







## OPINION OPEN ACCESS

# Multistakeholder Engagement to Scale Soil Health Globally: The Coalition of Action 4 Soil Health

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## ABSTRACT

Healthy soil is critical for ecosystem restoration, climate change mitigation and adaptation, biodiversity conservation, water cycling, farmer livelihoods, and food and nutrition security. Despite its importance, soil health has often been overlooked, but momentum is growing as evidenced by recent high-level initiatives such as the Nairobi Declaration as part of the Africa Fertiliser and Soil Health Action Plan and the European Union Soil Mission: A Soil Deal for Europe. The UN Decade on Ecosystem Restoration was launched on 5 June 2021 to galvanise local, national and global action to restore degraded ecosystems. In the same year, the UN Food Systems Summit (UNFSS) initiated a call for coalitions of action to champion integrated, systemic approaches to transform food systems. The Coalition of Action 4 Soil Health (CA4SH) was launched to bring soil health into focus with participation across sectors and scales to ultimately raise awareness about this critical ecosystem that we depend on, but which is being degraded at unprecedented rates. Since 2021, CA4SH has grown to include nearly 200 members (as of January 2025) representing the public and private sectors, research institutions, non-governmental organisations, farmer organisations and cooperatives, individuals, youth-led organisations, and indigenous organisations to mention some. The initiative has also had a strong focus on gender equity and social inclusion (GESI) in soil and landscape restoration. The Coalition promotes soil as a unifier across a diverse set of stakeholders, building partnerships to overcome critical economic, technical and institutional barriers to the adoption and scaling of healthy soil practices. Furthermore, CA4SH facilitates evidence-based policy and practice action for the scaling of restoration practices that improve soil health. The Private Sector Guiding Group, launched as part of the UNFSS, developed a call to action to support increased investments in healthy soil, and continues to support the actions of the Coalition. Its four working groups focus on communication, soil health monitoring and implementation, policy, and financial investment. In the first three years since its launch, the Coalition has engaged in multinational dialogues and contributed to the adoption of soil health in the

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outcomes from the UN Framework Convention of Climate Change (UNFCCC) 27th Conference of the Parties (COP27) through the Koronivia joint work on agriculture (now the Sharm El-Sheikh Declaration), the UNFCCC COP28 UAE Declaration on Food Systems and Agriculture, the UNCCD COP16 Riyadh Action Agenda and also launched the Soil Health Resolution. Leveraging on the enabling policy environment, the Coalition catalyses public and private sector action with outcomes for economic returns and growth, productivity and rural livelihoods, climate and nature. The positioning of the Coalition in the current global environmental transition is pivotal to drive the multifaceted benefits that soil health improvement offers to food systems transformation and global adaptation to and mitigation of climate change.

## 1 | Introduction

Healthy soil is the foundation of resilient food systems and provides many vital ecosystem services, including agricultural productivity, flood regulation, nutrient cycling, habitat for biodiversity, and carbon sequestration (Millennium Ecosystem Assessment 2005). Despite the wealth of benefits that existing soil-focused initiatives have delivered, soil degradation continues due to the widespread application of unsustainable land management practices, with fertile topsoil lost at an estimated rate of 24 billion tonnes per year (UNCCD 2017) (Box 1).

The world is currently at a crossroads, with more than 40% of the Earth's surface degraded (UNCCD 2022a) and over 3.2 billion people negatively affected by land degradation (IPBES 2018). Continuing business as usual is therefore no longer an option. There is a strong need to transform food systems in general but agricultural systems, in particular, so that they become part of the solution through practices that benefit nature and people, ensure operation within planetary boundaries (Rockström et al. 2009), increase soil organic carbon (SOC) (Lal 2006, 2020), replenish nutrients, support biodiversity (FAO 2015), and reduce the significant greenhouse gas emissions from agriculture (Tubiello et al. 2021). There is a need for nature-positive solutions for soil health (UNCCD 2022b), or we will jeopardise not only long-term soil health but the economic productivity of agriculture (Panagos et al. 2017). Sustainable land management practices, such as reduced tillage, maintaining plant cover, and applying crop residue mulch, can store SOC, serving as a nature-based solution for restoring biodiversity and offsetting a significant amount of global carbon emissions (Lal 2006). On the African continent, where over 65% of agricultural land is considered degraded (Berrahmouni and Mansourian 2021), urgent investments and prioritised action in soil health are needed (Snapp et al. 2024). Moreover, advancing multistakeholder soil stewardship to support farmers and land managers is key for meeting climate, biodiversity, land degradation neutrality, ecosystem restoration, and the UN Sustainable Development

Goals (SDGs). Indeed, healthy soil is a unifier across sectors and scales, contributing to regional initiatives while supporting smallholder livelihoods, for example, and underpinning the efforts of non-profit organisations at the same time as the private sector.

On 5 June 2021, the UN Decade on Ecosystem Restoration was launched to galvanise local, national, and global action to restore degraded ecosystems. In the same year, the UN Food Systems Summit (UNFSS) initiated a call for coalitions of action to champion integrated, systemic approaches to transforming issues related to food systems. Thus, the Coalition of Action 4 Soil Health (CA4SH) was launched (originally called the Global Soils Hub) to bring global soil health into focus with participation across sectors and scales. CA4SH is aligned with the Summit's five Action Tracks, specifically Action Track 3 on Boosting nature-positive production, linking soil and agriculture for wider ecosystem, land, and livelihood resilience. At the UNFSS, CA4SH was officially endorsed by private sector supporters<sup>1</sup> in a *Call to Action on Soil Health* (Private Sector Guiding Group to the UNFSS 2021), developed to support the goals of CA4SH and commit to enhanced partnerships. Greater investment and collaboration between stakeholders are key to overcoming the critical economic, technical, and structural barriers (e.g., a financial cushion for transitioning to new practices, access to information, and land tenure systems, respectively) that farmers and land managers face when adopting healthy soil practices, calling for a dedicated space for these interactions to take place.

Since 2021, CA4SH has grown to include over 250 stakeholders representing the public and private sectors, research institutions, non-governmental organisations, farmer organisations, and more. It has collaborated with parallel initiatives and partnerships, engaged in multinational dialogue, and contributed to the adoption of soil health in the decisions from the UN Framework Convention of Climate Change (UNFCCC) 27th Conference of the Parties (COP27) through the Koronivia joint work on agriculture (now the Sharm El-Sheikh Declaration) and in the UNFCCC COP28 Declaration on Food and Agriculture, the Riyadh Action Agenda at UNCCD COP16 and the Soil Health Resolution. At UNFCCC COP27 and COP28, CA4SH co-hosted the Food Systems Pavilion, hosting thematic days dedicated to soil health. CA4SH also launched the #COPSoil initiative, including awareness campaigns, a webpage for soil-related events at the COPs, and co-facilitated inclusive dialogues at the COPs (CA4SH 2024a). The positioning of CA4SH during this pivotal time in the global environmental transition is essential to drive the unifying benefits that scaling soil health offers to food systems transformation and global adaptation to and mitigation of climate change.

### BOX 1 | Definitions of soil health adopted by CA4SH.

The definition of soil health adopted by CA4SH is from the Intergovernmental Technical Panel on Soils, namely:

Soil Health is “the ability of the soil to sustain the productivity, diversity, and environmental services of terrestrial ecosystems” (ITPS 2020).

## Summary

- Soil health is a unifier, calling for multi-stakeholder action to scale soil health globally.
- The Coalition of Action 4 Soil Health was launched in 2021 from the UN Food Systems Summit Call to Action and to date has a global partnership of over 250 multistakeholder organisations.
- Research alone will not address the triple planetary crises of food and nutrition security, land degradation, and climate change, necessitating increased efforts to translate science into action.
- The Coalition of Action 4 Soil Health is a novel and pivotal approach to drive the multifaceted benefits that soil health improvement offers to food systems transformation and global adaptation to and mitigation of climate change.

Drawing on the Coalition's multistakeholder partner base, CA4SH is ideally positioned to align global efforts to scale soil health, serving as a one-stop-shop for collaboration by filling knowledge and implementation gaps through strategic partnerships. This opinion article delves into the Coalition's approach, main channels for engagement, and future priorities for action. In doing so, this article seeks to raise awareness of the Coalition's activities, to clearly communicate and incite a shared path forward for multistakeholder soil health advocates globally, and to raise awareness of the ample opportunities for addressing global goals through scaling global soil health.

## 2 | CA4SH Objectives, Structure and Rationale

The main objective of the Coalition of Action 4 Soil Health (CA4SH) is to improve soil health globally by addressing critical implementation, monitoring, policy, and public and private investment barriers that constrain farmers from adopting and scaling healthy soil practices. CA4SH functions as a global coordination center for innovation, knowledge-sharing, and action to build soil health through five main principles: (1) Accessible, inclusive multi-stakeholder partnerships that empower smallholder farmers, (2) Transparent and accountable business solutions and joint investments that promote equity, (3) Evidence-based policy as an enabler for all, at all scales, (4) Capacity building for on-ground implementation and monitoring, and (5) Implementation of robust soil health monitoring frameworks to track interventions over time. These principles orient CA4SH's activities toward the four targets of the Coalition, namely:

1. Integrate soil health considerations in policy across the development, environment, biodiversity and climate change domains.
2. Significantly increase the number of hectares of land under improved practices for soil health.

3. Fill key knowledge gaps on the impact of land management on soil health through expansion of research in development and monitoring.
4. Substantially increase investments in soil health, by a margin of 5–10 fold above current financing commitments.

Members of CA4SH agree to the Coalition's targets and engage in knowledge sharing and networking to identify synergies and foster collaboration. This is facilitated through communications channels, such as LinkedIn, a monthly newsletter and news centre, and regular partner meetings, thematic working groups, and the #Youth4Soil Initiative. A goal of CA4SH is to become a one-stop-shop for information pertaining to soil health, and initiatives working to scale it, fostering continuity within the soil health advocacy space. This is facilitated in line with the Coalition's conceptual framework (Figure 1), which is used to direct and streamline its activities through strategic channels.

## 3 | CA4SH Working Groups

CA4SH partners are invited to join thematic working groups (WGs) to collaborate and move the needle forward. WGs meet regularly throughout the year to work towards CA4SH's core targets, positioning the role of soil health across domains and drawing on expertise to align and advance the mandates of partners.

The following subsections explore the remit and outcomes of the WGs since their inception in 2023. The WGs' expected impact is

- Coordinating partner activities and serving as platforms to translate science into action
- Refining tools, policies, and narratives to scale soil health globally
- Fostering interdisciplinary collaboration and peer-to-peer learning & knowledge exchange
- Advancing multi-stakeholder approaches

### 3.1 | Soil Health Monitoring, Research in Development, and Implementation Working Group

The objectives of this WG are: (1) Bring clarity and harmonisation in soil health monitoring, (2) Identify tools and opportunities to make soil health data measurable, accessible, comparable, and exchangeable, and (3) Identify key challenges and opportunities in implementation. A key output of the monitoring WG in 2024 was a brief on General Recommendations for Soil Health Monitoring (Alho et al. 2024). Key considerations include monitoring biological, chemical, and physical aspects of soil, and combining field-based methodologies with Earth Observation and data analytics to provide robust, quantitative assessments to track changes over time. It is critical to monitor soil health to: (1) Understand the impacts of land management practices on ecosystem services, (2) Prioritise interventions and investments, and (3) Continue to adapt interventions to maximise, synergise,



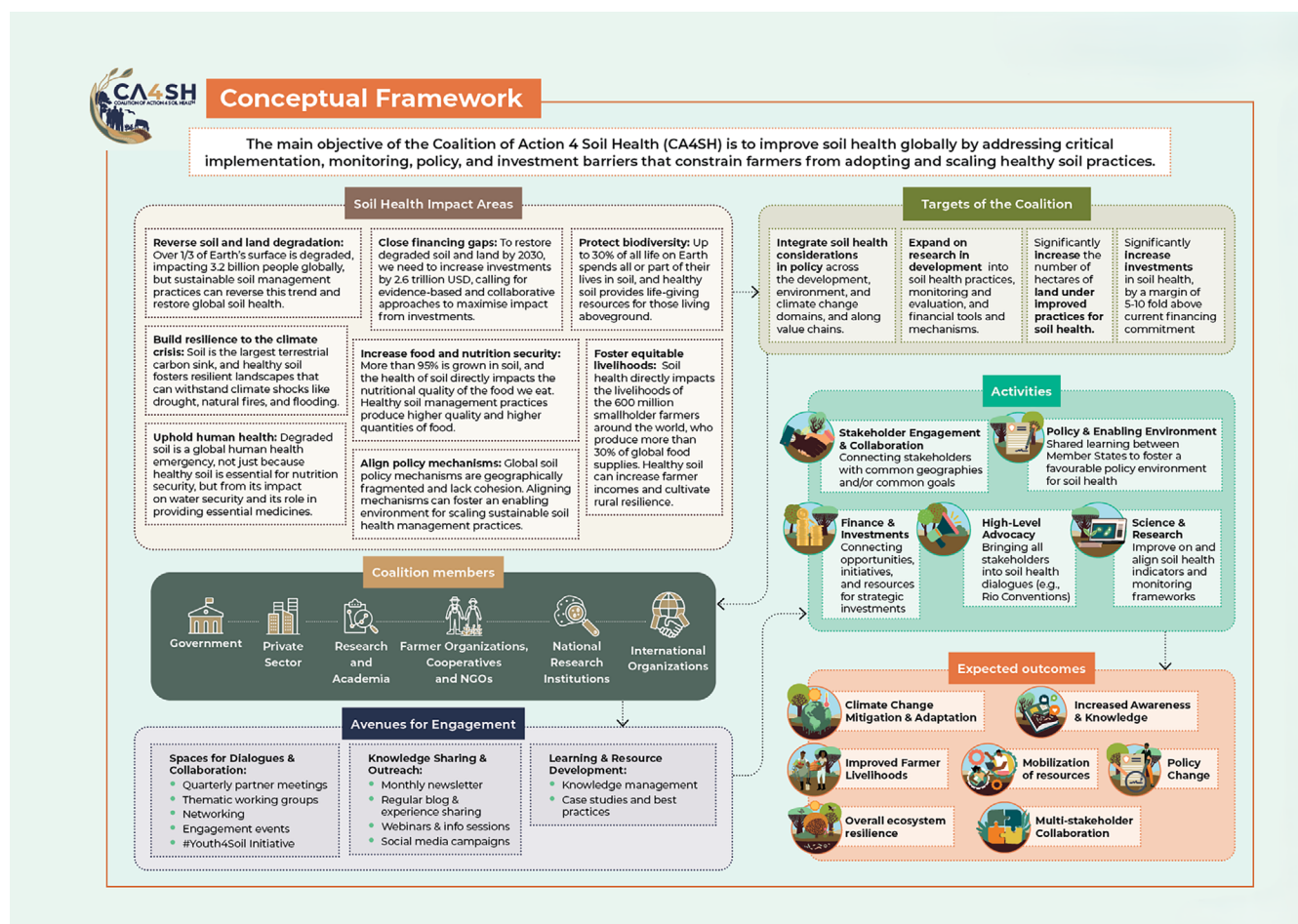


FIGURE 1 | Conceptual framework of CA4SH. Source: CA4SH.

and minimise trade-offs. These data are critical to encourage evidence-based decision making.

Through these efforts, the WG is:

- Contributing to scientific advances and lessons learned in inclusive, multi-stakeholder collaboration across soil health research and development, fundamental to scaling healthy soil practices globally and to land restoration.
  - For example, the WG co-produced the General Recommendations for Soil Health Monitoring brief in 2024 and are harnessing the lessons learned through this process to develop a suite of recommended indicators and a shared framework for soil health monitoring to help fill key data gaps, increase data sharing, and align stakeholders and future monitoring efforts.
- Helping harness local knowledge to develop equitable and context-specific soil and land management strategies
  - For example, the WG co-hosted a webinar in 2024 on the theme of harnessing science and knowledge, including Indigenous knowledge systems, to support soil health data and monitoring efforts. Through multistakeholder advocacy in dialogues such as these, the WG seeks to scale Indigenous knowledge systems alongside the scientific community for greater livelihood and environmental outcomes.

## 3.2 | Stakeholder Engagement and Communication Working Group

This WG aims to: (1) Identify connections between the SDGs through soil and communicate them, (2) Have a presence at major events, and (3) Develop campaigns that bring soil health to wider audiences. This WG leads the #COPSoil initiative and co-produced an online resource to communicate the central role of healthy soil in achieving all 17 of the SDGs. The WG implements an ongoing online survey of soil health definitions amongst CA4SH partners and translates these definitions to reach diverse stakeholder groups.

## 3.3 | Finance and Investments for Soil Health Working Group

This WG aims to: (1) Catalyse evidence-based public and private investment in soil health, (2) Drive alignment of key stakeholders to collectively address investment barriers and the soil health investment gap, (3) Develop and identify tools and mechanisms to support investments in soil health, and (4) Explore funding opportunities. The WG aims to address key financial barriers constraining farmers from adopting healthy soil practices, including by developing resources that draw from evidence from partner flagship initiatives. Through these efforts, the WG is

mobilising resources by promoting innovative financing mechanisms to support soil health and land restoration at multiple scales—from farm-level initiatives to national and international strategies.

### 3.4 | Policy and Enabling Environments Working Group

There are ample opportunities to integrate soil health into policy, including climate (Nationally Determined Contributions [NDCs]), biodiversity (National Biodiversity and Action Plans), and ecosystem restoration targets such as Land Degradation Neutrality and agricultural policies. For example, CA4SH participated in a policy roundtable and co-produced six policy briefs on Integrating SOC into Nationally Determined Contributions (AICCRA 2022). Drawing from partners' expertise, the Policy WG aims to: (1) Identify strategic policy opportunities and entry points for soil health, (2) Advocate for government backing to scale soil health globally through global and national level policy frameworks, and (3) Carve a clear roadmap for action on soil health within policy frameworks. CA4SH has facilitated dialogues related to the National Soil Strategy (Australia), Soil Health Monitoring Law and the EU Mission Soil Manifesto (EU), and Soil Health Inquiry (UK) and other countries interested in developing national soil strategies, for example, as part of the Africa Fertiliser and Soil Health Action Plan.

Through these efforts, the WG is:

- Advancing the integration of science into policy by embedding evidence-based approaches into development frameworks.
- Driving global advocacy for soil health to ensure it remains central to global agendas.

### 3.5 | #Youth4Soil

CA4SH recognises youth as young professional people under the age of 40, in line with the definition adopted by the Young Professionals for Agricultural Development (YPARD), a key partner for the #Youth4Soil Initiative. CA4SH acknowledges and supports youth as experts of their local environments, advocates, innovators, and solution leaders. To foster their meaningful inclusion, the #Youth4Soil Initiative was launched in August 2024. The goals of the initiative are to:

- Include youth perspectives in all CA4SH activities
- Organise, mobilise and engage youth
- Promote knowledge co-creation and sharing
- Facilitate financial support for youth soil health initiatives

Youth are engaged through the WG and can apply to the #Youth4Soil mentorship programme to learn from experienced professionals working in the field of soil health. In addition, members are connected with opportunities; for example, a member from Kenya joined a workshop on soil information services at the CIFOR-ICRAF headquarters. The member underscored

her youth perspective in the workshop and subsequently at the World Food Prize Borlaug Dialogue. Moreover, youth are invited to share their initiatives with support from the CA4SH Secretariat; for example, a brief highlighting youth-led projects was produced alongside six youth-led initiatives (CA4SH 2024b).

### 3.6 | Advancing Scientific Thinking

The WGs are advancing scientific thinking by: (1) coordinating strategic activities focused on interconnected areas that together create an ecosystem of support for improving soil health globally, (2) driving harmonisation in definitions, tools, and methodologies for soil health, (3) translating evidence into practice to inform decision-making and strengthen policies, (4) elevating diverse voices and advocating for inclusive decision-making at all levels, and (5) identifying/promoting equitable and context-specific soil and land management practices. To date, the WGs have co-produced a suite of tools, initiatives, and knowledge products aimed at advancing scientific thinking and are harnessing the lessons learned through these processes to scale these initiatives and contribute to a scientific and Indigenous-led community of practice for soil health. Key to the future of these initiatives is monitoring and reporting on uptake of CA4SH initiatives from a wide range of stakeholder groups.

## 4 | The Soil Health Resolution

The flagship initiative of CA4SH is the Soil Health Resolution, a set of commitments to enable and scale healthy soil practices. The Resolution was conceived by CA4SH in partnership with the International “4p1000” Initiative in 2022, and has been translated by partners into Spanish, French, Arabic, and Mandarin Chinese. The Resolution proposes five commitments (Figure 2) for Member States to take up in achieving the objectives of the Rio Conventions. The Policy WG engages governments to take the Resolution forward, supports implementation, and develops the Resolution over time in a co-creation process.

## 5 | Way Forward and Targets

Key to CA4SH's mission is to fill strategic gaps in the global soil health agenda, and spur cooperation between actors to develop holistic policies and investments toward supporting land managers to scale healthy soil practices. A key focus for CA4SH is engaging in high-level initiatives such as the processes and outcomes from the African Fertiliser and Soil Health Summit; CA4SH has partnered with AUDA-NEPAD to develop soil health indicators to action and support the Nairobi Declaration, the Kampala Declaration, and the new Comprehensive African Agricultural Development Programme Strategy and Action Plan. An example activity from this engagement comes from early 2025 when CA4SH co-produced an Insight Brief, Policy Brief, and a Guidance Note with AUDA-NEPAD on the role of Soil Information Systems and scientific evidence in upholding these regional activities. The Coalition is now working alongside AUDA-NEPAD to translate these knowledge products into policy action, with a view to scale to other continents and high-level fora.





**FIGURE 2** | Excerpt from the Soil Health Resolution brochure, including key commitments from government leaders. *Source:* CA4SH.

The Coalition continues to support diverse initiatives to ensure soil health stays on the agenda. Specific entry points going forward, including:

- Highlighting the role of healthy soil for achieving all 17 of the Sustainable Development Goals: In 2024, CA4SH initiated the SOIL+SDGs initiative to communicate the relevance of healthy soil for achieving the 17 SDGs. Looking forward, CA4SH is scaling this initiative to increase the visibility of soil health for achieving global goals with a view to engage in the next iteration of the SDGs and ensure that soil health is appropriately represented therein.

Showcasing how investing in soil health is integral to achieving the objectives of the three Rio Conventions: The 2024 CA4SH webinar series included a session on how finance can contribute to scaling global soil health with co-benefits for financial institutions, farmers, and governments. Coalition partners are translating case studies into actionable evidence to increase soil health investments.

- Continuing to bring forward the Soil Health Resolution in national and multinational dialogue and supporting its implementation: CA4SH is developing a Global Soil Health Act to bring forward to global decision-makers, fostering an enabling environment for scaling global soil health in line with the tenets of the Soil Health Resolution. Moreover, CA4SH is actively reaching out to Member States to assist in the adoption of the commitments of the SHR into national frameworks.

- Mobilising resources to foster soil health implementation on the ground with a focus on empowering smallholder farmers and land managers: CA4SH serves as a trusted source for connecting donors with initiatives seeking funding to scale healthy soil practices. CA4SH is also developing a resource mobilisation strategy to attract in-house funding to implement original soil health living labs, grants, and other initiatives.
- Increasing equitable access to soil health data and developing capacity to action these data amongst diverse stakeholders: In 2024, CA4SH partners CIFOR-ICRAF and Varda implemented a joint pilot project funded by the Norwegian Development Agency (Norad) to advance soil health data exchange in Kenya and Tanzania. The project consortium is actively seeking opportunities to scale this initiative to other countries in Africa and build a continental soil health data ecosystem underpinned by capacity building initiatives that reach farmers, practitioners, and government agencies to action these data, with a view to expand the initiative to other continents.
- Playing a core role in carrying out the Riyadh Action Agenda by mobilising stakeholders to contribute to the UNCCD's goals and promote alignment across the Rio Conventions: CA4SH is a key partner initiative for the implementation of Action Area 3—Promote Sustainable, Resilient, and Inclusive Agri-Food Systems to support efforts in advancing soil health, fostering landscape-level approaches, repurposing public policies, and integrating holistic food systems-based solutions.
- Elevating the voice and role of youth in soil restoration: CA4SH is intentional about ensuring youth are heard in all of its activities, including when organising speaking

panels. The #Youth4Soil Initiative upholds this principle by collating a dedicated cohort of youth soil health advocates around the world who are initiating and engaging original soil health initiatives supported by the Coalition. For example, in March 2025, #Youth4Soil held its first Soil Health Solutions online showcase event to demonstrate some of the global initiatives underway by members and to attract donors and partner organisations to support them. The initiative is currently scaling the online showcase and developing a resource mobilisation strategy targeted at supporting youth initiatives.

- Supporting countries as they update and implement their NDCs with healthy soil as a central solution: In October 2022, CA4SH participated in a policy roundtable organized by Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA), bringing together experts and developing recommendations on how to include soil organic carbon in Member States' Nationally Determined Contributions (NDCs) and co-producing policy briefs for six African countries. The Coalition is actively seeking opportunities to expand this initiative to other countries and continents and support Member States in implementing strategies to reduce their carbon emissions.

Prior to CA4SH's official launch in 2021, there were very few events dedicated to soil health at the Rio Conventions. Through CA4SH's continued advocacy, including aligning the objectives of the Rio Conventions, soil health is on the agenda. CA4SH's main mission is to scale soil health globally, but its secondary mission is to ensure every voice is heard. This is none better exemplified than on all CA4SH event panels wherein youth, pastoralists, government officials, national research institutes, fertiliser development actors, Indigenous peoples, and the private sector continuously collaborate to speak on their individual and shared goals. Soil health is a unifier, and CA4SH offers not only the space for unified advocacy and action to take place, but the momentum.

## Author Contributions

**Leigh Ann Winowiecki:** writing – original draft, writing – review and editing, conceptualization, supervision, project administration. **Hanna Lindén:** conceptualization, writing – original draft, writing – review and editing, project administration. **Sasha Alexander:** writing – review and editing, conceptualization. **Aida Bargaúes Tobella:** conceptualization, writing – review and editing. **Joao Campari:** conceptualization, writing – review and editing. **Colin Christensen:** conceptualization, writing – review and editing. **Dhrupad Choudhury:** conceptualization, writing – review and editing. **Henk Van Duijn:** conceptualization, writing – review and editing. **Martina Fleckenstein:** conceptualization, writing – review and editing. **Yvonne Harz-Pitre:** conceptualization, writing – review and editing. **Zakir Hussain:** conceptualization, writing – review and editing. **Bharat Kakade:** conceptualization, writing – review and editing. **David Kamau:** conceptualization, writing – review and editing. **Paul Luu:** conceptualization, writing – review and editing. **Christine Magaju:** conceptualization, writing – review and editing. **Vincent Makiyi:** conceptualization, writing – review and editing. **Pamela Mbabazi:** conceptualization, writing – review and editing. **Cristine Morgan:** conceptualization, writing – review and editing. **Sieg Snapp:** conceptualization, writing – review and editing. **Daniela Solis:** conceptualization, writing – review and editing. **Sabrina Trautman:** conceptualization, writing – review and editing.

**Roland Van der Vorst:** conceptualization, writing – review and editing. **Penelope Wensley:** conceptualization, writing – review and editing. **Tom Williams:** conceptualization, writing – review and editing. **Rattan Lal:** conceptualization, writing – review and editing, supervision.

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## Conflicts of Interest

The authors declare no conflicts of interest.

## Data Availability Statement

There are no data associated with this manuscript.

## Endnotes

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