ORCaSa

Because soil carbon matters

Development of the KP4SoilCarbon platform (aka Impact4Soil)

D5.3

https://soilcarbonfutures.earth

Document Information

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Coordinators	Suzanne Reynders & Mathieu Nogues - INRAE
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The ORCaSa project has received funding from the Horizon Europe Programme under grant agreement n° 101059863.

History

Date	Version	Submitted by	Reviewed by
09/03/2026	N°1	Susana Romao,	Emilie Vrot

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1 Deliverable identification

According to the Grant Agreement, the main deliverable is D5.3 – Development of the KP4SoilCarbon platform.

This deliverable is led by Vizzuality (VIZZ) and involves developing the KP4SoilCarbon knowledge platform, which was later named the Impact4Soil platform.

It builds on D5.2, which produced the user sketches and a comprehensive list of existing resources for the ORCaSa project, providing the foundation for platform development. D5.3 then focused on the technical development of the platform through iterative phases with end users, allowing progressive design, testing, and refinement based on feedback.

This deliverable includes the final release of the digital platform and documents the development and improvements implemented after the initial public launch in May 2024, as well as the platform's current status.

The Impact4Soil platform is publicly accessible at: https://www.impact4soil.com

2 Purpose and scope of the platform

The Impact4Soil platform was developed to support knowledge sharing, collaboration and decision-making related to soil organic carbon (SOC).

The platform provides an integrated digital environment that enables users to:

- explore geospatial information on soil carbon and land use,
- access scientific evidence related to soil carbon dynamics,
- identify land management practices affecting soil carbon,
- discover organisations and initiatives working in the field,
- explore a broader collection of datasets relevant to soil carbon research.

The platform was designed to support multiple user groups, including researchers, practitioners, policymakers and organisations engaged in soil carbon management.

Impact4Soil contributes to the broader objectives of the Soil Carbon International Research Consortium (IRC) and the Soil Carbon Futures initiative by providing a shared knowledge and collaboration platform.

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3 Platform Site Architecture

3.1 Functionalities

The platform currently integrates **five main modules**, each addressing a specific dimension of soil carbon knowledge and collaboration:

1. **Geospatial Data** – This module enables users to explore and interact with spatial datasets that are essential for monitoring and modelling SOC. We curate and showcase in this component a selection of datasets, ranging from global maps to high-resolution local layers (10 m), that support carbon farming practices and the development of Monitoring, Reporting, and Verification (MRV) frameworks.
2. **Scientific Evidence** – This module provides a science-driven interface enabling users to explore and visualise the effect of climate change, land use change and land management practices on SOC changes. Mean effect size, confidence interval and number of observations are displayed for each effect size. Beyond visualisation, the module facilitates access to the primary scientific literature underpinning these assessments.
3. **Practices** – The Practices component was designed to serve as a resource for users looking to implement land management practices that positively impact SOC. This component is therefore primarily intended for companies or NGOs seeking operational and contextualised information on practices to increase SOC.
4. **Network** – The Network component is a dynamic module designed to foster collaboration and strengthen connections across the global SOC community. It brings together research and development projects, scientific and technical networks, partners, and funders from around the world.
5. **Datasets** – The datasets component allows users to find and access relevant data layers on SOC, related to SOC or relevant to the study of SOC. The component provides an overview of metadata of over 1500 relevant datasets from various sources: Harvard Dataverse, INRAE, Cirad, ISRIC, Zenodo, JRC. The linkages to the source repositories are based on APIs, and records are regularly harvested for an up-to-date overview of relevant datasets. At present, the repositories are selected based on feedback from users in the user survey. Other repositories can be added by the administrator after evaluation of the added value for users.

Together, these modules provide a structured environment for exploring scientific knowledge, datasets and collaboration opportunities related to soil carbon. In addition to these core modules, the platform includes a landing page that provides contextual information about the initiative and offers direct links to related partner initiatives and resources relevant to the soil carbon community.

3.2 Integration with the Soil Carbon Futures

Impact4Soil serves as the operational knowledge and data platform for the broader Soil Carbon Futures initiative. While Soil Carbon Futures provides the strategic framework**,** global network, and research agenda for advancing soil carbon science and sustainable soil management, Impact4Soil implements this agenda by curating, sharing, and operationalising datasets, methodologies, and guidance for researchers, practitioners, and policymakers. Explicit branding, navigation, and cross-referencing between the platform and initiative help users understand this two-way relationship: the initiative informs and guides the platform, while the platform operationalises and contributes back to the initiative's goals.

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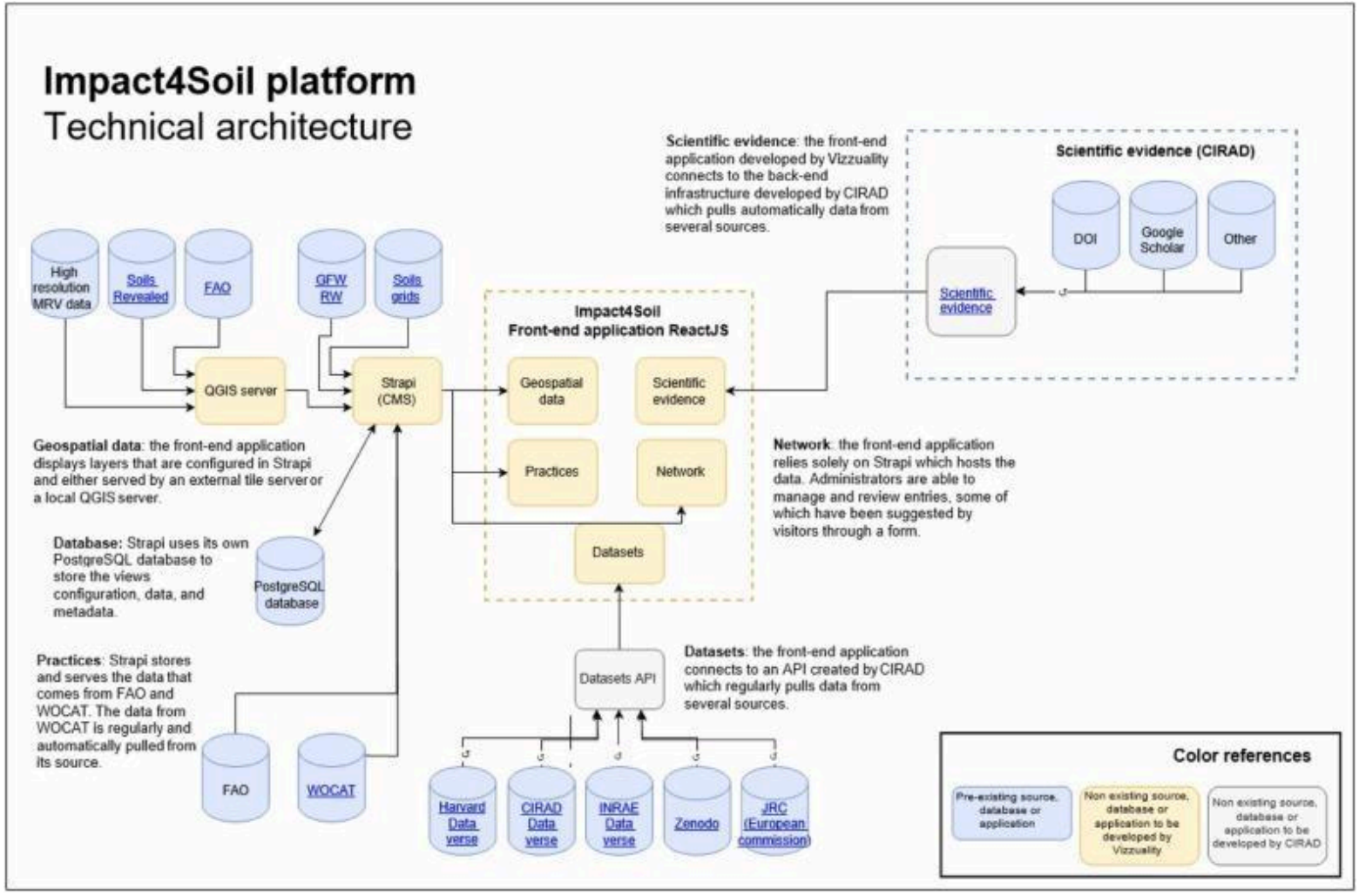
3.3 Technical architecture: open source technologies



Two requirements were initially defined to design Impact4Soil:

- interoperability to ensure updated content in the future;
- open-source to contribute to the persistence and sustainability of the platform.

Therefore, Application Programming Interfaces (APIs) were used to ensure interoperability, while open-source technologies were implemented to contribute to the persistence and sustainability of Impact4Soil, in line with the FAIR (Findability, Accessibility, Interoperability, Reusability) guiding principles. The previous figure summarises the technical architecture of Impact4Soil and lists the technologies implemented in its various components. Impact4Soil was developed by Vizzuality, Cirad, Khaméos, and eKoal.

3.4 Hosting

As the persistence of Impact4Soil has been considered since its initial conceptualisation, all the infrastructures are hosted by a public French institution (Cirad) that is committed to maintaining Impact4Soil. The exploited servers are located in France on the premises of Cirad and are subject to strict security rules.

4 Development approach

Platform development during the project followed an **iterative and user-centred approach**, led by Vizzuality in close collaboration with CIRAD.

Development was organised through a sequence of development cycles and sprints, allowing incremental improvements to be implemented based on user feedback and consortium input.

In total, three development cycles were carried out. The goal was to iterate on the features and issues encountered in each of these versions. Concurrently, sprints were held every two weeks to deliver new features or fix bugs.

The development cycles were supported by three technical meetings between May and September 2023, which were organised to prepare the platform architecture, including the platform's requirements, architecture, and expected user experience, by including insights from key stakeholders. The technical sessions focused on understanding user needs, defining technical and functional specifications, and ensuring compatibility with the intended applications. The discussions covered performance optimisation, security, and scalability while addressing usability concerns for developers, testers, and end-users. Additionally, the sessions helped establish a roadmap by aligning teams on milestones, validation strategies, and iterative feedback loops to refine the platform. Ultimately, it enabled the creation of a well-designed, efficient, and user-centric platform.

4.1 Summary of user feedback

User feedback was collected before and after the launch in April 2024 through:

- webinars demonstrating the platform,
- surveys integrated within the platform or sent by email,
- beta testing sessions,
- internal reviews with ORCaSa partners.

The main themes emerging from user feedback are summarised below.

Need for clearer explanations of the platform modules - Several users highlighted the need for clearer descriptions of the different modules and their respective purposes, particularly the distinction between geospatial data, datasets, scientific evidence and practices.

Importance of centralised access to datasets - Users indicated that the ability to discover datasets related to soil carbon through a single interface was particularly valuable for research and project preparation.

Demand for improved filtering and search capabilities - Feedback emphasised the importance of being able to filter information by criteria such as land use type, geographic area, intervention type and time period when exploring scientific evidence and practices.

Interest in identifying organisations and initiatives - Users expressed interest in identifying organisations, research groups and projects active in soil carbon research and implementation in order to facilitate collaboration and partnership building.

Accessibility of scientific evidence for non-specialists - Feedback highlighted the value of making scientific evidence easier to access and interpret, particularly for users without direct access to academic literature platforms.

4.2 Summary of feedback implementation

The feedback collected during platform testing and engagement activities informed the prioritisation of improvements during the development process. Development efforts focused primarily on improving platform usability, expanding available data sources, and refining the functionality of the platform's modules.

Numerous functional improvements and fixes were implemented across the platform during the project through iterative development cycles. A detailed changelog documenting platform releases and updates is available in the project repository: https://github.com/Orcasa-Platform/orcasa/blob/main/CHANGELOG.md

The main enhancements implemented in response to user feedback are summarised below.

4.2.1 Improvements to Platform Modules

Geospatial Data module

The Geospatial Data module was improved to facilitate exploration of spatial information related to soil carbon. Key improvements included:

- increased map zoom levels,
- improved display of map information layers,
- clearer distinction between global and local datasets.

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These updates improved the usability of the map interface and the interpretation of spatial data displayed on the platform.

Scientific Evidence module

Several improvements were implemented to enhance the usability and interpretation of scientific evidence available through the platform. These included:

- improvements to filtering behaviour and chart displays,
- improved consistency between filters and map visualisations,
- clearer presentation of interventions and effect sizes,
- improvements to the layout of detailed views of meta-analyses.

These updates improved the accessibility and interpretability of the scientific evidence available through the platform.

Practices module

The Practices module improvements included:

- integration of additional FAO data sources,
- improvements to filtering capabilities,
- addition of new metadata fields supporting content review.

These updates improved the accessibility and quality of information related to soil carbon practices.

Network module

The Network module was refined to improve the representation of organisations and initiatives active in soil carbon research. Key developments included:

- improved filtering of initiatives and organisations,
- improved visualisation of relationships between actors,
- mechanisms preventing duplicate submissions when suggesting organisations or initiatives.

These improvements strengthened the reliability and usability of the collaboration network represented on the platform.

Datasets module

The Datasets module aggregates soil carbon datasets from multiple repositories. During this reporting period, the module was expanded through the integration of additional data sources, including the ISRIC Soil Data Hub, enabling access to a broader collection of datasets relevant to soil carbon research.

4.2.2 Usability Improvements

In addition to module-specific improvements, several cross-platform usability enhancements were implemented. These included:

- improvements to navigation and layout,

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- improved responsiveness across devices,
- addition of contextual information buttons within modules,
- integration of video tutorials explaining the functionality of each module.

These enhancements support users in navigating the platform and understanding the available functionalities.

5 Evidence of delivery

The main output of Deliverable D5.3 is the **Impact4Soil platform** itself, publicly available at:

https://www.impact4soil.com

The platform currently provides:

- five integrated knowledge modules,
- access to geospatial soil carbon data,
- access to scientific evidence derived from large-scale meta-analysis,
- more than 1,000 datasets,
- over 100 documented land management practices,
- a network of organisations and initiatives working on soil carbon.

These components collectively constitute the implementation of the KP4SoilCarbon platform described in the Grant Agreement.

6 Conclusion

Deliverable D5.3 documents the development of the **KP4SoilCarbon platform**, implemented through the Impact4Soil website.

Since the previous reporting period, the platform has evolved through iterative development cycles and user feedback, resulting in improvements across all modules and the integration of additional datasets and information sources.

The platform now provides a publicly accessible environment supporting knowledge sharing, collaboration and exploration of information related to soil organic carbon.

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