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VIEWPOINT

United Nations Food Systems Summit: What is the role of soil health in putting the Sustainable Development Goals on track?

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The Sustainable Development Goals (SDGs) or the Agenda 2030 of the United Nations (UN)—similar to its predecessors including the Agenda 21 launched in 1992 and the Millennium Development Goals launched in 2000 (WHO 2018)—are not on track to be accomplished by 2030 (Lal et al. 2021; UN 2015). The UN Food Systems Summit (UNFSS), that involved tens of thousands of people from the local to the global level and worked for 18 months, concluded on September 23, 2021 (UN 2021a). It was a much-needed global initiative with high expectations of transforming the world food systems and addressing the growing threat of hunger and malnutrition. Over 811 million people were prone to hunger by December of 2020 (FAO 2020; FAO et al. 2020), an increase of 20% over one year, likely caused by the COVID-19 pandemic. As many as 3 billion people (~38% of the total world population) cannot afford a healthy and safe diet. Human malnutrition, affecting more than 2 billion people (~25.0% of the total population), is being aggravated by soil degradation and depletion that affect one-third of the ice-free land (Díaz et al. 2019). Global temperatures have increased up to 1.2°C (2.2°F) since circa 1750 and are increasing at the rate of 0.2°C (0.36°F) per decade (Shukla et al. 2019). Unless noncarbon (C) fuel sources are implemented in conjunction with re-carbonization of the terrestrial biosphere (soil and vegetation), global temperatures may exceed 2°C (3.6°F) above the preindustrial level before the end of the 21st century. Furthermore, one-third of all anthropogenic emissions are contributed by the present food systems, which are also responsible for the loss of 80% of biodiversity while withdrawing 70% of all freshwater supply.

THE PROBLEM WITH THE PRESENT FOOD SYSTEMS

The present food systems have some notable limitations. Important among these are the following: (1) failure to end hunger and malnutrition; (2) inability to provide adequate amount of nutritious, healthy, and safe food to all; (3) inability to reverse the alarming trends of degrading soil, contaminating water, polluting air, accelerating global warming, and decreasing biodiversity; (4) inability to alleviate poverty and reduce helplessness, desperateness, and drudgery; and (5) inability to enhance the respect and dignity of the farming and food system professions (figure 1a).

Yet, scientific progress (i.e., soil science, agronomy, and plant breeding) has been impressive since 1960s, and several innovative options are awaiting translation into action at local, regional, and global levels. Scientific innovations exist for restoring soil and biophysical environments, adopting nutrition-sensitive agriculture, sequestering atmospheric carbon dioxide (CO_2) in soil and vegetation, using supplemental irrigation based on water harvesting, recycling nutrients by transforming biowaste into soil amendments, improving use efficiency of fertilizer and water, producing more from less, and returning some land (and water) back to nature (figure 1b). Adoption of such biophysical innovations can also lead to improvements in social equity at all levels of human dimensions, and implementation of some site-specific game changing solutions can also strengthen human resource development through creation of a global science-policy interface for sustainable farm systems (figure 1c).

Adoption of proven best management practices (BMPs; i.e., conservation agriculture, mulch farming, cover cropping, and integration of crops with trees and livestock such as agro-forestry) can lead to increased reliance on negative emission farming, reduced inputs of chemicals, use of biostimulants and organic amendments, promotion of the bio-circular economy, and reaped benefits of digital innovations (e.g., precision agriculture) and the "One Health" concept (figure 2). The latter states that "health of soil, plants, animals, people, ecosystems and planetary processes is one and indivisible" (Lal 2020).

RECOMMENDATIONS OF THE UNITED NATIONS FOOD SYSTEMS SUMMIT

More than 2,000 ideas were suggested through all of the five Action Tracks of the UNFSS. The Summit also involved a Pre-Summit from July 26 to 28, 2021, which about 500 people from 130 countries attended and over 22,000 people from 183 countries joined virtually. The UNFSS proposed ideas involving three Ps (UN 2021b):

1. People: nourishing everyone for health and wellbeing
2. Planet: producing in harmony with nature
3. Prosperity: inclusive, transformative, and equitable recovery for the 2030 Agenda

There is at least one statement in which agriculture is specifically mentioned: "It will be impossible to sustainably manage water resources to achieve SDG 6 without agriculture playing a central role" (UN 2021a). Two other related terms mentioned are "environment" and "nature-based solutions." Regrettably, the word "soil health" is not mentioned anywhere, as was the case in all of the 17 SDGs (UN 2015). A two-year stock-take meeting is also recommended for reviewing the progress. However, the basic control that determines health of all planetary process (e.g., soil health) has neither been specifically elucidated nor adequately articulated.

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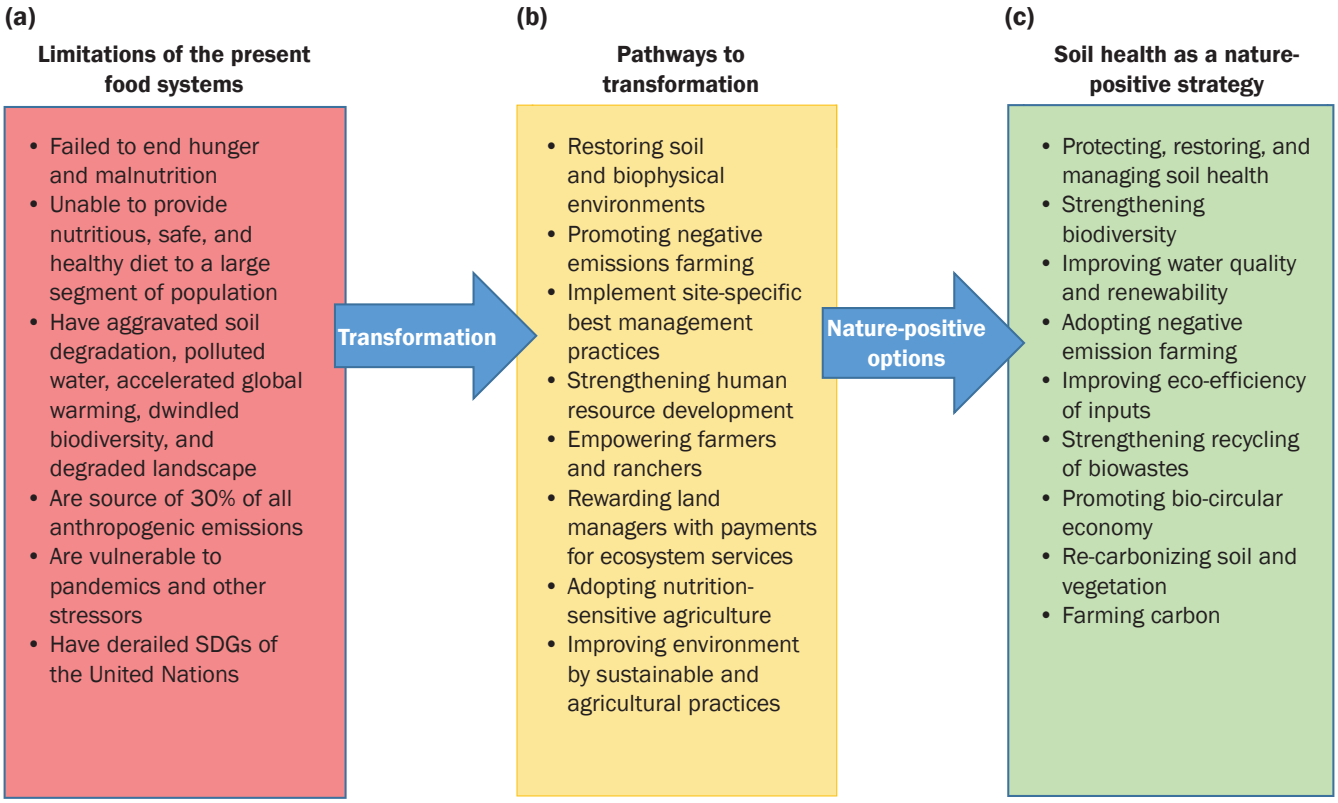
Figure 1
Pathway to adopting the One Health concept: health of soil, plants, animals, people, ecosystems, and planetary processes is one and indivisible.



AN OPPORTUNITY MISSED

Indeed, the UNFSS has missed a critical opportunity to emphasize the importance of soil health and its management for putting SDGs on track for their accomplishment by 2030. Restoration and sustainable management of soil health is critical to advancing several SDGs. Primary SDGs dependent on soil health are SDG 2 (End Hunger), SDG 6 (Clean Water), SDG 13 (Climate Action), and SDG 15 (Life on Land or Land Degradation Neutrality). Other SDGs directly affected by soil health and its management are SDG 1 (End Poverty), SDG 3 (Good Health and Wellbeing), and SDG 7 (Renewable Energy). For example, SDG Target 2.4 specifically states, "By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality." Similarly, SDG Target 15.3 states, "By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world." However, the report of the UNFSS presented on September 23, 2021, failed to emphasize the importance of soil health and its management in achieving most SDGs.

THE COALITION OF ACTION 4 SOIL HEALTH

Nonetheless, the Coalition of Action 4 Soil Health (CA4SH) is an idea that evolved from discussions within Action Track 3 of the UNFSS. CA4SH is a multistakeholder coalition aimed at facilitating the adoption and upscaling of restoration practices that improve and sustain soil health by managing productive landscapes through translation of science into action. CA4SH is focused both on understanding and promoting basic principles and site-specific BMPs to address global issues such as the ever-increasing undernutrition and malnutrition, increasing water contamination and scarcity, escalating global warming and frequency of extreme events, and the ever-dwindling biodiversity. By October 13, 2021, CA4SH has received support from nearly 120 member countries of the UN and numerous private sector organizations (Lal 2021). The support from the Private Sector Guiding Group has been enthusiastic and impressive.

CA4SH is specifically aimed at: (1) enhancing cooperation among multiple stakeholders interested in soil health, (2) promoting adoption and on-the-ground upscaling of BMPs, (3) developing and validating tools for measuring management-induced changes in soil health, (4) advocating a unified and a system-based soil health agenda for land at regional and global scales, (5) promoting an on-the-ground action plan for restoring soil health of degraded and desertified ecosystems, (6) developing a protocol for payments

Figure 2

Conservation agriculture with contour farming and riparian buffers. Inset photo shows no-tillage soybeans in cover crop stubble. Credit: USDA NRCS/SWCS photos by Lynn Betts.

to land managers for strengthening ecosystem services, (7) empowering farmers and land managers to adopt BMPs that restore and sustain soil health, (8) strengthening human resource capital in science and practice of managing soil health, (9) enhancing respectability of the soil science profession by attracting the best and the brightest to careers in this field, and (10) alleviating drudgery and hardship of farming operations, especially those of small landholders in developing countries.

NOW IS THE TIME TO TAKE ACTION

We still have nine years to develop and implement the action plan, promote adoption and implementation of CA4SH, and advance some critical SDGs of the UN Agenda 2030. To implement CA4SH, one of the UN organizations (i.e., in Rome or Bonn) can provide a virtual home (platform) for CA4SH and help establish its secretariat. In addition to providing a monthly newsletter, the secretariat can also coordinate activities of all stakeholders in implementing on-the-ground programs to restore and sustain soil health. These community-oriented soil health programs, based on a participatory approach in which farmers/land managers are involved from the planning through implementation stages, can be established on benchmark sites in Central America and the Caribbean, sub-Saharan Africa, and South Asia. Rather than starting anew, CA4SH programs should be built upon current ongoing activities of the Private Sector Guiding Group and other stakeholders.

Now is the time to implement CA4SH and build a world where soils are healthy, and food produced on these soils is nutritious, available, and affordable for everyone, everywhere. The time is right to adopt CA4SH and create an opportunity to provide a bold and pragmatic road map for restoration and sustainable management of soil health. During the next nine years (2022 to 2030), critical SDGs (i.e., 2, 6, 13, and 15) can be put on track to eliminate hunger and malnutrition, enhance soil resilience for adaptation and mitigation of climate change, improve quality and renewability of water, strengthen activity and species diversity of above- and belowground biota, and promote world peace and prosperity.

We must never ever forget the mantra that "Healthy Soil = Health Diet = Healthy People = Healthy Ecosystem = Healthy Planetary Processes."

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