IFDC
Developing Agriculture from the Ground Up

WORLD AGRICULTURE FORUM

The Soil Health Imperative: Building Resilience from the Ground Up

Webinar Report

Host: World Agriculture Forum and the International Fertilizer Development Center

Presented By
World Agriculture Forum

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Introduction

Soil health stands at the heart of resilient food systems, climate adaptation, and sustainable rural development, yet it remains one of the most underinvested and underappreciated assets in agriculture. On May 28, 2025, the World Agriculture Forum (WAF), in collaboration with the International Fertilizer Development Center (IFDC), hosted a high-impact webinar titled “The Soil Health Imperative: Building Resilience from the Ground Up.” This event brought together leading voices from science, policy, and development to discuss how restoring soil health can transform agriculture and drive climate resilience, food security, and economic sustainability.

Drawing from field-based evidence, programmatic experiences, and scientific research, the session highlighted the urgency of collective action and long-term investment to restore soil fertility, enhance productivity, and build resilient landscapes. With over one-third of the world’s soils degraded and 2025 marking a critical year for global climate and biodiversity goals, the urgency to act has never been greater.

Overview

The panel discussion focused on the critical role of soil health in sustainable agriculture and food security, emphasizing the need for collaborative efforts among various stakeholders. This webinar aimed to spotlight scalable soil restoration strategies, showcase innovations, and explore the policy and financial instruments needed to mainstream regenerative agriculture.

Opening Remarks

Dr. Rudy Rabbinge, Chair of the Board of the World Agriculture Forum,[1] served as moderator of the session. He opened by introducing the panelists and discussing the challenges of unsustainable agricultural practices, including soil degradation and poverty. He noted the importance of soil health in crop productivity and the production of nutritious food crops in a world with an increasing population and a decreasing area of arable land while also emphasizing the need to boost production in an environmentally friendly way. Rabbinge explained that there are two contrasting pathways to unsustainability in agriculture. In high-income regions such as the United States, Europe, China, and parts of India, unsustainability is often driven by affluence, characterized by the excessive use of external inputs, which leads to severe environmental degradation. On the other hand, in many low-income regions, unsustainability stems from poverty and the inability to afford essential external inputs. This results in the mining of soil nutrients, declining soil fertility, and stagnant or decreasing crop yields. Rabbinge also pointed out that the dominant form of unsustainability is not due to overuse of inputs, but rather the lack of access to them; as a result, soils are being depleted of nutrients, poverty is deepening, and agricultural productivity remains low. Addressing these distinct challenges is critical for developing appropriate and effective sustainability strategies.

Sustainable Production and Soil Health Improvement

Dr. Yashpal Saharawat, Director, Resilience and Environment at IFDC,[2] discussed the detrimental effects of industrial agriculture on climate change and soil health, advocating for a shift toward farming system and landscape-based strategies that prioritize local adaptation and community involvement. He described the industrial revolutions that the agriculture sector has gone through, from mechanization in the 1800s to today's precision and digital farming. While these transformations have boosted productivity, they have also contributed significantly to climate change, with global agricultural systems responsible for approximately one-third of greenhouse gas (GHG) emissions, equating to 18 gigatons of carbon dioxide annually.

In countries like India, each metric ton of carbon dioxide emitted from agriculture costs the economy approximately $86 when factoring in environmental and social damage. Moreover, agriculture is responsible for:

- Utilizing 50% of global land and 70% of freshwater.
- Serving as the leading driver of eutrophication in aquatic systems (78%).
- Accounting for 96% of global mammal biomass and 71% of livestock and poultry biomass.

To counter the impacts of climate change, global efforts are converging around sustainable, inclusive, and climate-resilient agriculture.

[1] The World Agriculture Forum is a global platform connecting diverse stakeholders to drive sustainable agricultural development through policy advocacy, trade facilitation, and technology-driven solutions. The Forum unites governments, farmers, agribusinesses, experts, and development institutions to bridge implementation gaps and drive sustainable agriculture and food systems transformation towards a resilient, food-secure future.

[2] IFDC is an independent non-profit organization that combines innovative research, market systems development, and strategic partnerships to identify and scale sustainable soil solutions for improved food security and livelihoods around the world.

While the terminology varies, ranging from climate-smart agriculture and sustainable intensification to ecological intensification and nature-based solutions, the one fundamental principle is healthy soils.

Soil is not inert – it is a dynamic, living ecosystem. Healthy soils contribute to:
·Improved productivity and food security.
·Greater resource use efficiency (nutrients, energy, and water).
·Enhanced ecosystem services, including carbon sequestration.
·Better animal and human health.
Maintaining soil health through integrated soil fertility management (ISFM) and nutrient stewardship is essential. Success depends on local adaptation, economic feasibility, resilience to climate change, enabling policies, and investment in skilled human capital.
System-level approaches – moving from field-level practices to farming system approaches and ultimately to landscape-level interventions – are important in ensuring soil health (Figure 1).

This allows for:

- Continuous income and employment.
- Efficient use of natural resources.
- Reduced erosion and climate vulnerability.
- Greater integration of crops, livestock, forestry, and water systems.

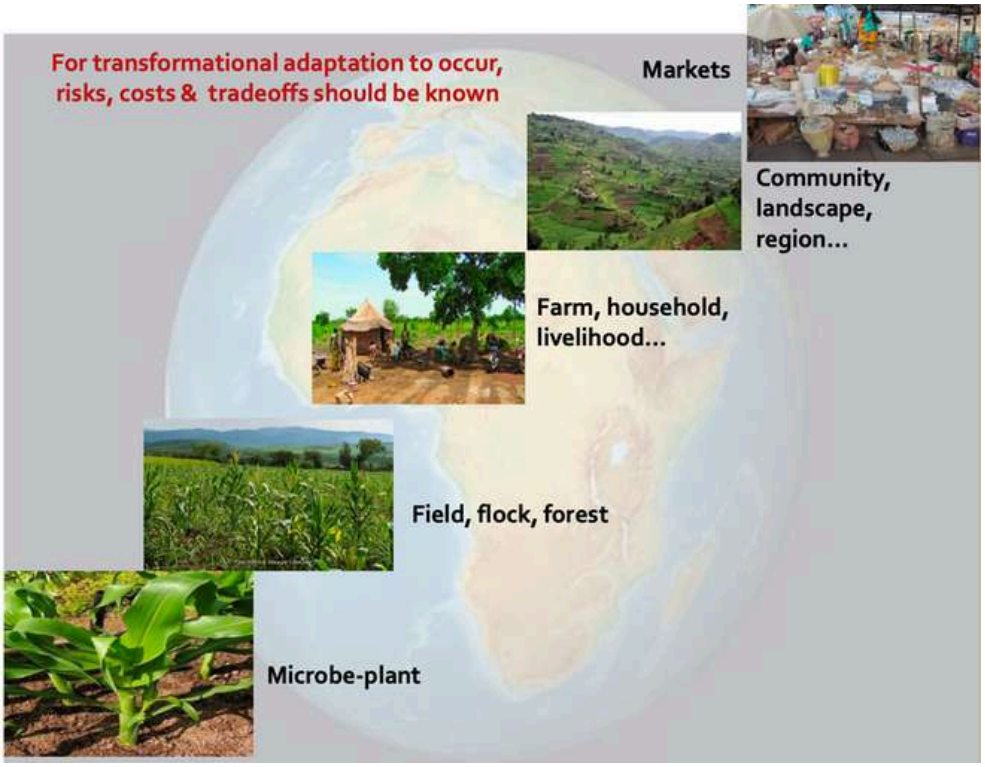

Figure 1. Moving from Plant to Farm to Landscape Level for Sustainable Production

Saharawat emphasized the need to expand the traditional fertilizer paradigm of nitrogen, phosphorus, and potassium to include carbon, recognizing this nutrient as central to soil and environmental health.

Government and Donor Investment in Soil Health

Sheila Keino, Executive Director of Sustain Africa,[3] discussed the need for governments, donors, the private sector, and others to play a role in ensuring soil health. The health of the soils in Africa is at the center of attention, with 65% of the soils being degraded, undermining food security, climate resilience, and rural livelihoods. The Nairobi Declaration, adopted by African Heads of State in May 2024 and anchored within the 10-year Fertilizer and Soil Health Action Plan, has committed to rehabilitating at least 30% of degraded soils on the continent by 2034.

At the heart of the soil health crisis lies severe nutrient depletion, adding that many African smallholder farmers rely on only two macronutrients, neglecting essential micronutrients. Soil acidity, declining organic matter, and continuous nutrient mining without replenishment have significantly reduced productivity, with average yields remaining far below the potential.
Delivering on the soil health agenda will require coordinated action from diverse groups, including governments, the private sector, and donors. The following are the roles each stakeholder must play.

- Governments: Domesticating the 10-year roadmap, aligning policies, and facilitating investments.
- Private sector: Investing in soil health innovations, developing local fertilizer blends, and expanding access to soil inputs.
- Donors and development partners: Providing catalytic funding and technical support for national and regional soil restoration programs.
- Research institutions: Driving evidence-based solutions, including large-scale liming, regenerative agriculture, and integrated nutrient management.
- Communities and farmers: Leveraging indigenous knowledge and adopting context-appropriate practices.
- Continental bodies: Supporting coordination through the African Union, regional economic communities, and initiatives such as the Africa Fertilizer Financing Mechanism (AFFM).

With declining donor funding and rising input costs, domestic resource mobilization and private sector investment are essential. The AFFM is being redesigned to include a Soil Health Fund, broadening support for organic fertilizers, soil conditioners, and women- and youth-friendly soil health solutions. A large-scale liming pilot in Kenya, supported by the Gates Foundation, World Bank, and others, is set to demonstrate scalable soil restoration pathways for the continent.

Keino noted that soil health is a smart cross-sectoral investment with a return of U.S. $4-7 for every U.S. $1 invested. Moreover, it directly supports several Sustainable Development Goals (SDGs), including SDG 1 – No poverty, SDG – 2, Zero hunger, SDG 3 –Good health and well-being, SDG 6 – Clean water and sanitation, and SDG 13 –Climate action. If Africa is to achieve food sovereignty, reduce fertilizer import dependency, and reverse land degradation, urgent, collective, and sustained action is required

[3] Sustain Africa is an initiative implemented by IFDC, the African Fertilizer and Agribusiness Partnership, and One Acre Fund that serves as a coordination mechanism among public and private sector partners to help smallholder farmers access affordable fertilizer.

Baseline Findings on Soil Health Practices: Challenges and Pathways for Scale

Mariano Dossou-Kpanou, Monitoring, Evaluation and Learning Lead of Soil Values,[4] shared insights from a baseline study conducted by the program. The study identified challenges such as poor soil quality and limited access to fertilizers. Across all countries involved in the study – Burkina Faso, Mali, and Nigeria – farmers consistently identified poor soil quality, limited access to fertilizers, and climate variability as critical constraints undermining yields and threatening long-term food security. Additional challenges include inadequate pest and disease management, limited access to quality seeds, and a lack of agronomic knowledge. Interventions are being undertaken by the Soil Values program to address these challenges, including:

- Data-driven soil mapping to tailor input use to actual soil needs rather than assumptions.
- Strengthening of fertilizer markets by supporting agro-dealer networks and facilitation of private sector participation to improve availability and affordability.
- Promotion of inclusive agribusiness models, especially targeting youth and women.

The majority of farmers in Mali and Nigeria face significant challenges in adopting agroecological practices, such as:

1. Limited availability of organic inputs, which was reported by 74% of farmers in Mali and 45% in Nigeria.
2. Lack of access to relevant and timely information on sustainable practices.
3. High cost of appropriate technologies, which limits widespread adoption.

In Burkina Faso, only 1.3% of farmers conduct soil testing to guide fertilizer application, and less than 4% practice reduced tillage, agroforestry, or cover cropping. Youth businesses need support to offer soil testing and advisory services to ensure more efficient and appropriate input use.

Solutions proposed under the Soil Values program to address these barriers include supporting youth-led enterprises to produce and distribute organic inputs (e.g., compost) and developing digital platforms for delivering localized, real-time agronomic advice.
Coordinated, farmer-centered, and context-specific interventions are urgently needed to improve soil health across the Sahel. By leveraging digital tools, empowering youth and women, strengthening markets, and aligning interventions with actual farmer experiences, the Soil Values program aims to foster a resilient and productive agricultural system in the region.

[4]Soil Values is a 10-year program that seeks to establish sustainable soil fertility management as a cornerstone within the farming systems of the Sahelian and Guinea Savanna regions of Africa. It is funded by the Netherlands Directorate-General for International Cooperation (DGIS) and implemented through a consortium of IFDC, SNV, and Wageningen University and Research.

Soil Health in a Landscape Context: Identifying Opportunities for Win-Wins with Climate and Biodiversity

Stephen Wood, Senior Scientist for Agriculture and Food Systems at the Nature Conservancy,[5] addressed the need for targeted recommendations linking soil health indicators to tangible outcomes, advocating for a landscape-level perspective. There is a large body of evidence of positive soil health impacts from farm management practices, and scientific literature shows that practices such as cover cropping and no-till farming can significantly improve key soil health indicators over time, including:

- Active carbon.
- Aggregate stability.
- Soil organic matter.
- Microbial activity.

These improvements have been documented through the Nature Conservancy's Soil Health Partnership, which has provided practical support to farmers implementing regenerative practices.

Despite improvements in soil health indicators, a critical evidence gap remains in linking these indicators to measurable outcomes, particularly those important to farmers (e.g., sustainable increases in crop yields) and environmental goals (e.g., climate change mitigation, water quality improvements).

This gap represents an opportunity to generate data that can inform clear, outcome-based soil health targets, much like those used in nutrient management.

Recent research mapped areas globally where practices such as cover crops and no-till resulted in either win-wins – increased crop yields and lower GHG emissions – or trade-offs – improvements in one area but setbacks in another.

Findings show that win-wins are more likely in areas with adequate nutrients and water, emphasizing the need to tailor practices to local biophysical conditions rather than relying on one-size-fits-all recommendations.

While soil health indicators are typically measured at the field or farm level (Figure 2), they do not capture landscape-scale benefits such as:

- Watershed-level water quality.
- Biodiversity and habitat availability.
- Regional greenhouse gas mitigation.

Thus, these metrics alone cannot adequately reflect the full ecological value of soil health practices.

[5]The Nature Conservancy, founded in the U.S. through grassroots action in 1951, is a global environmental nonprofit working to create a world where people and nature can thrive.

Figure 2. Benefits of Soil Health at Different Levels

A compelling case was made for expanding the soil health paradigm to include entire farming landscapes. For example, a regenerative farm in Connecticut, USA, has productive fields that score high on soil health; however, the surrounding woodlands suffer from invasive species, such as multiflora rose, which degrade biodiversity and ecosystem function. This situation illustrates that even when fields are well-managed, landscape-level degradation can undermine overall agricultural sustainability and ecosystem service delivery (Figure 3).

Figure 3. Healthy Soils Do Not Always Equate to Healthy Landscapes

Wood called for a paradigm shift from focusing solely on plot-level soil metrics to embracing landscape-level planning and measurement. This would allow practitioners and policymakers to:

- Identify synergies and trade-offs at multiple scales.
- Develop targeted recommendations that consider broader ecological interactions.
- Promote more resilient agricultural systems that sustain both people and the planet.

Audience Engagement and Highlights

The interactive session attracted over 140 participants from a number of countries, including Australia, Ethiopia, Nepal, Nigeria, and the United States. Attendees actively engaged with the panelists, posing insightful questions that reflected their deep interest in the subject matter. Topics raised included soil testing and diagnostics, nutrient balancing, the role of the black soldier fly in organic input generation, suitable feedstocks for biochar production, and implementation of agroecological practices. The panelists responded thoughtfully, providing evidence-based insights and practical recommendations tailored to various contexts.

Concluding Remarks

Beatrice Bezmalinovic Dhebar, Vice President of Business Development at IFDC, thanked the World Agricultural Forum for organizing the dialogue on soil health. She noted that the conversation among practitioners illuminates the complexity of the challenges facing global agriculture today and underscored the need for *context-specific, systems-based approaches* rather than simple one-size-fits-all solutions.

She highlighted a central theme emerging from the panel: the importance of understanding the landscape context and fostering the integration of multiple actors and sectors, including policy, water systems, and agricultural practices, from the outset.

Key insights included:

- The value of building resilient, locally adaptive, and economically viable landscapes that integrate watershed management with agriculture.
- The urgent need for systemic support for smallholder farmers in Africa, where only 1.5% currently conduct soil testing, revealing a major gap in data-driven practices.
- The recognition that agricultural transformation is not the responsibility of individual farmers alone, but requires enabling systems of incentives, investments, and supportive policies.

She stressed that the challenge now lies in translating sophisticated analysis into collective strategic action that delivers real impact on the ground. The dynamic Q&A reflected both the depth and diversity of challenges in the sector, underscoring the maturity of the discussion.

Bezmalinovic Dhebar concluded by expressing gratitude to the panelists and participants for their valuable contributions and reaffirmed her enthusiasm for continued collaboration in future conversations.

Key Takeaways

1. Soil health is foundational to resilient food systems and must be treated as a dynamic, integrated priority across climate, food, and finance sectors.

2. The shift to integrate carbon with traditional fertilizer nutrients is valuable but must be broadened to include secondary nutrients and micronutrients, tailored by soil diagnostics.

3. Agroecological practices are effective, but only when informed by site-specific soil conditions and regularly updated data.

4. Organic input availability is a constraint; solutions such as biochar, bokashi, and black soldier fly larvae can help close this gap if adapted contextually.

5. Farmer-led approaches and cross-sector partnerships are critical to mainstreaming soil regeneration.

Panellist Profiles

1. **Dr. Yashpal Saharawat**, Director, Resilience and Environment, International Fertilizer Development Center (IFDC)
2. **Sheila Keino**, Executive Director, Sustain Africa
3. **Mariano Dossou-Kpanou**, Monitoring, Evaluation and Learning Lead, Soil Values, IFDC
4. **Stephen Wood**, Senior Scientist for Agriculture and Food Systems, The Nature Conservancy

Moderator

Dr. Rudy Rabbinge, Chair of the Board, World Agriculture Forum

Webinar Recording: https://www.youtube.com/watch?v=A80_F3Q5ZVE

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