSa partners)
- Knowledge product: provide guidelines for the best practices, a technical report and a policy brief
- Capacity building and training: look for opportunities for training on certification programmes, organize internal workshops
- Continue working on the engagement of stakeholders including funders
- Collaborate on large grants if available

5. ANNEXES

ANNEX 1: Agenda of the Soil Carbon TAP Kick Off

ORCaSa
Because soil carbon matters

anr agence nationale de la recherche

Thematic Annual Programming on Soil Carbon–**Kick-off**

Introducing the action: aligning national or regional research projects

Tuesday 8th April 2025 from 10:00 - 11:30 AM Paris Time (UTC+2)
Online – WebEx link

Opening, welcome remarks and context	
09:50 - 10:00	Opening of the meeting and testing the connexion
10:00 - 10:25	**Welcome words, Meeting objectives & tour de table** Inès SOLTANI *French National Research Agency (ANR) – France*
10:25 - 10:30	**Roadmap for implementing the Strategic Research Innovation Agenda** *French National Research Agency (ANR) – France*
10:30 - 10:40	**The Soil Carbon International Research Consortium** Jean-François SOUSSANA & Mathieu NOGUES *The Soil Carbon International Research Consortium (Soil Carbon IRC) – France*
Thematic Annual Programming action	
10:40 - 10:55	**Exploring the TAP: Insights from the Water JPI example** Esther DIEZ CEBOLLERO *French National Research Agency (ANR) – France*
10:55 - 11:25	**Shaping the future of Soil Carbon TAP: Key Developments and Next Steps** Nuria RUIZ *French National Research Agency (ANR) – France*
Closure of the meeting	
11:25 - 11:30	Summary of key discussions and next steps Workshop closure

ANNEX 2: News published by ARTIK about "Soil Carbon TAP kicks off":

On 8 April, the French National Research Agency (ANR) launched the Soil Carbon Thematic Annual Programming (TAP) action, marking a significant step toward strengthening global collaboration on soil carbon research.

The kick-off meeting welcomed 27 researchers and six representatives from funding agencies, spanning four continents.

As part of the ORCaSa project (Operationalising International Research Cooperation on Soil Carbon), the TAP aims to build a dynamic international network of research projects funded at national and regional levels.

Its goal is to enhance knowledge sharing, support interdisciplinary collaboration, identify research gaps, and promote cross-sector partnerships — including North-South and South-South cooperation.

Currently, the Soil Carbon TAP connects 30 projects and 44 researchers from countries including Australia, Canada, France, Germany, Ghana, Ivory Coast, Kenya, Lebanon, Morocco, Portugal, Senegal, South Africa, South Korea, and Spain.

The 2025 theme, "The Role of Soil Carbon in Climate Change Mitigation", will explore how soil management, climate change, and land use influence carbon dynamics and sequestration.

Jean-François Soussana, Chair of the Soil Carbon IRC Steering Committee, highlighted the initiative's ambition to foster a unified global approach to soil carbon science.

Esther Diez Cebollero, Coordinator of Water JPI, contributed valuable insights from TAP actions under the Water4All initiative.

The expected impacts of the Soil Carbon TAP include:

- **Identifying research gaps** and proposing strategies to address them, particularly in key areas for advancing soil carbon sequestration and its role in climate change mitigation.
- **Enhancing cross-sectoral collaboration** to tackle challenges related to carbon stock management, climate change, mitigation strategies, and policy integration.
- **Promoting the exchange of knowledge, data, and methodologies**, enabling researchers to expand their expertise, share findings, and identify opportunities for cooperation and impact.
- **Encouraging partnerships** across sectors, disciplines, and regions to amplify the reach and effectiveness of the network.

For more information : orcasa@agencerecherche.fr

ANNEX 3: Policy Brief drafted following the workshop held from 26th to 28th May 2025, in Nairobi in partnership with Soil Carbon IRC representatives and the FARA. This draft is under revision in collaboration with the workshop participants

Empowering African Voices in Soil Carbon Science: Towards Equitable Collaboration and Farmer-Centered Innovation

Context

Soil carbon is a cornerstone of sustainable agriculture and climate resilience. However, in Africa, translating soil carbon science into local impact requires not just technical expertise, but inclusive and co-created pathways. As part of the Africa Chapter of the International Research Consortium on Soil Carbon titled *"Exploring the State of Knowledge and Action for Optimizing Soil Carbon in Africa"* held from 26th to 28th May 2025, in Nairobi, a qualitative questionnaire was distributed during the East Africa workshop to 35 participants from six countries (Kenya, Ghana, Tanzania, Lesotho, Côte d'Ivoire, South Africa).These participants, representing researchers, NGOs, farmers, and the private sector, shared critical insights in response to three guiding questions:

1. What would fair and effective international cooperation look like for you?
2. How can we, together, make soil carbon science work for farmers, not just for funders?
3. What do African researchers need that goes beyond 'being included'?

Insights from Thematic Sessions

Discussions across the workshop's thematic tracks offered a deeper understanding of both systemic opportunities and overlooked leverage points. Presentations explored:

- The dual benefits of **green carbon management** for soil health and climate mitigation;
- The strategic role of **agroforestry** and **organic fertilizer production** in enhancing soil carbon stocks;
- The complex relationship between **mineral fertilizers** and soil carbon, separating evidence from myth;
- The imperative of **soil data** infrastructure and localized metrics for informed policymaking;
- The value of **capacity building** in supporting agroecological transitions and local ownership of solutions.

These insights further validated the survey findings and underscored the need for holistic, integrated approaches to soil carbon governance in Africa.

Key Findings

- **Equitable Governance**: There is a strong consensus on the need to move beyond symbolic inclusion. African stakeholders seek genuine co-leadership in research design, governance, and resource allocation. This includes prioritizing local research agendas and ensuring transparency in funding mechanisms.
- **From Research to Field**: Respondents emphasized the gap between scientific development and

farmer reality. They called for more investment in context-specific technologies, farmer-friendly monitoring tools, and participatory extension services that translate research into usable knowledge.

- **Structural Barriers**: Infrastructural limitations, limited access to funding, and weak national policy support are key obstacles. Respondents urged donors and international partners to address these systematically, with long-term support rather than project-based interventions.

Policy Recommendations

1. **Support Co-Governed Research Programs**: Enable African institutions to lead and shape research frameworks alongside international partners.
2. **Invest in Farmer-First Innovations**: Develop scalable, low-cost soil carbon measurement tools and capacity building that reaches the field.
3. **Reform Funding Mechanisms**: Shift toward flexible, multi-year support that strengthens institutional capacity, research infrastructure, and regional networks.
4. **Monitor Equity and Impact**: Create metrics to assess inclusiveness and outcomes that matter to communities, not just to funders.

Conclusion

This consultation underscores the urgent need for a paradigm shift in soil carbon collaboration—one that recognizes African actors not merely as participants, but as equal partners in knowledge generation, implementation, and policy shaping. TAP 2025 is committed to supporting these ambitions by fostering meaningful, African-led engagement at every level of the soil carbon agenda.